CHAPTER III

RESEARCH METHOD

This chapter discusses the methods of research used in this study, those are: the research design, population and sample, data collecting technique, proceures of collecting data, criteria of good test of reading, the data analysis, data treatment, hypotesis testing, and statistical testing.

3.1 Research Design

This research was conducted as quantitative research based on the experimental class. This research was applied one group pretest-posttest design. There were two class as taken as the investigated groups in this study which classified as diffrent groups. One group was the subject of the research as the experimental class and the other group was the try out class. The experimental class that was receive mind mapping technique in teaching descriptive text as its treatment. In teaching experimental class, the teacher was used mind mapping technique as the treatment in classroom activities, meanwhile, the other as try out class.

In this study, reading test was conducted to find out whether there was significant changes in experimental group after being given mind mapping technique or not by comparing the average score (mean) of the pre-test with the average score (mean) of the post-test. The researcher was conducted pretest, three treatments, and posttest. In this design, pretest and posttest was administered to see whether mind mapping technique can be used to increase students' reading comprehension achievement. According to Setiyadi (2006: 132), the design of the study as follows

T1   X   T2

Where :

T1 = Pretest

X = Treatments

T2 = Posttest

3.2. Population and Sample

Population is the whole subject of the research (Arikunto,2002). The population in this research is all the second year students of SMP 3 Bandar Lampung. There are seven classes of the second grade student. Each class consist of about 34 students. Out of the population, two classes were taken, one as the tryout class (Class VIII F) , and one as the sample or the experimental class (Class VIII D), which is selected by using Simple Random Sampling. The class is selected randomly by using lottery, since the first grade in SMPN 3 Bandar Lampung is not stratified class. There is no

priority class. It was applied based on the consideration that every student in population has the same chance to be chosen in order to avoid the subjectivity in the research (Setiyadi, 2006:39). The steps in determining experimental group and try out group were the writer provides seven pieces of paper printed the name of class of population. Then, the writer takes two classes randomly and get the first classes as try out group and the second as experimental class. The experimental class has pretest, posttest, three treatments.

3.3 Data Collecting Technique

In collecting the data, the research uses some technique as follows:

1) Try Out Test

The try out test was administered to Class VIII F that considered of 34 students. This test was given to identify the quality of the test before it was used to obtain the data for the research. The test included multiple choices that consist of 40 items with four alternative options A, B, C, and D: one correct response and three distractors. The try out test was conducted for 90 minutes. In determining the quality of the test the researcher see in these aspects such as validity, reliability, level of difficulty, and the discrimination power. From the computation of level of difficulty, the researcher got that there are 3 items (3, 30, 39) categorized as the difficult items which were less than 0.30 (difficult items) and there are 12 items (1,13, 17, 18, 19, 20, 26, 29, 31, 32, 33, and 36) categorized as the easy items in which the range of the item is >0.70 (Easy). Then, the researcher found that there

were 25 items which categorized as the moderate difficulty items (in the range of 0.30-0.70) 12 items in easy category which had less than 0.20 indexes. In short, the researcher had 20 test items that had a good discrimination power and positive value since a large acknowledgeable the students that poor students got the items correct. The result is shown in table belows, which summarize the difficulty level and the discrimination power:

Table 1. Difficulty Level of the Tryout items

NO	Item Number	Value Range	Criteria
1	3, 30, 39	< 0.30	**Difficult**
2	2, 4, 5, 6, 7, 8, 9 10, 11, 12, 14, 15, 16, 21, 22, 23, 24, 25, 27, 28, 34, 35, 37, 38, 40	0.3- 0.70	**Average**
3	1,13, 17, 18, 19, 20, 26, 29, 31, 32, 33, 36,	>0.70	**Easy**

Table 2. Discrimination Power of the Tryout items

NO	Item Number	Value Range	Criteria
1	1, 3, 13, 17, 18, 19, 20, 26, 29, 30, 31, 32, 33, 36, 39	<0.20	**Poor**
2	2, 4, 5,6, 7,8 9, 10, 11, 12, 14, 15,16, 21,22, 23, 24,25, 27,28, 34, 35, 37, 38, 40	≥0.20	**Good**

2) Pre-test

For the pretest, the reseacher took Class VIII D that consisted of 34 students. This test was administered to find out the students' basic reading comprehension before treatments. The test included multiple choices that consist of 25 items with four alternative options A, B, C, and D: one correct response and three distractors. The try out test was conducted for 45 minutes.

3) Treatment

After the pretest, the researcher were conducted the treatment for three meetings, which took 90 minutes in every meeting. The researcher was teach reading comprehension of descriptive text by using mind mapping technique to the students experimental class.

4) Posttest.

The posttest was conducted after the treatment. It was to evaluate the students' reading comprehension achievement after giving the treatments. The items for the posttest were similiar to those of the pretest, only the order of the texts and their corresponding items were rearranged. The test were multiple choices that consist the 25 items and it was conducted for 45 minutes.

3.4 Procedures of Collecting Data

In collecting the data, the researcher used the following steps:

1) *Determining the population and sample :* there were seven classes of the second year students of SMPN 3 Bandar Lampung. The researcher chose two classes, VIII F as a try out class and VIII D as the sample class by lottery.

2) *Selecting the instrument materials :* the reseacher selected the material was chosen from text book. The selecting process considered materials that has been taught to the students and the students interest.

3) *Administering the try out test :* the test was done in order to measure the level of difficulty (LD) and discrimination power (DP) as well as find out the reliability and validity of the test.

4) *Administering the pretest*: pretest was conducted before the treatments. It is aimed to check students' reading ability in determining main idea, references, inference, finding detail information, and vocabulary in texts. Pretest is administered for about 45 minutes.

5) *Giving treatment*: three treatments by using mind mapping are given in two weeks. The treatment was conducted in three meetings and 90 minutes for each. The treatments was classroom activity, which uses an apply mind mapping technique in reading.

6) *Conducting posttest*: posttest was conducted after the treatment. Posttest was conducted to find out whether there is a significant students' reading ability in determining mind idea, references, inference, finding detail information, and

vocabulary after the treatments. It was administered for 45 minutes in experimental group.

7) *Analyzing the data and testing hypothesis :* after scoring students' work was finished, the reseacher compared the result of pretes and posttest to see whether the score of posttest is higher than pretest.

3.5 Criteria of Good Test of Reading

The two reading tests were given to the students to check their reading comprehension achievement. They are pretest and posttest. The researcher was used objective test. It was multiple choice tests consists of four options (A, B, C, D), to make it easy to check and to give score. The material was descriptive text. The researcher were given 25 items for pretest and 25 items for posttest. The purpose of pretest was to know the students' reading comprehension achievement before treatments. The purpose of posttest was to know the students' increase of reading comprehension achievement after treatments. To know whether the test was good or not, some criteria should be conseidered. The criteria of good test were : validity (content validity and construct validity), reliability, level of difficulty and discrimiination power.

3.5.1 Validity

Validity refers to the extent to which the test measures what it is intended to measure. It means that it relates directly to the purpose of the test. A test can be considered to valid if it can precisely measure the quality of the test. There are several types of

validity according to the different purpose of the tests. In this research, the researcher were use content validity and construct validity.

3.5.1.1 Content Validity

Content validity is the extent to which a test measures a representative sample of the subject matter content, the focus of content validity is adequancy of the sample and simply on the appearance of the test (Hatch and Farhady,1982:251).

In this research, the researcher was formulated table specification, so every test item can be matched with the goal and the materials have been taught. The content of the item is presenteds in the table of specification below:

Table 3. The table of specification of Data Collecting Instrument

No	Reading Skills	Item Numbers	Percentage (%)
1	Determining main idea	6, 10, 13, 19, 26, 30, 37	17.5%
2	Finding detailed information	4, 5, 8, 9, 17, 28, 29, 31, 34, 36, 38	27.5%
3	References	2, 12, 23, 25, 32, 39	15%
4	Inferences	1, 7, 14, 16, 18, 21, 24, 27	20%
5	Vocabularies	3, 11, 15, 20, 22 , 33, 35, 40	20%
	Total	40	**100%**

The precentage of determining main idea, finding specific information, inference and vocabulary took bigger part than finding reference, it was caused they are the fundamental to succesful reading comprehension. Hence, The precentage of finding specific information is the biggest because if the students are still confused to determine the main idea and vocabulary, it might the students get dificulty to find the

spesific informaton of the text that was why the determaining main idea, finding

specific information, inference and vocabulary took bigger part than finding reference

3.5.1.2 Construct Validity

Construct validity is concerned with whether the test is actually in line with the

theory of what it means to know the language (Shohamy. 1985; 74). Knowing the test

is true reflection of the theory in reading comprehension, the researcher was

examined whether the test questions actually reflect the means of reading

comprehension or not. The test consist of some reading skills namely, determining

the main idea, supporting details, reference, inference, vocabulary and specific

information.

3.5.2 Reliability

Reliability is defined as the extent to which a questionnaire, test, observation or any

measurement procedure produces the same results on repeated trials. In short, it is

the stability or consistency of scores over time or across ratters. It is a measure of

accuracy, consistency, dependability, or fairness of scores resulting from the

administration of particular examination. According to Heaton (1988:162) reliability

is a necessary characteristic of any good test.

To measure the coefficient of the reliability between odd and even number (reliability

of half test), the researcher uses Pearson Product Moment, in the following formula:

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

Note

$\sum x$ = total score of odd number

r_{xy} = the correlation of odd group and even group

x^2 = square of X

Y^2 = square of Y

N = total number of students

(Henning, 1987:60)

After getting the reliability of half test, the researcher then uses " Spearmean Brown's

Prophency Formula" to determine the reliability of the whole test as follows:

$$r_k = \frac{2r_{xy}}{1+r_{xy}}$$

Note:

r_k = The reliability of the whole test

r_{xy} = The reliability of half test

(Hatch and Farhady, 1982: 246)

The criteria of reliability are:

0.90 – 1.00 = High

0.50 – 0.89 = Moderate

0.0 – 0.49 = Low

(Hatch & Farhady, 1982: 223)

In this research, the result of reliability of the try-out test is 0.79 (see appendix 3). It could be inferred that the test had moderate of reliability, in the range 0.50-0.89. It indicated that this instrument would produce consistent result when it was administered under similar condition and participants but in different time (Hatch and Farhady, 1882: 286). So, it can be concluded that the test was reliable.

3.5.3 Level of dificulty

Arikunto (1993:209) in his book says that the test item are good if they are not too difficult and not too easy or in the other word the difficulty level is average.

The classification of the difficulty level is as follow (Arikunto, 1993:212):

0,0 – 0,3   = too difficult

0,3 – 0,7   = average

0,7 – 1,0   = too easy

The formula that was used to determine the difficulty level of each test item is as follow:

$LD = R/N$

In which:

LD   = level of difficulty

R   = the number of correct answers

N   = the number of students taking the test

Based on the criteria above, there were 6 easy items in the try-out test (1, 4, 6, 8, 30, and 33). There were 7 difficult items (14, 18, 21, 27, 32, 33, and 39). And, there were 27 average items. (see appendix 3).

3.5.4 Discrimination Power

According to Arikunto (1993:213), discrimination power is the ability of the item to differentiate between the students who have high ability and those who have low ability. The discrimination power of an indication item the extent, to which the item discriminates between test taker from the less able. The formula of the discriminate power is:

$$DP = U - L \div \frac{1}{2} N$$

In which :

DP   : discrimination power

U   : the number of students from the upper who answer correctly

L   : the number of students from the lower who answer correctly

N   : the number of students

(Shohamy, 1985:82)

The criteria of discrimination power are:

a) If the value positive, it has positive discrimination because large number or more knowledge students than poor students get the item correct. If the value is zero, it means that there is no discrimination.

b) If the value negative, it has negative discrimination power because lower and higher level of students gets the item correct.

c) In general, the higher discrimination index is better. In the classroom situation most items should be higher than 0.20 indexes.

(Shohamy, 1985:82)

Based on the criteria above, there were 15 items in the try-out test which did not fulfill the standard of discrimination power, since those items had discrimination index under 0.20 which meant that the items had bad and poor discrimination power. By looking discrimination power and level of difficulty, the total items that were administered were 25 items (2, 4, 5,6, 7,8 9, 10, 11, 12, 14, 15,16, 21,22, 23, 24,25, 27,28, 34, 35, 37, 38, and 40). Tose items had discrimination power above 0.21 with the criteria from satisfactory to excellent items. (see appendix 3)

3.5.5 Scoring System

In scoring the students' results of the test, Arikunto's formula was be used. The ideal highest score is 100. The score of pretest and posttest was calculated by using this formula:

$$S = \frac{R}{N} \times 100$$

Where:

S = the final score of the test

R = the total number of the right answers

N = the total items

3.6 Data Analysis

Analysis means categorizing, ordering, manipulating, and summarizing of data obtain answer to research questions (Kerlinger, 1988:125). The purpose of analysis is to reduce data to be intelligible and interpretable so that the relation of research problem can be studied.

In order to find out how significant the increasing of the students' reading comprehension in descriptive text through mind mapping techinque, the data was analyzed by these following procedures:

a) Scoring the pretest and posttest

b) Tabulating the results of the tests and calculating the scores of the pretest and posttest

c) Drawing conclusion from the tabulated result of the pretest and posttest which statistically analyzed using *Repaeted Measuares T-Test* computer through SPSS version 16.0.

3.7 Data Treatment

According to Setiyadi (2006:168-169), using t-test for hypothesis testing has 3 basic assumptions, namely:

1. The data is interval or ratio

2. The data is taken from random sample in population

3. The data is distributed normally

3.8 Hypothesis Testing

Hypothesis testing was used to prove whether hypothesis that the proposes by the researcher was accepted or not by using t-test. The researcher used SPSS (Statistical Package for Social Science) version 16.0 for Windows. The researcher used *Paired Samples T-test* in order to know the significance of the treatments' effect by comparing the mean of the pre-test and the post-test. The hypothesis was analyzed at significant level of 0.05 in which the hypothesis was approved if sig.< α.

The criteria are:

Ho (null hypothesis) is accepted if t-ratio is lower than t-table (t-ratio<t-table). It means that there is no significant increase of students' reading comprehension achievement of descriptive text after they are taught through Mind Mapping technique.

H_1 (alternative hypothesis) is accepted if t-ratio is higher than t-table (t-ratio>t-table). It means that there is a significant increase of students' reading comprehension achievement of descriptive text after they are taught through Mind Mapping technique .

The hypothesis testing (see appendix 9) showed that t-ratio is higher than t-table (8.790 >2.042). It meant that H was rejected and Hα was accepted. It can be concluded that there is a significant increase of students' reading comprehension achievement of descriptive text after they are taught through Mind Mapping technique at SMP Negeri 3 Bandar Lampung.

3.9 Statistical Testing

Match t-test is use to analyze the data statistically. It is used since match t-test is probably the most widely used statistical test for the comparison of two means. It can be uses with very small sample sizes. It is uses as the data coming from the sample or known as paired data (Hatch & Farhady, 1982: 108). This research only uses one class for the experimental class and there is no control group. Therefore, match the t-test is used. Match t-test is used to analize the data of the increase the students' reading ability in identify main idea. It compares two kinds of data or mean (average score of the students) prom similar sample (Setiyadi, 2006: 170).

First, scoring the pretest and posttest, then the scores of pretest and posttest are analyzed and compared to find out whether there is a significant increase in students' ability by calculating the means of both pretest and posttest using match T-test. To find the means of pretest and posttest, a following simple statistic formula is uses:

$$\bar{x} = \frac{\sum x}{N}$$

where,

$\bar{x}$ = mean (average score)

$\sum x$ = total number of the students' score

N   = total number of the students

(Hatch & Farhady, 1982: 55)

Then after calculating the means of pretest and posttest, the data is analyze by using match t-test. It is used as the data come from the same sample or known as pairing the data (Hatch and Farhady, 1982: 114). The formula is as follows:

$$t = \frac{\bar{x}_{1-}\bar{x}_2}{S_{\bar{D}}} \qquad in\ which \qquad S_{\bar{D}} = \frac{S_D}{\sqrt{n}}$$

Where,

$\bar{x}_1$ = mean of pretest

$\bar{x}_2$ = mean of posttest

$S_{\bar{D}}$ = standard error of differences between two means (denominator)

S_D = standard deviation

n   = number of students

(Hatch and Farhady, 1982: 116)

The hypothesis is analyzed at the significant level of .01 in which the hypothese are approved if sig. $< \alpha$.:

H_o : t-ratio $\leq$ t-table $\rightarrow$ accepted

H_1 : t-ratio $\geq$ t-table $\rightarrow$ rejected

(Hatch and Farhady, 1982).