Chapter Three

Methodology

This chapter discusses the research method of this study. Research method is the way how the researcher gets the result of the study. In this study, the researcher arranges this chapter into the research design, population and sample of the study, data collecting method, and analysis of data.

Research Design

The design of this research is Quantitative design. This research uses Quantitative design because the data of this research was in numerical form and statistical analysis. According to Cohen, Manion and Morrison(2011) Quantitative research design isused to examine question that can be the best answered by collecting and analyzing the data in numerical form.The design of the research is correlational. This reason of employing correlational design is because the researcher will identify the relation between classroom physical environment and students' achievement. Cresswell (2012) suggested that correlational design deals with statistical test to determine the model for two or more variables or two sets of data to vary consistently. Additionally, according to Sugiyono (2008), the correlational design aims to investigate the subsistence and the level of relationship between two or more variables. If two variables are highly related, scores on one variable could be used to predict scores on the other variables. In this study which uses correlation as the research design to identify the correlation

between classroom physical environment and students' achievement at EED UMY.

Population & Sample

The research took place at EED UMY to collect the data. The data were collected from students' batch 2014 at EED UMY. The total number of population batch 2014 consists of 169 active students. The researcher took students' batch 2014 at EED UMY because of the feasibility reasons. Taking these students is easily accessible because the sample of this study was in the same university with the reseacher. Cohen et al., (2011) said that if the population is 169 students, the convidence level is 95% and the convidence interval is 5%, it meant that the total sampling becomes 132 students. Techniques that were used to find out the sample are convenience sampling. This research used convenience sampling because time effectiveness to collect the data, it means that the researcher can get the data quickly. According to Cresswell (2012) in convenience sampling, the researcher decides on the subject for samples accordance with the capability of the researcher to achieve.

Research Setting

This study was conducted at Universitas Muhammadiyah Yogyakarta, especially in English Education Department. It was done there because the place was accessible for researcher as the student at EED UMY. In addition, this department had classroom physical environment that suitable with the classroom physical aspects in this research. This research started on April, 2015 up to

Agustus,2015. It was done to identify the correlation between classroom physical environment and students' achievement.

Data Colleting Method

The data for this study were collected by using two instruments. The instruments were questionnaire and document of students' grade point average score. In this study, the questionnaires were used to get information about how the classroom physical environment at EED in batch 2014 was. The researcher used closed ended questionnaire to measure the correlation between classroom physical environment and students' achievement at EED UMY. The participants could directly choose appropriate answer. The questionnaire consisted of 20 statements developed from four indicators asking about classroom physical environments at EED UMY. The categories and the number of the questionnaire item could be seen on the table below.

Table 3.1
The categories of questionnaire

No.	Indicator	Item	Total
1.	Thermal Factors	4,18,20	3
2.	Spatial Factors	1,2,3,6,7,8,13,14	8
3.	Acoustics Factors	9,10,11,12,19	5
4.	Visual Factors	5,15,16,17	4
	Total Item		20

The questionnaires used Indonesian language. It was to prevent misunderstanding among participants toward the questionnaire. The questionnaires employed likert scale rating that possessed four options namely

Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD). The rating used for each option is shown in following table.

Table 3.2
The scale rating

Description	Scale
Sangat Setuju / Strongly Agree	4
Setuju / Agree	3
Tidak Setuju / Disagree	2
Sangat Tidak Setuju / Strongly Disagree	1

There were some steps of technique of data collection before distributing the questionnaire. First, the researcher made some statements related to classroom physical environment and consulted to the supervisor for four times. Thus, the researcher did expert judgement with two lecturers to check validity in the questionnaires. There were two experts lecturers of English Education Department of Universitas Muhammadiyah Yogyakarta were Mr. Puthut Ardianto and Mrs. Indah Puspawati. The first experts said that the diction in the statement or question was not appropriate for the reader as respondents. The second experts said that there were some statements not related to the theory. The revision of questionnaire was based on the first and second experts could be checked in appendix 2 and 3. Revision one and two were combined that became a fixed questionnaire. The fixed questionnaire could be seen in appendix 4. After all had been done, the researcher distributed the questionnaire to students' batch 2014 to five classes, namely A, B, C, D, and E. Before distributing the questionnaire, the researcher made appointment with the lecturer who taught those classes. On June

22, on Monday, the researcher distributed to class A, and E. On the next day on June 23, on Tuesday, the researcher distributed the questionnaire to class B, C, and D. From those five classes, the researcher got 132 questionnaire filled. The research used SPSS program version 20 to analyzed validity and reliability of the questionnaire about classroom physical environment.

Meanwhile, another instrument that the researcher used in this study was document of students' Grade Point Average scores (GPA) to obtain data about students' achievement. The researcher used Grade Point Average (GPA) students' batch 2014. Before the researchers obtained the document of students' grade point average scores, the researcher inquired permission to the Head and lecturers of English Education Department of Universitas Muhammadiyah Yogyakarta. After that, the reseacher gave the permission letter to the office staff at EED UMY to get documents of the students' grade point average students batch 2014 in the first semester. On June 30, 2015 on Tuesday, the researcher got the data from office staff at EED UMY.

Validity of the instrument. The data validity of the instrument from questionnaire was to identify the *r* value. Next the researcher compared the *r* value to *r* table. The *r* table of this research was based on sample in this research of 132 students with the significance level 0.05 and confidence level 95% was 0.0171. The *r* table could be checked in appendix 5. The items questionnaires were to be valid if the *r* value was higher than *r* table. This statement was related with Arikunto (2006) that the question valid if the *r* value was higher than *r* table. The criteria of items validity could be checked on table.

Table 3.3
The criteria of item validity

r value > *r* table	Valid
r value < *r* table	Not valid

The questionnaire contained of 20 questionnaire items. The data had been analyzed. The researcher established that all of questionnaire items were valid for the reason that the *r* value was higher that *r* table. The result of the test validity statistics could be seen below.

Table 3.4
Test validity statistics

No.	Question Item	*r* value	*r* table	Description
1.	Q1	0.413	0.171	Valid
2.	Q2	0.270	0.171	Valid
3.	Q3	0.370	0.171	Valid
4.	Q4	0.559	0.171	Valid
5.	Q5	0.423	0.171	Valid
6.	Q6	0.470	0.171	Valid
7.	Q7	0.375	0.171	Valid
8.	Q8	0.388	0.171	Valid
9.	Q9	0.663	0.171	Valid
10.	Q10	0.583	0.171	Valid
11.	Q11	0.568	0.171	Valid
12.	Q12	0.518	0.171	Valid
13.	Q13	0.457	0.171	Valid
14.	Q14	0.271	0.171	Valid
15.	Q15	0.488	0.171	Valid
16.	Q16	0.553	0.171	Valid
17.	Q17	0.379	0.171	Valid
18.	Q18	0.495	0.171	Valid
19.	Q19	0.440	0.171	Valid
20.	Q20	0.459	0.171	Valid

Reliability of the instrument. The researcher utilized the statistical calculation by using SPSS program version 20 to reveal the reliability of the research instrument. Field (2009) stated that an instrument to be reliable if the Cronbach's alpha (α) is higher than 0.70. It was related with George and Marelly as quoted in Gliem (2003) suggested that the data reliable that the Cronbach alpha was between 0.60 – 0.90. The categories of the reliability of the instrument, it could be found below.

Table 3.5
Category of reliability

Cronbach's alpha	**Internal Consistency**
≥ 0.9	Excellent (High Stakes testing)
≥ 0.8	Good (low stakes testing)
≥ 0.7	Acceptable
≥ 0.6	Questionable
≥ 0.5	Poor
≤ 0.5	Unacceptable

From the calculation of Cronbach's alpha, all items of questionnaire was tested the reliability after to analyzed two twice .The result for first analysis the Cronbach's alpha of 20 items questionnaire was 0.800. From the result of reliability statistics, there were item questionnaire that not reliable, the number item questionnaire not reliable were number 2 and 14 because number 2 and 14 has Cronbach's alpha more than 0.800.

Table 3.6
Reliability Statistics

Cronbach's Alpha	N of Items
0.800	20

In other words, the researcher should repeat the reliability statistics to increase the Cronbach's alpha without number 2 and 14. Afterbeing calculatedonce more, the second result of the instrument is Cronbach's alpha showed the number 0.807, it could be seen on table 3.7 and there was no item more than Cronbach's alpha.It meant that the instrument of the research was reliable and the internal consistency indicated the instrument was reliable because Cronbach's alpha value was more than 0.800.

Table 3.7
Reliability Statistics

Cronbach's Alpha	N of Items
0.807	18

Analysis of Data

From this study, this research had to complete two variables to analyze the data. There were two variables, namely physical environment as independent variable and students' achievement as dependent variable. To get the data from independent variable, the researcher used closed ended questionnaire to find out how the classroom physical environment at EED UMY was.

After collecting the data, the researcher analyzed the validity and reliability of the questionnaire based on the findings. The result showed that the questionnaire items on the classroom physical environment at English Education Department were all valid and reliable. The categories of classroom physical environment of this research could be seen as follows.

Table 3.8
The Categories of Classroom Physical Environment

Scale	Description
$\leq 45 - 55.33$	Poor
$55.34 - 65.67$	Fair
≥ 65.68	Good

Thus, another instrument was the documents of students' grade point average scores batch 2014 which used to know the students' achievement at EED UMY.

This research analyse the students' grade point average scores in first semester academic year 2014/2015, the reseacher used descriptive statisctics. From the result, the maximum score of students' grade point average was 4.00 and the minimum score students' grade point average was 1.43. After that, the reseacher made categories of students'grade point average based on the interval formulation from Supratno (2000), it could be seen in table below.

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

Note :

C : The range prediction (class size, width and length).

k : The number of class that research requirements.

X_n: The maximum score of variable.

X_1: The minimum score of variable.

(Supratno, 2000)

The categories of students' grade point average scores of this study are showed as follows.

Table 3.9
The categories of students' score grade point average

Scale	Description
1.43 – 2.27	Low
2.28 – 3.13	Moderate
3.14 – 4.00	High

After the researcher obtained the data from the questionnaire and documents of students' grade point average, the researcher analysed the data by using SPSS program version 20. In addition, to calculate the correlation between classroom physical environment and students' achievement, the researcher used inferential statistics. Sugiyono (2011) stated that there are five standard correlations, as follow:

Table 3.10
The criteria of correlation

Interval of coefficient	**The level of Correlation**
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