CHAPTER III
RESEARCH METHOD

A. Research Design

Quantitative research is 'Explaining phenomena by collecting numerical data that are analyzed using mathematically based methods (in particular statistics).'[1] Quantitative strategies involved complex experiments with many variables and treatments (e.g., factorial designs and repeated measure designs).[2]

This research was experimental research. The essential feature of experimental research is that investigators deliberately control and manipulate the conditions which determine the events in which they are interested, introduce an intervention and measure the difference that it makes.[3]

The basis of the experimental method is the experiment, which can be defined as: *a test under controlled conditions that is made to demonstrate a known truth or examine the validity of a hypothesis*. The key element of this definition is *control*, and that is where experimental research differs from non-experimental quantitative research. When doing an experiment we want to

---

[1] Daniel Muijs, *Doing Quantitative Research in Education,* (London: SAGE Publications Ltd 2004), page 1

[2] John W. Creswell, *Research Design Qualitative, Quantitative, And Mixed Methods Approaches Second Edition* (California: Sage Publications, Inc, 2003), Page 13

[3] Louis Cohen, Lawrence Manion And Keith Morrison, *Research Methods In Education*. (New York: Routledge, 2007), page 272

control the environment as much as possible and only concentrate on those variables that we want to study.[4] The main advantage of experimental research is the control over external factors mentioned several times in the previous section.[5]

This research used random to subject design in which the subject both experiment and comparison group have been established randomly. The design will be as follow:

E	X	01
C		02

B. Time and Place

The research was conducted in MA NU 03 Sunan Katong Kaliwungu in the academic year of 2015/2016 from March 20th until April 20th 2016 with three meeting in classroom.

First meeting was used to observe student's interaction and ability in reading comprehension especially news item.

[4] Daniel Muijs, *Doing Quantitative Research in Education*, (London: SAGE Publications Ltd 2004), page 13

[5] Daniel Muijs, *Doing Quantitative Research in Education*, (London: SAGE Publications Ltd 2004), page 22

Schedule of Research

Group	Activities	Month/Date				
		March		April		
		20th	21th	10th	17th	18th
	Pra Research	√				
Experiment group	Treatment 1		√			
	Treatment 2			√		
	Post test				√	
Control group	Treatment 1			√		
	Treatment 2				√	
	Post test					√

No	Steps	Activities	Time Allotment
1	Treatment 1	Researcher gives first treatment by providing a sample *news item* text and ask students about the content of the text using *DRTA* strategy	2x 45 minutes (1 meeting)
2	Treatment 2	In second treatment, researcher explains more about the generic structure, language feature etc. of the text	2x 45 minutes (1 meeting)
3	Post test	After being given treatments, researcher conducts post-test to experiment group	2x 45 minutes (1 meeting)

C. Subject

a. Population

Population refers to the entire set of actual or potential observational units.[6] The population is the group of people we want to *generalize* to. Population of the research was the tenth grade of MA NU 03 Sunan Katong Kaliwungu Kendal.

b. Sample

Sample is a subset of all of the possible experimental units of the population are actually selected for study.[7] Sample of the research was X B as experiment group and X C as control group.

c. Sampling

Sampling technique is a technique of sample making of population.[8] Sampling in social science research is a technique, a procedure, for selecting a subset of units of analysis from a population.[9]

D. Variable of The Research

a. Independent Variable

---

[6] Howard J Seltman, *Experimental Design and Analysis*, (2015), page 34

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

[8] Kuntjojo, *Metodologi Penelitian*, (2009), page 30

[9] Mark Balnaves & Peter Caputi, *Introduction to Quantitative Research Method*, (London: Sage Publication, 2001), page 90

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] From this definition, the independent variable of this research is using *Directed Reading Thinking Activity (DRTA)* strategy in teaching and learning process.

b. Dependent Variable

Dependent variable, on the other hand, is the outcome variable, that 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.[11] Dependent variable in this research is reading comprehension score on news item.

E. Technique of Collecting Data

a. Documentation

In the research, researcher checked written goods such as books, magazine, document, regulation, minute book,

[10] Louis Cohen, Lawrence Manion And Keith Morrison, *Research Methods In Education*. (New York: Routledge, 2007), page 523

[11] Louis Cohen, Lawrence Manion And Keith Morrison, *Research Methods In Education*. (New York: Routledge, 2007), page 523

daily note, etc.[12] Documentation was necessary needed to get information about student list and data from the school.

b. Test

A test is an attempt to determine how an individual will function in a set of actual situation.[13]

F. Technique of Data Analysis

This research uses quasy experiment design. Reading test includes treatment and post-tests. Researcher takes two classes and divide them into control and experiment classes.

Subject	Pra	Treatment	Pasca
Experiment class	-	**X**	**O**
Control class	-	-	**O**

1. Try-out Instrument of the Test
   a. Validity of test

Validity is an important key to effective research. If a piece of research is invalid then it is

[12] Suharsimi Arikunto, *Prosedur Penelitian Suatu Pendekatan Praktik*, (Jakarta: Rineka Cipta, 2013), page 201

[13] Bruce W. Tuckman, *Conducting Educational Research Second Edition*, (Toronto: Harcourt Brace Jovanovich, Inc, 1978), page 165

worthless. Validity is thus a requirement for both quantitative and qualitative/naturalistic research.[14]

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

Notice:

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

N = The number of students

$\sum X$ = The sum of score of X item

$\sum Y$ = The sum of score of *Y* item

Product Moment Formula used to calculate validity test as follow[15]:

$$r_{pbi} : \frac{M_p - M_t}{SD_t}\sqrt{\frac{p}{q}}$$

Where:

r_{pbi} = point biserial correlation coefficient

M_p =the mean scores of subjects who correctly searched items correlation with the test.

M_t = the average score of the total score.

SD_t = standard deviation of the total score

[14] Louis Cohen, Lawrence Manion And Keith Morrison, *Research Methods In Education*. (New York: Routledge, 2007), page 133

[15] Anas Sudijono, *Pengantar Evaluasi Pendidikan,* (Jakarta: RajaGrafindo Persada, 2012), p.185

p = the proportion of subjects who answered right against the grain of the item being tested for validity item.

q = the proportion of subjects who answered wrong of the items of the item being tested for validity item.

b. Reliability

Reliability refers to a definition that instrument can be believed enough to be data gatherer tool.[16] Reliability in quantitative research is essentially a synonym for dependability, consistency and reliability over time, over instruments and over groups of respondents.

To calculate the reliability of the test, the researcher uses the formula of K - R 20 as follows:[17]

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

Notice:

r_{11} = The reliability coefficient of items

K = The number of item in the test

[16] Suharsimi Arikunto, *Prosedur Penelitian Suatu Pendekatan Praktik*, (Jakarta: Rineka Cipta, 2013), page 221

[17] Suharsimi Arikunto, *Prosedur Penelitian Suatu Pendekatan Praktik*, (Jakarta: Rineka Cipta, 2013), page. 187

P = The proportion of students who give the right answer

Q = The proportion of students who give the right answer

S^2 = The deviation standard of the test

c. Item Difficulty

Every item should be analyzed first before it is used in the test. A good question is a question that not really difficult and not really easy. Index difficulty formula:[18]

The formula:

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

Where:

P = the facility value (index of difficulty)

B = number of students who answered the item test correctly

JS = the total number of students

[18] Suharsimi Arikunto, *Prosedur Penelitian Suatu Pendekatan Praktek*… page 208

interval of DD	criteria
Less of 0,30	Difficult question
0,30 – 0,70	Medium question
More than 0,70	Easy question

d. Discriminating power

The discriminating power was a measure of the effectiveness of a whole test. It was used to know how accurate the question differs higher subject and lower subject. The formula for discriminating power was:

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

Notice:

D = Discriminating index

JA = members of students in upper group

JB = member of students in low group

BA = members of students in upper group who answer the item correctly

BB = members of students in low group who answer the item correctly

The criteria were:

Interval (D)	Criteria
$0.00 < D \leq 0.19$	poor
$0.20 < D \leq 0.39$	satisfactory
$0.40 < D \leq 0.69$	Good
$0.70 < D \leq 1.00$	Very difficult

2. Pre test

a. Normality

It was used to know the normality of the data that was going to be analyzed whether both groups had normal distribution or not. Chi square are used here:[19]

$$\chi^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

Notice:

χ^2 : chi square

O_i : frequency from observation

E_i : expected frequency

b. Homogeneity

It was used to know whether experimental group and control group, that were decided, came from population that had relatively same variant or not. The formula was:[20]

$$F = \frac{Vb}{Vk}$$

Notice:

Vb : bigger variant

Vk : smaller variant

[19] Sudjana, *Metode Statistik*, (Bandung: Tarsito, 2002), page 273

[20] Sudjana, *Metode Statistik*, (Bandung: Tarsito, 2002), page 250

c. Testing the similarity of average of the initial Data between Experimental and Control Classes.

Proposed hypothetical test in average similarity with the right test is as follows:

Ho: $\mu_1=\mu_2$

Ha: $\mu_1\neq\mu_2$

μ_1 : average data of experiment group

μ_2 : average data of control group

The t-test formula is used.

$$t = \frac{\bar{x}_1 - \bar{x}_2}{S\sqrt{\frac{1}{n_1}+\frac{1}{n_2}}} \text{ With } S = \sqrt{\frac{(n_1-1)S_1^2+(n_2-1)S_2^2}{n_1+n_2-2}}$$

Notice:

$\bar{x}_1$: average of experimental group

$\bar{x}_2$: average of control group

n_1 : number of experiment group

n_2 : number of control group

S_1^2 : standart deviation of experimental group

S_2^2 : standart deviation of control group

Testing criteria that apply Ho is accepted if $t_{count} > t_{table}$ with determinate df = (n_1+n_2-2) and significant $\alpha = 5\%$ $(1-\alpha)$

3. Post test

Posttest was held after conducting all treatments. This test was used to measure students' achievement after they given treatments. The result of test was analyzed statistically.

a. Normality test

Steps normality second step was the normality test was the same on the initial data.

b. Homogeneity test

Steps normality second step was the homogeneity test was the same on the initial data.

c. Hypothesis test

Proposed hypothesis test in average similarity with the test is as follows:

Ho: $\mu_1 \leq \mu_2$

Ha: $\mu_1 > \mu_2$

μ_1 = average data of experiment group

μ_2 = average data of control group

The formula that is used in the t-test as follows:[21]

$$t = \frac{\bar{x}_1 - \bar{x}_2}{s\sqrt{\frac{1}{n_1}+\frac{1}{n_2}}} \text{ With } S = \sqrt{\frac{(n_1-1)S_1^2+(n_2-1)S_2^2}{n_1+n_2-2}}$$

Notice:

$\bar{x}_1$ = average of experimental group

[21] Subjana, *Metode Statistik,8*(Bandung: Tarsito, 2002), page 239

$\bar{x}_2$ = average of control group

n_1 = number of experiment group

n_2 = number of control group

S_1^2 = standart deviation of experimental group

S_2^2 = standart deviation of control group

Testing criteria that apply Ho is accepted if $t_{count} > t_{table}$ with determinate df = (n_1+n_2-2) and significant $\alpha = 5\%$ $(1-\alpha)$