CHAPTER III
RESEARCH METHOD

This chapter presents the description of research method that includes research design, location of the research, population and sample, research instruments, data collection and data analysis. Below is the description of research method.

A. Research Design

This study uses quantitative research. According to Sugiyono, quantitative is a research that involved type of number and table of ranked or scoring as the data of research.[1] The data of quantitative research is used for statistically technique. In other word, the form of data is number or score that obtained by using data collection tool. Meanwhile, the design that employed by the researcher in this study is path analysis. Theoretically, Land in Caraka and Sugiarto stated that path analysis is a technique of analysis that used to analyze causal relationship that occur in multiple regression variable if the variable that influence depend not only directly but also indirectly. [2]

In other word, path analysis is not only investigate direct contribution, but also indirect contribution. Path analysis is used in this study, because the researcher does not only wants to know the correlation among students' critical thinking, learning style toward their writing skill but also to see the contribution among those variables.

B. Participants of the Research

The population of this study is students of MA Darussalam. MA Darussalam is the institution which is under auspicious of Islamic boarding school. It is located in Nganjuk. There are 309 students as the population that divided into 9 classes. As the participants of study, the researcher choose 100 students to fulfil the instruments.

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[1] Sugiyono. (2013), *Metodologi Penelitian Kuantitatif, Kualitatif Dan R&D*. (Bandung: ALFABETA). (Bandung: ALFABETA, 2013).
[2] Caraka and Sugiarto, Path Analysis Terhadap Faktor-Faktor yang Mempengaruhi Prestasi Siswa, *Jurnal Akuntabilitas Manajemen Pendidikan*, 5 (2), (2017), 214.

According to Sarwono, the minimum sample size of path analysis is 100 and the ideal sample size is 400-1000.[3]

Table 3. 1 Sample size in each class

No	Class	Students Amount	Sample Size (30% from population)
1	MIPA 1	33	11
2	MIPA 2	34	12
3	MIPA 3	33	11
4	MIPA 4	29	9
5	IPS 1	24	8
6	IPS 2	24	8
7	IPS 3	28	9
8	IPS 4	27	8
9	IPS 5	33	11
10	IPS 6	43	13
	Total	309	100

C. Research Instrument

Instrument is a tool to conduct the research. In this case, the researcher uses three instruments. They are questionnaire of critical thinking, learning style and writing test.

1. Questionnaire of Critical Thinking

To measure the students' critical thinking, the researcher uses a questionnaire of critical thinking. The questionnaire includes six elements that are used to assess students' critical thinking. Those are interpretation, analysis, inference, evaluation,

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[3] J. Sarwono, '*Mengenal Path Analysis: Sejarah, Pengertian dan Aplikasi', Jurnal Ilmiah Manajemen Bisnis*, Ukrida, (2011), 289.

explanation and self- regulation (see in appendix). The following is the quality of each of the critical thinking aspects:

Table 3. 2 The blueprint of critical thinking

No	Core of CT	Indicators	Number of item
1	Interpretation	a. Categorization b. Interpreting information c. Clarifying information	3, 4, 9
2	Analysis	a. Considering various ideas b. Identifying arguments c. Analysing arguments	6,11, 14, 15, 16
3	Inference	a. Understanding facts b. Constructing premise c. Explaining conclusion	1, 8, 10, 18
4	Evaluation	a. Judging fact from information b. Assessing information quality	2, 20,
5	Explanation	a. Concluding result b. Adjusting to fact c. Presenting arguments	7, 12, 13, 17
6	Self – regulation	a. Self-controlling b. Self-correction	5, 9, 21

The questionnaire consists of 21 statements. It will be given to the students to know their critical thinking level. The questionnaire of critical thinking is adapted from Peter Facione. The questionnaire uses Likert 4- points scale, namely strongly agree, agree, disagree, strongly disagree.

Table 3. 3 The way of scoring

No	Statement	Score
1	Strongly agree	4
2	Agree	3
3	Disagree	2

4	Strongly disagree	1

Then, since the instrument was adapted, a validity instrument was done with the step of expert judgment. The questionnaire of students' critical thinking had been checked by Villa Sofia as the expert validator. According to her, there were some item of questionnaire that needed to be revised (see in appendix). Next, the reliability test of instrument also was done to ensure that the questionnaire was reliable to be distributed for the research participants. The researcher did the tryout of instrument to the 30 participants (not the research participants). In addition, the reliability test results are presented below:

Table 3. 4 Reliability Test for Critical Thinking

Reliability Statistics

Cronbach's Alpha	N of Items
,833	21

The results of the critical thinking questionnaire reliability test for students were summarized in Table 3.4. Cronbach's Alpha was found to be.833 in the table above. When the worth of an instrument exceeds.70, according to Sekaran in Priyanto, it is acceptable. Then, if the number is more than.80, the instrument is considered good and dependable. As a result, the instrument employed to assess students' critical thinking was accurate and dependable.[4]

2. Questionnaire of learning style

The researcher uses questionnaire as an instrument to know what kind of learning style that the students used. The questionnaire consists of 18 statements including visual, auditory, and kinesthetic styles. It is adapted from Jeffrey Barsch (see appendix 1). The following is a list of further resources:

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[4] Priyatno, "*SPSS Panduan Mudah Olah Data bagi Mahasiswa dan Umum*" (Yogyakarta: Andi, 2018), 25.

Table 3. 5 Specification of Learning Style

No	Learning Style	Indicators	Number of Item
1	Visual	• Like to see words in writing or have concepts presented pictorially. • They remember what they see. • They are attuned to physical elements in a classroom. They like illustrations, diagrams, charts, etc.	1, 4, 7, 10, 14, 16
2	Auditory	• Use their voices and ears as the primary modes for learning. • They remember what they hear. • They express themselves verbally. They understand things by talking them through	3, 5, 9, 12, 15, 18
3	Kinesthetic	• Learn better when they touch and are physically involved in what they study. • They want to handle material, make products, do projects, etc. • They understand and remember what they do. They learn best by trying things out, experimenting and practicing.	2, 6, 8, 11, 13, 17

The questionnaire is categorized into likert 3 point- scale. It consists of often, sometimes and seldom. The point of each categories will be summed to obtain the preference score.[5]

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[5] Barsch, Barsch Learning Style Inventory, retrived from https://www.honolulu.hawaii.edu/facdev/wp-content/uploads/2018/05/1-5_Barsh-Learning-Styles.pdf

Table 3. 6 The way of scoring

No	Statement	Score
1	Often	5
2	Sometimes	3
3	Seldom	1

Following that, following the instrument's adoption, a validity evaluation has been carried out using expert judgment. The questionnaire had been checked by Nurmajidda as an expert validator. According to her, the questionnaire was good (see in appendix). After that, a reliability test was required to be conducted to ensure that the questionnaire was reliable to be shared with the research participants. The tryout was held for 30 people by the researcher (not the research participants). The reliability test result is shown below:

Table 3. 7 Reliability Test for Learning Style

Reliability Statistics

Cronbach's Alpha	N of Items
,822	18

The reliability test of the students' learning style questionnaire yielded the results shown in the table above. The value of Cronbach's Alpha was.822 based on the table above. When the value is more than.70, according to Priyatno, the instrument is acceptable. Then, if the number is more than.80, the instrument is considered good and dependable. As a result, the instrument used to assess students' learning styles was effective and trustworthy.

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3. Writing test

The type of the text of the writing test is argumentative text. There are some rules for this test. The researcher gives two topics to be chosen by the students. The length of the text is three paragraphs. Then, the researcher gives 60 minutes for doing the test (see

appendix). Meanwhile, the researcher adopts an assessing rubric score from Brown to assess the students' writing (see appendix).[6]

D. Data Collection

The researcher applies some steps to collect the data. The first step is preparing questionnaire of critical thinking and learning style. Second, the researcher prepares writing test for the students. After preparing the instruments, the researcher distributes to the sample of research. The researcher takes two classes of eleventh grade at MA Darussalam randomly as the respondents (not the participants of research). This step is used to make sure that the instruments are valid and reliable. After trying out the instruments, the researcher analyze the validity and reliability by using SPSS.

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After all instruments are valid and reliable, the researcher distributes the questionnaire to the students of eleventh grade. The researcher takes 30% of the population as the sample of research (see table 3.1). The following is the process of collecting the data:

1. Learning style

   The researcher prepares the questionnaire of learning style. Then, the researcher distributes it to the students. The researcher asks the students to fill the questionnaire for 25 minutes. The questionnaire on learning style consists of 18 statements which provide likert 3 scales. After finishing the questionnaire, the students submit it to the researcher.

2. Critical thinking

   After finishing submitting the questionnaire of learning style, the researcher distributes the questionnaire of critical thinking. The researcher gives time for 45 minutes to fill it. There are 21 statements that must be completed by the students.

3. Writing test

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[6] Setyowati et.al. Exploring the Use of ESL Composition Profile for College Writing in the Indonesian Context. *International Journal of Language Education*. (2020). 4 (4), 175.

This test is conducted in the next day after collecting data of learning style and critical thinking. The researcher asks the students to write an argumentative text to determine the students' critical thinking and writing skill with some rules (see in appendix 4).

E. **Data Analysis**

After collecting the data, the researcher analyzes the data which are divided into three parts.

1. Questionnaire of learning style

The researcher analyzes the data from the questionnaire to discover the students' learning styles. In this case, the researcher calculates the score of students' questionnaire responses of each learning type based on the way of scoring (see table 3.3) by using Microsoft excel. It is to determine the students' learning style used. Therefore, the result will be classified into frequency and percentage.

2. Questionnaire of critical thinking

To know the students' critical thinking, the researcher analyzes the questionnaire of critical thinking. The researcher calculates the score of students' responses by using Microsoft excel based on the way of scoring (see table 3.4). It is to categorize students' critical thinking. According to Azwar cited in Putri, et.al, there are five categories of critical thinking, namely very high, high, medium, low, and very low.[7] The result will be classified into percentage and frequency.

Table 3. 8 Category of Critical Thinking

No	Category	Average score (%)
1	Very high	$75,05 < X$
2	High	$58,35 < \ \leq 75,05$
3	Middle	$41,65 < \ \leq 58,35$

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[7] Putri, et,al, The Analyzing of Critical Thinking Skills on Students of High Shools Grade X in Plaju and Seberang Ulu Ii District, *Jurnal Pena Sains*, 5 (2), (2018), 99.

4	Low	$24{,}95 < {}\leq 41{,}65$
5	Very low	$X < {}\leq 24{,}95$

X: average score obtained by the students

3. Writing test

To analyze the students' writing test, the researcher uses a scoring rubric to assess students' writing skills that adopted from Brown cited in Setyowati et.al (see appendix).[8] There are four aspects of writing skills that are assessed including content, vocabulary, grammar, and mechanics. Each aspect will be given scores 1 – 4. Every aspect will be multiplied. As a result, the highest point is 100. The following is the formula of the final score:

$$\frac{3C + 2.5V + 2.5G + 2M}{40} \; x \; 100$$

4. Prerequisite test

Before analyzing the data, the researcher analyzes the pre-requisite first to know whether the distribution of variables is normal and linear or not.

a. Normality test

Normality test is used to know whether the research data is normally distributed population or not. To do normality test, the researcher applies Kolmogorov – Smirnov test by using SPSS. The data can be said normally distributed if the p-value is greater than 0.05 ($p > 0.5$).

b. Linearity test

Linearity test is used to know whether the correlation between independent and dependent variable is linear or not. This test is conducted by using ANOVA (linearity test). The variables are linear if the p-value (linearity) is less than 0.05 ($p < 0.5$). It means that the correlation are linear.

c. Heteroscedasticity test

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[8] Setyowati, et.al. Exploring the Use of ESL Composition Profile for College Writing in the Indonesian Context. *International Journal of Language Education,* 4 (2), (2020), 173

Heteroscedasticity is used to assess whether there is a variance inequality of the residuals for all observations in the linier regression model. This test is one of the classical assumption test that must be performed on linear regression. If the assumption of heteroscedasticity is not met, then the regression model is declared invalid as a forecasting tool.

d. Multicolinearity test

Multicilinearity test is one part of classical assumption for linear regression model. It used to know whether any inter correlation between independent variable.A good regression is one that is free from the problem of multicollinearity. The consequence of multicollinearity is that the correlation coefficient is not certain and the error becomes very large or infinity.

e. Linear regression

The linear regression test is the test of statistical inference tool that is used to determine the effect and correlation of the independent variable on the dependent variable. In this case, the researcher examines to find out the effect and correlation between students' critical thinking with their argumentative writing skill, students' learning style with their argumentative writing skill, and also students' critical thinking and learning style with their argumentative writing skill. The following is the table of parameter correlation

Table 3. 9 Coefficient Variable

No	Value	Degree
1	0.00 – 0.199	Very weak
2	0.20 – 0.399	Weak
3	0.40 – 0.599	Sufficient
4	0.60 – 0.799	Strong
5	0.80 – 1.00	Very strong

5. Hypothesis testing

It is used to investigate cause and effect linkages between variables by measuring the effect of the exogenous independent variable and endogenous dependent variable utilizing the coefficient route. The researcher employs the AMOS 21 program to determine the relationship, direct and indirect contributions of students' critical thinking and learning style to their argumentative writing abilities. The researcher then performed the Z-sobel test to determine the importance of influence. The researcher used a goodness of criteria test during the analysis to guarantee that the model suggested in the study was appropriate. Aside from that, the researcher used AMOS 21 and SEM (Structural Equation Model) to find the direct and indirect relationships between variables. Through the use of a path diagram, the researcher was able to determine the contribution. The term "correlated model" was coined to describe this path analysis. This model's unique trait, according to Sarwono, is that the arrows only point in one direction. Only one external variable and three endogenous variables are present, and there are no arrows pointing in the opposite direction. As a result, the researcher developed a diagram with additional information to help readers better grasp the model and goals of this study.

Figure 1 Detail Information of Proposed Model
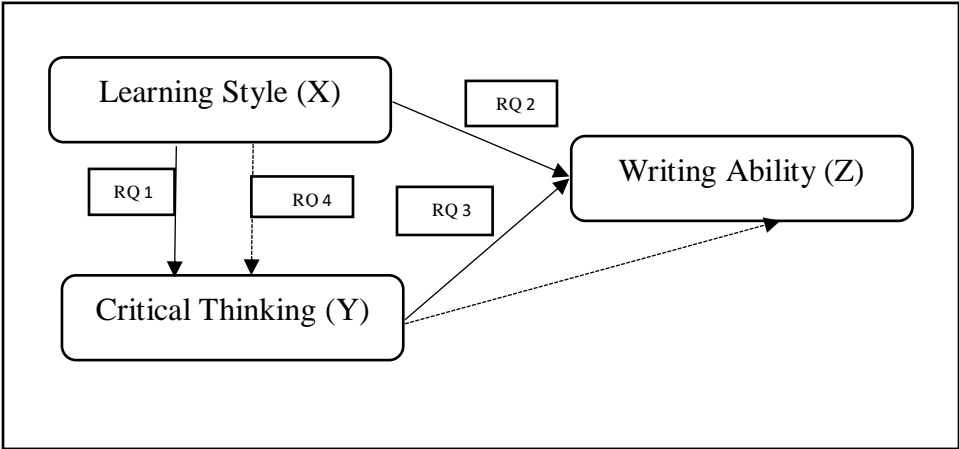
RQ 1: The arrow of direct contribution of students' learning style toward their critical thinking

RQ 2: The arrow of direct contribution of students' learning style toward their writing ability

RQ 3: The arrow of direct contribution of students' critical thinking toward their writing ability

RQ 4: The arrow of indirect contribution of students' learning style toward their writing ability mediated by their critical thinking among second grade students of MA Darussalam.