Chapter Three

Research Methodology

This chapter provides information about the research methodology used in this study. This chapter is divided into six subchapters which are research design, research setting, research participant, research instrument, data gathering procedure, validity and reliability, and data analysis.

Research Design

This study used quantitative research method. The researcher chose quantitative research method because this method is suitable to answer the research questions which aim to know students' linguistic intelligence, students' writing skill, and the correlation of both linguistic intelligence and writing skill. In addition, quantitative research method was appropriate to be used since the researcher wanted to present numerical data and statistical data of two variables.

The method under quantitative research design employed in this study was correlational research design. According to Creswell (2012), in correlational research design, the researcher uses correlational statistical test to describe and measure the correlation between two or more variables and set of scores. The type of correlational design that was used in this research was explanatory design. Creswell (2012) stated that an explanatory research design is a correlational design in which the researcher is interested in the extent to which two variables or more.

Research Setting

This study was conducted at English Language Education Department (ELED) in a private university in Yogyakarta. There were multiple reasons why the researcher chose this location. The first reason was because in this department, there were some writing courses supporting the researcher to conduct research, such as Basic Reading and Writing, Interpretive Reading and Writing, as well as Academic Reading and Writing. From those courses, the researcher chose "Interpretive Reading and Argumentative Writing" course to gather the data of students' writing score. The second reason was because ELED provided some facilities and activities which could show the students' ability for linguistic intelligences. For example, ELED students had non-academic activities where they could apply their linguistic intelligence such as Musical Drama group, and English debate club. The other reasons were because ELED students often dealt with components of language which is good for their linguistic intelligence. The last reason was because the researcher had an access to conduct a research in this department. This study was conducted on September 2018.

Research Population and Sample

This study has a set of research population and sample. In this part the number of population and sample based on the criterion of participant are explained. The explanations are presented below:

Research population. The research population of this study was students of English Language Education Department (ELED) at one private university in Yogyakarta. There were four active batches of ELED students in one private university which were batch 2014, 2015, 2016, and 2017. The total population of the student body was around 597 students (the total of batch 2014-2017). The target population of this study was ELED students' batch 2017. The first reason was because students of batch 2017 finished their Interpretive Reading and Argumentative Writing course. The second reason was because those students had a fresh writing score which was used to answer the second research question in this research. Then, the third reason was because ELED students were language learners. The total population of ELED students' batch 2017 was 231 students.

Research sample. Cohen, Manion, and Marrison (2011) stated, "the smaller group or subset is the sample" (p.143). Based on target population, 231 students got involved in this study. To determine the sample of this study, the researcher used formula from Notoatmodjo (2010). The formula is presented below:

$$n = \frac{N}{(1 + N.d^2)}$$

$$n = \frac{231}{(1 + 231.(0.05)^2)}$$

N = Population size

n = sample size

d = level of confidence / accuracy desired (0.05)

$$n = \frac{231}{(1 + 231.0.0025)}$$

$$n = \frac{231}{(1 + 0.5775)}$$

$$n = \frac{231}{1.5775}$$

$$n = 146$$

Based on the calculating above, the researcher found that 5% confident level of 231 students was 146. So, the sample of this study was 146 students which included of English Language Education Department students' batch 2017. But, 146 students were becoming minimal sample size of this study in gathering a data instrument. In case, the researcher got 151 students to be participants of this study. But, during processing data into statistical application, there are several students who keep filled in the questionnaire. So, the researcher assumed that the rest of five students who are late to filled in the questionnaire did not used as participants of this study.

The sampling technique used in this study was random stratified sampling. The sample of the respondents was chosen randomly based on the characteristic of the same group. According to Cohen, Manion, and Marrison (2011), "Random stratified sampling involves dividing the population into homogenous groups, each group containing subjects with similar characteristics" (p. 154). The characteristics were ELED students' batch 2017 passing Interpretive Reading and Argumentative Writing course, and they had experiences in English writing skill. Based on sampling technique, the researcher used lottery to choose a group of classes. By using lottery, the researcher got some classes becoming the respondents to participate in answering the research questionnaire. Based on the result of lottery process, E class did not slip out as a part of group participated in this study. According to the research sample of this study, the amount of five classes was sufficient to use as participant of this study. Therefore, some profit classes for the participants in this study were A, B, C, D, and F class.

Research Instrument

The data gathering instruments used in this research were questionnaire and writing score. Based on Wilson and Mcleand (as cited in Cohen et al, 2011, p. 377), "questionnaire is widely used and useful instrument for collecting survey information, providing structured, often numerical data, being able to be administered without the presence of the researcher and often being comparatively straightforward to analyze". The questionnaire was used to gather data for the students' linguistic intelligence.

The type of questionnaire used by the researcher was structured questionnaire. The questionnaire contained 18 items. Moreover, the questionnaire rating scales were of strongly disagree (1), disagree (2), agree (3), and strongly agree (4). The questionnaire was distributed to EFL learners of ELED batch 2017. Questionnaire items were adopted from Thomas Armstrong's book of Multiple Intelligence in the Classroom. Armstrong (2009) has a book of Multiple Intelligence which consists of a variety survey of each intelligence. The other researcher also adopted a questionnaire from Thomas Armstrong to assess language learner intelligence. The participants of other research were students of English Education Department of Syarif Hidayatullah State Islamic University at Jakarta on a research title of "The Correlation between Students' Verbal Linguistic Intelligence and Their Reading Achievement". Besides, several university students of southwest and center of Iran who are learning English as Foreign language became the participant in a study of "Exploring Relationship between Reading Strategy Use and Multiple Intelligence among Successful L2 Readers". It means that both studies involved participants of language learners

learning English as foreign language, and the participants are not English native speakers.

The other instrument used in this study was the students' writing document score. The researcher asked permission from the lecturer of Interpretive Reading and Argumentative Writing. The researcher only used an individual assignment writing score from ELED students. An individual assignment was chosen because the researcher considered that a score from individual assignment was more valid to be used for research data. Interpretive Reading and Argumentative Writing subject was chosen by the researcher because on argumentative writing, students tried to explore their mind deeply in order to be able to give an argumentation. Thus, process of giving argumentative writing made students have critical thinking. Besides, it was challenging for EFL learner to write argumentation which could be show up their idea without doing a bias. According to Pei, Zheng, Zang, and Liu (2017), "EFL argumentative writing does not only make an organizational of words, phrases, and sentences, but it is also a complex process of creating appropriate topic, develop statement, organize a coherent discourse, and put an idea into writing" (p. 31-32).

Data Gathering Procedure

In conducting this research, the researcher did some steps to gather the data. First, the researcher prepared questionnaire instrument which was adopted from Thomas Armstrong. The questionnaire items were translated into Indonesian language without changing the meaning. Then, the questionnaire was checked through expert judgment to measure the validity of questionnaire items. After that,

the researcher did a lottery of class to determine some classes to become the respondents of this research. There were five classes involved the respondents of this study which were A, B, C, D, and F. After that, the questionnaire was distributed to ELED students' batch 2017 getting pass score in Interpretive Reading and Argumentative Writing by sharing a link of Google form. In distributing a link of Google form, the researcher asked a permission to the leader of each class to get an access in joining WhatsApp class group. After joined in WhatsApp class group, the researcher asked permission and shared the link of linguistic intelligence questionnaire. Through a Google form link, students could access the linguistic questionnaire and fill it.

To collect the data of students' writing skill, the researcher used score of a writing assignment from Interpretive Reading and Argumentative Writing class. The researcher asked permission to the lecturer to get students writing score on this subject. The researcher used score documents based on individual assignment. The researcher found that the minimum score was 9 and the maximum score was 20 while inputting 151 data of students writing score. So, the researcher assumed that 20 was the higher score that lecturer used to be guidance in giving students score on Interpretive Reading and Argumentative Writing subject. So, on this study 20 was calculated as standard to get the finding of English writing level of ELED students' batch 2017. Afterward, the data from both the questionnaire and writing score were analyzed and used to answer the research questions and to perceive findings of the research.

Validity and Reliability

In this part, the data gathered from the questionnaire were checked using validity and reliability test. It was done to determine whether the data calculated was valid or not. Then, the researcher also presents the reliability level of questionnaire data. The explanations of validity and reliability are presented as follows:

Validity. Validity test was used to measure the accuracy of a data gathering instrument. According to Cohen, Manion, and Morrison (2011), validity is an important key to effective research. Validity test was used to know whether the data was trustworthy or not. The researcher asked lecturers to be validator of this study. The researcher asked three lecturers to become the expert's judgment. In checking the questionnaire, the lecturer checked the range score of the items. Then, the questionnaire items that were checked by the three experts were ready to be tested by using Aiken test on Microsoft software application. Furthermore, Aiken test was used to determine whether the data was valid or not. Literally, there were 18 items of linguistic questionnaire checked by Aiken test. The formula of Aiken test and the result are presented as follows:

$$V = \frac{\sum s}{n\,(c-1)}$$

V = Validity index of the instruments   n = number of raters

$s = r - I_0$ c = numbers of categories

r = score of categories $\sum$ = the sum of s for the n raters

I_0 = the lowest score

Validity	Criteria
>0.8	High
0.4 – 0.8	Medium
<0.4	Low

Table 3.1. *The validity criteria's of (Retnawati, 2016, p.19)*

The criteria to identify the validity are low < 0.4, medium 0.4 – 0.8 and high > 0.8. Based on the criteria, the researcher could determine the items was valid. The item was valid if the score is 0.4 or higher. These criterions were used to check whether the data are valid or not. The result of Aiken is presented in the table below:

Items	Expert 1	Expert 2	Expert 3	s1	s2	s3	Sum	V	Validity Category
1	4	4	4	3	3	3	9	1.00	High
2	3	4	4	2	3	3	8	0.89	High
3	3	4	4	2	3	3	8	0.89	High
4	3	4	4	2	3	3	8	0.89	High
5	3	4	3	2	3	2	7	0.78	Moderate
6	4	3	4	3	2	3	8	0.89	High
7	4	4	4	3	3	3	9	1.00	High
8	3	4	4	2	3	3	8	0.89	High
9	4	4	3	3	3	2	8	0.89	High
10	4	4	4	3	3	3	9	1.00	High
11	3	4	3	2	3	2	7	0,78	Moderate

12	4	4	4	3	3	3	9	1.00	High
13	3	4	4	2	3	3	8	0.89	High
14	3	4	4	2	3	3	8	0.89	High
15	4	4	4	3	3	3	9	1.00	High
16	3	3	3	2	2	2	6	0.67	Moderate
17	3	3	4	2	2	3	7	0.78	Moderate
18	3	4	4	2	3	3	8	0.89	High

Table 3.2. *The table of Aikens test for validity analyze.*

Based on the result from Aiken test above, the researcher found out 14 items called as had high validity, and 4 items had medium validity. The items with medium validity were items number 5, number 11, number 16, and number 17. The Aiken test also shows that there was no item with low validity. Hence, all of the questionnaire items were valid.

Reliability. Reliability is the consistency of data gathering instrument. Cohen, Manion, and Morrison (2011) said that "reliability is essentially a synonym for dependability, consistency and replicability, over instruments and over groups of respondents" (p. 199). To test the reliability of the instrument, the researcher used the result of Cronbach's Alpha analysis on statistical application software application. Firstly, the researcher inputted the data of questionnaire and score that was processed on Microsoft Excel. Then, the data were processed on statistical application to assess whether the data was reliable or not. After that, the value of Cronbach's Alpha on Software Application for statistics was matched to

the reliability criteria. According to Cohen, Manion, and Morrison (2011), the criteria of reliability of Cronbach's Alpha are:

Cronbach's Alpha	Criteria
>0.90	Very high reliable
0.80 – 0.90	Highly reliable
0.70 – 0.79	Reliable
0.60 – 0.69	Marginally/minimal reliable
<0.60	Unacceptably low reliability

Table 3.3. *Reliability criteria of Cronbach's Alpha (Cohen, Manion, & Marrison, 2011, p.640)*

Based on the table above, the data item was reliable if the score is 0.70 or higher. If the score is under of 0.60, the data item is not reliable. The researcher checked whether the data was reliable or not by using statistical application program.

The result of reliable analysis on SPSS application program shows that all of questionnaire items was reliable. There were 18 questioner items used in this research. The reliability statistic is 0.711 which included in reliable category with interval 0.70 – 0.79. It means that all questioner items were reliable. The result of reliability test is presented below:

Reliability Statistics

Cronbach's Alpha	N of Items
.711	18

Data Analysis

This study used two data analysis, descriptive statistics and inferential statistics. Cohen, Manion, and Morrison (2011) stated that "Descriptive statistics include frequencies, measure of dispersal (Standard deviation), measures of central tendency (means, modes, medians), standard deviations, crosstabulations and standardized scores" (p. 622). In this study, the first and second research questions were analyzed using descriptive statistics. The first question is "How is the linguistic intelligence of university students in Yogyakarta?" and the second research question is "How is student writing skill of university students in Yogyakarta?". Then, the last research question was analyzed using inferential statistics, and the question is "What is the correlation between students' linguistic intelligence and their writing skill of University Students in Yogyakarta?". Inferential statistics was used to do a normality test.

In addition, this data analysis used class interval to determine class width, class size, and class length of this research. According to Supranto (2000), the formula to determine class width is:

$$C = \frac{X_n - X_1}{K}$$

$$C = \frac{4 - 1}{3} = \frac{3}{3} = 1$$

C = class width, class size, class length

X_n = Maximum value

X_1 = Minimum value

K = The number of class

This formula was used to answer the first research question about students' linguistic intelligence. Questionnaire was used to gather the data of this variable. The class interval of students' linguistic intelligence from maximum value (4) minus minimum value (1) is three (3). Based on the formula above, the class interval is one (1). Thus, the researcher decided the categories of students' linguistic intelligence are presented as follows:

No.	Interval	Categories
1.	3.1 – 4	High
2.	2.1 – 3	Intermediate
3.	1 – 2	Low

Table 3.4. *The categories of students' linguistic intelligence*

Table 3.4 shows three categories of students' linguistic intelligence. If the interval is between 1 – 2, it is in low category. If the interval is between of 2.1 – 3, it is in intermediate category. Then, if the interval is around 3.1 – 4, it is in the high category of linguistic intelligence. In addition, the questionnaire has four points in the rating scale. Those rating scales are presented below:

No.	Rating Scale	Score
1.	Strongly Agree	4
2.	Agree	3
3.	Disagree	2
4.	Strongly Disagree	1

Table 3.5. *Rating scale of students' linguistic intelligence questionnaire*

To answer the second research question, the researcher will use the formula of class interval. It was used to determine the minimal and maximal writing score of each category. The formula is presented below:

$$C = \frac{X_n - X_1}{K}$$

$$C = \frac{20 - 1}{3} = \frac{19}{3} = 6.4$$

C = Class width, class size, class length

X_n = Maximum value

X_1 = Minimum value

K = the number of class

This formula was used to determine the class interval of each research question. The researcher also used students writing score from the Interpretive Reading and Argumentative Writing course. The maximum writing score was inputted in the maximum value formula. Then, the minimum writing score was inputted in minimum value formula. This research used three categories of class interval. Those categories are advanced, intermediate, and low. Through class interval, the researcher found the average number of students writing skill at ELED in a private university in Yogyakarta batch 2017. Based on the formula above, the maximum value of writing score is twenty (20) and the minimum score is one (1). Then, maximum value of twenty minus minimum value of one is 19. After that, the number is divided by three and the result is six points four (6.4). Therefore, the researcher could make category of variables based on the result of the formula above. The categories of writing score are presented below:

No.	Interval	Categories
1.	13 – 20	Advanced
2.	6.5 – 12.9	Intermediate
3.	1 – 6.4	Low

Table 3.6. *The categories of students writing score.*

Based on table 3.6, there are three different categories of students writing score. If the interval of students writing skill is between 1 – 6.4, it will be included in the low category. If the interval of students writing skill is between 6.5 – 12.9, it will be included as intermediate category. If the interval of students writing skill is between 13 – 20, it is in the advanced category. This could answer the second research question about "how is student writing skill of University students in Yogyakarta?".

The third research question aims to find out the correlation of two variables by using inferential statistics. This research used normality test to check whether the data is normal or not. If the data of this research is normal, the researcher has to perform a correlational test. The data is called correlated if the significant value of the data is more than 0.05, but if the significant value of the data is less than 0.05 it means that there is no correlation. According to Creswell (2012), "correlational design provides an opportunity for you to predict scores and explain the relationship among variables" (p.338). In addition, Cohen and Manion (as cited in Creswell, 2012, p.347) divided degree of association into 4, which are presented below:

No.	Range	Degree of Association
1.	0.86 and above	Very strong correlation
2.	0.66 – 0.85	Strong correlation
3.	0.36 – 0.65	Weak correlation
4.	<0.20 – 0.35	Very weak correlation

Table 3.7. *Degree of association (Cohen and Manion as cited in Creswell, 2012,*

p.347)

Based on the table 3.7, if the correlational range is <0.20 – 0.35, the two items have a very weak correlation. If the correlational range is between 0.36 – 0.65, it means they have a weak correlation. If the correlational range is between 0.66 – 0.85, they have a strong correlation. Last, if the correlational range is between 0.86 and above, they have a very strong correlation.