CHAPTER III
RESEARCH METHODOLOGY

III.1. Research Design

The design of the research was a causal-comparative study that focuses on quantitative research. According to L.R Gay (2000:364), the causal comparative design involves selecting two groups differing on some independent variables and comparing them on some dependent variables.

The groups may differ in a number of ways. One group may possess a characteristic that the other does not, one group may possess more of a characteristic than the other, or the two groups may have had a different kind of experiences. In this research, there are three variables; Four Square Strategy (X1) and DEFENDS Strategy (X2) Strategies are independent variables, while the students' writing skill is a dependent variable.

Therefore the experimental group 1 and experimental group 2 were provided with Pre-test, then the treatments were given to experimental groups and then provided with post-test. They could be drawn on the following table:

Table 3.1

The Research Design

E1	O1	X1	O2
E2	O1	X2	O2

E1 : Experimental Group 1

E2 : Experimental Group 2

X1 : Independent variable 1 (Four Square)

X2 : Independent variable 2 (DEFENDS)

O1 : Pre-test

O2 : Post-test

Gay, (2000 : 354).

III.2 Location and Time of the Research

This research was conducted at SMPN 01 Kuantan Mudik, which is located at Bunga Setangkai street number 35, Lubuk Jambi, Kuantan Mudik district of Kuantan singingi regency , Riau. The subject of this research was the second year students of SMPN 01 Kuantan Mudik was registered in 2016/2017.In order to get the data of students' writing score, this research was conducted for six months starting from January to June 2017.

III.3. THE POPULATION AND SAMPLE OF THE RESEARCH

III.3.1. Population

The population of this research was the second year students of SMPN 01 Kuantan Mudik in the academic year 2016 – 2017 which consisted of five classes which had the same capability, and two classes were chosen by using cluster sampling.

Table 3.2. Population of the second year students of SMPN 01 Kuantan Mudik.

Class	Total of Students
VIII 1	23
VIII 2	23
VIII 3	22
VIII 4	20
VIII 5	21
Total Population	**109**

III.3.2 Sample

The sample of this study used cluster sampling. Gay (2000:12) states cluster sampling randomly selects groups, not individual. All the members of selected groups had similar characteristics. Among the 5 classes of the eighth grade, two classes were taken as the sample of this research as follows:

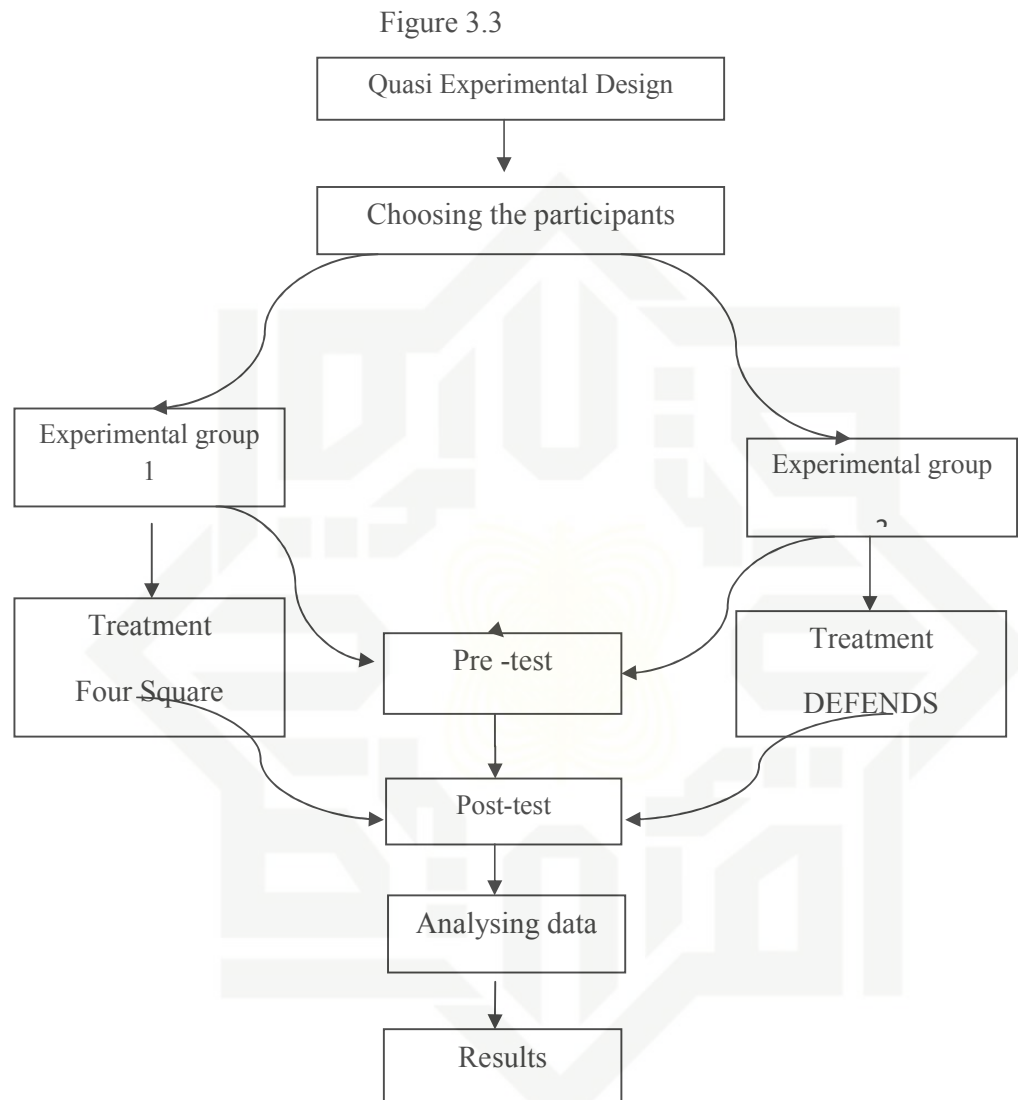**Table 3.3**

The Total Sample of the Research

Class	Population		Total	Sample
	Male	Female		
Group 1/ **VIII 1**	9	14	23	Experimental Class 1
Group 2/ **VIII 2**	14	9	23	Experimental Class 2

Based on the population, two classes were taken as the participants for this study. Cluster sampling technique was used to determine the sample of the study. Since the sample of this research was different group within a population, the above sampling technique was considered as the appropriate sampling technique in this study.

III.4. Research Procedure

Figure 3.3

1. Procedures of collecting data for experimental group 1 and experimental group

   Three procedures were administered to collect the data.

   a. Pre-test

   Pre-test was given to the students before conducting of the teaching and learning process using Four Square and DEFENDS strategy. It was used to measure the student's writing skill by using written test.

   b. Treatment

   In the treatment, the students were taught by using Four Square in the experimental class 1 and DEFENDS in experimental class 2. The teacher taught and explained the descriptive text by using the procedure of Four Square and DEFENDS strategy with the procedure: pre activities, whilst activities and post activities as they were stated at Chapter II.

   c. Post-test

   Post-test was conducted for the students of the experimental 1and experimental 2 after applying the treatment by using Four Square and DEFENDS strategy. The result of the post-test was compared with the pre-test result in order to determine the comparison of the Four Square and DEFENDS strategies on the students' writing skill after conducting 4 meetings of the Four Square in the experimental group 1 and DEFENDS in the experimental group 2.

III.5   RESEARCH INSTRUMENTS

To collect the data a writing test was administered as the instrument of this study. The pre-test and the post- test were administered to two classes which consisted of VIII 1 and VIII 2. The pre-test was administered before the treatment and the post-test aimed at finding out the students' writing skill after treatment. The treatment was given by teaching with Four Square strategy and DEFENDS strategy. This activity also intended to find out whether the students' skill kept holding of the material after doing the treatment.

III.6   DATA COLLECTION TECHNIQUE

In this research, the data were collected by distributing the pre-test and the post-test to the students. The test consisted of five questions related to the passages of the writingtest. The time and procedures of theFour Square strategy and DEFENDS strategy were already considered before the test was given. The duration of time was 90 minutes. The tests were taken from the students' textbook and internet materials.

In order to get the data to support this study, the researcher used the technique as follows:

1. Observation

Observation was used to observe directly the students using Four Square and DEFENDS strategies in writing skill in descriptive text and to observe the influence of Four Square and DEFENDS strategy toward the students' ability in writing skill of descriptive text. In observation

technique the researcher had a list of observational items to be observed in the class during teaching and learning process by using Four Square and DEFENDS strategy.

2. Test

To find out the comparison of using of the students' Four Square and DEFENDS strategy for students writing skill in the second grade of SMPN 1 Kuantan Mudik, the researcher administered the test to assess students' English ability especially in descriptive text. The test was administered into two stages. The first was the pre-test done before doing the treatment. The second was the post-test done after doing the treatment. The researcher measured the total score from the result of the students' English writing skill test. The classification of the students' score is shown below.

Table 3.4

The Classification of Students' Score

Score	Categories
80 – 100	Very good
66 – 79	Good
56 – 65	Fair
40 – 55	Poor
30 – 39	Very Poor

If the students are able to achieve to goal, this means that assessment of students' ability needs to be correlated with purposes of achieving. **Hughes (2003)**, there are many techniques that can be assessed to the students' English reading comprehension, but in this case, it uses written test.

III.7 VALIDITY AND RELIABILITY TEST

III.7.1 The validity of instrument

Before collecting the data,each item in question was tested in order to be ideal to try out. The purpose of the try out is to find out the quality of the test items. Brown (2000:22) states that a test is a method of a measuring a person's ability, knowledge, or performance in a given domain. Validity is the extent to

which inferences make from assessment results which are appropriate, meaningful, and useful in terms of the purpose of the assessment.

The points of difficulty level and discrimination indexare analyzed by using a formula (Heaton, 1975 : 178).

$$FV = \frac{R}{N} x 100\%$$

Where :

FV : The index of difficulty

R: The number of correct answers

N : The number of respondents

III.7.2 The reliability of Instrument

A reliability is an important characteristic of a good test. In order to calculate the reliability of the test, the mean of the students' scores and the standard deviation sought.To find out the reliability of the test, the following formula was used; the discrimination index of an item indicates the extent to which the item discriminates between the students, separating the more able students from the less able. The following formula was taken from Heaton (1975: 164) as follow :

$$r_{ii} = \frac{N}{N-1} \left(1 - \frac{m(N-m)}{N(X)^2}\right)$$

Where : $M = \frac{\sum x}{N}$ and $S^2 = \frac{\sum x^2 - \frac{(\sum x_i)^2}{N}}{N}$

r_{ii} : Reliability of the test

N : The number of item in the test

M : The mean score of all the test

S^2 : The standard deviation of all the test score

Table 3.5 Criteria Coefficient of Reliability

Coefficient Reliability	Criteria
$0,80 \leq r_{11} \leq 1,00$	Highest reliability
$0,60 \leq r_{11} \leq 0,79$	High reliability
$0,40 \leq r_{11} \leq 0,59$	Middle reliability
$0,20 \leq r_{11} \leq 0,39$	Low reliability
$0,00 \leq r_{11} \leq 0,19$	Lowest reliability

III.8 DATA ANALYSIS TECHNIQUE

In analyzing the data, the researcher used scores onthe pre-test and the post-test of the experiment. T-test is use to find out the difference between scores of the pre-test and the post-test taken from the experimental group 1 using Four Square and experimental group 2 using Defends strategy. The difference scores between the pre-test and the post-test was taken from both the groups. This score

was analyzed statistically for both descriptive and inferential statistics. In this research, the researcher used these following formulas:

1.   Independent sample t-test

To find out whether there is a significant difference or there is no significant difference between two or more variables can be analyzed by using an Independent Sample t test. Gay adds that the t-test for independent sample is used to determine whether there is probable a significant difference between the means of two independent samples. Independent sample t-test is used to find out the results of the first and seventh hypotheses. They are as follows:

1. To find out whether there is a significant difference of students reading comprehension before giving the treatment by using Four Square Strategy and DEFENDS Strategy for the experimental class and non treatment for the control class.

2. To find out whether there is a significant difference of writing skill after giving the treatment by using Four Square Strategy and DEFENDS Strategy for the experimental class.

To analyze the final-test scores of the experimental group, the following formula is used:

$$t = \frac{M_X - M_Y}{\sqrt{\frac{(SD_X)^2}{N_1 - 1} - \frac{(SD_Y)^2}{N_2 - 1}}}$$

Where:

t   = The value of comparing two means
1.
M_X = Mean of the score in pre-test

M_Y = Mean of the score in post-test

SD_X = Standard deviation of experimental group

SD_Y = Standard deviation of control group

N_1 = Number of the sample in pre-test

N_2 = Number of the sample in post-test

1 = the constant number

The t-table has the function to see if there is a significant difference between the mean of the score of both experimental groups. The t-obtained value is consulted with the value of the t - table at the degree of freedom (df) = (N1+N2)-2 which is hypothesized

Ha: to > t-table

Ho: to < t-table

Ha is accepted if to > t-table or there is effective after giving the treatment of Four Square Strategy and DEFENDS Strategy on students' writing skill.

Ho is accepted if to< t-table or there is no effect after giving the treatment Four Square Strategy and DEFENDS Strategy on writing skill.

2. **Paired sample t-test or Non-independent Sample t- t$_{test}$**

Non-independent sample t- t$_{test}$ is known also as Paired-Sample t$_{test}$. The researcher uses this formula to obtain the result of the seventh, eleventh and four hypotheses that is to find out whether there is a significant effect of using Four Square Strategy and DEFENDS Strategy on students' writing skill at the second grade students of SMPN 1

Kuantan Mudik. L.R 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-test and post-test or on two different treatments. (L.R Gay, 2000: 488).

3. **Eta square**

As for the effect size of the independent sample t-test, the eta squared was commonly used (Pallant: 2001). Eta squared ranges from 0 to 1 and represents the proportion of variance in the dependent variables that was explained the independent variables. The formula is, as follows

$$eta\ squared = \frac{t_2}{t_2 + (n-1)}$$

Where:

Eta square : the value of effect size

t : t value

N: the number of samples in experimental class

Here is the category of effect size (Cohen, 2007: 521)

0 – 0,20 = Weak effect

0,21 – 0,50 = Modest effect

0,51 – 1,00 = Moderate effect

> 1,00 = Strong effect