CHAPTER III
RESEARCH METHODOLOGY

This chapter describes the methodical aspects of the present study. This chapter covers research design, research hypothesis, population and sample, data collection, and data analysis.

3.1 Research Design

This study used a quasi-experimental design, which included experimental and control groups. Hatch & Farhady (1982) states that quasi-experimental designs are practical compromises between true experimentation and the nature of human language behavior which the researcher wishes to investigate. It creates treatment conditions by manipulating an independent variable, and then giving test to the participants to obtain a set of scores within each condition (Gravetter and Forzano, 2012). A quasi-experimental design involves selecting groups which are tested without any random sampling. Therefore, it can reduce time and resources needed for experimentation (Shuttleworth, 2008).

There were two groups investigated in this study. They were an experimental group and a control group. The experimental group was given treatment of CTL approach, while the control group was given treatment of GTM.

Table 3.1 The Experimental Research

Experimental	T_1E	X_1	T_2E
Control	T_1C	X_2	T_2C

(Adapted from Hatch and Farhady, 1982, p. 21)

Description:

T_1E : students' reading score of experimental group in pretest
T_1C : students' reading score of control group in pretest
X_1 : treatments using CTL approach for experimental group
X_2 : treatments using GTM for control group
T_2E : students' reading score of experimental group in posttest
T_2C : students' reading score of control group in posttest

3.1.1 Variables

Variable is an attribute of a person or of an object which varies from person to person or from object to object (Hatch and Farhady, 1982, p. 12). There were two variables in this study, including independent and dependent variables. According to Hatch and Farhady (1982, p. 15), independent variable is the major variable which the researcher wishes to investigate. The independent variable in this study was the use of CTL. Meanwhile, dependent variable is the variable observed and measured to determine the effect of the independent variable (Hatch and Farhady, 1982). The dependent variable in this study was students' reading comprehension scores.

3.2 Research Hypothesis

Hypothesis is the proposition which arises from and is consistent with the theory, and then it is tested by using experimental research (Coolidge, 2000). Further, Coolidge explains the two hypotheses in an experiment; (1) the experiments begun with a research idea called null hypothesis (**H_0**). It states that there is no relationship between the independent and dependent variable; (2) the prior research belief about what is true called alternative hypothesis (**H_a**). It states that there is relationship between the independent and dependent variable.

The null hypothesis (**H_0**) in this study stated *there is no significant difference in mean's score between students who are taught by using CTL approach and GTM*. Meanwhile, alternative hypothesis (**H_a**) stated *there is significant difference in mean's score between those who are taught by using CTL approach and GTM.*

The formulation of the null hypothesis (**H_0**) and alternative hypothesis (**H_A**) according to Coolidge (2000, p. 98) is as follows.

$$\mathbf{H_0: \mu_1 = \mu_2}$$

$$\mathbf{H_A: \mu_1 \neq \mu_2}$$

Note:
H_0 : null hypothesis
H_A : alternative hypothesis
μ_1 : mean's score of students who are taught by using CTL approach
μ_2 : mean's score of students who are taught by using CTL approach

3.3 Population and Sample

Population is the entire group of people or object which has quantity and characteristics in common to be learned and inferred (Sugiyono, 2002, p. 55). Sample is a part of the population which will be investigated (Arikunto, 2006). The population of this study was the eleventh graders of one of the public vocational schools in Bandung. From the nine existing classes, only two classes were chosen as the sample of this study: XI TKJ 1 and XI TKJ 2. XI TKJ 1 was chosen as the experimental group and XI TKJ 2 was chosen as the control group. Each group consisted of 30 students, thus the total numbers of the sample of this study were 60 students.

The selection of samples were based on the following considerations: (1) procedural text is taught in eleventh graders of Vocational School; (2) the two groups are in the same major. Therefore, it is expected that the students have similar characteristics in terms of academic competence. Moreover, the study was conducted in one of Vocational Schools in Bandung. The selection of the Vocational School students as the research site is based on several reasons. First, this school is expected to be the model for surrounding schools under the West Java Province Government, especially the students' competence. So far, the students' ability in English is not

satisfying yet. Therefore, there should be an appropriate method to help students improve their skills in English. Second, the researcher had been familiar to this site. Therefore, the researcher could adapt easily to the surroundings and the students (Creswell, 2012, pp. 210-211 as cited in Mayangsari, 2014).

3.4 Data Collection

The data were collected through several instruments which were elaborated in the instrumentation, and the treatments given were described in the research procedure.

3.4.1 Instrumentation

In collecting the data, there were three instruments used: teaching materials, pilot test, pretest and posttest, and interview.

3.4.1.1 Teaching Material

Teaching materials given to the students were taken from the relevant textbooks for the second grade students of Vocational School, including "Get Along with English" by Sutinah and "Electronic Book (BSE)" by Widyantoro, Pratiwi, & Prihatini, and sources from the internet. The materials covered some procedural texts about giving instruction. This is in accordance with basic competence number 2.6, "Understanding Simple Instruction", stated in the School Based Curriculum (KTSP) of Vocational School released by National Education Ministry year 2006. The materials about understanding simple instruction was taught to the second grade students of Vocational School on the fourth semester. The materials were associated to the students' major as the context of learning. The materials were chosen and then developed into lesson plans and delivered during the treatments.

In the experimental group, the material was delivered by using CTL approach. The material used in the control group was similar to the one used in the experimental

group. However, it was delivered by using GTM. The use of CTL approach and GTM in the experimental and control groups aimed to help students to improve their reading comprehension. The study conducted by Wandansari (2011) on the first grade students of Senior High School found that the use of CTL approach effectively improved students' reading comprehension. Another study related to the use of GTM was conducted by Zahra (2012) on the second grade students of Junior High School in Karawang. The result of the study showed that the use of GTM could help students to read better, to know the vocabulary and the meaning of the text, and to improve their reading ability. Therefore, this study tried to give treatment to help students improve their reading comprehension through different way. CTL provides students with the context, meanwhile GTM facilitates students with grammar and translations of the words to help students gain comprehension.

3.4.1.2 Pilot Test

A pilot test is a standard scientific tool for 'soft' research, allowing scientists to conduct a preliminary analysis before committing to a full-blown study or experiment (Shuttleworth, 2014). The pilot test was administered to examine the validity of the instrument used in pretest and posttest. The pilot test items were designed by choosing the text related to computer and networking technology and developing 40 questions related to the text. The students' score in pilot test was then analyzed by using SPSS 17.0 for windows. The items considered valid were then calculated to find out the reliability, level of difficulty, and discrimination index. After that, these items were used to formulate pretest and posttest.

3.4.1.3 Pretest and Posttest

The pretest was given to both control and experimental groups before the students received treatments. It aimed to determine the students' knowledge level of the course content. On the other hand, post-test was conducted to see whether the

treatments given were successful in increasing students' knowledge of the training content (I-Tech Technical Implementation Guide, 2010). Therefore, it can be determined if there is significant difference between the control and experimental groups after receiving treatments.

Pretest and posttest were developed based on the analysis of pilot test. The questions in pre-test and post-test covered finding main ideas, supporting details, vocabularies, and characteristics of procedural text.

3.4.1.4 Interview

The interview was carried out to the students in the experimental group after the treatments were completed. It aimed to obtain more information about the students' responses toward the use of CTL approach. The interview was conducted individually in the form of open ended questions. Open ended questions allow interviewees to express what they think in their own words (McLeod, 2014) and elicit deeper information about the topic discussed (Sugiyono, 2010). The coverage of interview included students' opinion about reading, students' opinion about the importance of reading, difficulties that the students found in reading, the students' opinion toward the use of CTL in the learning process, the advantages and disadvantages they got after learning procedural text by using CTL. The interview was developed by formulating open-ended questions to fulfill the coverage of the interview mentioned before. The students' answer in interview was then classified and converted into percentage.

3.4.2 Research Procedure

This study was conducted from April 25 to May 30, 2014. The research schedule can be seen in table 3.2 and was interpreted in the next section.

Table 3.2 Schedule of Research

No.	Experimental Group (EG)		Control Group (CG)	
	Date	**Material**	**Date**	**Material**
1.	April 25, 2014	Pre-test	April 30, 2014	Pre-test
		Treatment 1 using CTL approach: How can I change it?		Treatment 1 using Grammar Translation Method: How can I change it?
2.	May 2, 2014	Procedural Text: Treatment 2 using CTL approach: How do I Upload My Photo?	May 7, 2014	Procedural Text: Treatment 2 using Grammar Translation Method: How do I Upload My Photo?
3.	May 9, 2014	Procedural Text: Treatment 3 using CTL approach: How to Reset Printer	May 14, 2014	Procedural Text: Treatment 3 using Grammar Translation Method: How to Reset Printer
4.	May 16, 2014	Procedural Tex Treatment 4 using CTL approach: I Need to Send It	May 21, 2014	Procedural Tex Treatment 4 using Grammar Translation Method: I Need to Send It
5.	May 23, 2014	Procedural Text: Treatment 5 using CTL approach: Design Your Presentation	May 28, 2014	Procedural Text: Treatment 5 using Grammar Translation Method: Design Your Presentation
6.	May 30, 2014	Post-test	May 30, 2014	Post-test
		Interview		

In implementing the research, the following procedures were carried out.

1. Administering the pilot test

The first step of this research was conducting a pilot test. It aims to examine the validity of instrument and then revise it into the correct one (Creswell, 1994).

Therefore, pilot test is one of the most critical aspects of a successful survey to generate good survey data (Rothgeb, 2013). The pilot test was delivered to 32 students of eleventh graders of Vocational School in the same major by giving forty multiple choice questions.

2. Administering the pretest

The pretest was conducted on April 25th and April 30th 2014. It was given to both experimental and control groups in which each group consists of 30 students. This test was conducted in the first meeting for 60 minutes. There were 31 questions in the form of multiple choice items related to procedural text.

3. The treatments

The treatments were carried out for five meetings. The experimental group was given treatments by using CTL approach to teach reading procedural text. Meanwhile, the control group was taught by using Grammar Translation Method. The materials used were taken from the relevant English textbooks and sources from internet. The material includes some procedural texts about giving instruction related to computer.

Regarding the methodology used in administering the treatments, the stages of REACT (*Relating, Experiencing, Applying, Cooperating, and Transferring)* were applied in every meeting in the treatment. The treatments which used CTL in teaching and learning process were discussed below.

- Treatment 1: How can I change it?

On the first meeting, students were displayed a picture of computer and laptop. Then, they were given some questions related to the pictures and were asked to mention the steps in changing the computer desktop. This stage was the application

of *relating* stage. In *experiencing* stage, students were given a text (see appendix A) and instructed to find the appropriate words to complete the text. In *applying* stage, students discussed the content of the text and were given a quiz to answer the questions related to the text. After that, they were instructed to arrange the pictures based on the given instructions. The *cooperating* stage was included in every stage of activity. In *transferring* stage, students were given new texts with the same topic and instructed to answer the questions in group. (see Appendix A)

- Treatment 2: How do I Upload My Photo?

On the second treatment, as an application of *relating* stage, a picture of Facebook Homepage was displayed and some questions including the steps of uploading photos in Facebook were also proposed. After that, in *experiencing* stage, the students completed the text (see appendix A) with appropriate words. After discussing the answer, the students were given a word search game, in which the students were challenged to find the words based on the clues given. In *applying* stage, the students answered the questions orally and mentioned the tools needed in doing the instruction given before. After that, they arranged the jumbled pictures into the correct order based on the instructions. In the last stage, *transferring*, the students were given different texts and answered the questions provided. (see Appendix A)

- Treatment 3: How to Reset Printer

On the third treatment, the students were displayed a video about resetting Epson T13 printer and were given some questions as the *relating* stage. In the *experiencing* stage, the students completed the text (see appendix A) with appropriate words. After that, they were instructed to write down the words according to the clues given. Then, students analyzed the parts of the text guided by the teacher. In the *applying* stage, students were given a quiz by answering the questions orally. After

that, every group were asked to demonstrate the instructions given before. The new text and exercises were given in the *transferring* stage. (see Appendix A)

- Treatment 4: I Need to Send It

On the fourth treatment, the students were stimulated by using a video which showed how to send email using yahoo. After that, they were asked whether they have ever sent an email using yahoo, and explained the steps of sending an email they have ever done. These steps were implemented in *relating* stage to relate the material being learned with their experience. Completing the text (see appendix A) with the appropriate words, matching the words with the clues, and mentioning temporal connective words found in the text were applied in the *experiencing* stage. In *applying* stage, students played a '*find the answer games'*. Here, students worked together to answer the questions given one by one. Students could take the next question after they have answered the question correctly. The fastest group which could finish the questions became the winner and got the highest score. After that, the students were instructed to apply the instructions about sending an email using Yahoo Mail. Internet connection provided by the school enabled students to send the email. In *transferring* stage, the students were given new texts and completed the exercises. (see Appendix A)

- Treatment 5: Design Your Presentation

On the last treatment, the students watched a short video about how to insert video in the *Power Point Presentation* for windows 2007. Then, they were asked to explain how to put a video in the *Power Point Presentation* for windows 2007 based on their own experience or the video they have watched. These activities were implemented in *relating* stage. In *experiencing* stage, the students completed gaps in the text (see appendix A) and played *'Find the Words Games'* to find the appropriate words based on the clues given. These activities encouraged students to work in

group to complete the task. After that, the students found imperative words mentioned in the text. In *applying* stage, the students were given a quiz related to the text that they have read and were instructed to design their own presentation in *Microsoft Office Power Point*. Then, the students' work was displayed in front of the class. In the last stage, *transferring*, students were given a different text and completed the exercises. (see Appendix A)

4. Post-test

After the treatments were delivered, the post-test was administered to investigate if there is significance different between the control and experimental groups, in which both of them received different treatments. This test was given to both control and experimental groups on May 30th 2014 by giving 31 numbers of multiple choice questions.

5. Interview

The interview was conducted on May 30th 2014 using interview guide to discover students' responses toward the use of (CTL) approach in the learning process. The interview was carried out to nine students in experimental group after the treatments were completed. The respondents were selected based on the principle of voluntary and fairness (Herdiansyah, 2013, p. 49). In addition, Sugiyono (2012) states that the respondents of interview should know themselves, can be trusted, and have the same interpretation about the questions proposed. The time efficiency is another aspect considered in choosing the number of the respondents in this study.

The interview was conducted by using Bahasa Indonesia to allow students to express themselves clearly (Asri, 2013). Besides, Andreenkova (2012) states that the interview should be conducted by using the language which is used most or the language preferred or feel more comfortable to use during interview. Therefore, by

using Bahasa Indonesia, the students can understand well the questions proposed and feel more comfortable in responding the questions.

During the interview, the students were asked about whether they like reading, whether reading is important, difficulties they found in reading, their opinion toward the use of CTL in reading procedural text, advantages and disadvantages they got after they learned procedural text by using CTL. (see Appendix B)

3.5 Data Analysis

The data collected through the instruments were analyzed in accordance with the specific purpose. In this study, there were three kinds of analysis carried out: (1) test instrument analysis, (2) pretest and posttest data analysis, (3) interview data analysis.

3.5.1 Test Instrument Analysis

In conducting the study, there were some aspects that should be considered to formulate a good test instrument. Therefore, the test instruments used in this study should be analyzed to find out if the instrument can be used in this study. The analysis of the test instrument includes validity, difficulty, discrimination index, and reliability.

3.5.1.1 Validity

Validity refers to the extent to which the results of the procedure serve the uses for which they were intended (Hatch and Farhady, 1982, p. 250). The validity of a test examines whether the test can measure what is supposed to measure.

To calculate the validity of the test instrument, this study employed SPSS 17.0 for windows with Pearson Product Moment correlation type. The following criteria were used to determine the validity (Arikunto, 2005, p. 72).

- If $r_{value} > r_{crit}$, the instrument or question is significantly correlated to the total score. It means that the question is valid.
- If $r_{value} < r_{crit}$, the instrument or question is not significantly correlated to the total score. It means that the question is not valid.

Based on the calculation of validity test, it was found that 31 of 40 questions were valid, since the values were above r critical (r_{crit} = *0.349, N=32)*. Therefore, these items were appropriate to use as the instrument.

3.5.1.2 Difficulty

Difficulty of the test purposes to get the level of difficulty for each item of the instrument (Arikunto, 1993, p. 209). Therefore, by examining the instrument, each number of the instrument can be classified into easy, moderate, and difficult. The index of difficulty in this study was calculated by using SPSS 17.0 for windows. The following criteria were used to interpret the index of difficulty. The smaller the index means the more difficult the test. Meanwhile, the bigger the index means the easier the test.

Table 3.3 The Criteria of Difficulty

Facility Value	Interpretation
0.00 - 0.300	Difficult
0.300 - 0.700	Moderate
0.700 – 1.000	Easy

(Arikunto, 1993, p. 210)

The result of the calculation found that 17 of 31 questions were above the value 0.70. Therefore, those items were categorized as easy. Whereas, 13 items were

between the value 0.30 and 0.70, and were categorized as moderate. Only 1 item was categorized as difficult, since the value was below 0.30.

3.5.1.3 Discrimination Index

Discrimination Index aims to differentiate students who have high ability and low ability (Sudjana, 2009, p. 141). It means that if the students can answer the question correctly, it indicates that they have high ability. On the contrary, if students give the wrong answer, it means that they have low ability. Therefore, it is expected that the students who have high ability would select the correct answer more often that those who have low ability. To calculate the Discrimination Index, SPSS 17.0 for windows was employed. The following criteria were used to interpret the discrimination index.

Table 3.4 The Interpretation of Discrimination Index

Discrimination Index	Interpretation
DI $\geq$ 0.70	Excellent (can be used)
0.40 $\leq$ DI < 0.70	Good (can be used)
0.20 $\leq$ DI < 0.40	Moderate
DI < 0.20	Poor

Sumarna (2004, p. 31)

The calculation of discrimination index found that 7 items were above the value 0.7. Therefore, these items could be categorized as excellent. Whereas, 20 items were categorized as good since the values were between 0.4 and 0.7. The rest 4 items were categorized as moderate since the values were between 0.2 and 0.4.

3.5.1.4 Reliability

According to Hatch and Farhady (1982, p. 244), reliability is defined as the extent to which a test produces consistent results when administered under similar

conditions. Therefore, a reliable test will have consistent score if it is given more than one time toward the same object.

SPSS 17.0 for windows was applied to calculate the reliability of the test items. To determine the reliability of the test instrument, Sugiyono (2012, p. 184) states that an instrument is reliable if the minimum coefficient of reliability is 0.60. Therefore, it can be concluded that the instrument is reliable if $\alpha \geq 0.60$, while the instrument is not reliable if $\alpha < 0.60$.

The data obtained from the calculation showed the value 0.883. By comparing the value obtained from the calculation with the minimum coefficient of reliability, it was found that the test items were reliable.

3.5.2 Pretest and Posttest Data Analysis

To analyze the students' score in pretest and posttest, SPSS 17.0 for windows was employed. Before the output data is analyzed in t-test, the following criteria should be fulfilled (Coolidge, 2000):

1. The data should have normal of distribution
2. The variance of two groups must be homogenous
3. The participants must be different in each group

Considering the criteria above, the calculation of normal distribution and homogeneity of the variance was measured before calculating data by using t-test formula. If the data do not fulfill the criteria, *Mann-Whitney* test is operated to test the hypothesis. *Mann-Whitney* test is used to test the difference between one group and another without considering the criteria stated above. However, the data obtained should be ranked. The result of the calculation is then compared to U_{crit} to determine whether the hypothesis is accepted or rejected.

3.5.2.1 Normality of Distribution Test

The normality of distribution test aims to find out the normality of the test, thus the parametric statistics can be applied (Sugiyono, 2002). This test is important to examine whether the data obtained represents the population. The Kolmogorov-Smirnov was performed by using SPSS 17.0 for windows.

There were two steps in analyzing the normality of distribution. It included formulating the hypothesis of normality of distribution and determining the significance level. The first step was formulating the hypothesis in analyzing the normality of distribution of pretest and posttest score. The hypothesis were formulated as follows.

H_0 states that the score of experimental and control groups are normally distributed

H_a states that the score of experimental and control groups are not normally distributed.

The second step was determining significant level of normality of distribution by comparing the result of the calculation to $p = 0.05$. The table data output from the SPSS 17.0 computation is simply concluded as: if the column labeled sig. > 0.05, it means that the data are normally distributed. However, if the column labeled sig. < 0.05, it means that the data are not normally distributed.

3.5.2.2 Homogeneity of Variance Test

The requirements should be fulfilled in conducting an experimental research is the control and experimental groups must be homogenous or having the similar characteristics (Sugiyono, 2001). It means that the students in experimental and control groups' competence in reading should be equal. If the data are not homogenous, the hypothesis testing cannot be performed since the data obtained do not represent the population. The homogeneity of the variance test is performed to

show that the difference in the result of the t-test computation is caused by the difference between groups (Sutrisna, 2012).

To measure homogeneity of the variance test, Levene's test for equality of variance in SPSS 17.0 was employed to find out whether or not the data are homogenous. Beforehand, the hypothesis is determined as follows.

H_0: there is no difference between experimental and control group's score in pretest. It means that the students are homogenous

H_a: there is difference between experimental and control group's score in pretest. It means that the students are not homogenous

The next step was determining the significant level. The significant level was determined in the level 0.05. Based on the level of significance, the criterion states that if the probability > 0.05, H_0 is accepted, which means that the experimental and control groups are homogenous. On the contrary, if probability < 0.05, H_0 is rejected, which means that the experimental and control groups are not homogenous.

If the data are not normally distributed, Mann-Whitney test is administered to test the hypothesis and calculated by using SPSS 17.0.

3.5.2.3 T-test

The t-test is a test which aims to determine whether the means of two groups differ to a statistically significant degree (Kranzler and Moursund, 1999, p. 89). There were two kinds of t-test used in this study: independent and dependent t-test.

3.5.2.3.1 The Independent t-test

The independent t-test purposes to determine whether there is significant difference between the experimental and control groups' means on the dependent variable beyond mere chance differences (Coolidge, 2000, p. 141). Both groups are

chosen randomly and the means of both groups should not differ from each other at the beginning of the experiment.

The calculation of independent t-test in this study employed SPSS 17.0 for windows. The result of the calculation was then analyzed by comparing the significance value with the level of significance to test the hypothesis. If the significant value is higher than or equal to the level of significance (0.05), the null hypothesis is accepted, and it can be concluded that there is no significant different between the means of two groups. On the other hand, if the significant value is lower than the level of significance (0.05), the null hypothesis is rejected, and it can be concluded that the means of two groups are significantly different.

3.5.2.3.2 The Dependent t-test

Dependent t-test is a test that aims to compare the students' score of each group in pretest and posttest. It is in line with Kranzler (1999, p. 97) who states that dependent t test is a test in which each pretest score is logically linked to one, and only one posttest score. Therefore, the scores are paired.

By employing SPSS 17.0 for windows, the significant value obtained from the calculation was then compared to the level of significance to test the hypothesis. If the significant value is higher than the level of significance (0.05), the null hypothesis is accepted, and it means that there is no significant different between the means of each group in pretest and posttest. However, if the significant value is less than the level of significance (0.05), the null hypothesis is rejected, and it indicates that the means of each group in pretest and posttest are significantly different.

3.5.2.4 The Calculation of Effect Size

Effect size refers to the effect or the influence of independent variable upon the dependent variable (Coolidge, 2000, p. 151). On the other words, the effect size measures how well the treatment works. If the treatment really works (as indicated by

large difference between two groups' means), the effect size is large. Meanwhile, if the difference between two groups' means is small, then there is said to be a small effect size.

The formulation of effect size according to Coolidge (2000) is described as follows.

$$r = \sqrt{\frac{t^2}{t^2 + df}}$$

Where:
r = effect size
t = t obtain or t value from the calculation of independent t-test
df = $N_1 + N_2 - 2$

The correlation coefficient of the effect size will always be positive and range from 0 to 1.00. The following scale is used to interpret the magnitude of the effect size.

Table 3.5 Interpretation of Effect Size

Effect Size	r value
Small	0.100
Medium	0.243
Large	0.371

(Coolidge, 2000)

3.5.3 Interview Data Interpretation

Interview covered some questions related to the use of CTL approach in teaching and learning Procedural text. The Interview was conducted after the treatments were completed. Besides, it was only administered to students in

experimental group. The students' answer in interview was converted into percentage and was interpreted. (see Appendix B)