CHAPTER III

RESEARCH METHODOLOGY

A. Research Design

This research was a kind of experimental research. According to Gay and Airasian, experimental research is "the only type of the research that can test hypotheses to establish cause-and-effect relationship".[1] The research design used in this research was quasi-experimental research. This research used non equivalent control group design which had two classes (control and treatment class), pre-test, and post-test.[2]

The writer tried to find out the use of visualization strategy and the effect of using visualization strategy toward writing ability on descriptive paragraph of the first year students at Islamic Boarding Senior High School Daarun Nahdhah Thawalib Bangkinang.

Table III.1

The Research Design

Group	Pretest	Independent Variable	Posttest
E	Y_1	X	Y_2
C	Y_1	-	Y_2

E : Experimental group

C : Control group

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[1] L.R. Gay and Peter Airasian. *Educational Research Competencies for Analysis and Application. Six Ed.* New Jersey: Prentice-Hall, Inc. 2000. P. 367

[2] Donald T Campbell and Julian C Stanley. *Experimental and Quasi-Experimental Design for Research.* London: Houghton Mifflin Company. 1963. P. 7

Y_1 : Pre-test

X : Treatment

Y_2 : Post-test

B. The Location and Time of the Research

The research was carried out at Islamic Boarding Senior High School Daarun Nahdhah Thawalib Bangkinang in 2013-2014 of academic year. The research was conducted from 24 August to 15 September 2013.

C. The Subject and the Object of the Research

The subject of the research was the first year students of Islamic Boarding Senior High School Daarun Nahdhah Thawalib Bangkinang. The objects of the research were visualization strategy and writing ability on descriptive paragraph.

D. Population and Sample

In conducting the research, the writer took the first year students of Islamic Boarding Senior High School Daarun Nahdhah Thawalib Bangkinang in Kampar Regency as the population. Population of this research was the whole the students of the first year of Islamic Boarding Senior High School Daarun Nahdhah Thawalib Bangkinang. There were six classes which consisted of VA, VB, VC, VD, VE, and VF. It can be seen in the following table:

Table III.2

The population of the first year students at Islamic Boarding Senior High School Daarun Nahdhah Thawalib Bangkinang

No	Class	Population	Male	Female
1	V A	24	0	24
2	V B	24	0	24
3	V C	25	0	25
4	V D	26	0	26
5	V E	25	25	0
6	V F	27	27	0
	Total	151	52	99

The total number of the first year students was 151 students. The population was too large to be taken all as sample of the research. Then, the writer decided to take sample two classes by using cluster random sampling. In this case, the writer used lottery. The writer made number of classes and then random. The writer took two classes, they were VA and VB. In this research, the writer chose VB as an experimental class and VA as a control class. VA consisted of 24 females and there was no male, while VB consisted of 24 females and there was no male. The total of sample was 48 students.

Table III.3

The Sample of the First Year Students at Islamic Boarding Senior High School Daarun Nahdhah Thawalib Bangkinang

No	Class	Male	Female	Total
1	VB	0	24	24
2	VA	0	24	24
	Total			48

E. Technique of Collecting Data

In order to get the data needed to support this research, the writer used written test to collect the data. The test was used to measure whether there was or no and how big the ability of the object of research (students).[3] The test was given to the students, and it was taken twice, pre-test and post-test. Pre-test was taken before applying the treatment, and post-test was taken after applying the treatment. The data of this research were the score of the students' writing ability on descriptive paragraph that could be measured by using writing assessment used by the English teacher of Islamic Boarding Senior High School Daarun Nahdhah Thawalib Bangkinang.

Table III.4

Assessment Aspect of Writing Descriptive Paragraph

No	Aspects Assessed	Score			
		1	2	3	4
1	Content				
2	Organization a. Identification b. Description				
3	Vocabulary				
4	Grammatical Features a. Present Tense b. Adjectives				
5	Spelling and Punctuation				
Total					
Maximum Score		20			

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[3] Suharsimi Arikunto. *Prosedur Penelitian Suatu Pendekatan Praktik.* Ed. 13th. Jakarta: PT. Rineka Cipta. 2006. P. 223

Explanation of Score :

1 = Incompetent

2 = Competent Enough

3 = Competent

4 = Very Competent

Final Score = $\frac{Total\ Score}{Maximum\ Score} \; x \; 80$

F. The Technique of Data Analysis

In order to analyze students' writing ability on descriptive paragraph, the writer used gain scores analysis in order to see the improvement obtained from both control and experimental groups. The improvement (gain) from pretest to posttest can be computed for each participant by subtracting each person's pretest score from his or her posttest score by considering the following formula[4]:

$$\boxed{\textbf{Gain = posttest – pretest}}$$

When a gain score is computed in this manner, a positive gain score indicates that the posttest score is greater than the pretest score, a negative gain score indicates that the posttest score is less than the pretest score.

In order to see the global gain from both experimental and control group, the data are also analyzed by Hake's formula[5], as follows:

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[4] Lee A Becker. *Analysis of Pretest and Posttest Scores with Gain Scores and Repeated Measures*. http://web.uccs.edu/lbecker/Psy590/gainscore.htm Retrieved on January 10th 2014 at 09.36 am. P. 1
[5] Richard R. Hake. *Analyzing Change/Gain Scores*. http://AnalyzingChange-Gain.pdf Retrieved on January 10th 2014 at 10.15 am. P. 1

$$< g > = \frac{< \bar{S}_{post} > - < \bar{S}_{pre} >}{100\% - < S_{pre} >}$$

By considering the following criteria:

a. "High-g" courses as thoses with $(<g>) > 0.7$;

b. "Medium-g" courses as those with $0.7 > (<g>) > 0.3$;

c. "Low-g" courses as those with $(<g>) < 0.3$.

According to Hartono, T-test is one of the statistic tests that are used to know whether or not there is significant difference of the two samples of mean in two variables.[6] Based on the formulations of the problem, the writer analyzed the data through the following procedures for each problem by using SPSS:

1. Independent sample t-test

The t-test for independent sample is used to determine the first and the second of the formulation of the problem, whether or not there is probably a significant difference between the means of two independent sample.[7] The different mean is analyzed by using T-test formula:[8]

To find out T-test, the formula is used as follow:

$$t_0 = \frac{M_x - M_y}{\frac{SD_x}{\sqrt{N-1}}^2 + \frac{SD_x}{\sqrt{N-1}}^2}$$

[6] Hartono. *Statistik untuk Penelitian*. Yogyakarta: Pustaka Pelajar. 2009. P. 208

[7] _____ Ibid. P. 484

[8] _____ Ibid. P. 178

Where:

t_0 = The value of t-obtained

M_x = Mean score of experimental class

M_y = Mean score of control class

SD_x = Standard deviation of experimental class

SD_y = Standard deviation of control class

N   = Number of the students

The t-table is employed to see whether or not there is a difference between the mean score of both experiment and control class. The t-obtained value is consulted with the value of t-table by using degree of freedom. The formula at the degree of freedom is as follows:[9]

df = (Nx + Ny) – 2 statically hypothesis:

$H_a : t_o > t_{table}$

$H_o : t_o < t_{table}$

Where:

df = degree of freedom

Nx = Number of students in experimental class

Ny = Number of students in control class.

Ha is accepted if to > t-table or there is an effect of using visualization strategy toward students' writing ability on descriptive paragraph.

Ho is accepted if to > t-table or there is no effect of using visualization strategy toward students' writing ability on descriptive paragraph.

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[9]_____ Ibid. P. 22

2. Paired sample t-test

The writer used this formula to answer the third formulation of the problem. Gay states that t-test for non independent sample is used to compare groups that are formed by some types of matching or to compare a single group's performance on a pre- and post-test or on two different treatments.

$$t = \frac{M_D}{\frac{\Box D^2 - \frac{\Box D^2}{N}}{N \quad N-1}}$$

To identify the level of the effect of using visualization strategy toward students' writing ability on descriptive paragraph of the first year students at Islamic Boarding Senior High School Daarun Nahdhah Thawalib Bangkinang, it will be calculating coefficient (r^2) by using formula:[10]

$$r^2 = \frac{t2}{t2 + n - 2}$$

where:

t   : T-test

r   : Significant

n   : Sample Experiment

To find out the percentage of coefficient effect (K_P), it used the following formula:

$K_{P} = r^2$ x 100%.

Where:

K_p : Percentage

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[10] Riduwan. *Rumus dan Data dalam Analisis Statiska.* Bandung: Alfabeta. 2008. P. 125

G. The Reliability and Validity of the Test

The test measuring the students' writing ability had to have reliability and validity. According to Gay and Airasian, reliability is the degree to which a test consistently measures whatever it is measuring.[11] It is reflected in the obtaining how far the test or instrument test that enable to measure the same object on different occasions that indicating the similar result. In short, the characteristic of reliability is sometimes termed consistency.

There are five types of reliability: stability, equivalence, equivalence and stability, internal consistency, and rater agreement. In this research, the writer used the rater agreement type of reliability concerned with inter-rater reliability as the scores were given by two raters. Gay and Airasian said that inters judge reliability can be obtained by having two (more) judges independently score to be compared to the score of both (more) judges.[12]

The writer used the categories of reliability can be seen from the following table:

Table III.5

The Categories of Reliability

No	Reliability	Level of Reliability
1	0.0 – 0.20	Low
2	0.21 – 0.40	Sufficient
3	0.41 – 0.70	High
4	0.71 – 1.0	Very high

(Taken from Tinambunan in Meltiawati in Zelly)[13]

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[11] Gay, L.R and Peter Airasian. Op Cit. P. 169

[12] _____ Ibid. 169

[13] ZellyPutriani. *The Correlation between Reported Speech Mastery and Speaking Ability of the Second Year Students of SMKN 1 Pekanbaru*. Pekanbaru: Unpublished. 2011. P. 35.

The scores given by rater 1 were correlated to scores given by rater 2. The higher correlation, the higher inter-rater reliability. As explained by Henning that if rating of students' result of the test is rated by two or more judges or raters, the correlation between raters should be inter-correlated. Then, the inter-correlation of the raters is used in finding the reliability of the test.[14]

To determine the correlation between scores given by rater 1 correlated to scores given by rater 2, the writer used *Pearson Product Moment* formula through SPSS 16.0 version.

r product moment can be obtained by considering the degree of freedom (df) as follows:

df = N-nr

Explanation:

N = number of cases

nr = the total variable correlated

Statistically the hypotheses are:

H_o: $r_o < r_t$

H_a: $r_o \geq r_t$

H_o was accepted if $r_o < r_t$ or there was no significant correlation between score from rater 1 and rater 2.

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[14] Grant Henning. *A Guide to Language Testing: Development, Evaluation and Research.* Boston:Heinle&Heinle Publisher. 1987. P. 82-83

H_a was accepted if $r_o \geq r_t$ or there was a significant correlation between score from rater 1 and rater 2.

Next, the writer used the *Spearman-Brown Prophecy Formula* to find the final reliability obtained between two raters. The following is the formula:[15]

$$r_{tt} = \frac{nr_{A,B}}{1+(n-1)r_{A,B}}$$

Where:

r_{tt} = inter-rater reliability

n = the number of raters whose combined estimates from the final mark for the exeminees

$r_{A,B}$ = the correlation between raters, or the average correlation among all raters if there are more than two.

The following table describes the correlation between scores given by rater 1 and rater 2 by using *Pearson Product Moment* formula through SPSS 16.0 Version.

Table III.6

Inter-Rater Correlations

		RATER1	RATER2
RATER1	Pearson Correlation	1	.459[*]
	Sig. (2-tailed)		.024
	N	24	24
RATER2	Pearson Correlation	.459[*]	1
	Sig. (2-tailed)	.024	
	N	24	24

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[15] _____ Ibid. P. 83

From the table above, it can be seen that the coefficient of correlation product moment r_{obtained} (r_o) between scores given by rater 1 and rater 2 is 0.459. Before compering it to r_{table} (r_t), the writer obtained the degree of freedom (*df*)

df = N – nr

df = 48 – 2 = 46

After obtained the degree of freedom (df) = 46, the coefficient product moment r_{obtained} was compered to r_{table}, either at level 5% or 1%. At level 5% r table is 0.273; while at level 1% r table is 0.354. Based on r $_{\text{table}}$ it can be analyzed that (r_o) is higher than (r_t) either at level 5% or 1%. It is clear that 0.273 < 0.459 > 0.354. So, the writer concluded that H_o is rejected and H_a is accepted. It means there was a significant correlation between score of rater 1 and score of rater 2. In the other words, the writing test was reliable. Then, r_{obtained} is adjusted by the *Spearman-Brown Prophecy Formula* below:

$$r_{tt} = \frac{nr_{A,B}}{1+(n-1)r_{A,B}}$$

$$r_{tt} = \frac{(2)(0,459)}{1+(2-1)(0.459)}$$

$$= \frac{0.918}{1+0.459}$$

$$= \frac{0.918}{1.459}$$

$$= \mathbf{0.63}$$

Based on the calculation above, the writer obtained inter-rater reliability was 0.63. So, it is conclude that the reliability of writing test included in high level.

Besides, the test used also had validity. Validity is the most important characteristic of a test or measuring instrument can possess. Clearly validation is a crucial feature of any test. To know the validity of the test, the writer used content validity. Content of validity used by the writer in the test, which students asked to write about the topics related to their materials. The material of the test had been taught at the first year of Islamic Boarding Senior High School Daarun Nahdhah Thawalib Bangkinang. It was familiar materials and near to the students' daily life. Moreover, the materials were taken from the book guide for the students and other related resources. The writer prepared some topics based on the topics discussed at the time. The topic would be chosen from the writer and they wrote in the piece of the paper based on steps of visualization strategy.