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CHAPTER III

RESEARCH METHODOLOGY

3.1 Research Design

Quasi Experimental Design-Nonequivalent Pre-test and Post-test Control Group Design was considered appropriate to be used in this study. This kind of design is normally employed to test an idea (or practice or procedure) to determine whether the idea influences an outcome or dependent variables (Cresswell, 2009: 158). In addition, Gay (2012:15) states that when individuals are not randomly assigned, the procedure is called quasi-experiment design with nonequivalent control group. This design was used in this study to find out the significant effect of using Mind Mapping Technique on students' reading comprehension and reading interest at SMKN 1 Bangkinang Kota.

In this research, there were three variables: Mind mapping Technique (X) was an independent variable and the students' reading comprehension (Y₁) and reading interest (Y₂) were dependent variables. Two classes were involved in the study; one class was an experimental group which was treated by Mind Mapping technique and another one was a control group taught without using Mind Mapping technique. For both experimental and control group, a pre-test and a post-test were administered to the students. The pre-test was given at the beginning of the teaching learning in order to identify the students' reading comprehension

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while the experimental group was given a treatment by using Mind Mapping technique and the control group without using Mind Mapping technique. At the end of teaching learning process, both groups were given a post-test in order to determine the effect of using Mind Mapping technique on students' reading comprehension and their reading interest.

The research design is presented in Table 3.1 below:

Table 3.1 Research Design

Group	Pre-Test	Treatment	Post-Test
E	O ₁	X	O ₂
C	O ₁	-	O ₂

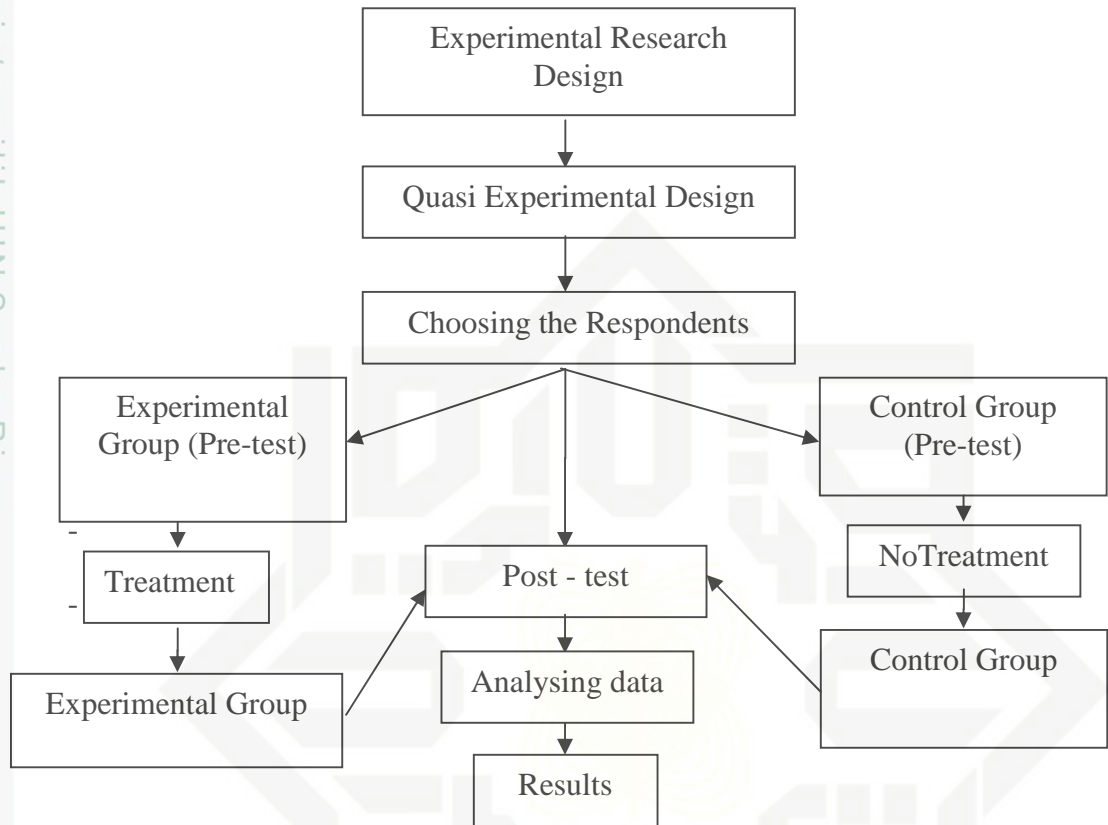
John W. Creswell (2008)

- E : Experimental Group
 C : Control Group
 O₁ : Pre-Test
 O₂ : Post-Test
 X : Treatment by using Mind Mapping
 - : Without Treatment

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Figure 3.1 The Scheme of Research Design



3.2 The Location and the Time of the Research

This research was conducted at SMKN 1 Bangkinang Kota located in Kampar Regency, Riau Province from November to December 2016.

3.3 The Population and Sample of the Research

3.3.1. Population

The population of this research was the second grade students of SMKN 1 Bangkinang Kota in 2016-2017 academic year majoring in Computer and Networking totaling 435 students consisting of 14 classes. Of this total, two classes i.e. XI TKJ 1 (the experimental class) and XI

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TKJ 2 (the control class) were taken as the sample by using cluster sampling.

Table 3.2

Population of the second grade students at SMKN 1 Bangkinang Kota

Class	Total of Students
XI Teknik Bangunan	34
XI Teknik Instalasi Tenaga Listrik	29
XI Teknik Pemesinan	64
XI Teknik Kendaraan Ringan	64
XI Teknik Sepeda Motor	62
XI Teknik Audio Video	54
XI Teknik Pendingin dan Tata Udara	35
XI Teknik Multimedia	34
XI Teknik Komputer dan Jaringan	59
Total Population	435

3.3.2. Sample

The following table presents the sample of the study.

Table 3.3

Sample of the second grade students at SMKN 1 Bangkinang Kota

Class	Male	Female	Total of Students
XI Teknik Komputer Jaringan 1 (Experimental Group)	9	16	25
XI Teknik Komputer Jaringan 2 (Control Group)	9	17	26
Total Sample	18	33	51

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2. Preparation of the Study

Preparation is one of the important steps that must be followed before conducting a study. In this study everything was prepared related to what was needed for the implementation of teaching process such as;

a. Making instrument

Making instrument is the most important thing. To collect the data, a reading test was administered as the instrument of this study. A pre-test and post-test were administered to two classes. The pre-test was administered before a treatment and the post-test was administered after the treatment find out the effect of using mind mapping technique on the students' reading comprehension. To know the students' reading interest, a questionnaire was also prepared for the students to complete.

b. Teacher Training

The English teacher was trained in order to make her easy to implement the technique in the experimental class. The mind mapping technique was explained to the English teacher and the materials and lesson plan were prepared for the English Teacher as the guideline in her teaching.

c. Installing Mind Mapping Software

Students were asked to install the Mind Mapping software in their laptops and learn how to use it before treatment (the teacher helped them when necessary).

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d. Conducting a try out

A try out was conducted for the students of the third grade by giving the questions already prepared in order to know whether or not the items were valid and reliable to be used in the pre-test and the post-test.

e. Analysing validity and reliability of the instrument

After gaining the results of the try out, each question was analysed to know whether it was valid and reliable or not by using SPSS 20. If the questions were valid and reliable, they were used as the questions for the pre-test and post-test.

3. Materials and Blue Print

For the teacher, the materials were taken from a text book as a hand book by the students in this school, student worksheet (LKS) and internet. The questions were adapted from the text in the form of three of narrative texts with the following topics:

1. The Enchanted Fish
2. The Frog Prince
3. Hunting

B. Procedures of collecting data

1. Procedure of collecting data for experimental group

Three procedures were used to collect the data.

a. Pre-Test

A pre-test was given to the students before conducting the teaching and learning process using Mind Mapping technique. It was used to

measure the students' reading comprehension and their reading interest by using written tests and questionnaire.

b. Treatment

In the treatment, the students were taught by using Mind Mapping technique. Teacher taught and explained the narrative text using the procedures of applying the Mind Mapping technique.

c. Post-Test

A post-test was given to the students of the experimental group after applying the treatment by using Mind Mapping technique. The results of the post-test were compared with the pre-test results in order to determine the effect of Mind Mapping technique on the students' reading comprehension and their reading interest after conducting 4 meetings of teaching by using Mind Mapping technique.

2. Procedure of collecting data for control group

a. Pre-Test

A pre-test was administered to the students of the control group before they were taught by using non-Mind Mapping technique. The pre-test was given to the students of the control group which was similar to that of the experimental group. The pre-test was aimed to get the homogeneity between both control group and experimental groups.

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b. Teaching by using non-Mind Mapping technique

The students were taught reading comprehension about narrative text by using non-Mind Mapping technique with the same topics and materials given to the experimental group.

c. Post-Test

A post-test was administered to the students of the control group after being taught for four meetings by using non-mind mapping technique. The results of the post-test were compared with the pre-test results in order to find out the effect on the students' reading comprehension and reading interest.

3.5 Research Instruments

To collect the data of reading comprehension, reading test was administered as the instrument of this study. A pre-test and a post-test were administered to two classes which consisted of XI TKJ 1 and 2. The pre-test was administered before the treatment and the post-test aimed at finding out the students' reading comprehension after treatment. During the treatments, narrative text was taught by using Mind Mapping Technique. This activity also intended to find out whether the students' skill keeps holding of the material after doing the treatment.

Questionnaire was used to investigate the students' reading interest. It was also given as a pre-test before treatment and as a post-test after giving the treatment

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3.6 Data Collection Technique

3.6.1 Test

To find out the effect of using Mind Mapping technique on the students' reading comprehension of the second grade of SMKN 1 Bangkinang Kota, a test was administered to assess their reading comprehension, especially on narrative text. The test was given twice, one as a pre-test given before the treatment and the other one as a post-test given after the treatment. The test consisted of six passages in which each consisted of five questions related to narrative texts of reading comprehension test. The time for each reading text had been set up to 90 minutes in duration. The tests were taken from the students' textbook and internet materials.

The data were taken from the total scores of the results of the students' reading comprehension. The classification of the students' scores is shown below:

Table 3.6.1.

The Classification of Students' Score on Reading Comprehension

Score Range	Categories
81 – 100	Very Good
61 – 80	Good
41 – 60	Mediocre
21 – 40	Poor
0 – 20	Very Poor

If the students were able to achieve the goal, it means that the assessment of students' reading comprehension needed to be correlated with the purposes of achievement.

3.6.2 Questionnaire

To find out the effect of using Mind Mapping technique on the students' reading interest of the second-grade students of SMKN 1 Bangkinang Kota, 20 statements of questionnaire were given based on the indicators outlined in Chapter 2 to assess the students' reading interest on reading narrative text. The test was also given twice; the pre-test before the treatment and the post-test after treatment. Total score was measured from the results of the students' reading interest on narrative text. The questionnaire was designed based on Likert-Scale model with the following options: Strongly Agree (SA), Agree (a), Undecided (U), Disagree (D) or Strongly Disagree (SD). The classification of the students' scores is shown below.

Table 3.6.2.

The Classification of Students' Scores on Reading Interest

Score Range	Categories
74 – 100	High
48 – 73	Mediocre
20 – 47	Low

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3.7 Validity and Reliability Test

3.7.1. The validity of instrument

Brown (2000; 22) states that a test is a method of a measuring a person's ability, knowledge, or performance in a given domain. Before collecting the data, each item of question was tested for a try out. The purpose of the try out was to find out the quality of the test items. Creswell suggests that validity is the individual's scores from as assessment make sense, meaningful, enable you, as the researcher, to draw good conclusions from the sample being studied. (Creswell (2008: 169). It means that validity is the extent to which inferences are made from assessment results which are appropriate, meaningful, and useful in terms of the purpose of the assessment.

To analyse the validity of data, inter item validity was analysed by using SPSS 20 program. The following table is the criteria of the correlation coefficient of items validity.

Table 3.7.1

The Criteria of Items' Validity

r/p	Interpretation
r result r table p < 0,05	Valid

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Table 3.7.2

The Validity Analysis of Reading Interest Try-Out

Item	r	p	Interpretation
1	0.439	0.001	Valid
2	0.376	0.007	Valid
3	0.560	0.000	Valid
4	0.412	0.003	Valid
5	0.585	0.000	Valid
6	0.490	0.000	Valid
7	0.370	0.008	Valid
8	0.409	0.003	Valid
9	0.525	0.000	Valid
10	0.551	0.000	Valid
11	0.345	0.013	Valid
12	0.522	0,000	Valid
13	0.507	0,000	Valid
14	0.463	0.001	Valid
15	0.277	0.049	Valid
16	0.631	0.000	Valid
17	0.585	0.000	Valid
18	0.461	0.001	Valid
19	0.522	0.000	Valid
20	0.538	0.000	Valid

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3.7.2. 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, the standard deviation were sought. To find out the reliability of the test, the discrimination index of an item indicated the extent to which the item discriminated between the students, separating the more able students from the less able.

To analyse the reliability of the instrument SPSS 20 program was used. The following table is the criteria coefficient of reliability. (Heaton, 1975:164).

Table 3.7.3
Criteria Coefisien of Reliability

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

Brown, (2003) says that reliability has to do with the accuracy of measurement. This kind of accuracy is reflected in obtaining of similar results when the measurement is repeated on different occasions or with different instruments or by different persons. Brown states that the

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characteristic of reliability is sometimes termed consistency. The following table is the level of internal consistency of Cronbach Alpha.

Table 3.7.4
A commonly accepted rule of thumb for describing internal consistency by using Cronbach Alpha

Cronbach Alpha	Internal Consistency
0.9	Excellent
0.9 > 0.8	Good
0.8 > 0.7	Acceptable
0.7 > 0.6	Questionable
0.6 > 0.5	Poor
0.5 >	Unacceptable

To obtain the reliability of the test given, SPSS 20 program was used to find out whether or not the test was reliable.

Table 3.7.5
Cronbach Alpha Table

Reliability Statistics	
Cronbach's Alpha	N of Items
0.823	20

From the table above, it is clear that the value of Cronbach's alpha is that 0.823. It means that the items are reliable, in which the value of

internal consistency is $0.9 > 0.846$ 0.8, so the reliability of test is Good or high.

3.8 Data Analysis Technique

The scoring guide was used as the criteria of scoring representing the basic aspects of reading. The reading comprehension results were evaluated by considering five aspects and each aspect had a score or a level. The specification of the aspects included the topic, the main idea, the specific idea, textual reference, and word meaning.

In analysing the data, the scores of the pre-test and the post-test of the experimental and control groups were used. These scores were analyzed statistically for both descriptive and inferential statistics using SPSS 20 or the following formulas. This study used SPSS 20 to analyze the scores and the analyses were presented in the next chapter.

1. Independent sample t-test

To find out whether there was a significant difference or there was no significant difference between two or more variables can be determined by using Independent Sample t_{test} . Gay added that the t-test for independent sample is used to determine whether there is probably a significant difference between the means of two independent samples. Independent sample t-test was used to find out the results of the first and second hypotheses:

1. To find out whether there was a significant difference of students reading comprehension and reading interest before the treatment by

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using Mind mapping technique for the experimental class and non treatment for the control class.

2. To find out whether there was a significant difference of reading comprehension and reading interest after the treatment by using Mind Mapping for the experimental class and non-treatment for the control class.
3. To analyze the final-test scores of experimental group and control group, the following formula was applied. This study used SPSS 20 calculation.

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

Where:

t = The value of comparing two means

M_X = Mean of the score in the pre-test

M_Y = Mean of the score in the post-test

SD_X = Standard deviation of the experimental group

SD_Y = Standard deviation of the control group

N_1 = Number of the sample in the pre-test

N_2 = Number of the sample in the post-test

1 = the constant number

The t-table has the function to see if there is a significant difference among the mean of the score of both experimental and control group.

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The t-obtained value is consulted with the value of t-table at the degree of freedom $(df) = (N1+N2) - 2$ which is hypothesized

Ha: $t_o > t\text{-table}$ or $p < 0.05$

Ho: $t_o < t\text{-table}$ or $p > 0.05$

Ha was accepted if $t_o > t\text{-table}$ or there was an effect after giving the treatment using Mind Mapping technique on the students' reading comprehension.

2. Paired Sample T-Test

Paired Sample T-Test is known also as Non-Independent Sample T-Test. Gay (2000: 488) states that t-test for non-independent samples is used to compare groups that are formed by some type of matching or to compare a single group's performance on a pre- and post-test or on two different treatments. In this study, paired sample t-test was used to find out whether there was a significant effect before and after using Mind Mapping on students' reading comprehension by using the pre-test and post-test scores of experimental class as in the following:

1. To find out whether there was a significant difference of students reading comprehension and reading interest before the treatment by using Mind Mapping technique.
2. To find out whether there was a significant difference of reading comprehension and reading interest after the treatment by using Mind Mapping technique.

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3. To analyze the final-test scores of the experimental group and control group, the following formula of paired-sample t-test was used by applying SPSS 20 calculation.

$$t = \frac{\bar{D}}{\frac{\sum D^2 - \frac{(\sum D)^2}{N}}{N(N-1)}}$$

D : Gain Score ($D = X_2 - X_1$)

The t-table has the function to see if there is a significant difference among the mean of the score of both pre-test and post-test. The t-obtained value is consulted with the value of t-table at the degree of freedom (df) $N - 1$ which is statistically hypothetic:

H_0 : $t_o < t\text{-table}$ or $p > 0,05$

H_a : $t_o > t\text{-table}$ or $p < 0.05$

H_0 was accepted if $t_o < t\text{-table}$ or there was no significant effect after using Mind Mapping technique on students' reading comprehension.

H_a was accepted if $t_o > t\text{-table}$ or there was a significant effect after using Mind Mapping technique on students' reading comprehension.

Afterwards, the following formula was used to find out the coefficient size of T-test:

$$\tilde{\eta}^2 = \frac{t^2}{t^2 + n - 1}$$

η^2 squared = $\tilde{\eta}^2 \times 100\%$

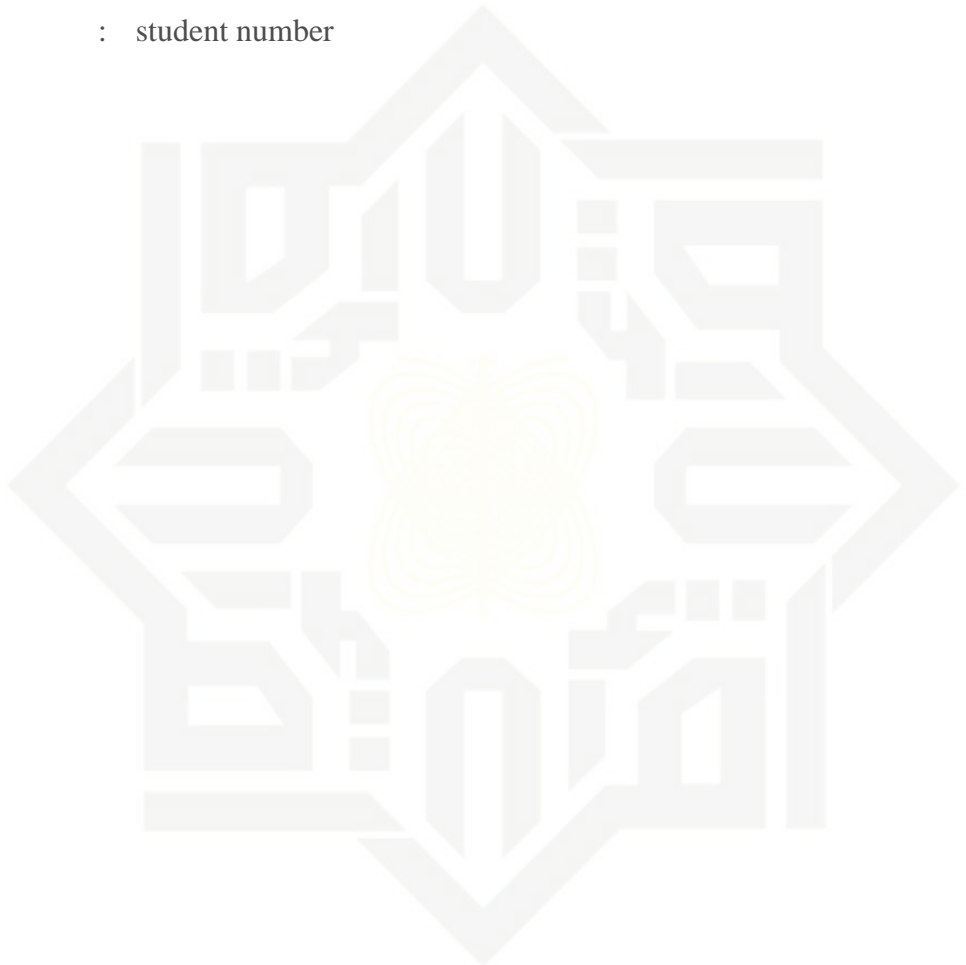
Where:

eta squared : Coefficient effect

$\tilde{\eta}^2$: Coefficient

t^2 : t-test result

n : student number



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