

Chapter Three

Methodology

In this chapter, the researcher presents the method of this research. The research design of this study is explained in the beginning of this chapter. The researcher then explains the population and sample of this study. Subsequently, the researcher elaborates the data collection method used in the recent study. In the end, this chapter describes how the researcher analyses the data.

Research Design

The researcher chose a quantitative research for the recent study. Creswell (2012) characterised the quantitative research as identifying a research problem based on the trends. Since the first and second research questions are regarding the person's attitudes, it can be examined through numerical data from a large numbers. In this study, the third research question has variable 'gender' categorised as dichotomous variable that might influence the participants' attitudes. Moreover, the researcher also personally inclines towards this approach in which the researcher likes to deal with numbers.

The recent study used survey design in order to measure a description of the students' attitudes and their association with gender. Survey design, as suggested by Creswell (2012), is used to determine trends or opinions about a specific issue. More importantly, this design of the study assists discovering individual beliefs and attitudes. From these, the researcher attempted at designing a survey related to the topic being issued, which is ICT use in English learning.

The recent study, in addition, has one dependent variable regarding students' attitudes. As the hypothesis presented, it is expected that the independent variable which is gender influences students' attitudes.

Survey design was chosen since in the first research question the researcher tried to examine the students' attitude on the use of ICT in English learning. What the individuals think about this issue becomes the trends, and it was appropriate if the researcher gained the data through survey. Survey design can be analytic if there are variables that influence the dependent variables (Cohen, Manion, & Morrison, 2011). So, since the third research question examined the statistical difference between the variables being tested, this study was categorised as analytic survey design.

Research Setting

The recent study was conducted in Yogyakarta. There are seven private senior high schools of Muhammadiyah (Islamic organisation based) in Yogyakarta. The researcher chose three out of seven schools (3 out of 7) to be representatives since three schools represented 43%. After the researcher chose the schools randomly through simple random sampling, three schools were selected to be the setting. The schools were Muhammadiyah Senior High School 3 of Yogyakarta (MUGA), Muhammadiyah Senior High School 5 of Yogyakarta (MUMA), and Muhammadiyah Senior High School 6 of Yogyakarta (MUNAM). Based on the schools' websites, these schools have integrated ICT in their learning. It was shown from the portal for e-learning that they have. The websites also let the teachers upload the learning materials for students to be downloaded.

Their websites are also quite active to be managed by an admin. The schools also have Hotspot so the students can access the Internet easily in the school without worrying about having no connection.

The researcher considered in choosing Yogyakarta schools particularly private schools. The first reason was that there are few studies about ICT use for English learning in high school conducted in Indonesia particularly in Yogyakarta. The newest studies in Indonesia related to the researcher's study were found in Salatiga (Palekahelu, Hunt, & Thrupp, 2016) and Semarang (Suratno & Aydawati, 2016) in which the studies were conducted about the use of ICTs, the attitudes, gender differences and other variables differences in primary and/or secondary schools. The researcher then chose the schools in urban area in Yogyakarta because urban schools are perceived to have more positive attitudes towards the use of ICT. Kubiato's finding (2010) in his study showed that students living in the city or urban area perceived more positive attitudes towards the use of ICT. This finding led the researcher to consider the schools in Yogyakarta.

The second reason was related to choosing private schools namely Muhammadiyah schools as one of Islamic private schools. Seen in the study from Suratno and Aydawati (2016), private schools tend to have higher value on perceived use of ICTs. This also became another consideration for the researcher to take private senior high schools from Muhammadiyah schools. The third reason was regarding the researcher's accessibility in conducting this research. Since the researcher was based in Yogyakarta and the researcher's university was under

Muhammadiyah institution, the researcher considered to conduct the recent study in Muhammadiyah senior high schools in Yogyakarta to have easier access for the research.

Research Population and Sample

Population includes all subjects being studied while samples are subjects from population which are taken as representative of the whole population. In this study, the researcher have decided the research population and samples to be used.

Research population. The researcher chose students of Yogyakarta Muhammadiyah senior high schools as population of this research. There are seven Muhammadiyah senior high schools in Yogyakarta, starting from Muhammadiyah senior high school 1, 2, 3, 4, 5, 6 and 7 of Yogyakarta. The total population are 4385 students from students of 10th, 11th and 12th grade in academic year 2016/2017. The data were obtained from the website of Ministry of Education and Culture (*sekolah.data.kemdikbud.go.id*). These schools facilitate ICT for English teachers to use in their teaching and learning process. Besides, some English teachers also implement ICT in their English teaching and learning process.

The researcher chose the target population from the population using simple random sampling. Simple random sampling is a technique sampling which gives the population an equal chance of being selected and involves selecting at random from the list of population (Cohen et al., 2011). In this study, the researcher simply made a lottery by writing the number from 1 to 7 in the seven pieces of paper. These paper were folded and the researcher took three pieces.

Then, the appeared numbers were 3, 5, and 6, meaning that the target population were students of Muhammadiyah Senior High School 3 of Yogyakarta (MUGA), Muhammadiyah Senior High School 5 of Yogyakarta (MUMA), and Muhammadiyah Senior High School 6 of Yogyakarta (MUNAM).

Therefore, the target population were the students of Yogyakarta Muhammadiyah Senior High School 3, 5, and 6 year 2016/2017 from class X and XI. The researcher did not choose class XII students because the schools did not allow to involve them in this research. Besides, they were focusing on national examination, and when the researcher collected the data, they had the days off. Based on the data from the schools' administration office, except class XII, the total students of MUGA School students are 509 students (250 male students and 259 female students), the total students of MUMA School are 330 students (164 male students and 166 female students), and the total students of MUNAM School are 71 students (42 male students and 29 female students). So, the total target population are 910 students with 456 male students and 454 female students.

Research sample. The researcher did not need to investigate the whole population since it was not necessary and would be a waste of resources (Dornyei, 2003). Mackey and Gass (2005) suggested that sampling is the best way to gain representative of the population. Besides, inferential statistics as this study also uses it is able to generalise the findings to get the data from population by selecting the samples. Due to generalizability, the researcher considered the representativeness of the samples to have the same chance to be selected. Since inferential statistics also requires the random data distribution (Cohen, Manion, &

Morrison, 2011), for these reasons, the researcher chose probability samples as it is useful for the inferential research. Probability samples are useful if the researcher wishes to make generalization to seek representativeness of the wider population (Cohen et al., 2011) as this study did the same. In addition to this, the type of probability samples is specified into stratified random sampling as it involves dividing the population into particular subgroups or strata and within each group or stratum the researcher randomly selected the participants (Bluman, 2009). Therefore, the researcher cut the pieces of paper which named the class of each school with the total number of the students there. Like lottery, the researcher took some pieces until the sample size has fulfilled the sample allocation from each school. However, this was applied only to MUGA School as they allowed the researcher to distribute the questionnaire in the presence of the researcher. MUMA and MUNAM School have randomly selected the samples by the teachers, so the researcher did not need to choose randomly.

The researcher chose stratified random sampling in this study. Stratified random sampling divides the population into groups or strata (Bluman, 2009). The population from each school was stratified into stratum namely male and female. In MUGA and MUMA School, the researcher chose proportionate random stratified sampling to know the sample allocations from each stratum. To decide the sample allocation, the researcher decided the sampling fraction. The sampling fraction is the value from 0 to 1, and the researcher can determine the fraction from this range (Banning, Camstra, & Knottnerus, 2012). Thus, the researcher

decided to use 0.2 as sampling fraction since it allocated 20% of target population of this study.

Table 1					
<i>Proportionate stratification in MUGA School</i>					
Gender	Population Size	% in Population	Sampling Fraction	n in Sample	% in Sample
Male	250	49%	0.2	50	49%
Female	259	51%	0.2	52	51%
	509			102	

Firstly, total population in MUGA School were 509 students with 250 males and 259 females. As seen in Table 1, with sampling fraction 0.2, the samples for male students are 50, and the samples for female students were 52. So, the total samples from MUGA School were 102 students.

Table 2					
<i>Proportionate stratification in MUMA School</i>					
Gender	Population Size	% in Population	Sampling Fraction	n in Sample	% in Sample
Male	164	50%	0.2	33	56%
Female	166	50%	0.2	33	44%
	330			66	

Secondly, total population in MUMA School were 330 students with 164 males and 166 females. With the same sampling fraction of 0.2, the samples for male students were 33, and the samples for female students were 33. So, the total samples from MUMA School were 66 students.

Thirdly, target population in MUNAM School were 71 students with 42 males and 29 females. Because the stratum population sizes were not equal and the stratum sample sizes were different from proportional allocation, the researcher used disproportionate random stratified sampling to decide the sample allocation in MUNAM School. Hence, the researcher considered to choose all students of class X (46 students) and XI (25 students) to be the samples. So, the total samples in MUNAM School were 71 students.

Therefore, the total samples were 239 students of MUGA schools (102 students), MUMA schools (66 students), and MUNAM schools (71 students). There were 125 male students and 114 female students who became the respondents in this study.

Instrument of the Study

The instrument of this study was a questionnaire. As suggested by Mackey and Gass (2005), questionnaire is a common instrument in collecting data for survey research. Questionnaire also allows the researcher to gather the data about facts, behaviours, and attitudes (Dornyei, 2003). In the recent study, the researcher adapted and modified the questionnaire from Yunus, Lubis, and Lin (2009) and translated the items into Indonesian language, so the respondents would be easy to fulfil the questionnaire because the language was in their mother tongue. However, the researcher did not take all the items since the purposes were different. Then, the researcher eliminated some parts of the questionnaire such as the items regarding the challenges in using ICTs and the response on English

subject. The researcher also added some items based on the literature review from some references.

Part	Items	Purposes of the study
A	Q1, Q2, Q3	Demographic information
B	Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8	The use of ICT in English learning
C	Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8, Q9, Q10, Q11	Attitudes on benefits of using ICT in English learning

The questionnaire consisted of three parts. The first section was demographic information of the students including gender, electronic devices mostly used for daily life, and the purpose of using electronic devices. The respondents gave the checklist on the choices provided in the items. The second part was the use of ICT in English learning. The respondents answered on how often they use ICT for a certain purpose. In this part, the researcher used rating scales. The range was measured by the numeric rating scales from 1-Never, 2-Almost Never, 3-Often, and 4-Very Often. The third part was asking the respondents' attitudes on the benefits of using ICT in their English learning. The items were used to measure the respondents' attitudes. The researcher used the Likert-scales from 1-Strongly Disagree, 2-Disagree, 3-Agree, 4-Strongly Agree. These scales led the respondents to indicate their response on the statements, whether they agree or disagree. Moreover, the researcher did not use a zero midpoint or a zero response as "don't know" or "neutral" because it would make the interpretation in measurement difficult (Mackey & Gass, 2005) and if the

study deals with attitudes, perceptions and opinions, it is suggested to render the data more sensible and responsive to respondents (Cohen et al., 2011) by omitting the zero midpoint. The researcher took this into a consideration since the researcher wanted the data to have certain results. Hence, the total items were 21 items with closed-ended questions as it made the answer easily to be quantified and analysed (Mackey & Gass, 2005).

Validity. The validity of this questionnaire used content validity through expert judgements from three lecturers of English Education Department of UMY. Content validity refers to “the representativeness of our measurement regarding the phenomenon about which we want information.” (Mackey & Gass, 2005, p. 107). It becomes a consideration since the questionnaire was adapted from other research, so the researcher needed to validate the content of the questionnaire which was translated to the respondents’ native language to ensure the items to have covered the purposes of the recent study.

In this case, Retnawati (2016) suggested to have indicator of score relevance items. The experts gave index agreement by scoring the items in the researcher’s questionnaire (Part B and Part C) with rating scales from 1-not relevant, 2-less-relevant, 3-quite relevant, and 4-very relevant. If the Aiken index (V) is less than 0.4, the validity of the questionnaire is low. The validity will be high if the score is more than 0.8. Then, the score between 0.4 – 0.8 shows average (mediocre). The researcher calculated the validity score using the Aiken formula suggested by Aiken (1985, as cited in Retnawati, 2016) below.

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

Where:

V = validity score

s = score from each expert minus the lowest score which is given in the category

c = numbers of categories

n = numbers of experts

After the questionnaire was given to the experts to have their judgement on the content of the questionnaire, the researcher revised the items into what were suggested. Overall, the feedback was on how the researcher translated the original items and the relation of items to the use of ICT in English learning. Detailed feedback and revision were displayed on Appendix C. Therefore, from the feedbacks, the researcher revised the items as suggested by the experts.

After that, the researcher looked at the validity score (V) of each item. From rating scales given by the experts, the researcher computed the values into a table of Aiken index to calculate V of each item using the Aiken formula and categorised the V scores to the categories of V's Aiken score. The table of V's Aiken was presented in the Table 4 below.

Table 4									
<i>Results of Aiken Index</i>									
Items	Rater1	Rater2	Rater3	s1	s2	s3	$\sum s$	V	Validity
Part B									
1	4	4	4	3	3	3	9	1.00	High validity
2	4	4	4	3	3	3	9	1.00	High validity

3	4	4	4	3	3	3	9	1.00	High validity
4	4	4	4	3	3	3	9	1.00	High validity
5	4	4	4	3	3	3	9	1.00	High validity
6	4	4	3	3	3	2	8	0.89	High validity

7	4	4	4	3	3	3	9	1.00	High validity
Part C									
1	4	3	4	3	2	3	8	0.89	High validity
2	3	4	4	2	3	3	8	0.89	High validity
3	3	4	4	2	3	3	8	0.89	High validity
4	4	4	4	3	3	3	9	1.00	High validity
5	4	4	4	3	3	3	9	1.00	High validity
6	4	4	4	3	3	3	9	1.00	High validity
7	4	2	4	3	1	3	7	0.78	Average validity
8	4	3	4	3	2	3	8	0.89	High validity
9	4	4	4	3	3	3	9	1.00	High validity
10	3	3	4	2	2	3	7	0.78	Average validity
11	4	3	4	3	2	3	8	0.89	High validity

Based on the results of Aiken test of validity, the V scores belong to high validity, meaning that the V score was more than 0.8. However, items number 7 and 10 in the Part C had average validity since both of the V scores were 0.78 which belongs to the category of 'average' validity. Therefore, the questionnaire of this study was all valid.

Reliability. Reliability refers to stability over time and over similar samples, equivalence, and internal consistency using test in the questionnaire (Cohen et al., 2011). The researcher measured the reliability using SPSS version 20 (a software package used for statistical analysis) after the researcher collected

the data. The researcher input the data to this software and the software analysed the reliability of the items in the questionnaire by looking at Cronbach alpha (alpha coefficient). Cronbach alpha calculated internal consistency amongst the items. The following guideline for the alpha coefficient can be used and seen in Table 5 (Cohen et al., 2011).

Table 5 <i>Reliability categories</i>	
Cronbach's alpha	Categories
>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

The collected data were input into SPSS software, and it analysed the items statistically. The result showed that overall Cronbach alpha (N = 18) was 0.818 which was categorised into 'highly reliable'. Bryman and Cramer (1990, cited in Cohen et al, 2011) remarked that the reliability level is acceptable at 0.8, so the reliability of the questionnaire was acceptable since the overall alpha in this questionnaire was 0.818.

Table 6 <i>Reliability Statistics</i>	
Cronbach's Alpha	N of Items
.818	18

In addition, Cohen et al. (2011) suggested that if there is item's alpha coefficient in 'Cronbach's Alpha if Item Deleted' (see Table 7) above overall alpha (0.818) which is item 7 in Part B, the researcher may wish to remove the

item in order to increase the overall reliability, and the overall reliability can rise to the alpha coefficient of that item. However, the reliability in the questionnaire was acceptable and had highly reliable, so the researcher did not need to rise the overall reliability by exciding the items which have greater alpha coefficient than overall alpha. Moreover, as seen on the Table 7 below, the Cronbach's Alpha if Item Deleted showed that all the items in the questionnaire were categorised to 'highly reliable'. The scores were ranged from 0.80 to 0.90 which mean highly reliable. Therefore, the questionnaire items were all reliable seen from the overall Cronbach's alpha and each item of Cronbach's alpha.

Table 7		
<i>Results of reliability of each item</i>		
Items	Cronbach's Alpha if Item Deleted	Reliability
Part B		
1	.812	Highly reliable
2	.825	Highly reliable
3	.821	Highly reliable
4	.809	Highly reliable
5	.807	Highly reliable
6	.808	Highly reliable
7	.822	Highly reliable
Part C		
1	.810	Highly reliable
2	.807	Highly reliable
3	.802	Highly reliable
4	.807	Highly reliable
5	.805	Highly reliable
6	.805	Highly reliable

7	.802	Highly reliable
8	.807	Highly reliable
9	.800	Highly reliable
10	.802	Highly reliable
11	.808	Highly reliable

Technique of Data Collection

The researcher visited MUGA School, MUMA School, and MUNAM School after getting a permission from the schools and *Pimpinan Daerah Muhammadiyah Kota Yogyakarta* (Yogyakarta Regional Leadership of Yogyakarta). Then, the researcher needed a consent letter from the researcher's faculty given to the schools and *Pimpinan Daerah Muhammadiyah Kota Yogyakarta* in order to conduct the survey research in these three schools. After the researcher chose the respondents from the classes of the three schools using simple random sampling, the researcher counted the number of male and female students based on the sample sizes for each school.

To administer the questionnaire, the researcher self-administered the questionnaires. This form of administering the questionnaire allows the researcher to have a greater degree of flexibility in the data collection process (Mackey & Gass, 2005). The researcher self-administered the questionnaires in the presence of the researcher and without the presence of the researcher based on the school's decision. Self-administering questionnaires in the presence of the researcher is beneficial for the researcher to ensure a good response and make sure that the questions are completed (Cohen et al., 2011). It also lets the respondents ask the uncertainties to the researcher. Besides, self-administering questionnaires without

the presence of the researcher helps the respondents to complete the questionnaire in private, and it gives them much time to complete it.

In this study, MUGA School gave permission to self-administer in the presence of the researcher while MUMA and MUNAM Schools did not give the permission. In MUGA School, the researcher arranged the schedules with the English teacher and started administering the questionnaire based on the schedule. In MUMA School, the school allowed the researcher to leave the questionnaires to English teacher, so the teacher himself distributed the questionnaires. In MUNAM School, English teacher only gave permission to leave the questionnaires to a person in charge of each class to distribute them to their classmates. They completed the questionnaire at home, and then they gave the completed questionnaires to the researcher in the next days.

Data Analysis

To analyse the data, the researcher used descriptive statistics and inferential statistics. Firstly, in Part A, the researcher analysed the demographic information using descriptive statistics. The demographic information (Part A) are students' gender and electronic devices used by the students and its purposes. Descriptive statistics is used to present overall information including frequencies, measures of dispersal (standard deviation), and measures of central tendency namely means, modes, and medians (Cohen et al., 2011). In Part A, the researcher looked at the frequencies and percentages of the male and female students, the frequencies of what students' electronic devices, and the frequencies of the

purposes of using electronic devices which have been proposed in the questionnaire.

Secondly, another demographic information in Part B was also analysed using descriptive statistics. Part B items about the use of ICT in English learning were measured by looking at the means score of each item, and the total mean score based on the students' gender. Then, to see the use of ICT in English learning, the researcher made a range prediction to categorise the results of mean scores of each item to which category the mean score belongs to. The formula to make a range or category was from Supranto (2000) in the following.

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

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

K = the number of class

X_n = the maximum score of variable

X_1 = the minimum score of variable

Based on Table 8 below, the range prediction for Part B about the use of ICT was divided into four categories. The categories are 'never', 'rarely', 'often', and 'always' which means that the category showed the average of students using ICT in English learning.

Never	1.00 – 1.75
Rarely	1.76 – 2.50
Often	2.51 – 3.25
Always	3.26 – 4.00

Thirdly, to answer the first and second research questions on what male and female students' attitudes are on the use of ICT in English learning, descriptive statistics was used to analyse the data from Part C. Part C was measured statistically with means and standard deviation. In order to answer the research questions, the researcher looked at the mean scores to obtain the results of students' attitudes, whether they have positive or negative attitudes based on the gender. In the analysis of students' attitude, the researcher also made a range prediction to see the mean scores which belong to positive and negative attitudes by formula from Supranto (2000).

Table 9	
<i>Range of students attitudes means</i>	
Positive attitude	2.51 – 4.0
Negative attitude	1.0 – 2.50

Based on Table 9, if the total mean scores or the mean scores from each statement have value on 2.51 – 4.0, it indicates that the students have positive attitudes. Conversely, the students have negative attitudes if the mean scores are 1.0 – 2.50. Since the first and second research questions were about the male and female students' attitudes, the researcher presented the results based on gender. So, the total mean scores from each gender will be used and reported.

Fourthly, before analysing the data for inferential statistics from the result of students' attitude which was in Part C, the researcher needed to have assumption test. The data from Part C (Attitude on the Use of ICT in English Learning) analysed using inferential statistics should be normal and homogenous. As suggested by Berg (2014), dependent variables should be normally distributed

in both samples, and the variances of the samples should be equal. First, the researcher tested the normality after the data were collected. Normality test is used to observe whether the participants of this study are from the same proficiency or ability, or if the data are normally distributed (Bluman, 2009). The researcher used test of normality based on Kolmogorov-Smirnov test. The distribution are normal if the significance value has greater value than significance level ($\alpha > 0.05$).

Second, the researcher tested the homogeneity to show that the groups in the samples come from the same variance. Berg (2017) suggested the test of homogeneity since the standard deviation of dependent variable must be equal in both populations. One-Way ANOVA in SPSS was used to test the homogeneity. The results showed Levene Statistics with significance value (α) from the results. The data distribution are homogenous if the significance value is higher than 0.05 ($\alpha > 0.05$), meaning that the population from male and female students are equal. After the researcher tested the normality and homogeneity, the data were analysed.

Lastly, the researcher used inferential statistics in order to answer the third research question as to whether the male and female students have significant difference on the use of ICT in English learning. Inferential statistics measures the obtained data to make inferences and predictions (Cohen et al., 2011). One of the tests in inferential statistics is significance test. The significance test used in this study was a t-test, specifically an independent samples t-test. A t-test is a test to determine if the means of two groups are significantly different from one another

(Mackey & Gass, 2005), while an independent t-test is used “to test the difference between means when the two samples are independent and when the samples are taken from two normally or approximately normally distributed populations” (Bluman, 2009, p. 484). From this, the independent samples t-test was used since the recent study sought to ascertain the significant difference between two means of variables.

In the recent study, the data had two total mean scores from males and females, and the samples were independent which were identified by dichotomous variable. A dichotomous variable is a variable which has two values such as male and female (Mackey & Gass, 2005). The dichotomous variable or categorical variable (groups of males and females) became independent variable and the metric variable or continuous variable (the total mean scores of students' attitudes) became dependent variable. Therefore, independent samples t-test was used to analyse the third research question of this study.

To see the result of independent samples t-test, firstly, the researcher looked at the result of Levene's test for equality of variances. If the probability value is significant ($\rho < 0.05$), the researcher will use the second row of data ('Equal variances not assumed'), and if the probability value is not significant ($\rho > 0.05$), the researcher will use the first row of data ('Equal variances assumed'). Secondly, after the row was determined, the researcher looked at column 'Sig. (2-tailed)' to see whether there is statistically significant difference between male and female students. H1 is accepted if the significance value is less than level of significance ($\rho < 0.05$). Hence, using independent samples t-test is

appropriate to answer the third research question of which whether there is a significant difference between male and female students on the attitudes on the use of ICT in English learning.