CHAPTER III

RESEARCH METHODOLOGY

A. The Research Design

The type of reseach was an experimental reseach that consisted of two variables. Cohen, Manion and Marrison state "an experiment involves making a change in the value of one variable – called the independent variable – and observing the effect of that change on another variable – called the dependent variable."[1] In the research, the independent variable (X) refered to the use of "DEFENDS" strategy, and (Y) refered to students' ability in writing analytical exposition paragraph as dependent variable.

The design of this research was the Quasi-Experimental designs with the Non-Equivalent control class. The design from this research referred to the using of experimental class and control class in giving treatment. Dealing with this, Gay states "the entire classrooms, not individual students, are assigned to treatments. When this situation occurs there are still a number of designs that provide adequate control of sources of invalidity."[2]

In conducting this research, two classes of the second grade students at SMAN 3 Tapung have been participated. The first class was the experiment class (X) treated by using "DEFENDS" strategy, and the second was the

[1]Louis Cohen, Lawarence Manion and Keith Marrison, *Reseach Methods in Education*.Sixth Edition. (USA and Canada: Routledge.2007), p.272

[2]L.R. Gay and Peter Airasian, *Educational Research Competencies for Analysis and Application*.(New Jersey: Prentice - Hall, 2000), p.394.

control class (Y) which was treated by using conventional technique. However, the materials given to each class were the same.

There were two kinds of test given in this research; they were pre-test given before the treatment and post-test given after the treatment. So, the design of this research could be described as follows[3]:

Table III.1

The research Design

Pre- and Post-test Design **Time** →

Select Control Group	Pre-test	No Treatment	Post-test
Select Experimental Group	Pre-test	Experimental Treatment	Post-test

B. The Location and the Time of the Research

The research was conducted at the eleventh grade students at SMAN 3 Tapung. The research was conducted from January 13th until February 6th 2014.

C. The Subject and the Object of the Research

1. The Subject of the Research

The subject of the research was the eleventh grade students at SMAN 3 Tapung in the academic year of 2013/2014.

2. The Object of the Research

The object of the research was the effect of using DEFENDS strategy on the students' ability in writing analytical exposition paragraph.

[3]John W. Creswell, *Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research*. Fourth Edition. (Boston: Pearson Education, 2008), p. 310.

D. The Population and Sample of the Research

The population of this research was the eleventh grade students at SMAN 3 Tapung in the academic year of 2013/2014. There were 4 classes which consisted of 2 classes for science department and 2 classes for social department. The number of the eleventh grade students at SMAN 3 Tapung could be shown in the following table:

Table III.2
The Total Population of the Eleventh Grade Students at SMAN 3 Tapung 2013-2014

No	Class	Male	Female	Total
1	IPA 1	11	17	28
2	IPA2	10	18	28
3	IPS1	9	21	30
4	IPS2	11	19	30
Total		41	75	116

The data above showed the number of population, 116 students. According to Suharsimi Arikunto, if the amount of the subject is less than 100, it is better to take all of the population and if the amount of the subject is more than 100, it is better to take 10-15 or 20-25% of the population.[4] Based on the reseach design of the reseach, the writer took two classes as the sample of the reseach. In considering the sample, the writer used cluster sampling technique because all samples had the same characteristics. According to Gay *et al*, cluster sampling randomly selects groups, not individuals.[5]

[4] Suharsimi Arikunto, *Prosedur Penelitian: Suatu Pendekatan Praktik Edisi Revisisi VI.* (Jakarta: Rineka Cipta, 2006), p. 134

[5] Gay et al, *Op.Cit.*, p. 129

All of the sample had the same opportunity to be taken as the representative of all the samples. Furthermore, because they were homogenous, the writer has selected two groups of students to be sample in this research. It was the students of XI IPA1 as an experimental class and IPA 2 as a control class. The following table presented the number of sample:

Table III.3
The Number of Sample of the Eleventh Grade Students at SMAN 3 Tapung

No	Class	Male	Female	Total
1	IPA 1	10	18	28
2	IPA 2	11	17	28
Total		21	35	56

E. The Technique of Collecting Data

In this research, the writer administered test to collect the data. According to Brown, a test is a method of measuring a person's ability, knowledge or performance in a given domain"[6]. The test has been used to find out the students' ability in writing analytical exposition paragraphs. The data of this research were the score of the students' writing ability obtained by using composition test. The test has been done twice, before and after treatment to both groups intended to obtain the students' ability in writing analytical exposition paragraphs at the second grade of SMAN 3 Tapung. The students' ability in writing analytical exposition can be measured by using writing assessment used by the English teacher of SMAN 3 Tapung.

[6]H. Douglass Brown, *Language Assessment: Principle and Classroom Practices.* (Boston: Pearson Education, Inc, 2007), p.3

Table III. 4
Assessment Aspects of Writing Analytical Exposition

No	Aspects Assessed	Score			
		1	2	3	4
1	Content				
2	Organization a. Thesis b. Arguments c. Reiteration				
3	Vocabulary				
4	Grammatical features				
5	Spelling & Punctuation				

(Taken from Megis)[7]

Explanation of score:

1 = incompetent

2 = competent enough

3 = competent

4 = very competent

Final Score = $\frac{TotalScore}{MaximumScore} x\ 80$

F. The Technique of Data Analysis

In order to analyze students' writing ability in analytical exposition paragraph, the writer used passing grade of English lesson at SMAN 3 Tapung (SKL) that is 70 for students' ability in writing analytical exposition paragraph, it means that those students whose scores below seventy (<70), they do not pass the passing grade (SKL), while those students whose scores more than and equals seventy (≥70), they pass the passing grade (SKL).

[7]Melgis Dilkawaty Pratama, *Teaching Writing A Handbook of Teaching Productive Skills.* (Pekanbaru: RIZQY Grafika, 2012), p. 205

In order to find out whether or not there is a significant difference of students' writing ability in analytical exposition paragraph between using and without using DEFENDS strategy, the data were analyzed by using inferential statistic method. The writer used the scores of post-test obtained from control and experimental groups. The different mean was analyzed by using independent sample t-test formula.

According to McMillan and Schumacher, "the independent sample t-test, or t-test for independent group, is used to determine whether the mean values of a variable on one group of subjects is different from a mean value on the same variable with a different group of subject."[8] And, the data were analyzed through SPSS Version 16.

Before the independent sample t-test formula was employed, the post test data of both experimental and control groups were analyzed in order to see whether or not the data were normally distributed, so that the parametric statistic can be employed.

The test for normal distribution of the data, chi-square was employed. This test was used for only post-test of both groups with the formula as follows:[9]

$$\chi^2 = \sum \frac{f_o - f_h}{f_h}^{2}$$

Explanation : f_o = Observed frequency

[8]James H. McMillan and Sally Schumacher. *Research in Education: Evidence-Based Inquiry*. Sixth Ed. (Boston: Pearson Education, Inc, 2006), p.490

[9]Sugiyono, *Statistika untuk Penelitian* (Bandung: Alfabeta, 2012), p. 107.

f_h = Expected frequency

If the data have been normally distributed, so the analysis can be continued to analyze them by using parametric statistics of independent sample t-test. The data are categorized as the normal data if $x^2{}_h < x^2{}_t$.

For the purpose of this prerequisite analysis, the writer needs to process them by proposing hypotheses as follows:

H_o is acccepted if $X^2{}_o$< (smaller than) X^2-table or the data are normally distributed.

H_a is acccepted if $X^2{}_o$ > (larger than) X^2-table or the data are not normally distributed.

G. The Reliability and Validity

The reliability can be defined as consistency of measurement across different characteristics or facet of a testing situation.[10] The following table is the categories of reliability test used in determining the level of the reliability of the test:

Table III. 5
The Level 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)[11]

In determining the reliability of the test in the reseach, the writer used inter-rater reliability formula because the writer used two raters in assessing

[10]Sara Cushing Weigle, *Assessing Writing: Cambridge Language Assessment Series*. J. Charles Alderson & Lyle F. Bachman. (Cambridge: Cambridge University Press, 2002), p. 49

[11]Zelly Putriani, *The Correlation between Reported Speech Mastery and Speaking Ability of the Second Year Students of SMKN 1 Pekanbaru*. (Pekanbaru: *Unpublished*, 2011), p. 35

and giving score of students' writing. The scores given by rater 1 correlated to scores given by rater 2. The higher correlation was, 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 was used in finding the reliability of the test.[12]

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 version.

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

df =N-nr

where: df= the degree of freedom

N = number of cases

Nr = the total variable correlated

Statistical the hypotheses are:

H_o: $r_o < r_t$

H_a: $r_o \geq r_t$

H_o is accepted if $r_o < r_t$ or there is no significant correlation between scores given by rater 1 and rater 2

H_a is accepted if $r_o \geq r_t$ or there is a significant correlation between scores given by rater 1 and rater 2

[12]Grant Henning, *A Guide to Language Testing: Development, Evaluation and Research*. (Boston: Heinle & Heinle Publisher, 1987), p. 82

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

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

Where:

r_{tt} = inter-rater reliability

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

$r_{A,B}$= the correlation between raters, or the average correlation among all raters if there are more than two.[13]

The following table describes the correlation between scores given by rater 1 and rater 2 by using *Pearson Product Moment* formula through SPSS 16 version.

Table III. 6

Correlations

		Rater1	Rater2
Rater1	Pearson Correlation	1	.674**
	Sig. (2-tailed)		.000
	N	28	28
Rater2	Pearson Correlation	.674**	1
	Sig. (2-tailed)	.000	
	N	28	28

**. Correlation is significant at the 0.01 level (2-tailed).

From the table above, it could be seen that the cooficient of correlation product moment $r_{obtained}$ (r_o) between scores given by rater 1 and rater2 was 0.674. Before comparing it to r_{table} (r_t), the writer obtained the degree of freedom

df = N – nr

df = 28 – 2 = 26

[13]*Ibid.*, p. 83

After the degree of freedom (df) =26 was obtained, the cooficient of $r_{obtained}$ product moment was compared to r_{table}, either at level of 5% or 1%. At level of 5%, r_{table} was 0.374; while at level of 1% r_{table} was 0.478. Based on r_{table}, it can be analyzed that (r_o) was higher than (r_t) either at level of 5% and 1%. It is clear that 0.374< 0.674> 0.478. So that, the writer concluded that H_o is rejected and H_a is accepted. It means there was a significant correlation between scores given by rater 1 and rater 2. In the other words, the writing test was reliable. Then, $r_{obtained}$ is adjusted by the *Spearman-Brown Prophecy Formula* below:

$$r_{tt} = \frac{nr_{AB}}{1+(n-1)r_{AB}}$$

$$r_{tt} = \frac{(2)(0.674)}{1+(2-1)(0.674)}$$

$$= \frac{1.348}{1+0.674}$$

$$= \frac{1.348}{1.674}$$

$$= 0.81$$

Based on the calculation above, the writer obtained inter-rater reliability that was 0.81. So, it could be concluded that the reliability of writing test included in very high level.

Besides, the tests used also had the validity. A test is said to be valid if it measures accurately what it is intended to measure.[14] In the reseach, the writer used content validity. According to Sugiyono, content validity is a kind of test that is used to measure achievement and the effect of treatment or program. To measure achievement, the test must be created based on appropriate material, easy

[14] Athur Hughes, *Testing for Language Teachers . Second Ed*. (Cambridge: Cambridge University Press, 2003), p. 26

to be comprehended or suitable with student's level.[15] The test of the reseach was appropriate to students' knowledge and it was familiar materials to the students' daily life.

[15] Sugiyono, *Metode Penelitian Pendidikan: Pendekatan Kuantitatif, Kualitatif, dan R&D* (Bandung: Alfabeta) p. 129