CHAPTER III
RESEARCH METHODOLOGY

This chapter presents the procedure and steps in conducting the research. Mainly this chapter discusses the elaboration of the research methodology which is further organized into six sections: purposes of the research and research question, population and sample, research design, data collection technique, validity and reliability of the instrument, and data analysis.

3.1 Purposes of the Research and Research Questions

The purposes of this research are firstly to find out the needs of needs of learning English for undergraduate engineering students in terms of necessities and lacks. Secondly, it aims to identify the learning needs related to engineering context of needs in which the learning take place. Therefore, this research was conducted to answer these two questions, "What are the needs of learning English for undergraduate engineering students in terms of necessities and lacks?" and "What are the learning needs related to engineering context of needs in which the learning take place?"

3.2 Population and Sample of the Research

The data of the research were derived from two different groups: three representatives of English engineering lecturers from Faculty of Engineering and 90 undergraduate engineering students from Faculty of Engineering in one of universities in Bandung, West Java. The purposive sample of the former group consisted of Participant 1, Participant 2, and Participant 3. On the one hand, the sample of latter group was drawn from the population of 864 people enrolling in the eight semester, majoring six different majors, namely Industrial Engineering, Food Technology, Mechanical Engineering, Informatics Engineering, Environmental Engineering, and Urban and Regional Planning (see Appendix F). The population size obtained from the data given by one of staffs working in the faculty of the university. Population, according to Johnson and Christensen (2016)

is “the large group to which a researcher wants to generalize his or her sample” (p. 250).

For Johnson and Christensen (2016), sample is “a set of elements taken from a larger population” (p. 259). Coolidge (2000) has declared two requirements of drawing sample from the population. First, sample should be drawn randomly from the population, and second, the sample should be relatively large. However, Coolidge has further claimed that these two requirements do not guarantee that the sample will be representative of the population since the sample may still lack some important characteristics present in the population.

As recommended by Creswell (2009) this research used random sampling in which each individual in the population has an equal probability of being selected. However, due to the lack of random sampling, Fowler (2002) has noted that “any of the characteristics of the sample may, by chance, differ somewhat from the population from which it is drawn” (p. 19). Regarding this, Fowler has further suggested that the sample should be stratified by determining a few characteristics of the sample representing the population. As the result of stratification, the sample could represent the true proportion in the population of individuals with certain characteristics.

The importance of stratification leaded this research to use proportional stratified sampling. Proportional stratified sampling defined by Johnson and Christensen (2016) is the type of stratified sampling in which the proportions in the sample are created to be the same as the proportions in the total population on certain characteristics. In this research, stratification characteristic was a different number of fourth-year engineering students in each stratum (major) of the faculty.

Firstly, the sample size of this research was drawn from the population by following the formula mentioned by Yamane (as cited in Riduwan & Kuncoro, 2013). Then, the drawn sample was stratified by allocating the proportional number of the sample for each strata (major). The following is the formula of drawing random sample stated by Yamane (as cited in Riduwan & Kuncoro, 2013).

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

where

n = the sample size

N = the population size

e = the acceptable sampling error

By following the formula above, the sample size of the population in this research is as follows.

$$n = \frac{N}{N.(e)^2 + 1} = \frac{846}{846.(0.1)^2 + 1} = \frac{846}{846.(0.01) + 1} = \frac{846}{8.46 + 1}$$

$$n = \frac{846}{9.46}$$

$$n = 89{,}43$$

Thus, the sample size of this research is of 89 participants.

The following is the formula of proportional stratified sampling developed by Yamane (as cited in Riduwan & Kuncoro, 2013).

$$ni = \frac{Ni}{N} . n$$

where

n_i = the sample size based on the stratum

n = the sample size

N_i = the population size based on the stratum

N = the population size

Secondly, by using the above formula, the sample size for proportional stratified sample for each strata is shown in the following table.

Table 3.1.

Proportional Stratified Sample

Major	Population (Batch 2012)	Formula	Sample
Industrial Engineering	138	$ni = \frac{Ni}{N} . n$ $= \frac{138}{846} . 89 = 14{,}52$	14

Food Technology	333	$ni = \frac{Ni}{N} . n$ $= \frac{333}{846} . 89 = 35{,}03$	35
Mechanical Engineering	91	$ni = \frac{Ni}{N} . n$ $= \frac{91}{846} . 89 = 9{,}57$	10
Informatics Engineering	205	$ni = \frac{Ni}{N} . n$ $= \frac{205}{846} . 89 = 21{,}57$	22
Environmental Engineering	23	$ni = \frac{Ni}{N} . n$ $= \frac{23}{846} . 89 = 2{,}42$	2
Urban and Regional Planning	56	$ni = \frac{Ni}{N} . n$ $= \frac{56}{846} . 89 = 5{,}89$	6
		Total of sample	90

After the sample size was stratified into the allocated-proportional sample size as shown in table 3.1., the sample size of Industrial Engineering is 14 participants. The sample size of Food Technology is 35 participants. The sample size of Mechanical Engineering is 10 participants. The sample size of Informatics Engineering is 22 participants. The sample size of Environmental Engineering is 2 participants. The sample size of Urban and Regional Planning is 6 participants. Hence, the sum of the sample of this research is 90 participants. With regard of this, the sample size used in this research is relatively large since the minimum number of sample in which researchers plan to use some form of statistical analysis on their data is thirty. The larger the sample the better, as this does not only establish greater reliability but also enable more sophisticated statistics to use (Cohen, 2007).

3.3 Research Design

To conduct needs analysis, there is no single approach to needs analysis in foreign language teaching (Hossain, 2013) as supported by Hutchinson and

Waters' (1987) view that the choice of method will depend on the available time and resources and the procedures of each will depend on the accessibility. In this research, a survey research was used as the research design. A survey research, according to de Leeuw, Hox and Dillman (2008) is "a research strategy in which quantitative information is systematically collected from a relatively large sample taken from a population" (p. 2). The key characteristics of survey research stated by Creswell (2012) are "sampling from a population, collecting data through questionnaires and interviews, designing instruments for data collection, and obtaining a high response rate" (pp. 380-381). Creswell further classifies survey research into several types such as cross-sectional survey, longitudinal survey, and trend or prediction studies. The type of survey research used in this research was a cross-sectional survey research. Cross-sectional survey, according to Cohen (2007) is a snapshot of a population at a particular point in time whose sample can represent the large population. Cross-sectional survey is the most popular survey form used in educational studies (Creswell, 2012).

The reason of using cross-sectional survey in this research is because according to McIntyre (as cited in Glaslow, 2005) the information from large samples of the population is able to collect and also well suited to gathering demographic data describing the composition of the sample. Two more reasons for using cross-sectional survey were suggested by Creswell (2012). First, cross-sectional design can measure the community needs of educational services as they relate to programs, courses, school, facilities projects, involvement in the school, or community planning. Regarding this, needs analysis for engineering students for ESP development concerned in this research could be measured. Second, cross-sectional study can examine current attitudes, beliefs, opinions, or practices. Attitudes, beliefs, and opinions attempted to find out in this research was the lecturers' and engineering students' perception towards the target needs of engineering. On the other hand, the practice tried to obtain in this study was the learning situation established by both lecturers and engineering students in teaching and learning process.

3.4 Data Collection Technique

The data from this cross-sectional survey were obtained from two data collection techniques, namely questionnaires and interview. As suggested by Creswell (2012) using questionnaire and interview as the instrument of the research belongs to the key characteristics of survey design.

3.4.1 Questionnaire

A questionnaire, according to Creswell (2012) is "a form used in a survey design that participants in a study complete and return to the researcher" (p.382). The reason of selecting questionnaire as data collection technique in this research since it can generalize the data from a sample to population (Creswell, 2003).

The items of the questionnaire were developed based on two expected-findings. First is the lacks of engineering students' English proficiency which needs to improve. The questionnaire items consisted of four categories adapting constructs of Present Situation Analysis of engineering students' English proficiency in Araminta and Halimi's research (2015) which was then specified into several categories. Second expected-finding was learning needs of engineering students whose questionnaire items consisted of three constructs adapting Hutchinson and Waters' framework of analyzing learning needs (1987) which was then specified into several categories. The detail information of categories in developing questionnaire items are provided in the following table.

Table 3.2.

Categories in Developing Questionnaire Items

Category	Sub-category	Item	
		Type of item	Number
Demographic data	Student's age, sex, major, and semester	Short answer	1
	English subjects students have learned in university		2
	Students' feeling during learning English subject in		3

	university		
The importance of learning English	Students' immediate purpose of learning English	Multiple choice with additional blank space for 'other option'	4
Self-assessment of English skill	Self-assessment covering these skills: reading, listening to monologue, listening and speaking, speaking, speaking monologue, writing, and additional to vocabulary	Rating scale: Very good : 4 Good : 3 Poor : 2 Very poor : 1	5
Job skills using English	Students' priority of learning job skills using English	Rank from 1-9, with 1 representing the most prioritized job-skill	6
Effective ways of learning English	Learning partner The use of media Kinds of activities	Rating scale Really suitable : 4 Suitable : 3 Rather suitable : 2 Not suitable : 1	7
Instructional materials	Kinds of instructional material	Multiple choice	8
Time for studying English subject	The enrollment of English subject Time of studying English	Multiple choice	9 10

As shown in table 3.1., the questionnaire contains 10 items developed from seven categories. To prevent misinterpretation in answering particular items, the questionnaire was written bilingually both in English and Indonesian. Avoiding the error data obtained such as incomplete or incorrect answer which was not in line with the instruction, the questionnaire was administered to 100 participants,

larger than the determined sample size which was of 90 participants. However, the data used in this research was still of 90 participants. In addition, a pilot test was conducted to 20 engineering students belonging to the population, not included in the sample size of this research. As stated by Creswell (2012) "a pilot test is a procedure in which a researcher makes change in an instrument based on feedback from a small number of individuals who complete and evaluate instrument" (p. 390). Furthermore, the validity and reliability of the questionnaire items had been validated by using IBM SPSS Statistics version 22.00, a widely used software package for testing validity and reliability of the research instrument.

The distribution of questionnaire was conducted for three days started from May 17, 2016 to May 19, 2016. Each participant answered 5 pages of printed-questionnaires by following the instruction provided. In case there was some confusion over instruction or particular item, the participant could directly ask the researcher. In addition, the site for conducting the interview was tentative which was decided based on the appointment associated with the accessibility of time and place of the participants (see Appendix E for the schedule).

3.4.2 Interview

As this research used cross-sectional survey research, the quantitative survey interview used was semi-structured interview (Creswell, 2012). The semi-structured interview, according to Cohen (2007) provides a clear set of instructions for interviewers and can provide reliable, comparable qualitative data. Likewise, Opdennaker (2006) explained that there will be synchronous time and place between the interviewer and the interviewee, the interviewee can give the interviewer a lot of extra information that can be added to the verbal answer of the interviewee on a question asked.

The semi-structured interview was conducted bilingually both in Indonesian and in English to the three English engineering lecturers of Faculty of Engineering in one of universities in Bandung. Time allocation for each interview was approximately one hour. Due to the participant's availability of expense, the interview was conducted in different time and site within the range of time, April 25, 2016 to April 27, 2016 (see Appendix E for the schedule).

The items of semi-structured interview administered to the three English lecturers for engineering was based on two expected-findings. First is the necessities (target situation needs) for engineering students whose interview items consisted of six categories adapting Hutchinson and Water's framework of Target Situation Analysis (1987) which was then specified into several aspects. Second is teaching context based on lecturers' experience in teaching English for engineering whose interview items consisted of three categories associated with learning needs of engineering students grounded by Hutchinson and Waters' framework of analyzing learning needs (1987). The detail information of categories in developing semi-structured interview items in terms of necessities are presented in the following table.

Table 3.3.

Categories in Developing Semi-Structured Items in Terms of Necessities

Category	Sub-category	Number of item
Demographic data	Name and position of the lecturer	1
	Subjects of English from department	2
	The amount of credit-course of the subjects	
The importance of English proficiency	The lecturer's perception toward the importance of students' English proficiency	3
Assessment of students' English proficiency	The lack of students' English proficiency	4
The use of English skill	Kinds of English skill for engineering students	5
	The channel or work activities using English	6
	Types of text or discourse using English	7
	The content areas of engineering context	8
	Partners when using English	9
Setting of using	The physical setting	10

English Human context

As shown in table 3.2., the interview consisted of 10 items developed from six categories. A pilot test was conducted to two English engineering lecturers from Faculty of Engineering in one of polytechnics in Bandung, West Java. As suggested by Creswell (2012) that a pilot test is a procedure allowing researcher to make change over a research instrument based on feedback from a small number of individuals completing and evaluating the instrument.

3.5 Validity and Reliability of the Instrument

Attempting to create validity and reliability of the instruments both questionnaires and interview questions for the sake of enhancing the accuracy of their assessment and evaluations, these instruments had passed validity and reliability test. Validity and reliability are two fundamental elements in the evaluation of a measurement instrument (Tavakol & Dennick, 2011). Indeed, reliability and validity are the pivotal keys however as suggested by Tavakol and Dennick (2011) and Cohen (2007) that reliability of an instrument is closely related to its validity. An instrument cannot be valid except if it is reliable. Nevertheless, the reliability of an instrument does not depend on its validity.

3.5.1 Validity of Questionnaire

Validity, according to Cohen (2007) is a pivotal key to effective research both quantitative and qualitative research. Cohen (2007), Tavakol and Dennick (2011) and Pallant (2005) explain that the earlier versions of validity were based on the view that it is essentially a demonstration in which a particular instrument measures what is supposed to measure. However, Gronlund (as cited in Cohen, 2007) argues that it does not mean the possibility of the research can be 100 per cent valid which is the optimism of perfection. This expresses that quantitative research owns a measure of standard error that is inbuilt and has to be acknowledged. As a result of this reason, validity should be defined as a matter of degree rather than as an absolute state. In Creswell's (2009) statement, "establishing the validity of the scores in a survey helps to identify whether an instrument might be a good one to use in a survey research" (p. 149). Creswell

further classifies validity into three traditional form of validity which are content validity (do the items measure the content they were intended to measure?), predictive or concurrently validity (do scores predict a criterion measure? Do results correlate with other results?), and construct validity (do items measure hypothetical constructs or concepts?).

To establish the validity of the questionnaire used as the instrument of this research, the questionnaire firstly piloted to 20 engineering students belonging to the population who were not counted as the sample of the research. As suggested by Cohen (207) that piloting questionnaire and refining their contents, wording, length, etc. as appropriate for the sample of the research are necessary. Data collected from pilot test was then analyzed by creating construct validity. Construct validity was intended to see if scores to items were related in a way that was expected so that they could be used as the valid items for a quantitative research (Creswell, 2012).

The test of construct validity of the questionnaire was conducted by using a widely used-software package for statistical analysis, IBM SPSS (Statistical Package for the Social Sciences) Statistics version 22.0. This had evidence (http://www.spsstests.com) that the analysis was conducted by using Pearson Product Moment Correlations done by correlating each item of the questionnaire scores with the total score. Items of questionnaires that significantly correlated with the total score indicates that the items are valid. The following is the basic making decision of validity test based on the two points: the value of significance and the value of rxy table with r product moment.

Seeing the value of significance

- If the value of significance is $\rho < 0.05$, then the instrument is declared invalid.
- If the value of significance is $\rho > 0.05$, then the instrument is declared valid.

These statements are emphasized by Mitchell and Jolley (as cited in Cohen, 2007) that the more the level of significance is reduced, the lower the validity of the instrument. Thus, the level of significance used in this research was .05.

Comparing the value of rxy table with r product moment

- If the value of rxy > r table product moment, then the instrument is declared invalid.
- If the value of rxy < r table product moment, then the instrument is declared valid.

where:

rxy = correlation value between the item or the item with a total score

r table = correlation coefficient 'r' in product moment

In conducting construct validity test, the questionnaire was firstly classified based on the categories of the instrument consisting of demographic data, lacks and learning needs. By knowing that the varied-forms used in the questionnaire are short answer, nominal scale, rating scale, and ordinal scale, the variables of questionnaire using rating scale whose validity can be measured to find out lacks and learning needs.

First, the following is the result of construct validity test of lacks category measuring whether each item was valid or invalid. Rating scale started from 1 to 4 (namely 1 = very weak, 2 = weak, 3 = good, and 4 = very good) was used to measure self-assessment of engineering-students' English proficiency related to their work context. The even number scale was selected for the sake of avoiding the neutral option and varying the response on each item (Rovai, Baker, & Ponton, 2012).

Table 3.5.

The Result of Construct Validity Test over Lacks 1

Item	Rxy	r table	Decision
Item 1	.673	.444	Valid
Item 2	.573	.444	Valid
Item 3	.702	.444	Valid
Item 4	.607	.444	Valid

Item 5	.541	.444	Valid
Item 6	.502	.444	Valid
Item 7	.594	.444	Valid
Item 8	.555	.444	Valid
Item 9	.666	.444	Valid
Item 10	.782	.444	Valid
Item 11	.616	.444	Valid
Item 12	.519	.444	Valid
Item 13	.544	.444	Valid
Item 14	.492.	.444	Valid
Item 15	713	.444	Valid
Item 16	.617	.444	Valid
Item 17	.562	.444	Valid

Based on the output above, in which the level of significance used is (2-tailed) meaning that $\rho = .05$ and N, a total number of piloted-participants is 20, it can be concluded that the counted-value of rxy for all items > r table product moment which is .444. It signifies that all items are valid so that those can be used as the research instrument (Creswell, 2012). r table product moment was obtained from the distribution of the r table product moment with the level of significance level 5% and with N = 20 piloted-participants. Then, the value of r table product moment equals to .444 (see Appendix D).

Second, the following table describes the result of validity test of learning needs category with the level of significance used 5% and N = 20. Rating scale started 1 to 4 (1 = not suitable, 2 = less suitable, 3= suitable, and 4 = really suitable) was used to measure engineering-students' level of suitability in learning

English during teaching and learning process in the classroom. The even number scale was selected for the sake of avoiding the neutral option and varying the response on each item (Rovai, Baker, & Ponton, 2012).

Table 3.6.

The Result of Construct Validity Test over Learning Needs

Item	Rxy	r table	Decision
Item 1	.459	.444	Valid
Item 2	.543	.444	Valid
Item 3	.484	.444	Valid
Item 4	.501	.444	Valid
Item 5	.499	.444	Valid
Item 6	.499	.444	Valid
Item 7	.617	.444	Valid
Item 8	.724	.444	Valid
Item 9	.417	.444	Not valid
Item 10	.503	.444	Valid
Item 11	.482	.444	Valid
Item 12	.469	.444	Valid
Item 13	.499	.444	Valid
Item 14	.505	.444	Valid
Item 15	.686	.444	Valid

Based on the output above in which the level of significance used is (2-tailed) meaning that ρ = .05 and N, a total number of piloted-participants is 20, it can be concluded that 1 of 15 items, which is item number 9 has the counted-value of rxy .417 < r table product moment which is .444. It shows that item number 9 is not well-correlated with other items so that the item is not valid to be the questionnaire item for learning needs category. Hence, the item was omitted. While, r table product moment was obtained from the distribution of the r table product moment with the level of significance level 5% and with N = 20 piloted-participants. Then the value of r table product moment equals to .444 (see Appendix D).

3.5.2 Reliability of the Questionnaire

Reliability is concerned with consistency (Creswell, as cited in Mohamad, Sulaiman, Sern, & Salleh, 2015; Cohen, 2007; Tavakol & Dennick, 2011) and stability of the instrument (Creswell, as cited in Mohamad, Sulaiman, Sern, & Salleh, 2015). It means that the scores of an instrument are stable and consistent although the instrument is administered repeatedly at different times over similar samples. A reliable instrument for a piece of research will produce similar data from similar samples over time (Creswell, as cited in Mohamad, Sulaiman, Sern, & Salleh, 2015; Cohen, 2007).

The reliability of the instrument measured in this research used Cronbach's alpha, the most widely used objective measure of reliability. Cronbach's alpha provides a measure of the internal consistency of a test or scale determined within the range of 0.00-1.00. Internal consistency signifies the extent to which all items of the instrument measure the same concept or construct so that it is connected to the inter-relatedness of the items within the instrument (Cronbach, as cited in Mohamad, Sulaiman, Sern, & Salleh, 2015). Indeed, values close to 1.00 express that investigated factors can be measured, however there are different reports about the acceptable values of alpha. Fraenkel and Wallen (as cited in Mohamad, Sulaiman, Sern, & Salleh, 2015) stated that the reliability of items is acceptable if the alpha is within .70 and .99. Nunnally and Bernstein (as cited in Tavakol & Dennick, 2011) departing from Fraenkel and Wallen, believed that the acceptable

values of alpha were ranging from .70 to 0.95. However, SPSS (http//www.spsstest.com) further cross classified the degree of the value of Cronbach's alpha. The instrument has a high degree of reliability if the value of Cronbach's alpha obtained as follows.

- If Cronbach's alpha > 0.90 = very high reliability
- If Cronbach's alpha 0.70 to 0.90 = high reliability
- If Cronbach's alpha 0.50 to 0.70 = quite-high reliability
- If Cronbach's alpha < 0.50 = low reliability

The following was the basic decision making in reliability test whether the items of the instrument are dictated reliable or unreliable.

- If the value of Cronbach's Alpha > .600, then the questionnaire items are dictated reliable.
- If the value of Cronbach's Alpha < .600, then the questionnaire items are dictated unreliable.

To ensure both consistency and stability of the questionnaire as one of the instruments in this research, the pilot test was administered to 20 engineering students belonging to the population who were not involved in the actual research. Following consideration proposed by Cohen (2007) that in order the reliability is to be guaranteed, statistical significance of the correlation coefficient can be found and should be .05 or higher if reliability is to be guaranteed. Regarding this, the statistical significance used in testing reliability of the questionnaire items is .05. Reliability test was categorized into two categories, namely lacks and learning needs.

First, the following table shows the result of reliability test over lacks of engineering students' English proficiency.

Table 3.7.

First Output (Case Processing Summary)

		N	%
Cases	Valid	20	100.0
	Excluded[a]	0	.0
	Total	20	100.0

As shown in Table 3.7., first output (Case Processing Summary) with N = 20 or the number of valid data of 20 units and the missing data of 0 describe that all data was processed.

Table 3.8.

Second Output (Reliability Statistics) of Lacks

Cronbach's Alpha	N of items
.890	17

As shown in table 3.8., second output of reliability statistics over the items of lacks of engineering students' English proficiency obtained Cronbach's Alpha value of .890 > .600. It signifies that based on the basis of decision making in the reliability test, the questionnaire items of finding out lacks of engineering students' English proficiency are reliable in which the degree of reliability value belongs to high reliable (see Appendix D).

Second, the following table describes the result of reliability test over learning needs.

Table 3.9.

First Output (Case Processing Summary)

		N	%
Cases	Valid	20	100.0
	Excluded[a]	0	.0
	Total	20	100.0

As shown in table 3.9., first output with N = 20 or the number of valid data is 20 units and the missing data = 0 mean that all data are processed.

Table 3.10.

Second Output (Reliability Statistics) of Lacks

Cronbach's Alpha	N of items
.819	15

As shown in table 3.10., second output of reliability statistics over learning needs obtained Cronbach's Alpha value of .819 > .600. It describes that based on the basis of decision making in the reliability test, the questionnaire items of learning needs are reliable in which the degree of reliability value belongs to high reliable (see Appendix D).

3.5.3 Validity and Reliability of Interview

To validate interview questions, Cannel and Kahn (as cited Cohen, 2006) suggested to conduct face validity that is whether the varied-questions asked look as they are measuring what are intended to measure. However, face validity, according to Drsot (2004) is frequently seen as a weak form of construct validity since regardless of subjective judgment on the operationalization of a construct, the method of validation is not highly convincing to others as a valid judgment. Another alternative offered by Bollen (as cited in Drost, 2004) is by conducting content validity as a qualitative type of validity in which the main concept is made clear. Bollen further explained two basic ways of assessing content validity including asking a number of questions about the instrument or test and/or asking the opinion of expert judges in the field. In this research, to validate the interview, content validity was carried out by asking a number of interview questions to the expert in the relevance field. To assess the reliability of the interview, as suggested by Silverman (as cited in Cohen, 2006), the interview questions was firstly piloted to two English engineering lecturers in one of polytechnics in Bandung, West Java. The result shows that there were some questions that need to be omitted due to their lack of underpinning the main concept and some questions that need to be revised in terms of the word choice. Some omitted-questions were as follows.

1. How many credit-courses does the subject have?

2. How do you identify the needs of engineering students?

   Prompts:

   - Are the needs provided by the department of faculty in university?
   - Or did you conduct the needs analysis to the engineering students in this university as the participants?

3. How do you update yourself in terms of the needs of English for Engineering

The changes over the part of instrument resulted by a pilot test also highlighted by Creswell (2012) that a pilot test is a procedure allowing researcher to make change over a research instrument based on feedback from a small number of individuals completing and evaluating the instrument.

3.6 Data Analysis

The collected data both from interview and questionnaires were analyzed as follows.

3.6.1 Analysis of the Interview

The data obtained from the interview were analyzed through several stages as follows (Hoyos & Barnes, 2012). Firstly, the data from the interview were prepared and then transcribed. The themes relating to one of categories as the main focus of this research, namely necessities, were then classified, categorized, and identified. The categorized-data were then connected and interrelated which were followed by interpreting the data to deal with the research questions. The data then finally related to the theory in the relevance area.

3.6.2 Analysis of Questionnaires

The data from questionnaires were analyzed through statistical analysis of questionnaire data which were further extended beyond simple descriptive analysis. The statistical devices used for analyzing the data were arithmetic percentage and frequency distribution (Creswell, 2012). Descriptive statistics from the questionnaire was categorized into two categories including lacks and learning needs. The discussion of the result of descriptive statistics was provided underpinned by some theories in the relevance area.

3.7 Concluding Remark

This chapter has presented a brief explanation regarding the research methodology employed in this research, including purposes of the research and research questions, site and participants, research design, data collection techniques, and data analysis. In the following chapter, the findings and discussions of this research will be elaborated. It includes the findings and the discussion from the interview of three lecturers of English for engineering and the analysis of questionnaire.