CHAPTER III

RESEARCH METHODOLOGY

III.1. Research Design

This research was an experimental research. Marguerite, et al (2010) explain that an experimental research is the researcher control or manipulates how group of participants are treated and then measures how the treatment affects each group. In technical term, the researcher controled or manipulated one or more independent variable and examines the effect that experimental manipulation has on the dependent variable or the outcome of the study. The independent variable is the variable that refers to how participants are treated. Participants are usually assigned to different groups that receive different treatments.

The design of this study was a quasi-experimental research. It consisted of pre-test and post-test non-equivalent control group design. Pre-test was administered before being given the treatment. In this research, three variables were used; using Communicative Language Teaching (CLT) through small group discussion was an independent variable, students' writing ability was dependent variable 1, and students' reading comprehension was dependent variable 2. Two groups were involved: an experimental group and a control group.

Table III.1

Quasi-Experimental Design

Group	Pre-test	Treatment	Post-test
Experimental	O1	X	O2
Control	O3	No treatment/ Conventional treatment	O4

(Adopted from Sugiyono 2010:112)

Where:

X   = Using CLT through small group discussion

O1 = Students' ability beforeaccurate treatment on experimental group

O2 = Students' ability after being given treatment on experimental group

O3 = Students' ability before being given Conventional treatment on control group

O4 = Students' ability after being given Conventional treatment on control group

According to the design on table III.1, firstly we needed to determine sample. Then, we did pre-test to see the students' ability for both groups experimental group and control group. Furthermore, treatment was given to the experimental group by using CLT through small group discussion. The control group was given a conventional technique or without treatment of CLT through small group discussion.

III.2. Location and Time of the Research

This research was conducted at SMAN 1 Kampar Timur, which is located at Jl. Pekanbaru-Bangkinang KM. 40 Kampar Timur sub-district

Kampar Regency from November 23, 2016 to May 9, 2017 in the academic year 2016-2017.

III.3. Population and Sample

Gay (2000) states that population is a group interest that the evaluation of the result to be generalizable It involves object or subject that has certain quality and characteristics. The population of this research was the first year of SMAN 1 Kampar Timur. The first year students of in this school were divided into 6 classes. For more detail, see table III.2 below.

Table III.2

Total number of the first year students of SMAN 1 Kampar Timur

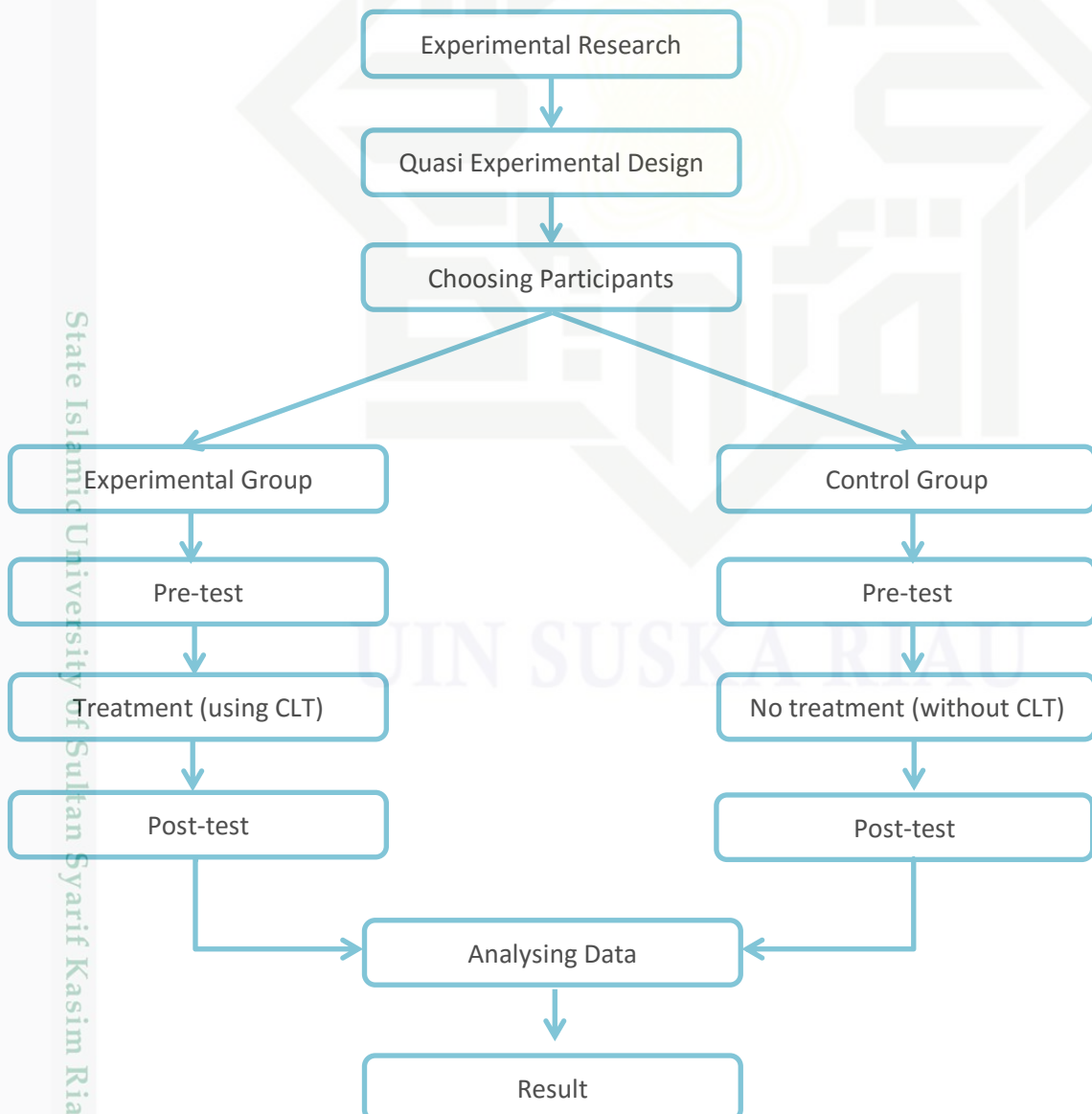| No.	Classes	Number of Students
1	XMIPA 1	36
2	XMIPA 2	36
3	XMIPA 3	32
4	XMIPA 4	33
5	XMIPA 5	31
6	XMIPA 6	33
Total of Population		**201**

In this research, there were two groups of participants as sample namely the experimental group and the control group. They were determined by using cluster random sampling. Gay (2009) states that cluster sampling randomly select groups, not individuals. The researcher got the sample by

selecting the intact group as a whole is known as a cluster sampling (Singh, 2006).

Table III.3

The Total Sample of the Research

No	Class	Male	Female	Total
1	XMIPA 1 (Experimental group)	10	26	36
2	XMIPA 2 (Control group)	9	28	36

III.4. Procedure of the Research

III.5. Instrument of the Research

III.5.1. Test

Test is one of the instruments to measure the students' ability in doing something. Suharsimi Arikunto (2006:150) states that test is a series of question or exercises which is used to measure skill, intelligent knowledge, aptitude of individual or groups. In this study, the researcher prepared writing and reading test.

III.5.2. Observation Sheet

The observation sheet is used to observe the teacher's activities. The observation sheet is designed base on the indicator of variable X (using CLT through small group discussion) and adapt base on the relevant situation and condition of the students.

III.6. Technique of Data Collection

To collect the data, writing and reading tests were used as instrument. To measure writing ability of the students, writing test was administered to them. The students choose and wrote one topic of procedure texts based on topics given. The test had some considerations such as; how to do or make something accurately, use correct grammar (simple present tense, imperative word, action verb, connective word, and adverbial clause), use appropriate vocabulary, use mechanic (spelling, punctuation, capitalization) and lastly use fluency (using simple sentence and flowing style).

On the other hand, to measure reading comprehension of students' in this study, reading test was administered to them. Text comprehension was

usually assessed through questions in multiple choices. Questions should focus on finding main idea, supporting detail, inference, reference and vocabulary in context. Elizabeth (2011) states that material used for assessing reading should ideally be authentic. They should reflect the type of reading normally encountered in daily life. Clay (2001) remarks that multiple choice questions can be used to test factual recall as well as levels of understanding and ability to apply learning. In doing the test the students were instructed to write and answer questions about procedure text in 2x40 minutes.

III.7. Validity and Reliability Test

III.7.1. Validity

Before collecting the data, each item of question was tested in order to be ideal to tried out. The purpose of the try out was to find out the quality of the test items. We got main point from Brown (2003:3) that a test is method of a measuring a person's ability, knowledge, or performance in a given domain. In line with that, Creswell (2008) states that validity is the individual's scores from an instrument make sense, meaningful, enable you, as the researcher to draw good conclusions from the sample you are studying to the population. It meant that validity is the extent to which inferences make from assessment result are appropriate, meaningful, and useful in terms of the purpose of the assessment.

To analyze the validity of the data, the researcher analysed by inter item validity used SPSS 20 program. The following table is the

criteria of items validity. To know whether the test valid or not, the value of $r_{counted}$ must be compared with r_{table}. For example, the number of students was 10. The degree of freedom is 25-2=23, r_{table} on df =23 are 0,3961 (5%).

If the value of $r_{counted} > r_{table}$ = valid,

If the value of $r_{counted} < r_{table}$ = invalid.

The result as below:

Table III.4 Instrument Validity Before Try Out

	Corrected Item-Total Correlation	R Table $\alpha = 0, 05 ; n= 20$	Categories
ITEM1	,283	< 0,422	Invalid
ITEM2	,417	> 0,422.	Valid
ITEM3	,731	> 0,422.	Valid
ITEM4	,849	> 0,422.	Valid
ITEM5	,849	> 0,422.	Valid
ITEM6	,849	> 0,422	Valid
ITEM7	,849	> 0,422.	Valid
ITEM8	,542	> 0,422.	Valid
ITEM9	,850	> 0,422.	Valid
ITEM10	,156	< 0,422.	Invalid
ITEM11	,361	< 0,422	Invalid
ITEM12	,110	< 0,422.	Invalid
ITEM13	,173	< 0,422.	Invalid

ITEM14	,244	< 0,422.	Invalid
ITEM15	,363	< 0,422.	Invalid
ITEM16	,323	> 0,422	Valid
ITEM17	,289	< 0,422.	Invalid
ITEM18	,248	< 0,422.	Invalid
ITEM19	,515	> 0,422.	Valid
ITEM20	,323	< 0,422.	Invalid
ITEM21	,699	> 0,422	Valid
ITEM22	,464	> 0,422.	Valid
ITEM23	,464	> 0,422.	Valid
ITEM24	,731	> 0,422.	Valid
ITEM25	,699	> 0,422.	Valid

From the result of calculation by using SPSS, it is clear that 15 items are valid; item 2, item 3, item 4, item 5, item 6, item 7, item 8, item 9, item 16, item 19, item 21, item 22, item 24, item 25 and 10 items are invalid; item 1, item 10, item 11, item 12, item 13, item 14, item 15, item 17, item 18, item 20, item 21, and item 25. So, the invalid items were removed by the writer, and the result of validity after the invalid items were changed can be apparent on table III.5 :

Table III.5 Instrument Validity after Try Out

	Corrected Item-Total Correlation	R Table α = 0, 05 ; n= 25	Categories
ITEM1	,969	> 0,422	Valid
ITEM2	,969	> 0,422.	Valid
ITEM3	,851	> 0,422.	Valid
ITEM4	,851	> 0,422.	Valid
ITEM5	,851	> 0,422.	Valid
ITEM6	,851	> 0,422	Valid
ITEM7	,756	> 0,422.	Valid
ITEM8	,932	> 0,422.	Valid
ITEM9	,932	> 0,422.	Valid
ITEM10	,932	> 0,422.	Valid
ITEM11	,932	> 0,422	Valid
ITEM12	,932	> 0,422.	Valid
ITEM13	,969	> 0,422.	Valid
ITEM14	,969	> 0,422.	Valid
ITEM15	,932	> 0,422.	Valid
ITEM16	,969	> 0,422	Valid
ITEM17	,969	> 0,422.	Valid
ITEM18	,874	> 0,422.	Valid
ITEM19	,969	> 0,422.	Valid
ITEM20	,969	> 0,422.	Valid

It is apparent after removing the invalid items, the result of all items' calculation were valid. So, in this research, the item for the test was 20 questions.

III.7.2. Reliability

A reliability was an important characteristic of a good test. In order to calculate the reliability of the test, the researcher founded out the mean of the students' scores the standard deviation.

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 is taken from Heaton (1975: 164) as follow :

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

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 III.6 Ccriteria Coefisien of Reliability

Coefisien Reliability	Criteria
$0{,}80 \le r_{11} \le 1{,}00$	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

(Arikunto, 2006, p.223)

The result of test realiblity can be showed as follow:

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,993	,993	20

From the results of calculation by using SPSS, it is obvious that the value of Cronbach's Alpha Based on Standardized Items (r_{11}) for test is 0,993. So, 0,80 $\leq 0,993 \leq 1,00$. It means that the instrument is highest realibility.

III.8. Technique of Data Analysis

Post-test score from experimental and control classes were used in order to find out whether there was a significant effect or not of using CLT through small group discussion on students' writing ability and students' reading comprehension at SMAN 1 Kampar Timur. The score were analysed statistically, both descriptive and inferential statistics. In this research, the researcher used this formula:

III.8.1. Independent sample t-test

The scores would be analysed statically by using independent sample t-test and paired sample t-test. They were used in order to find out the result of the hypotheses that mentioned at chapter II. They were as follows:

a. To find out whether there was a significant difference between students' reading comprehension pre-test mean score of experimental group and students' reading comprehension pre-test mean score of control group on procedure text by using CLT through small group discussion at SMAN 1 Kampar Timur.

b. To find out whether there was a significant difference between students' reading comprehension post-test mean score of experimental group and students' reading comprehension post-test mean score of control group on procedure text by using CLT through small group discussion at SMAN 1

c. To find out whether there was a significant difference between students' writing ability pre-test mean score of the experimental group and students' writing ability pre-test mean score of the control group on procedure text by using CLT through small group discussion at SMAN 1 Kampar Timur.

d. To find out whether there was a significant difference between students' writing ability post-test mean score of an experimental group and a control group on procedure text by using CLT through small group discussion at SMAN 1 Kampar Timur.

To analyse the final-test scores of the experimental group and the control group, the following formula was used:

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

Where:

t 1. = The value of comparing two means

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 group and control group. The t-obtained value was consulted with the value of the t-table at the degree of freedom (df) by using formula:

(df) = (N_1+N_2) - nr

Where:

df = the degree of freedom

N_1 = number of students from experimental class

N_2 = number of students from control class

nr   = number of variable

The value of both; t_o and t-table statistically hypothesis:

H_α = t_o > t-table

H_o = t_o < t-table

a. H_α is accepted if t_o > t-table or there was effect after giving the treatment by using Communicative Language Teaching through small group discussion on students' writing ability and students' reading comprehension of the first year students at SMAN 1 Kampar Timur.

b. H_α is accepted if t_o < t-table or there was no an effect after giving the treatment by using Communicative Language Teaching through small group discussion on students' writing ability and students' reading comprehension of the first year students at SMAN 1 Kampar Timur.

III.8.2. Non-independent sample t-test (paired sample t-test)

Non-independent sample t- t_{test} is known also as Paired-Sample t_{test}. The researcher used this formula to obtain the result of the third, fourth, seventh and eight hypotheses that was to find out whether there was significant effect of using CLT through small group discussion and conventional teaching technique on students' writing ability and students' reading comprehension at the first year students of SMAN 1 Kampar Timur. L.R Gay (2000) 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).

Pre-test and post-test scores were used in the experimental class in order to find the significant effect of using CLT through small group discussion on students' writing ability and reading comprehension of the first year students at SMAN 1 Kampar Timur. To obtain the data, SPSS 20 was used.

For the effect size of the independent sample t-test, the eta squared is 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 follow:

$$eta\ squared = \frac{t_2}{t_2 - (N_1 + N_2 - 1)}$$

The effect size can assist between 0 to 1, according to Cohen (Cohen, Manion, and Morrison :2007 p.521) the category of effect size is as follow:

0– 0.20	= Weak effect
0.21 – 0.50	= Modest Effect
0.51 – 1.00	= Moderate effect
> 1.00	= Strong effect

Paired sample t-test was used in this research to obtain the result of hypothesises. Gay (2000:163-167) contends that t-test for non-independent variable sample is used to compare groups that are formed by some types

of matching or to compare a single group's performance on pre-test and post-test.

The formula of paired-sample t$_{test}$:

$$t = \frac{\overline{D}}{\sqrt{\dfrac{\sum D^2 - \dfrac{(\sum D)^2}{N}}{N\,(N-1)}}}$$

D : Gain Score (D=X_2-X_1)

The t-table has the function to see if there is a significant improvement among the mean of the score of both pretest and posttest. The t-obtained value is consulted with the value of t-table at the degree of freedom (df) = N-1 which is statistically hypothesis:

H$_\alpha$ = t$_o$ > t-table

H$_o$ = t$_o$ < t-table

a. H$_\alpha$ is accepted if to > t-table or there is any significant effect after giving the treatment by using CLT through small group discussion on students' writing ability and students' reading comprehension of the first year students at SMAN 1 Kampar Timur.

b. H$_o$ is accepted if to< t-table or there is no significant effect after giving treatment by using CLT through small group discussion on students' writing ability and students' reading comprehension of the first year students at SMAN 1 Kampar Timur.