

III. RESEARCH METHOD

This chapter discusses the design of this research, how to collect data, population and sample, data collecting technique, the procedures of the research, scoring system and data analysis.

3.1 Research Design

This inferential quantitative research relied on second language learning to examine the relationship between grammar mastery and vocabulary mastery and their reading ability. The writer used *ex post facto* research design because she did not give any treatment but collected the data and saw the correlation of cause and effect that happened. *Ex post facto* design involved only one group and does not use any control class. Hatch and Farhady (1982:26) state that an *ex post facto* design is used when the researcher does not have control over the selection and manipulation of the independent variable. This design is often called co-relational study. Co-relational study focuses on the relationship among variables that exist naturally. It does involve the manipulation of the independent variables. Yet it involves collecting data in order to determine whether and what degree a relationship exists between two or more variables rather than the cause-effect relationship (Hatch and Farhady, 1982:27)

The research design of *Ex post facto* co-relational study is formulated as follows:

T1 T2

Where:

T1 : The test of understanding grammar and vocabulary mastery.

T2 : The test of reading comprehension.

(Hatch and Farhady, 1982:27)

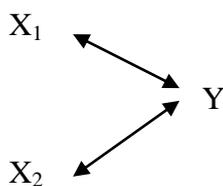
3.2 Population and Sample

The population of this research was the first year students of SMAN 1 Bandar Lampung. There were nine classes of the first grade students and whole of classes consisted of about 290 students. In this research, the writer determined the sample by using simple random sampling technique, because every student in the population got the same opportunity to be chosen or to be sample of the research. The writer took class X-5 consisting of 38 students as the sample and class X-6 consisting of 40 students as the try out class.

3.3 Variables

In this research, there were two variables: independent (X) and dependent variables (Y). The independent variables of this research were students' grammar mastery (X_1) and vocabulary mastery (variable X_2). While the dependent variable was reading ability (variable Y).

The correlation of the variables is illustrated as follows:



Where: X_1 = grammar mastery

X_2 = vocabulary mastery

Y = reading ability

(Hatch and Farhady, 1982:27)

3.4 Data Collecting Techniques

The procedures of collecting data were such the following:

1. Grammar test

Grammar test was administered to know grammar mastery and usage. The test of grammar was multiple choices, which consists of 30 items.

2. Vocabulary test

A test of vocabulary was used to measure the students' vocabulary mastery. Type of vocabulary test was multiple choices, which consists of 30 items.

3. Reading comprehension test

There was 30 items for reading comprehension test. It was multiple choices with four options, with one correct answer and three distracters. The test consisted of five aspects of reading skills, they are determining main idea, identifying specific information, inference, reference and vocabulary.

3.5 Research procedure

In conducting the research, there were some procedures that applied for taking the data :

1. Determining the problem

In order to determine the problem, the writer read the books that were related to the topic under discussion.

2. Determining the instrument

In this research, the writer used instrument in order to be able to be interpreted. The instruments were vocabulary test, consisting of 30 items, grammar test consisting 30 and reading comprehension which consists of 30 items.

3. Finding the sample

The sample of this research determined though simple random probably sampling. There were nine class of the first year of SMAN 1. However only class X.5 and X.6 had a chance to become the sample of this research.

- 4 Try out the instrument

Before distributing the instruments, the writer distributed the try out test to them in order to guarantee the result to be more valid.

- 5 Distributed the instrument

Both of the instruments would be distributed on the same day.

- 6 Scoring the students' work

The writer scored the students' work in order to get data.

7. Analyzed the data

The writer analyzed the data whether there was correlation between students' grammar and vocabulary mastery and their reading ability.

3.6 Try Out Test

Try out test was administered to determine the quality of the test that would be used to collect the data. In order to determine the quality of the test whether the instruments were valid, the writer tried out the instruments to measure the validity, reliability, discriminating power and level of difficulty. The writer gave 90 items for tryout test. After giving a try out test, the writer would find if the question was significant or not. Furthermore the significant questions would be tested again to find the correlation between students' grammar and vocabulary mastery and their reading ability.

3.6.1 Result of the Try out

In this research, the try out test would be categorized into three types of question, they were grammar test, vocabulary test, and reading test.

3.6.1.1 Grammar test

The tryout of grammar test contained 30 questions. The students who completed the tryout were 38 students. The highest score on the grammar test was 97 and the lowest was 47, the mean of the score was 78, the median score was 83.

Meanwhile the mode was 76 which there were three students scored 76 in completing the test. Below is the table of students' score in try out class;

Table 1. Distribution of Students' Grammar mastery in Tryout Class

No	Class Interval	Frequency	Percentage	Level
1.	< 59	4	11%	Unsatisfactory
2.	60 – 69	5	13%	Very Weak
3.	70 – 79	7	18%	Satisfactory
4.	80 – 89	13	34%	Very Good
5.	90 – 100	9	24%	Excellent
Total		38	100%	

3.6.1.1.1 Reliability of the Grammar

The grammar test that used in this research consisted of 30 items. In order to find out whether the test was suitable to be used in real research, the test was tried out to 38 students of X-6 class of SMA N 1 Bandar Lampung. So that, there were no items of questions that had to be dropped out since the reliability was sufficient (0.795) (see Appendix 4). The reliability of the test was gained by using cronbarch's alpha.

From the calculation, it was found that the grammar test is suitable to be used in the real sample because the reliability was high (Hatch and Farhady, 1982:22)

3.6.1.2 Vocabulary test

The writer gave the try out test to class X-6 which consisted 38 students. The try out test of grammar consisted of 30 items. The highest score on vocabulary test was 90 and the lowest score was 33, the mean of score was 64, the median score was 63, which implied that half students score below 63. Meanwhile the mode

was 87 which there were six student scored 87 in completing the test. Below is the table of frequency of students' score in tryout class.

Table 2. Distribution Frequency of Students' Vocabulary in Tryout

No	Class Interval	Frequency	Percentage	Level
1.	< 59	16	42%	Unsatisfactory
2.	60 – 69	6	16%	Very Weak
3.	70 – 79	2	5%	Satisfactory
4.	80 – 89	11	29%	Very Good
5.	90 – 100	3	8%	Excellent
Total		38	100%	

3.6.1.2.1. Reliability of Vocabulary Tryout

The writer gave the try out test to the first SMAN 1 Bandar Lampung. The writer got class X-6 which consisted of 38 students. It is found that the reliability of grammar test (r) is 0.811 (see Appendix 4). The reliability of the test was gained by using cronbarch's alpha.

From the calculation, it was found that the grammar test is suitable to be used in the real sample because the reliability was very high (Setiyadi, 2006).

3.6.1.3 Reading test

The tryout of reading test contained 30 questions. The students who complete the try out were 38 students. The highest score on reading test was 97 and the lowest score was 43, the mean of score was 76, the median score was 80, which implied that half students score below 80. Meanwhile the mode was 87 which there were seven students scored 87 in completing the test. Below is the table of frequency of students' score in tryout class.

Table 3. Distribution Frequency of Students' Reading Ability in Tryout

No	Class Interval	Frequency	Percentage	Level
1	>59	4	11%	Unsatisfactory
2	60-69	5	13%	Very Weak
3	70-79	7	18%	Satisfactory
4	80-89	19	50%	Very Good
5	90-100	3	8%	Excellent
Total		38	100%	

3.6.1.3.1 Reliability of the Reading

The reading test that used in this research consisted of 30 items. In order to find out whether the test was suitable to be used in real research, the test was tried out to 38 students of X-6 class of SMA N 1 Bandar Lampung. The result of the test presented in the appendix 3, it is found that the reliability of reading test (r) is 0.678 (see Appendix 4). The reliability of the test was gained by using cronbarch's alpha.

From the calculation, it was found that the reading test is suitable to be used in the real sample because the reliability was high level (Setiyadi, 2006)

3.7 Reliability and Validity of the Instruments

1. Reliability

Reliability referred whether the test was consistent in its score and gave us an indication of how the test score is accurate (Shohamy, 1985:70). Reliability defined as the extent to which a test produced consistent results when it administered under similar condition (Hatch and Farhady, 1982:243). That is why reliability in this research is important to be measured.

The reliability of grammar test, vocabulary test and reading test was found out by using split-half method. It was done by dividing the number of test items into two groups (odd and even) and correlated by using *Pearson Product Moment Correlation*, the formula is as follow:

$$r_{xy} = \frac{N \sum xy - (\sum x)(\sum y)}{\sqrt{n(\sum x^2) - (\sum x)^2 n(\sum y^2) - (\sum x)^2}}$$

Notes:

R : coefficient of reliability between odd and even numbers

N : number of the students

X : square of x

Y : square of y

$\sum X$: total score of odd number

$\sum Y$: total score of even number

$\sum Y$: total score of even number

(Hatch and Farhady, 1982:198)

The criteria are:

0.80 up to 1.00 is very high.

0.60 up to 0.79 is high.

0.40 up to 0.59 is average.

0.20 up to 0.39 is low.

0.0 up to 0.19 is very low

After being correlated, the calculation was continued by using formula of *Spearman Brown*. This formula was used to measure the reliability coefficient of all items. The formula as follow:

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

Notes:

r_n = Reliability all items

r_{xy} = Coefficient of reliability between odd and even number

The criteria of coefficient correlations are:

0.00 – 0.19 = Very low

0.20 – 0.39 = Low

0.40 – 0.59 = Average

0.60 – 0.79 = High

0.80 – 1.00 = Very high

(Hatch and Farhady, 1982:122)

2. Validity of the Test

The test can be valid if it measures the object to be measured and suitable for the criteria (Hatch and Farhady, 1982:250). There are three basic types of validity: content validity, construct validity, and criterion related validity. This research referred to the content validity. Content validity is extent to which the test measures a representative sample of the subject matter content. Besides that, 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).

a. Validity of Grammar Test

The validity of the grammar test referred to the content and construct validity in which the questions represented three sorts of grammar skills, they were identifying adjective clauses, identifying verb, and identifying the sentences. They were parallel to the skill required by the language curriculum. The test tried out to the students whose level was equal to sample of the research.

Table 4. Specification of grammar test

No	Questions of grammar test	Items number	Total items	%
1	Adjective clauses	4,9	2	7%
2	Grammatical tense	3,5,6,7,10,11,19,20,21,22,23,24,25,26,27,28,29,30	18	60%
3	Adverb connectors	1,2,8,12,13,14,15,16,17,18	10	33%
	Total		30	100%

b. Validity of Vocabulary Test

The validity of the vocabulary test referred to the content and construct validity in which the questions represented three kinds of vocabulary. They were Verb, noun, and adjective.

Table 5. Specification of vocabulary test

No	Part of speech	Items number	Total items	%
1	Verb	5,7,10,11,13,29	6	20%
2	Noun	2,4,8,,14,15,21,27	6	20%
3	Adjective	1,3,9,16,19,28	6	20%
4	Adverb	6,18,23,25,30	6	20%
5	Prepositional Phrase	12,17,20,22,24,26	6	20%
	Total		30	100%

c. Validity of Reading Test

The questions of reading test represented five sorts of reading skills that we were knew that quite the same as the reading skill. They determined main

idea, identifying specific information, inference, reference, and vocabulary. They were parallel to the skill required by the language curriculum. The test tried out to the students whose level was equal to the subject of the research.

Table 6. Specification of reading comprehension test

No	Skills of reading	Items number	Total items	%
1	Determining main idea	13,16,21,26,29	4	13%
2	identifying specific information	1,2,3,4,5,6,7,8,9,10,11,17,22,24, 27	14	47%
3	Inference	12,18,25,28	4	13%
4	Reference	14,15,19,20,23,30	6	20%
5	Vocabulary	24,27	2	7%
	Total		30	100%

3.8 Level of Difficulty

The difficulty levels of an item showed easy or difficulty that particular item done by the participants. To measure the level of difficulty of each test item, the writer used the following formula:

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

Where : FV =the index of difficulty

R =the number of the correct answer

N =the number of the students taking the test

(Heaton, 1991 : 179)

Classification:

- a. An item with FV 0.00 – 0.30 = hard
- b. An item with FV 0.31 – 0.70 = fair

- c. An item with FV 0.71 – 1.00 = easy

3.9 Discrimination Power

Discrimination power referred to the extent to which the item differentiates between high and low level students on the test. A good item according to this criterion was “one in which good students do better than the poor.” (Shohamy, 1985:81). To calculate the discrimination power (DP) of the test items, the writer uses the following formula:

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

- Where: DP = discrimination power index
 U = the proportion of upper group students
 L = the proportion of lower group students
 n = total number of students

(Shohamy, 1985:82)

Classifications:

1. 0.00 – 0.20 = poor
 2. 0.21 – 0.40 = satisfactory
 3. 0.41 – 0.70 = good
 4. 0.71 – 1.00 = Excellent
- (negative) = Bad items (should be omitted)

3.10 Scoring System

Scoring system is used to find the reliability of grammar, vocabulary and reading test. Mikado and Matsumoto in Danahar (1994:4) suggest that in order to improve the reliability of vocabulary, grammar and reading comprehension, the number of questions is added and also the number of multiple choices is multiplied. Thus, the writer used multiple choices in order to gain the objectivity of the result, in form of eighteen multiple choice and four alternative answers. One was as key answer and the other three were the distracters. In evaluating the students' grammar, vocabulary and reading comprehension scores were calculated by using formula as follows:

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

Notes:

S : the score of the test

R : the total of the right answers

N : the total items

3.11 Data Analysis

After conducting the test, the writer analyzed the data. It was used to identify whether there was positive significant correlation between students' grammar mastery and vocabulary mastery and their reading ability. Normality was used to measure whether the data were normally distributed or not. The writer used SPSS to analyze the data. The hypothesis for the normality test was as follows:

H_0 : the data is not distributed normally

H_1 : the data is distributed normally

In this research, H_1 is accepted if $p > \alpha$ (p = the significant score of students, α = the significant level), and the writer used level of significance of 0.05.

The data were correlated by using *Pearson Product Moment Correlation* (SPSS) in order to investigate whether there was any correlation or not.

3.12 Hypothesis Testing

The hypotheses of this research are:

1. H_0 = There is no significant correlation between students' grammar and their reading ability.

H_1 = There is significant correlation between students' grammar and their reading ability.

2. H_0 = There is no significant correlation between students' vocabulary mastery and their reading ability.

H_1 = There is significant correlation between students' vocabulary mastery and their reading ability

3. H_0 = There is no significant shared correlation between students' grammar and vocabulary mastery and their reading ability.

H_1 = There is significant shared correlation between students' grammar and vocabulary mastery and their reading ability.

In order to prove the hypotheses of this research, the writer used the following steps:

- a. Used the Product moment correlation in order to investigate the first and second hypothesis. The formula is as follow:

$$r_{x_1y} = \frac{N \sum_{x_1} y - (\sum x_1)(\sum y)}{\sqrt{[N \sum x_1^2 - (\sum x_1)^2][N \sum y^2 - (\sum y)^2]}}$$

$$r_{x_2y} = \frac{N \sum_{x_2} y - (\sum x_2)(\sum y)}{\sqrt{[N \sum x_2^2 - (\sum x_2)^2][N \sum y^2 - (\sum y)^2]}}$$

(Hatch and Farhady, 1982)

Notes:

r_{x_1y} = Coefficient correlation between students' understanding of grammar and their reading ability.

r_{x_2y} = Coefficient correlation between students vocabulary mastery and their reading ability.

N = Number of students in sample

$\sum x_1$ = The total score of students' grammar

$\sum x_2$ = The total score of students' vocabulary

$\sum y$ = The total score of reading comprehension

$\sum x_1Y$ = The total score of students' understanding grammar and reading comprehension

$\sum x_2 Y$ = The total score of students' vocabulary mastery and reading comprehension

(Hach and Farhady, 1982:198)

- b. In order to investigate the third hypothesis multiple correlations formula was used. The formula can be seen as follows:

$$R_{y.12} = \sqrt{\frac{r^2_{y1} + r^2_{y2} - 2r_{y1} \cdot r_{y2} \cdot r_{12}}{1 - r^2_{12}}}$$

(Sudjana, 1992:385)

Where:

$R_{y.12}$: The coefficient correlation between students' grammar, vocabulary and their reading ability.

r_{y1} = The coefficient correlation between X1 and Y

r_{y2} = The coefficient correlation between X2 and Y

r_{12} = The coefficient correlation between X1 and Y2

(Sudjana, 1992:385)

Setiyadi (2006: 167) states that coefficient correlation is always between -1 up to +1

Between 0.800 up to 1.00 = very high

Between 0.600 up to 0.800 = high

Between 0.400 up to 0.600 = moderate

Between 0.200 up to 0.400 = low

Between 0.000 up to 0.200 = very low

The coefficient correlation (r) value from the formula is intended to compare with critical value of the Pearson Product Moment Coefficient Correlation from the table.

- c. Determine the degree of freedom (df). The formula is $N-2$
- d. Determine the level of significance. In this case the researcher used significance level $\alpha 0.05$
- e. Determine the result of correlation in order to investigate the first and second hypothesis. It is achieved by comparing the result of r_{xy} with the critical value of r in the r_{table}
 1. If $r_{xy} \geq r_{table}$ it means that H_1 is accepted and the null hypothesis (H_0) is rejected.
 2. If $r_{xy} \leq r_{table}$ it means that H_1 is accepted and the null hypothesis (H_0) is rejected.