III. RESEARCH METHOD

In order to answer the research question and achive the objective of the research, research method should be constructed thoroughly. The research method consisted of research design, population and sample of the research, data, data collecting technique, try out, procedures of collecting data. Moreover, this chapter also explained about the criteria of a good test, research procedure, hypothesis testing and statistical testing.

3.1. Research Design

This research was a quantitative study since it was focused on the product (result of the test) not the process of teaching learning. This present study has *one group pre-test post-test design.* In this research, the researcher used regression study. Regression was used to predict the effect of dependent variable toward independent variable. The researcher selected the class by using *simple random probability sampling*. The learners received the questionnaire. There was treatment for three times, the students were tested before and after the treatment. After the treatment, the students were given a set of questionnaire in order to know the students' response toward the technique being implemented. The research design could be represented as follow:

$$\mathbf{T_1} \quad \mathbf{X} \quad \mathbf{T_2}$$

T_1 : Pre-test

T_2 : Post-test

X   : Treatment

(Setiyadi, 2006: 132)

The study was to investigate whether mind mapping technique can be used to increase students' reading comprehension ability by comparing the average score (mean) of the pre-test with the average score (mean) of the post-test.

Firstly, the researcher administered a pretest to the students to identify their achievement of reading comprehension ability in determining mind idea, references, inference, supporting detail, and vocabulary before applying the technique. Then, the students were given three treatments by using mind mapping technique. Eventually, a posttest was administered to identify students' reading comprehension ability after being taught by using mind mapping technique. If the average score of the pretest was higher than the average score of posttest, it indicated that mind mapping technique could not be used to increase students' reading comprehension ability. However, if the average score (mean) of the posttest was higher than average score (mean) of the pretest, it showed that mind mapping technique could be used to increase students' reading ability significantly (in narrative text).

3.2 Population and Sample

The population of this research was the first grade students of SMAN 2 Kota Metro. There were six classes in first grade of SMAN 2 Kota Metro and 30 students for each class. The sample was one class as experimental class, which was selected by using Simple Random Sampling. The class was selected randomly by using lottery, since the first grade in SMAN 2 Kota Metro was not stratified class. There was no priority class. It was applied based on the consideration that every student in the population had the same chance to be choosen and in order to avoid the subjectivity in the research (Setiyadi, 2006: 39). The experimental class has try out, pretest, posttest, three treatments and questioner after the posttest.

3.3 Data

This research gained the data of:

- Students' reading ability in identifying main idea before and after the treatments.
- Students' respond toward mind mapping technique.

3.4 Data Collecting Technique

In collecting the data, the researcher used some technique as follows:

1. Questionnaire

The questionnaire given to language learners in an attempt to get data about the students' respond toward mind mapping as a technique. In this study, the questionnaire was only given after the treatment. Besides, the questionnaire was used in finding out the students' respond toward mind mapping as a technique in teaching reading comprehension. The questionnaire used was referred from "METODE PENELITIAN UNTUK PENGAJARAN BAHASA ASING: Pendekatan Kuantitatif dan Kualitatif" developed by Setiyadi (2006). The questionnaire was designed particularly to review mind mapping technique used by learners in reading.

The questionnaire consisted of eight items. It was translated and answered into Indonesian in order to facilitate the learners in understanding the questionnaire. The questionnaire items measure the students' response toward mind mapping for teaching reading under one aspect and two indicators.

Table 1. Specification of students' response toward mind mapping in the questionnaire

No	Aspects	Indicators	Questions Number
1.	Students' response toward mind mapping technique	Indicated the students' interest mind mapping technique	1, 5, 6, 8
		Indicated the uses of follows reading comprehension lesson through Mind Mapping technique	2, 3, 4, 7

Based on the aspects and indicators above, which had determined which items designed to measure it. Each item had a numerical value, for example:

1 = strongly disagree

2 = disagree

3 = agree

4 = strongly agree

2. Reading Test

The kind of reading test used was objective test. The reading test which was given to know learners' reading achievement consisted of pretest and posttest. The pretest was given before the treatment was conducted, while posttest reading was given after the research conducts the treatment. It was used to know if there was any increasing of learners' reading comprehension after they were given the treatment. The posttest had the same difficulty as the pretest.

In selecting reading text, the researcher considered the text based on themes stated in curriculum for first years of SMA (KTSP 2006). The texts used were taken from any textbooks and articles on the internet.

The validity of the test was measured by content and constructs validity. Content validity was obtained by choosing the texts based on School Based Curriculum (KTSP) for first grade of SMA, while construct validity was achieved by representing five sorts of reading skill. Those five specifications were determining idea, finding detail information, reference, inference, and vocabulary mastery.

3.5 Try Out

Before conducting the research, the data collecting techniques are tried out in order to make sure whether the instruments are valid and reliable to collect the data. The try out contained 40 items, each item consists of four options. The type of the instruments was multiple choice test and time allocation is 90 minutes. The try out test was conducted in experimental class since to make an equal proficiency with the sample of the research. The number of the students for the experimental class are 30.

3.6 Procedures of Collecting Data

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

1. *Selecting the instrument materials*: the instrument materials (reading test) are chosen from text book. The selecting process considered materials that has been taught to the students and the students interest.

2. *Determining research instrument*: for both reading tests (pretest and posttest), the materials are taken from students' textbook. In the test, researcher uses kind of narrative texts and in each text that will be used is consist of 3 until 6 paragraphs. It is aimed at making an equal proportion and level of difficulty of both pretest and posttest. The number of the items are arranged in such a way so that the reliability of the tests could be seen through split-half method.

3. *Determining the population and sample of the research*: the sample of the research is determined through simple random probability sampling. It means

that the sample was selected randomly by using lottery, since that the first grade of SMAN 2 Kota Metro is not stratified class, there is no priority class. There are six classes of first grade at SMAN 2 Kota Metro. The class is chosen randomly by lottery.

4. *Administering the pretest*: pretest was conducted before the treatments. It is aimed to check students' reading ability in determining mind idea, references, inference, finding detail information, and vocabulary in texts. Pretest was administered for about 60 minutes on first week of the research.

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 are 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 after the treatments. It was administered for 60 minutes in experimental group.

7. *Distributing questioner.* The writer gives the students questionnaire to be answered. The questionnaire consists of 8 items. Students are given 15 minutes to answer the questionnaire. The result of this questionnaire is used to know their response toward the technique.

3.7 Criteria of Good Test of Reading

In this research, to prove whether the test of reading has good quality, it must be tried out first. As Heaton (1991:5) states that a reading test will be said have a good quality if it has good validity, reliability, and level difficulty and discrimination power. The questionnaire will also be called as a good test if it has good validity and reliability.

3.7.1 Validity

A test can be considered valid if the test measure the object to be measured and suitable with the criteria (Hatch and Farhady, 1982; 250). The discussion of the validity of questionnaire and reading test are provided below.

1. **Validity of the Questionnaire**

   According to the Hatch and Farhady (1982; 281) there are two basic types of validity; content validity and construct validity. The questionnaire used Thurstone Scales developed by Setiyadi (2006).

2. **Validity of the Reading Test**

   a. Content validity

   Content validity was concerned whether the test was sufficiently representative and comprehensive for the test. In the content validity, the material was given suitable with the curriculum. Content validity is the extent to which a test measures a representative sample of the subject meter content, the focus of content validity is adequacy of the sample and simply on the appearance of the test. (Hatch and Farhady, 1982; 251).

The topic chosen is narrative text. The topics are the representative of reading materials of School Based Curriculum or KTSP as a matter of tailoring the lesson to students' need. To know whether the test has a good content validity, the items of the test will be discussed with the expert (advisors), the researchers' colleague, and the English teacher of Senior High School. The composition of the test items was presented in table 2: table of specification below.

Table 2 Specification of Reading Test

No	Reading Specification	Item Number	Percentage
1	Determining main ideas	1,4,9,16,17,19,27	23.4%
2	Inferences	2, 6, 13, 20, 23, 28	20%
3	References	3,10,12, 15, 21,24,30	23.4%
4	Finding detail information	5, 7, 14, 18, 25	16.6
5	Vocabularies	8,11,22,26,29	16.6%
Total		30	100 %

a. Construct Validity

It is concerning to whether the test is actually based on the theory of which it means to know the language that is being measured. In this research the researcher focused on reading comprehension in the form of narrative texts. Nuttal (1985) states that the relation validity of the instrument refers to construct validity in which the question represents five of sort reading skills, i.e. determining main idea, finding detail information, reference, inference and vocabulary mastery. Skills of reading in the test are a part of the construct validity and the item numbers are a part of the content validity.

The test was compared to the table of specification to know whether the test hsd a good reflection of what has been taught. A table of specification was an instrument that helps the test constructor plans the test.

3.7.2 Reliability

Reliability of the test can be defined as the extent to which a test produces consistent result when administrated under similar conditions (Hatch and Farhady, 1982:243). Split-half technique is used to estimate the reliability of the test and to measure the coefficient of the reliability between odd and even group, *Pearson Product Moment formula* was used as follows:

$$rl = \frac{\sum xy}{\sqrt{\left[\sum x^2\right]\left[\sum y^2\right]}}$$

rl: Coefficient of reliability between odd and even numbers items.

x: Odd number.

y: Even number.

x^2: Total score of odd number items.

y^2: Total score of even number items.

xy: Total number of odd and even numbers.

(Lado, 1961 in Hughes, 1991:32).

The criteria of reliability are:

- 0.80 – 1.00: high.

- 0.50 – 0.79: moderate.

- 0.00 – 0.49: low.

(Hatch and Farhady, 1985:247).

To know the coefficient correlation of whole items, *Spearmen Brown`s prophecy formula* was used. The formula is as follows:

$$rk = \frac{2r1}{1+r1}$$

rk: The reliability of the test.

r1: The reliability of the half test.

(Hatch and Farhady, 1982:246).

3.7.3. Level of Difficulty

Level of difficulty relates to "how easy or difficult the item is in the form of the point of view of the students who took the test. It is important since test items which are too easy (that all students get right) can tell us nothing about differences within the test population." (Shohamy, 1985: 79).

Level of difficulty is calculated by using the following formula:

$$LD = \frac{R}{N}$$

LD = level difficulty

R = number of students who answers it right

N = total number of students

The criteria are:

LD < 0.30   = difficult

LD = 0.31- 0.70   = satisfied

LD > 0.71- 1.00   = easy

(Arikunto, 1997:214)

3.7.4. Discrimination power of the Test

Discrimination power refers to "the extent to which the item differentiates between high and how level students on that test. A good item which is according to this criterion, is one in which good students did well, and bad students failed." (Shohamy, 1985:81)

The formula is:

$$DP = \frac{Upper - lower}{\frac{1}{2}(N)}$$

DP   = discrimination power

Upper = proportion of "high group" students getting the item correct

Lower = proportion of "low group" students getting the item correct

N   = total number of students

The criteria are follows:

LD   = 0.00-0.20 = poor

LD   = 0.21-0.40 = satisfactory

LD   = 0.41-0.70 = good

LD   = 0.71-1.00 = excellent

(Arikunto, 1997:223)

3.7.5. Scoring System

The researcher uses Arikunto's formula in scoring the students' result of the test. The higher score will be 100

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

Where:

S is the score of the test

R is the right answer

N is the total of the items

3.8 Data Analysis

The data of this study was statistically analyzed. The researcher used computer system called Statistical Package for Social Sciences (SPSS). To examine the result of questionnaire in analyzing the learners' respond toward mind mapping technique, the researcher analyzed its qualitative data, matrix analysis; in this case description analysis was used, since the researcher used his own idea including his own interpretation toward the data (Setiyadi, 2006:262). The researcher also used *repeated measures t-test* to examine the data of learners' score in reading test.

3.9 Data Treatment

According to Setiyadi (2006:168-169), using t-test for hypothesis testing has three

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

3.10 Hypothesis Testing

The hypothesis testing was used to prove whether the hypothesis proposedin this

research is accepted or not. SPSS was used to know the significance improvement

of treatment effect. The hypothesis was analyzed at the significant level of 0.05

(*p< 0.05*)

1. H_0 : There is no significant improvement students' reading comprehension

ability by using mind mapping technique.

  H_1 : There is significant improvement students' reading comprehension ability

by using mind mapping technique.

2. H_0 : There is negative students' respond toward mind mapping technique.

  H_1 : There is possitive students' respond toward mind mapping for teaching

reading comprehension.