CHAPTER III
RESEARCH METHOD

In this chapter, the researcher discusses about research design, research setting, subject, variable and indicator of the research, technique of collecting data, and technique of analyzing data.

A. Research Design

A research design is a specification of operations for the testing of a hypothesis under a given set of conditions.[1] This research was quantitative, because the result of the students' achievement in pre-test and post-test will be expressed of mathematic, evaluated consequently and also interpreted by appropriate statistical procedures.

Experimental research used to seek the effect of particular treatment toward other treatment within controlled situation.[2]This research is called experimental research. The researcher used CPR game as a treatment that would be conducted in experimental class. The researcher used pretest- posttest control group design. It could be seen in the following table[3].

[1]Bruce W. Tuckman, *Conducting Educational Research*, p. 13.

[2]Sugiyono, *Metode Penelitian Pendidikan Pendekatan Kualitatif, kuantitatif, dan R&D*, (Bandung: Alfabeta, 2012), p.107.

[3]Sugiyono, *Metode Penelitian Pendidikan…,* p.112.

Table 3.1 Pre-test Post-test Control Group Design

Pattern:

R (Experiment)	O_1	X	O_2
R(Control)	O_3	-	O_4

In which,

O_1 = pre-test for experimental group

O_2 = post-test for experimental group

O_3 = pre-test for control group

O_4 = post-test for control group

The subject of the research was classified as experimental group and control group. Both experimental group and control group were given pre-test (O_1 and O_2) to measure the quality of them. Then, experimental group was given treatment (X) in teaching reading by using CPR game, while control group was taught without using CPR game (-). After that, post-test (O_3 and O_4) was given to both experimental group and control group.

B. Research Setting

1. Subject and Place of the Research

This study was conducted in MTs Miftahul Huda Raguklampitan located at Raguklampitan village 12/03, Batealit, Jepara. The subjects of this study were the eighth grade students of MTs Miftahul Huda Raguklampitan in the academic year of 2016/2017. This study was conducted in the first semester.

2. Time of the Research

This study was conducted from 3rd September to 2nd October 2016. It was counted since the proposal was submitted until the end of the research.

3. Procedures of the Research

In collecting data, there were some procedures of the research, the steps were:

a. Preliminary visit

The school was visited to get more information about headmaster, teacher, class and students. To gain the information, the researcher asked to administration officer.

b. Contacted the Headmaster

Having got the information about setting and participant, the researcher did the second visit to meet headmaster of MTs Miftahul Huda Raguklampitan by giving permission letter.

c. Contacted the English Teacher

After receiving research permission from the headmaster of the school, the researcher met the English teacher and asked for the data of students, and asked guidance for the researcher conducted the research. The researcher explained about test, material, and game that would be given to the students.

d. Gave the Pre Test

In this session, the researcher gave the pre test to the experimental and control class. In this case, the pre test was conducted in different time, because the time schedule of the experimental and control class were not same. This test was to ensure that both two classes were the same in understanding the meaning of reading text. The researcher gave 20 items of multiple choices in 40 minutes.

e. Gave the treatment

In this section, the experimental class received a new treatment by using CPR game in teaching reading of Descriptive text, whereas the control class did not get the treatment in teaching reading of Descriptive text.

f. Gave the Post Test

Giving the test was the last activity that is done by the researcher both experimental class and control class. In this session was done to measure students' reading ability after treatment was given. The procedure of research and the collection data could be seen in the table below:

Table 3.2 The Procedure of the Research

NO	DATE	ACTIVITIES
1	Saturday, 3 September 2016	Try-out test for try-out class
2	Monday, 5 September 2016	Pre-test for experimental class
3.	Wednesday, 7 September 2016	Pre-test for control class

4.	Wednesday, 14 September 2016	1st Treatment for control class
5.	Saturday, 17 September 2016	2nd Treatment for control class
6.	Sunday, 18 September 2016	1st Treatment for experimental class
7.	Monday, 26 September 2016	2nd Treatment for experimental class
8	Wednesday, 28 September 2016	Post-test for control class
9	Monday, 2 October 2016	Post-test for experimental class

C. Subject

1. Population

Population refers to the entire set of actual or potential observational units.[4] According to Suharsimi, "population is a whole subject of research."[5] Based on the explanation above, the population of the research was the eighth grade students of MTs Miftahul Huda Raguklampitan Batealit Jepara in the academic year of 2016/2017. The total number of the population was 90 students which were divided into three classes, A, B, and C.

[4] Howard J Seltman, *Experimental Design and Analysis*, (2015), p. 34.

[5] Suharsimi Arikunto, *Prosedur Penelitian Suatu Pendekatan Praktek*, p. 173.

2. Sample

Sample is some elements of population that are used as object of research.[6] The researcher did not take all students as the subjects of the study, but drew a sample. The sample of this research was involving 2 classes, there were class VIII A as experimental class consists of 30 students and class VIII B as the control class consists of 30 students. To fulfill the requirement as the object of the research, the researcher gave pre-test. Pre-test test was used to know condition of population as consideration to take a sample to know the experimental class and control class derived from the same starting point. The researcher used analysis as the following.

a. Normality Test

It is used to know the normality of the data that is going to be analyzed whether both classes have normal distribution or not. This test is used when the researcher want to know whether there are differences of subject proportion, object proportion, occurrence, or not

The steps normality test are as follows

1) Determining the range (R); the largest data reduced the smallest.
2) Determining the many class interval (K) with formula.
   K= 1+ (3,3) log n.

[6] Amos Neolaka, *Metode Penelitian dan Statistik*, (Bandung: PT Remaja Rosdakarya, 2014), p. 42.

3) Determining the average and deviation standard.
4) Making data tabulation into class interval.
5) Calculating the value of Z, with the formula:

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

Where, S = deviation standard, $\bar{x}$ = average, x= limit class.

6) Changing Z becomes wide area curve normal use table.
7) Calculating the chi-square (^{X2}), with the formula:

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

Where:

χ^2 : chi-square

Oi : frequency from observation

Ei : expected frequency

k : the number of interval class

8) Comparing Chi- square with table Chi- square with significant level 5%.
9) Determining the distribution normality with test criteria: if $\chi^2_{count} > \chi^2_{table}$, the data is not normal distribution, on the other way if $\chi^2_{count} < \chi^2_{table}$, the data is normal distribution.[7]

[7]Sudjana, *Metoda Statistika*,(Bandung: Tarsito, 2002), p.273.

b. Homogeneity Test

Homogeneity test was used to know whether experimental class and control class are taken from population that have same variant or not. According to Nunan, a test should be given to both classes of students before the experiment just to make sure that the both classes really are the same.[8]

Homogeneity test used similarity two variants test as shown on 3.5: [9]

$$F_{count} = \frac{biggest\ variant}{smallest\ variant} \quad \text{... (3.5)}$$

Hypothesis test is:

$H_o : \sigma_1^2 = \sigma_2^2$

$H_a : \sigma_1^2 \neq \sigma_2^2$

which:

σ_1 = variant of initial data of experimental class.

σ_2 = variant of initial data control class

Testing criteria H_0 accepted if $F_{count} < F_{(1/2.\alpha)(v1, v2)}$ with $\alpha = 5\%$.

In which:

$v_1 = n_1 - 1$

$v_2 = n_2 - 1$

[8]David Nunan, *Research Method in Language Learning* (Cambridge: University Press, 1992), p.27.

[9]Sudjana, *Metoda Statistika*, p. 249-250.

3. Sampling Technique

Sampling technique is used in order to establish sample in research. In this study, researcher used simple random sampling because the population was homogenous and each group has the equal chance to be chosen as the sample. In getting sample of the research, the researcher took the procedure name lottery. In this case, each of the classes' names was written on a piece of paper, and the paper rolled and put into a bottle. After being well mixed, a paper dropped out of the bottle and these become the sample of the research. Cluster random sampling technique in this study, the researcher chose experimental class and control class randomly.

D. Variable and Indicator of The Research

1. Independent Variable (X)

An independent variable is an input variable, that which causes, in part or in total, a particular outcome; it is a stimulus that influences a response, an antecedent or a factor which may be modified (e.g. under experimental or other conditions) to affect an outcome.[10]Other definition proposes that independent variable that factor which is measured, manipulated, or selected by the experimenter to determine its relationship to an observed phenomenon.[11] According to this definition, the independent

[10] Louis Cohen, et.al,, *Research Methods In Education*. (New York: Routledge, 2007), p. 523.

[11]Bruce W. Tuckman, *Conducting Educational Research*, p. 58-59.

variable of this research is the use of CPR game or the method used in teaching and learning process.

2. Dependent Variable (Y)

Dependent variable, on the other hand, is the outcome variable, which is caused, in total or in part, by the input, antecedent variable. It is the effect, consequence of, or response to, an independent variable.[12] The dependent variable is factor which is observed and measured to determine the effect of the independent variable, that is, factor appears, disappears, or varies as experimenter introduces, removes, or varies the independent variable.[13] Dependent variable in this research is student's reading skill.

Some indicators are as follow:

a. The students are able to understand about the content of material.
b. The students are able to answer the test correctly.

E. Technique of Collecting Data

To gain the accurate data, the researcher selected the data that is appropriate for the problem statement. In this case, the researcher attempted to use the following methods:

[12]Louis Cohen, et.al., *Research Methods In Education*, p. 523.

[13]Bruce W. Tuckman, *Conducting Educational Research*, p. 59.

1. Observation

Observation is a skill that can be learned and can improve with practice.[14] The distinctive feature of observation as a research process is that it offers an investigator the opportunity to gather 'live' data from naturally occurring social situations.[15] Researcher uses observation to detect some problems concerned in teaching learning process and to know the data from the object of the research, such as number of population and sample. The researcher will observe students' interest, involvement, and activity during research.

2. Test

Test is a tool or procedure used to measure and assess.[16] This method used to know students' reading achievement in teaching reading in experimental and control class. There were two tests that researcher used, namely pre-test and post-test. Pre-test and post-test would be implemented in the research. Pre-test will be given both experimental group and control group before carried out the teaching. The aim was to know students' reading ability before doing treatment. Post-test would be given to know

[14] Ruth Wajnryb, *Classroom Observation Tasks*, (Cambridge: Cambridge University Press, 2002), p.1.

[15] Louis Cohen, et.al., *Research Methods In Education*, p. 396.

[16] Anas Sudijono, *Pengantar Evaluasi Pendidikan*, (Jakarta: PT Raja Grafindo Persada, 2009), p. 66.

differences students' reading achievement after doing treatment. The researcher gave 20 items both pre-test and post-test.

Before gave pre-test and post-test both in experimental class and control class, the researcher gave try-out instrument test to class IX A. Instrument of test would be tried out first to the student in other class. It used to analyze validity, reliability, discriminating power, and degree of test difficulty. The researcher prepared 40 items as the instrument of the test.

a. Validity

Validity is measurement that indicates degree of validity an instrument[17]. An instrument is called valid when the instrument has high validity. On the contrary, an instrument is called invalid when the instrument has low validity. The validity of test was calculated using Product Moment Formula, as equation follow. 3.1[18]:

$$r_{xy} = \frac{N\sum XY - (\sum X)(\sum Y)}{\sqrt{\{N\sum X^2 - (\sum X)^2\}\{N\sum Y^2 - (\sum Y)^2\}}} \quad \text{... (3.1)}$$

In which :

r_{xy} = the correlation coefficient between variable X and variable Y

N = the number of students

[17]Suharsimi Arikunto, *Prosedur Penelitian Suatu Pendekatan Praktik*, p. 211.

[18]Suharsimi Arikunto, *Prosedur Penelitian Suatu Pendekatan Praktik*, p. 168.

ΣX = the sum of score of X item

ΣY = the sum of score of Y item

ΣXY = the sum of multiplication between X and Y

X = the score of each component of test

Y = the total score of correct answer

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

$\sum Y^2$ = the sum square of total score from each in the group.

Criteria r_{xy}, is as follow:

$0{,}00 < r_{xy} \leq 0{,}2$ (poor)

$0{,}20 < r_{xy} \leq 0{,}40$ (low)

$0{,}40 < r_{xy} \leq 0{,}60$ (satisfactory)

$0{,}60 < r_{xy} \leq 0{,}80$ (good)

$0{,}80 < r_{xy} \leq 1{,}00$ (excellent)[19]

b. Reliability

Reliability related to reliance. A test called has degree of high reliance, when a test gives a constant result. It means that test reliability related to consistency the result of the test.[20]. To determine reliability in multiple choice test used K-R.20 formula[21]as equations 3.2, that is:

[19]Suharsimi Arikunto, *Dasar-Dasar Evaluasi Pendidikan*,(Jakarta: Bumi Aksara, 2011), p.75.

[20]Suharsimi Arikunto, *Dasar-Dasar Evaluasi Pendidikan,* p. 86.

[21]Suharsimi Arikunto, *Dasar-Dasar Evaluasi Pendidikan,* p. 100-101.

$$r_{11} = \left(\frac{n}{n-1}\right)\left(\frac{s^2 - \sum pq}{s^2}\right) \quad \text{... (3.2)}$$

with

s^2 = the number of variant

$$s^2 = \frac{\sum x^2 - \frac{(\sum x)^2}{N}}{N}$$

In which:

$\sum x^2$ = the number of quadrate score

$(\sum x)^2$ = quadrate of number of score

N = the number of students

r_{11} = a whole of instrument reliability

n = the number of item

p = subject proportion of correct answer

q = subject proportion of wrong answer

S = deviation standard from the test

Σpq = the number of the result of multiple between p and q

c. Discriminating Power

Discriminating power is the ability an item to distinguish students who have high capability and students who have low capability. The numeral that shows the bigness of discriminating power called discrimination index (*D*). There is negative sign in discriminating index, where it used when an item is "in inverse" to indicate *testee* quality. That is smart student called stupid student and stupid student called

smart student.[22] The formula to determine discriminating power index as equation 3.3.

$$D = P_A - P_B = \frac{B_A}{J_A} - \frac{B_B}{J_B} \quad \text{... (3.3)}$$

In which:

D = discriminating power of each item of test

J = the number of test participant

J_A = the number of students of upper group

J_B = the number of students of lower group

B_A = the number of students in upper group who answer item correctly

B_B = the number of students in lower group who answer item correctly

P_A = the proportion of the upper group who answer correctly

P_B = the proportion of the upper group who answer correctly

Discrimination Power Criteria *(D)*, is as follow:

$D \leq 0{,}00$	(very poor)
$0{,}00 < D \leq 0{,}20$	(poor)
$0{,}20 < D \leq 0{,}40$	(satisfactory)
$0{,}40 < D \leq 0{,}70$	(good)
$0{,}70 < D \leq 1{,}00$	(excellent)[23]

[22]Suharsimi Arikunto, *Dasar-Dasar Evaluasi Pendidikan*, p. 211.

[23]Suharsimi Arikunto, *Dasar-Dasar Evaluasi Pendidikan*, p. 218.

d. Degree of Test Difficulty

A good question is question that is not really difficult and not really easy. Degree of test difficulty to multiple choices could be determined by using formula as equation 3.4.

$$P = \frac{B}{Js} \quad \text{... (3.4)}$$

In which:

P = difficulty's index

B = number of correct answer of students

Js = number of students

Criteria

$0{,}00 < P \leq 0{,}30$ (very difficult)

$0{,}31 < P \leq 0{,}70$ (medium) sufficient

$0{,}71 < P \leq 1{,}00$ (easy)[24]

3. Documentation

The researcher used documentation as evidence to monitor students' achievement. Beside that documents related to object of research such as list of students' name, students' number, and English subject schedule. In this case, the data is gained by the English teacher's help. Other data was the result of pre-test, post-test, and photos during research as documentation.

[24]Anas Sudijono, *Pengantar Evaluasi Pendidikan*, p. 372.

F. Technique of Analyzing Data

1. Test of Average

Data analysis with T-test was used to examine hypothesis:

H_o : $\mu 1 = \mu 2$, average score *pre-test* both two groups are same

H_a : $\mu 1 \neq \mu 2$, average score *pre-test* both two groups are different

μ_1 : average score *pre-test* of experimental group

μ_2 : average score *pre-test* of control group

Hypothesis test could be determined with formula used similarity 3.6:[25]

$$t = \frac{\bar{X}_1 - \bar{X}_2}{s\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}} \quad \text{... (3.6)}$$

with

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

In which:

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

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

n_1 : the number of subject of experimental group

n_2 : the number of subject of experimental group

s_1^2 : variant of experimental group

s_2^2 : variant of control group

S^2 : variant of both groups

[25]Sudjana, *Metoda Statistika*, p. 239.

Testing criteria that apply H_o is accepted if– $t_{table} < t_{count} < t_{table}$, $t_{table} = t_{1-1/2\alpha}$ with determine $dk = n_1 + n_2 - 2$, with significance level (α) = 5% and values for other t Ho rejected.

2. Analysis Phase End

The researcher used Analysis of Variance (ANOVA) to test the difference of the average of students' achievements test score on teaching reading between experimental class and control class. This is to determine the effect of learning outcomes of reading by using CPR game. To analysis the data, the researcher used Walisongo Statistics (W-Stats) application which was published by Ibnu Hajar in 2011.

The steps in the calculation of ANOVA by using W-Stats as follow:

a. Determining dependent variable (Y)
b. Determining independent variable 1 (factor A) and the number of its categories.
c. Determining independent variable 2 (factor B) and the number of its categories.
d. Determining the significance criteria.
e. Making the data of pre-test and post-test score of experimental and control class.
f. Analyzing the data result.