CHAPTER III
RESEARCH METHOD

3.1 Research Method

In this research, the researcher used descriptive quantitative research design with interactive correlation. Quantitative research was research that the research data in the form of numeral and analysis used statistics. Sugiyono (2010:37) states that interactive correlation is a correlation that has influence one variable to other variables which implement in quantitative data. In this research, the researcher used quantitative research with correlation research. So in this case, independent variable and dependent variable are having close correlation each other.

In this research, there are two variables, they are High Order Thinking Skills and writing ability. According to Arikunto, (2010:162): a variable is defined as something that varies from one case to another. The dependent variable is variable which one observes and measures to determine the effect of the independent variable. Independent variable (the major variable) is the variable which is select to be manipulated and measure by the researcher. Nazir (2009:124) state that dependent variable (Y) is variable caused by Independent variable (X). It means that a dependent variable (Y) is a variable which influenced by independent variable (X). The independent variable is high order thinking skills (X) and the dependent variable is writing analytical exposition text (Y).

3.2 Population, Sample and Sampling Technique.

3.2.1 Population

A population is defined as all members of any well defined class of people, events or object (Arikunto, 2010:148). Indeed population is all subject in a study that is going observed, in this research the population is the eleventh grade in SMA Kemala Bayangkari Kotabumi in academic year 2018/2019. The population in this study consists of five classes of the eleventh grade in SMA Kemala Bhayangkari Kotabumi academic year 2018/2019 which consist of 153 students. There are: XI Science 1, XI Science2, XI Science3, XI Social 1, XI Social 2.

TABLE 6
POPULATION OF RESEARCH

No	Class	Total
1	XI Science 1	32
2	XI Science 2	33
3	XI Science 3	31
4	XI Social 1	29
5	XI Social 2	28
	Total	153

Source: Staff Administration of SMA Kemala Bhayangkari

3.2.2 Sample

Sample is part of population that wants to be analyzed or group of individual as part of population. Setiyadi (2006:38) says that sample is the individual group that represents all of individual as a part of target groups. So, it can be concluded that sample is a represent population which is research. From the five of the Science and Social classes above, the researcher took representation from each of class as the research's sample by use proportional

random sampling. According to Arikunto (2006:134), if the sample is less of 100, it should be taken all, but if the sample is big population or more than 100 it could be taken 10-15% or 20-25% or more.

The total of students in eleventh grade of SMA Kemala Bhayangkari is 153. In this case, the researcher took 25% from each class that been sample of the research because the total of students in eleventh classes is more that 100. Furthermore, the way to take the sample in this research were the researcher write down the name of science and social students into piece of papers. Then, the paper was droped out from the can. The student's name which is come out from the can used as the sample of the research. The number which is needed should be appropriate with the sample of the research. The sample of the research can be illustrated in the table as follow:

TABLE 7
RESEARCH SAMPLE

No.	Class	Population	Sample	Up rounding
1	XI Science 1	32	$25\% \times 32 = 8$	8
2	XI Science 2	33	$25\% \times 33 = 8{,}25$	8
3	XI Science 3	31	$25\% \times 31 = 7{,}75$	7
4	XI Social 1	29	$25\% \times 29 = 7{,}25$	7
5	XI Social 2	28	$25\% \times 28 = 7$	7
	Total	153		38

3.2.3 Sampling Technique

This research used proportional random sampling technique to take a sample. According to Sugiyono (2010:82), this technique is used if the populations has a member/element that is not homogeneous and stratify proportionally. By using this technique all of individuals in the population get the same opportunity to be chosen as this sample of this research. To take the sample,

the researcher used list of the students' name of eleventh classes and randomly selected their names by making small pieces of paper with the name of subjects write on them and those papers are rolled and come into a tin can. In addition, the tin can mixed, and the paper is dropped out from the tin can.

3.3 Research Instrument

Research instrument is tool to collect data. According to Sugiyono (2010:148), instrument is a tool which used to measure the nature and social phenomenon being observed. In this research, the research applied an objective test as an instrument for collecting the data. The Instrument used for measuring ability in writing analytical exposition text is written test. Writing test using expert judgments that depend on their judgment toward the specification of writing ability in analytical exposition text that researcher served in this chapter at the specification of writing part. This instrument is tool which is used to measure the ability in writing. The second instrument is in the form of questionnaire. It was used to measure Higher Order Thinking Skills of students. Questionnaire consisted of 30 statements.

3.3.1 Research Instrument of Writing Ability in Analytical Exposition Text

a. Conceptual Definition of Writing Ability in Analytical Exposition Text.

Writing ability in analytical exposition text is the power or skill to deliver writer ideas, expressions, feelings, and minds in written form of argumentation text with a purpose to persuade and the reader to get specific and detail information about phenomenon that surrounding, to analyze all of the problem that happen there are five important thing consider to be useful that someone can

be easier in writing. They are: contents, language use, organization, vocabulary, and mechanics.

b. Operational Definition of Writing Ability in Analytical Exposition Text.

Operational definition is used to give empirical reference that can be observed and measured. It can be concluded that operational definition is bridge which connect conceptual-theoretical level with empirical-observational level.

The instrument is in the form of written test. The topic of analytical exposition text that students should write here related to the hot issue that happened around them, such as students should be banned to bring hand phone in the class, smoker should have special place, students should be carefully toward free sex, students should protect themselves from drugs. For the specification of writing test can be seen below:

TABLE 8
SPECIFICATION TEST OF WRITING ABILITY IN ANALYTICAL EXPOSITION TEXT

Research Variable	Aspects	Indicator	Score
Ability in writing Analytical exposition text	Content	• Students are able to develop sentences in analytical exposition text.	13-30
	Language Use	• Students are able to write analytical exposition text with effective construction.	5-25
	Vocabulary	• Students are able to use vocabulary correctly in writing analytical exposition text.	10-20
	Organization	• Students' idea must be coherence with the content of writing analytical exposition text.	7-20

	Mechanics	• Students' are able to write analytical exposition text with correct spelling, punctuation, and capitalization.	2-5

(Source :Modifed from Jacob et al. 's in Weigle (2002:116))

3.3.2 Research Instrument of High Order Thinking Skills (HOTS)

a. Conceptual Definition of High Order Thinking Skills (HOTS)

High Order Thinking Skills are those which involve mental effort, which may take various forms (e.g. problem-solving, contrasting, applying, synthesizing, analyzing, evaluating).

b. Operational Definition of High Order Thinking Skills (HOTS)

Operational definition is used to give empirical references which can be observed and measure. It can be conduct that operational definition is bridges which connect conceptual-theoretical level with empirical-observation level. The instrument is in the form of questionnaire. The tests consist of 30 statements. There are some levels used to assess in high order thinking skills level questionnaire, there are: creating, evaluating, analyzing, applying, understanding, remembering. In determining the scoring system, the score for students that answer 5, for often 4, for sometimes 3, for seldom 2, and for never 1 (positive statements), and always is 1, often is 2, sometimes is 3, seldom is 4, and never is 5 (negative statements). The researcher use questionnaire to know how far students have high order thinking skills by answering some statements that researcher served.

c. Instrument Specification of High Order Thinking Skills (HOTS)

Based on the conceptual and operational definition above, the specification of the instrument can be seen in the following table.

TABLE 9
SPECIFICATION OF HIGH ORDER THINKING QUESTIONNAIRE

Research variable	Level	Indicator	Positive statement (+)	Negative statement (-)	Total number of statements
High order thinking skills	Create	- Students can organize their information in a new or different way.	27,29	28,30	4
	Evaluate	- Students have to be able to check their writing.	21,23,25	22,24,26	6
	Analyze	- Involving students breaking apart information to examine each section.	17,19	18,20	4
	Apply	- Students use their thinking to their procedural knowledge.	13,15	14,16	4
	Understand	- Students are not retrieving information memorized; they are building a new connection in their minds. - Students develop new understanding.	7,9,11	8,10,12	6
	Remember	- Involving students retrieving information process from the memory.	1,3,5	2,4,6	6
	Total		15	15	30

(Source: The taxonomy Bloom's Revision by Anderson and Krathwol in Brookhart (2001:41))

3.3.3 Validity of the Test

Validity is a measurement which shows the grades of number of an instrument. Validity is the most important idea to consider when preparing or selecting an instrument for use. More than anything else, researcher wants the information they obtain through the use of an instrument to serve their purpose (Fraenkel and Wallen, 2009:147). An instrument called a valid one when it can measure something which is wanted by uncovering the variable studied exactly (Arikunto, 2006:168). In this research to measure the validity of instrument from students' High Order Thinking Skills, the researcher used Person product moment correlation. According to Arikunto (2006:28) the formula of Person product moment correlation is:

$$r_{} = \frac{N.\sum X \; - (\sum X)(\sum Y)}{\sqrt{\left(N.\sum_X 2 - (\sum X \times \sum X)\right)(N.\sum_y 2 - (\sum Y \times \sum Y))}}$$

Where:

r : correlation coefficient of variable X and Y.

∑xy : the sum of the product of X and Y scores for each students.

∑X : the sum of X scores.

∑Y : the sum of Y scores.

∑x2 : the sum of square of students' analytical exposition text ability score.

∑y2 : the sum of square of students' vocabulary mastery score.

(∑X)2 : the sum of the squared X scores.

(∑Y)2 : the sum of the squared Y scores.

N : the total of respondents.

The criterion of validity test is the calculation result of $r_{observed}$ is consulted with r_{t_0} score, if $r_{o|}$ $>r_{t_0}$, it means the instrument is valid and then the instrument can be for the research.

After that, to measure the validity of instrument test from the ability in writing analytical exposition text, the researcher used constructed validity of the instruments; written test. The researcher used the opinion from expert or usually called as expert's judgment. The experts are Mrs. Dewi Sartipa, S.Pd., M.Pd. BI and Mrs. Rulik Setiani S.S., M.Pd.

3.3.4 Reliability of the Test

Fraenkel and Wallen (2009:154) stated that, "Realibility refers to the consistency of the scores obtain, how consistent they are for each individual from one administration of an instrument to another and from one set of items to another. "If the data are true based on the fact or real, how many data used to the result was same." Reliability shows the degree of mainstays about something. It means the data can be believed so it can be relied on. To measured the reliability of instrument test from the students' higher order thinking skill. The researcher used Alpa Cronbach. Alpa Cronbach is a measure of internal consistency, which is closely related to a set of items are as a group. The formula of Alpa Cronbach is:

$$\alpha = \frac{N.\bar{c}}{v + (N-1).\bar{c}}$$

Where:

α : Alpa Cronbach

N : Equal to the number of items

$\bar{c}$: The average inter-items covariance among the items

$\bar{v}$: Equal the average variance

To measure the reliability of instrument test from the students' writing ability in analytical exposition text, according to Ebel in (Azwar, 2001:106), the formula to estimate interater reliability as follows:

$$r_{x}^{1} = \frac{(Ss^2 - Se^2)}{Ss^2}$$

Where:

Ss^2 : Variant between subjects that is influenced by rating

Se^2 : Variant interact between subject and rater

r_x^1 : Coefficient reliability x

The formula to calculate Se^2 and Ss^2 are:

$$Se^2 = \frac{\sum i^2 - (\sum R^2)/K + (\sum i)2/n}{(n-1)(K-1)}$$

$$Ss^2 = \frac{(\sum T^2)/K - (\sum i)}{n-1}$$

Descriptions:

I : Rating number which is given by a rater to a subject.

T : The number of rating which is received by a subject to all rates.

R : The number of rating which is given by a rater to all subjects.

N : Total subject.

K : Total Rater.

After the result of the calculation in found by those formula above, r_{0l} is interpreted to the r_S table to find how far the reliability of the test instruments; constructing writing test, according to Arikunto (2010:319), table interpretation of reliability can be shown from the table below:

TABLE 10
INTERPRETATION OF RELIABILITY

Large value of r	Interpretation
Between 0,800-1,00	Very high
Between 0,600-0,800	High
Between 0,400-0,600	Enough
Between 0,200-0,400	Low
Between 0,000-0,200	Very low

3.4 Data Collecting Technique

According to Arikunto (2010:266) data collecting tool that is collected in quantitative research can be also conduct by giving the test to measure the subject that will be observed. In this research, the data is collected by giving some tests. Moreover in collecting the data the researcher has two tests, namely: questionnaire and written test. Students' writing used scored based on five aspects which were modified from jacob's et.al in Weigle (2002:116). The criteria of each component could be seen in the previous page in research instrument.

The total score of the five components (content, language use, organization, vocabulary, and mechanics) are 100 and lowest is 5.

3.5 Data Analysis

The technique of data analysis uses the formula of Person's product moment correlation. The researcher used this formula because the researcher find out the correlation between two interval indications, namely students' high order thinking skill and their writing ability in analytical exposition text. The researcher used normality test and homogeneity test were as prerequisite test. The technique of data analysis used by researcher described below:

3.5.1 Normality Test

Normality test is conducted to find the data from the sample whether have normal distribution or not. According to Sudjana (2006:466) to calculate the normality with Liliefor's formula is as follows:

a. Determining the raw score by using the following formula:

$$Z_{i=\frac{x_i-\bar{x}}{s}}$$

Descriptions:

Z_i : Raw score.

X_i : The values obtained.

$\bar{X}$: Average

S : Standard deviation

b. The determine to opportunity of each raw score by using the following formula:$F(Z_i) = P(Z \leq Z_i)$

c. Determine the proposition by using the formula:

$$S(Z_i) = \frac{m \qquad Z_1, Z_2 \ldots\ldots Z_n \; tha \; \leq Z_i}{n}$$

d. Calculate the largest absolute price, which is called L_o, then compare

$L_o \; w \quad h \; L_t$

e. A normal criterion is if $L_o \leq L_t$ so, the group has the normal distribution.

3.5.2 Homogeneity test

Before to the next steps to analyze the data, it was do homogeneity test. It was because the researcher must find whether or not the samples of the research were really homogeneous or not, and to measure the homogeneity used formula of Bartlett and the test criteria were: if $X^2o \qquad \leq X^2t$, H_0 is accept and Ha is rejected. It means that the data was homogeneous. According to Sudjana (2005:263), to measure homogeneity of the data the researcher used some follows:

1. Determine the composite of variant from all of the sample used the formula:

   $S^2 = \frac{\sum(n_1 - 1)S_i^2}{\sum(n_1 - 1)}$

2. Determine B score by used the formula: $B = (\log S2) \sum(n_1 - 1)$
3. Calculate X^2 by used the formula:$X^2 = (ti \;\; 10)\{B - \sum(n_1 - 1) \log S_i^2\}$ and the hypothesis that should be proved was $H_0 : \sigma_1^2 = \sigma_2^2 \ldots\ldots = \sigma_3^2$ (the variant of data was homogeneous).

3.5.3 Hypothesis test

After the result of the calculationr_x was found by used to correlation product moment formula:

$$r_{.} = \frac{N.\sum X - (\sum X)(\sum Y)}{\sqrt{\left(N.\sum_{x} 2 - (\sum X \times \sum X)\right)(N.\sum_{y} 2 - (\sum Y \times \sum Y))}}$$

Where:

r : correlation coefficient of variable X and Y.

∑xy : the sum of the product of X and Y scores for each students.

∑X : the sum of X scores.

∑Y : the sum of Y scores.

∑x2 : the sum of square of students' analytical exposition text ability score.

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(∑X)2 : the sum of the squared X scores.

(∑Y)2 : the sum of the squared Y scores.

N : the total of respondents.

The result of hypothesis test should be interpreted to r_{t_0} to find whether or not there was significant correlation between High Order Thinking Skill and ability in writing analytical exposition text. The hypotheses that should be proven were:

H_a is accepted if: $r_{observed} > r_{table}$; it means that there was significant correlation between High Order Thinking Skills and ability in writing analytical exposition text.

H_0 is accepted if: $r_{observed} < r_{table}$; it means that there was no significant correlation between High Order Thinking Skills and ability in writing analytical exposition text.

With the correlation interpretation as follow:

TABLE 10
INTERPRETATION OF RELIABILITY

Large value of r	Interpretation
Between 0,800-1,00	Very high
Between 0,600-0,800	High
Between 0,400-0,600	Enough
Between 0,200-0,400	Low
Between 0,000-0,200	Very low

Because the result of r_x only shows the coefficient of correlation, the next step to find out the significant correlation both two variables, the researcher used to t-test. According to Sugiyono (2010:184), the formula is as follow:

$$t = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}}$$

Where:

t : Significant of correlation.

r : Coefficient of correlation (r_x).

n : Total sample

The formula above was very important due to find out whether or not H_0 was rejected and Ha was accepted in this research. The result computation indicates whether or not there was significant correlation between two variables.