Chapter Three

Research Methodology

This chapter presents the research methodology which consists of research design, research population, data collection method, and data analysis. The research design talks about the design used in this study. Research population discusses the participants of the study, and then data collection method will mention the steps of how the researcher collects the data. The last part of this chapter reveals data analysis steps of this study.

Research Design

The researcher applied quantitative research design in this study. According to Creswell (2012), some major characteristics of quantitative research are creating purpose statements, research questions and specific hypothesis. Quantitative research also collecting numeric data from population using an instrument with preset questions and responses. Then, quantitative research is also "analyzing trends, comparing groups, or relating variables using statistical analysis" (p. 13). Based on the explanation above, some characteristics of quantitative were same with this study that also investigates the relationship between students' most dominant multiple intelligence and their reading comprehension in TOEFL-like test. This study also collected numeric data from a large number of people with an instrument. Hence, the appropriate research design for this study was quantitative research design based on the similarities of characteristics between quantitative research design and this study.

Since this research purposes to investigate the relationship between two variables of this study which were students' most dominant multiple intelligence and students' reading comprehension in TOEFL-like test, and then the researcher determined the correlational research design as the quantitative research method of this study. Correlation analysis is a statistical test to decide two or more variables or two sets of data have relation each other or not. The statistic that presents a linear correlation is the product moment correlation coefficient as the statistic of correlation (Creswell, 2012). The researcher used explanatory research as one of correlational research design types. Explanatory research design is a correlational research design when the researcher is interested to explore two variables widely (Creswell, 2012). Thus, the quantitative research method of this study was explanatory correlation design.

Research Setting

The research took place at English Education Department of Universitas Muhammadiyah Yogyakarta building. Particularly, the results of this research will give benefit for both lecturers and students of EED of UMY batch 2014 in knowing students' intelligence type so they are able to apply a suitable teaching and learning strategy for them. Moreover, the researcher would find it easy to collect data because the researcher also studies in this university. Then, there is International Language Testing (ILT) course in UMY in which EED students learn TOEFL in this course. TOEFL score becomes an important requirement for graduation at EED of UMY. Therefore, the researcher conducted the research in

February-March 2017 as ILT course ran in the sixth semester in academic year 2016/2017.

Research Population

The researcher selected students of English Education Department of UMY batch 2014 who has existential intelligence as the population of this study. The researcher examined 111 EED of UMY batch 2014 students' most dominant multiple intelligence before conducting this research using sample random sampling technique. According to Cohen, Manion and Morrison (2011), simple random sampling is the method to select the participants from the population randomly, and the sample should have same characteristic. The research sampling should be chosen randomly because this research is parametric statistic. Afterward, the researcher found that students' most dominant multiple intelligence is existential intelligence (see Appendix A). There are 37 EED of UMY students batch 2014 who have this intelligence type. The number has fulfilled the standard sample size as Cohen, Manion and Morrison (2011) mentioned that minimum number of sample size is 30 for statistical analysis research. Thus, the participants of this research were 37 EED of UMY batch 2014 students who have existential intelligence.

Because this study is in English language education field, the researcher also chose the population which is in the same field since they have information that researcher's need. Then, the researcher is able to obtain relevant research data from them. Moreover, they are the students of sixth semester in academic year 2016/2017 who are taking International Language Testing (ILT) course.

It means that the students do TOEFL-like test at that course. Therefore, the researcher chose them as the appropriate participants of this research. It is because the researcher needed reading TOEFL-like score at ILT course as data for this research.

Instruments of the Research

The researcher used two instruments to collect data of this study. They were existential questionnaire and score document of International Language Testing class as data of students' reading comprehension in TOEFL-like. These instruments become a researcher's tool to obtain data of the research.

Questionnaire. The questionnaire was used to get information about EED of UMY batch 2014 students' existential intelligence as their most dominant multiple intelligences. Questionnaire is an instrument for collecting data with a pilot structured, often numerical data and it is able to be distributing to the participants without the researcher (Cohen, Manion & Morrison, 2011). Thus, the researcher used the questionnaire as the appropriate instrument of this study because the researcher needed numerical data for assessing correlation between students' most dominant multiple intelligence and their reading comprehension in TOEF like. The researcher distributed the questionnaire in Indonesian language to make the participants understand and answer the questionnaire easily, and then it minimized the bias data.

The researcher assessed students' most dominant intelligence type by adapting McKenzie's (1999) Multiple Intelligences Inventory survey. McKenzie's survey has nine sections with one section represented one intelligence type that

composed of 90 items. It means that one intelligence type consist of ten items. In this research, the researcher only used existential intelligence's items as students' most dominant multiple intelligence of EED of UMY batch 2014. It is found from a mini research that the researcher did before conducting this research. Moreover, the researcher modified some items' sentences without change the original meaning in order to make participants understand the questionnaire easily. The detail description of existential intelligence items from the original one was presented in Appendix B:

The researcher used structured and closed questionnaire. According to Cohen, Manion, and Morrison (2011), structured and closed questions propose the range of responses that participants will choose and it often more focus and directly to the point. It means that the participants only chosen an answer based on answer choices in the questionnaire, and the participants answered directly about themselves. The researcher designed the questionnaire by four Likert scales of response mode on multiple intelligences survey. Likert scales is designed "in a degree of sensitively and differentiation of response whilst still generating numbers" (Cohen, Manion, and Morrison, 2011, p. 386). Scoring of questionnaire's response mode was described below:

Table 1
Scales of Questionnaire

Score	**Alternative Answer**
1	Strongly disagree / Sangat tidak setuju
2	Disagree / Tidak setuju
3	Agree / Setuju
4	Strongly agree / Sangat setuju

Score document. The researcher obtained data collection of reading comprehension in TOEFL-like test from score document of EED of UMY students' reading pre-test TOEFL-like score at International Language Testing (ILT) course. In this course, the students would do pre-test TOEFL-like, post-test TOEFL-like, and several times for reading TOEFL-like test during this course. The researcher used pre-test TOEFL score because of researcher's time limitation for collecting data. The researcher have to finish this research before time limitation that was determined by EED of UMY. Then, this research's due date was faster than students' schedule for doing post-test TOEFL-like at ILT course. Afterward, the researcher also believes that students of EED of UMY have enough English proficiency because they have been studying English for more than two years at EED of UMY. Thus, the researcher used students' pre-test TOEFL-like score as data of this research.

Data Collection Procedure

The researcher was done some steps to collect data. The researcher was begin with going to meet 37 students of EED of UMY batch 2014 who has existential intelligence as students' most dominant multiple intelligence. The researcher found the data of these students based on researchers' mini research before conducting this research. Then, the researcher distributed multiple intelligences questionnaire, and the researcher explained about researcher's purpose for asking participants fill out the questionnaire again. After that, the researcher asked participants to fill the questionnaires and explained how to fill it. However, the researcher cannot meet all participants. Then, the researcher

contacted the participants who cannot be met to fulfill the questionnaire through google form with link https://goo.gl/forms/ZUymiNKs0h2okxpO2.

Moreover, the researcher used students' pre-test reading TOEFL-like score at ILT course to measure students' reading comprehension in TOEFL-like. Then, the researcher asked permission to ILT lecturer to obtain students' pre-test reading TOEFL-like score. The researcher used students' pre-test reading TOEFL-like score because of researcher's time limitation. After completing all of needed data, the researcher started to analyze data using SPSS program version 20.

Validity and Reliability

Before analyzing data, the researcher checked validity and reliability of the questionnaires as instrument testing. Validity is a part of the instrument to assess what is intended to describe and validity in quantitative research aims to provide the appropriate instrument and data statistical treatments (Cohen, Manion & Morrison, 2011). The researcher involved three expert judgments to analyze validity of questionnaire items. The expert judgments were EED of UMY lecturers who master in this research's topic. Then, the valid questionnaire items (see Appendix C) were used for collecting data.

The first expert judgment suggested to replace some words in order to the translations will be more appropriate with the original statements. Several words replacements such as in item 2, 3, 6, 7 and 10. The first judgment also suggested adding relevant information in item 1 in order to easier understand. The second expert judgment suggested replacing a word in item 6. Then, the second expert judgment advised to add words in item 7 and 10. Moreover, the third expert

judgment suggested replacing some words in item 6 and 9. Item 10 was recommended to delete same words by the third expert judgment.

Besides the experts given expert judgment, they also were become rater who scoring questionnaire items. Then, the score was used to analyze questionnaire item validity using Gregory's formula (Retnawati, 2016)

$$\boldsymbol{Validity\ coefficient = \frac{H}{(A + B + C + D + E + F + G + H)}}$$

Which:

Table 2
Category result for calculating Gregory index

Rater 1	Weak	Weak	Weak	Weak	Strong	Strong	Strong	Strong
Rater 2	Weak	Weak	Strong	Strong	Weak	Weak	Strong	Strong
Rater 3	Weak	Strong	Weak	Strong	Weak	Strong	Weak	Strong
Total	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**

The researcher combined the experts' suggestion in order to revise questionnaire of this research. Then, experts' rating score of questionnaire items were calculated using Gregory's formula, the detail category result of experts' rating was presented in Appendix D and E.

$$Validity\ coefficient = \frac{H}{(A + B + C + D + E + F + G + H)}$$

$$= \frac{10}{(0 + 0 + 0 + 0 + 0 + 0 + 0 + 10)}$$

$$= \frac{10}{10} = 1$$

The result showed that validity coefficient was 1. Based on validity indicator of Retnawati (2016) (see table 3), value 1 belonged to high validity category (<0.8). Therefore, the questionnaire of this research is high validity.

Table 3
Category of Validity

Score	**Category**
>0.4	Low Validity
0.4-0.8	Moderate Validity
<0.8	High Validity

Moreover, Cohen, Manion and Morrison (2011) stated that reliability in quantitative research is as stability, equivalence, and internal consistency of the instrument. An alternative reliability calculation can be found by using Cronbach's Alpha coefficient. Cohen, Manion and Morrison (2011) stated following guidelines of reliability:

Table 4
Category of Reliability

Score	**Category**
>0.90	Very Highly Reliable
0.80-0.90	Highly Reliable
0.70-0.79	Reliable
0.60-0.69	Marginally/Minimally Reliable
<0.60	Unacceptably Low Reliability

There were 10 items of questionnaire that were distributed to 37 students of EED of UMY batch 2014. The reliability of questionnaire was 0.818 which included in highly reliable category with interval 0.80-0.90.

It means the questionnaire was good to be used. The result of questionnaire reliability was shown below:

Table 5
Result of Reliability Test

Cronbach's Alpha	**N of Items**
.818	10

Analysis of Data

The researcher analyzed the data to get research' findings after gathering data, the researcher used two techniques in analyzing research data. The first technique was descriptive statistics to describe students' most dominant multiple intelligence and their reading comprehension in TOEFL-like that answered the first and the second research questions. The second technique was inferential statistic using Pearson Product Moment Correlation (*r*) that used SPSS program version 20 to find the third research question about correlation between students' most dominant multiple intelligence and their reading comprehension in TOEFL-like.

The first research question about students' most dominant multiple intelligence was analyzed using descriptive statistics. According to Cohen, Manion and Morrison (2011), the researcher will use descriptive statistics to describe and present the data by indicating central tendency (means, modes, medians). Then, the researcher categorized students' most dominant intelligence into three levels using Supranto's (2000) formula. The formula written as follows:

$$c = \frac{Xn - X1}{k}$$

Where:

c = The range prediction (class width, class size, class length)

k = The number of class that researcher wants

X_n = The maximum score of variable

X_1 = The minimum score of variable

In detail, the category of students' most dominant multiple intelligence was shown as follows:

Table 6
Category of Students' Most Dominant Multiple Intelligence

Scale	Description
1-2	Low
2.1-3.1	Moderate
3.2-4.2	High

Furthermore, the second research question of this research about EED of UMY students' reading comprehension in TOEFL-like was analyzed using descriptive statistics. The researcher described students' reading comprehension in TOEFL-like by seeing the mean, and then the researcher also categorized students reading comprehension into three levels that used Supranto's formula above with minimum score was 290, the maximum score was 610, and interval value was 106.67. There were poor, fair and good categories.

Table 7
The Category of Students' Reading TOEFL-Like Score

Scale	Description
290-396.67	Poor
396.68-503.35	Fair
503.36-610.03	Good

The second analysis technique is inferential statistic. Because of this research is explanatory correlation design, the researcher will use Pearson Product Moment Correlation (*r*) to find correlation between students' most dominant multiple intelligence and their reading comprehension in TOEFL using SPSS program version 20. According to Cohen, Manion and Morrison (2011), inferential statistics is research's attempting to find out the outcome based on data gathered. Before it, the researcher tests normality and linearity of the data. Normality test is used whether the participants are from the same proficiency. Moreover, the researcher also tests the linearity of the variables. Test of linearity aims to observe the variables are have a significant linear or not.

The correlation of the variables uses Pearson Product Moment in which the coefficient statistics are correlated at $\rho < 0.05$. Sugiono (2011) stated the following five criteria of correlation level:

Table 8
The Correlation Criteria Value

Interval of Coefficient	Correlation Level
0.00 – 0.199	Very Low
0.20 – 0.399	Low
0.40 – 0.599	Moderate
0.60 – 0.799	Strong
0.80 – 1.000	Very Strong