CHAPTER III
RESEARCH METHODOLOGY

This study aims to find out how the implementation of Pomodoro technique can help students improve their EFL reading comprehension. This chapter presents several subchapters focusing on the methodology employed in this research. Specifically, this chapter covers the explanation of six important subchapters in order: research design, hypotheses, research site, research participants, data collection, research procedure, and data analysis. In the first subchapter, that is the research design, the elaboration of method and approach are presented whilst the second subchapter reveals the hypotheses of the study. The third subchapter, which is the research site and participants, exposes the place where the study was conducted and the targeted participants (population and samples). As for the fourth subchapter, that is the data collection, the instruments or the techniques used in collecting the data of the study are explained, whilst the fourth subchapter, research procedure, explains the procedure of doing this research. The last subchapter, data analysis, describes the framework used to analyze the collected data.

3.1 Research Design

In accordance with the proposed research questions, this research employed a mixed methods explanatory design. The consideration of using mixed methods as an approach in this study is because the proposed research question requires a combination of qualitative and quantitative data to be answered. Creswell (2014) stated that mixed methods research is research that involves the collection and integration of qualitative and quantitative data to provide a stronger understanding of the research questions or problems. In mixed methods research, the researcher combines qualitative and quantitative research elements such as data collection technique, data analysis, and viewpoints within a single study in an effort to reach in-depth corroboration (Johnson et al., 2007). In relation to this study, the explanatory design uses the qualitative data as a follow-up explanation of the quantitative data (Creswell & Plano Clark, 2006) to find out whether the Pomodoro technique helps students improve their EFL reading comprehension.

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Furthermore, the follow-up model of explanatory mixed methods design is suitable for this study as it is usually used in research that requires the explanation of the statistical difference among groups (Creswell & Plano Clark, 2006), so the quantitative and qualitative data are not required to be transformed into qualitative and quantitative, respectively.
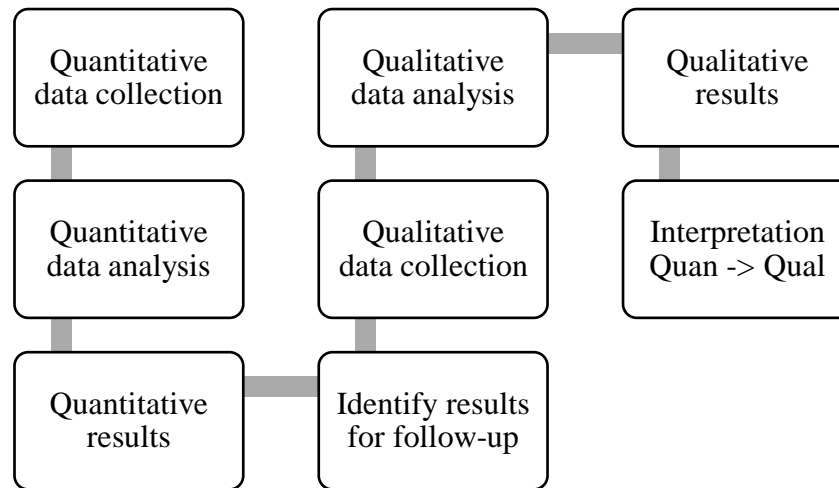

Figure 3. 1 Mixed Methods Explanatory Design: Follow-up model
(Creswell & Plano Clark, 2006)

In order to answer the research questions, the classroom observation and students' grouped interview were conducted to obtain the qualitative data, meanwhile the quantitative data were obtained through the one-group pre-test post-test design. This type of pre-experimental design is suitable to apply in this study as it is widely used in the field of educational research to evaluate a treatment in students' learning by comparing the pre-test and post-test scores of two dependent groups (Ary et al., 2010; Campbell & Stanley, 1963). The design is represented in the following table:

Table 3. 1 The One-group Pretest-posttest Design (Campbell & Stanley, 1963)

Pre-test	Independent Variable/Treatment	Post-test
O_1	X	O_2

As seen in Table 3.1, a pre-test (O_1) was administered to the students before the treatment X exposure, which is the Pomodoro technique. After receiving the treatment during the learning for three meetings, students then completed a post-test (O_2). The pre-test and post-test mean scores will be compared to determine whether there is an improvement in their reading comprehension after applying the technique. As the absence of a control group becomes a limitation of this design (Ary et al., 2010), data collected through classroom observation and students' grouped interview will enhance the validity of the pre-test post-test result in order to answer the research question of this study.

3.2 Hypotheses

The formulated hypotheses of this study are the null (H_0) and alternative (H_a) hypothesis that describes as follow:

H_0 : There is no significant difference between students' reading comprehension before and after using Pomodoro time management technique

H_a : There is a significant difference between students' reading comprehension before and after using Pomodoro time management technique

If there is no significant difference between students' reading comprehension before and after using Pomodoro time management technique, H_0 is failed to be rejected and H_a is rejected. However, if there is a significant difference between students' reading comprehension before and after using Pomodoro time management technique, H_0 is rejected and this study fails to reject H_a.

3.3 Research Site and Research Participants

The study was conducted in one of the senior high schools in Depok, West Java, Indonesia. The site's location is quite near by the researcher; hence, making it accessible and cost-effective. In regards to the research participants, the population of this study is all 10th grade students at the targeted school. As for the samples, as many as 33 students of 10th grade in class B are participating in the study. The number of targeted participants were determined by the total students of 10th grade in class B of the school.

The research participants were chosen as a result of a preliminary study conducted with one of the English teachers of the research site. Through the preliminary study, the researcher obtained some information about students' problems during the reading activity. The interview results show that when students were asked to read a text by themselves, some of them found difficulty in maintaining their concentration. They are often caught by the teacher coming across distractions or interruptions, for example: joking around with each other, completely neglecting the reading, and not concentrating on the text thoroughly. In addition, the teacher's observation of students' reading comprehension problems strengthened by their weak answers/responses when being asked questions regarding the text.

3.4 Data Collection

In regards to answering the research questions of this study, that is to investigate how the implementation of Pomodoro technique can help students in improving EFL reading comprehension, several quantitative and qualitative data collection techniques were employed as this study used a mixed methods design. The instruments were performed in the form of pre-test post-test, classroom observation, and students' grouped interview. The pre-test and post-test were performed to obtain the quantitative data using the one group pretest-posttest design. On the other hand, the classroom observation and grouped interview were conducted to obtain the qualitative data.

3.4.1 Pre-test and Post-test

As this study employed the one group pretest-posttest design for the quantitative data, the first data collection technique used is pre-test and post-test. This technique is suitable to use in this study because it provides comparison between two observations data (Campbell, 1957); in this case, EFL students' mean scores of reading comprehension test before and after the treatment of Pomodoro technique. Before assigning pre-test to the students, the researcher that acts as a teacher administered a pilot test to other group that is similar to the research participants in terms of the number of students and their English reading skill based

on the preliminary study. Pilot test is crucial to be conducted as it allows the researcher to investigate the validity and possible obstacles that may happen before the actual experiment (Cohen et al., 2007). The test was administered to 36 students of 11th grade of the school. It is consisted of 25 multiple choice questions and lasted for 30 minutes.

In regards to the type of text used for the pilot test, pre-test, and post-test, this study employed two types of text that the students are learning during the period of the study; recount text and narrative text. As for the type of questions, both pre-test and post-test are focusing on four reading micro skills, they are finding stated and implied information, as well as finding the synonyms and antonyms based on the text given. The justification of the type of questions used is based on students' weak answers in mentioned micro skills questions during the pilot test.

After assigning a pilot test to a different group of students, the pre-test was conducted to find out the initial ability of the research participants in reading comprehension before the application of Pomodoro technique. The pre-test lasted for 35 minutes and consisted of four paragraphs of recount text, followed by 25 questions in the form of multiple choices.

Furthermore, students were assigned with the post-test in the last meeting. It was conducted after the Pomodoro technique implementation in their reading for three meetings. Similar to pre-test, the researcher assessed them with a 35-minutes test that consisted of five paragraphs of narrative text, followed by 25 multiple choice questions. However, they did the test while applying Pomodoro technique, in which the details will be further explained in the research procedure subchapter.

3.4.2 Classroom Observation

As this study employed the mixed methods explanatory design, classroom observation was also used as a qualitative instrument besides the pre-test post-test as the quantitative one. Observation is defined as one of the key methods to note and record phenomenon that happens in the field of the research (Angrosino, 2007; Creswell, 2013). In this study, a classroom observation helped the researcher to collect information that occurs in the classroom during the research period, such as

students' actual behaviors, events, and interactions before and during the implementation of Pomodoro technique. In regards to the type of observational role used in this study, the observer-as-participant role was applied as the researcher observed the students while also engaging in the learning as a teacher with less extensive contact (Cohen et al., 2007).

The observation was conducted for five meetings from April to May. It was recorded in the observational field notes guided by Bogdan and Biklen (1992, as cited in Creswell, 2013) that are presented in the following table:

Table 3. 2 Observational field notes adapted from Bogdan and Biklen (1992, as cited in Creswell, 2013)

Meeting	Date	Length of Activity	Descriptive Notes	Reflective Notes
Meeting 1 (pre-test)	April 10, 2023	35 mins pre-test		
Meeting 2	April 12, 2023	14 mins reading		
Meeting 3	May 3, 2023	14 mins reading		
Meeting 4	May 4, 2023	14 mins reading		
Meeting 5 (post-test)	May 10, 2023	35 mins post-test		

As shown in Table 3.2, the observation field notes contain important information of the observational session such as the meeting indicator, the date of the observation, and the length of the activity including the Pomodoro timer breakdown for each reading activity. It also includes the "descriptive notes" and "reflective notes" section. Creswell (2013) proposed this example of observational

field notes where the researcher records the description about particular activities, students' actual behaviors, and events occurred during the observation in the "descriptive notes" section. Meanwhile the "reflective notes" section allows the researcher to put reflections or summary on the events described in the descriptive notes. It may contain the researcher's personal thoughts about the process for later development.

3.4.3 Grouped Interview

The next data collection technique used in this study is students' grouped interview. The grouped interview was conducted to a total of 14 students in an attempt to integrate the data collected by assessing them with pre-test post-test and doing a classroom observation. The 14 students were divided into two groups (seven students per group) and were asked several questions that were not directly answered through the test and classroom observation, such as experience and opinions in using Pomodoro technique during their reading to help improve their EFL reading comprehension. The interview was conducted separately between two groups. This type of interview is suitable to collect the data for this study as it allows the students to interact and listen to each other's answer that will likely build better information (Creswell, 2013). Furthermore, the interview was conducted in a semi-structured form so that the researcher could expand the questions and elaborate the information gathered depending on the research participants' answer during the interview.

The grouped interview lasted for approximately 15 minutes for each group and was conducted in a face-to-face mode while being recorded. The set of interview framework are adapted and modified from stages of interview investigation proposed by Kvale (1996, as cited in Cohen et al., 2007) and are described in the following table:

Table 3. 3 Interview guide adapted from Kvale (1996, as cited in Cohen et al., 2007)

Categories	Indicators

Pomodoro technique implementation during reading	Students' time management during the reading with focus and break sessions
	Distraction and interruption encountered by students during the reading
	Students' opinions in the benefit of Pomodoro technique reading strategy
Pomodoro's technique challenges	Students' challenges in the application
	Students' suggestions to overcome the challenges

There are different amounts of questions for each indicator seen in Table 3.3. The first indicator consisted of five questions focusing on students' experience in using the focus and break sessions in the classroom as the main characteristic of Pomodoro technique. The second indicator covered two questions about type of distractions and interruptions that students have encountered before Pomodoro technique implementation and whether the technique influenced the decreasing of encountered distractions. The third indicator had two questions regarding students' opinion about the benefit of Pomodoro technique based on their experience. Then, the fourth and the fifth indicator each have one question. They covered students' problems or challenges faced during the technique implementation and their advice to overcome those challenges, respectively. The total amounts of the interview questions are eleven. However, as the interview type is semi-structured, the set of questions developed and modified according to students' answer to each question asked. The semi-structured interview aims to seek in-depth information on how the Pomodoro technique can help students improve their reading comprehension in EFL context.

3.5 Research Procedure

In regards to answering the aim of this study, this subchapter presents the procedure of doing this research. Several data collection techniques were used in

this study, there are pre-test post-test, classroom observation, and grouped interviews. To begin with, the classroom observation was conducted for five meetings and was not carried out throughout the entire learning activity of these meetings. It only focused on students' overall engagement during the reading activity for each meeting. Furthermore, the type of the text and the students' reading task were vary based on the learning objective of 10th grade students. As for the length of the activity, variety reading duration as well as the focus and break sessions duration in Pomodoro were applied depending on the length of the text that students read. Table 3.4 presents the activity, the type of texts, and the time breakdown for each meeting.

Table 3. 4 Reading time duration

Meeting	Date	Activity	Type of text	Duration and the Pomodoro Time Breakdown
Meeting 1	April 10, 2023	Pre-test based on reading text including 25 multiple choice questions	Recount text "The Bathroom Number 3"	35 mins without Pomodoro
Meeting 2	April 12, 2023	Reading and finding verbs in past form	Several paragraphs taken from "The Bathroom Number 3"	14 mins Duration per sessions: • *2 mins focus* • *1 min short break* • *3 mins long break*
Meeting 3	May 3, 2023	Reading and finding verbs in past participle form	Narrative text "Linda and her Grandmother"	14 mins Duration per sessions: • *2 mins focus* • *1 min short break* • *3 mins long break*

Meeting 4	May 4, 2023	Reading and answering 25 multiple choice questions	Narrative text "A Koala in Russia"	35 mins Duration per sessions: • *6 mins focus* • *2 min short break* • *5 mins long break*
Meeting 5	May 10, 2023	Post-test based on reading text including 25 multiple choice questions	Narrative text "The Legend of Malin Kundang"	35 mins Duration per sessions: • *6 mins focus* • *2 min short break* • *5 mins long break*

The choice of the text and reading task for all meetings was based on the 10th grade learning objective, that is: (1) to identify the social function and language features of simple past and present perfect tense and (2) to differentiate and identify the social function, text structure, and language features of some legends.

Furthermore, the table also shows that students were given 35 minutes to finish 25 multiple choice questions about a recount text as a pre-test in the first meeting. A regular stopwatch app on the researcher's phone was set to monitor the time. Meanwhile, during the Pomodoro technique implementation in the treatment and post-test session in the second to fifth meeting, an online Pomodoro timer called Pomofocus.io was used to help the time tracking. The interfaces of the website can be seen in Figure 3.2 and 3.3 below.

Figure 3. 2 Pomofocus online timer

Figure 3. 3 Pomofocus online timer settings

As seen in Figure 3.2 and 3.3, the Pomofocus online timer provides a customizable Pomodoro timer that is very easy to use. The website breaks down the time interval, focus, short break, and long break sessions automatically based on the user's preference. Additionally, it has a built-in alarm feature with a variety of sound options. The user is also allowed to write down specific tasks to be done with Pomodoro technique and activate the auto starts.

Before the application of the technique, the researcher first explained the Pomodoro technique rule to the students. It contains the explanation about focus and break sessions, as well as the "no talking and no discussing" rule to obey during the focus session. The "no talking and no discussing" rule means that students are not allowed to discuss when the focus session starts. They must dedicate their time to be focused on reading until the time is over. When the bell signals a short break session, they must stop reading and take a short break according to the duration given. It was repeated until four focus sessions and three short break sessions were completed, followed by a long break session to end the Pomodoro. In some meetings, students could see the countdown displayed on the screen projector while using the technique.

The next step was conducting a grouped interview. Once the pre-test, treatment, and post-test sessions had been finished, 14 students were divided into two groups and interviewed separately. The first group that consists of Student 1 to

Student 7 was interviewed on June 28, 2023 and Group 2 that consists of Student 8 to Student 14 was interviewed the day after, which is June 29, 2023. The interview was audio-recorded and conducted outside of the classroom in non-formal settings to create a comfortable and friendly nuance to the students.

3.6 Data Analysis

As the present study employed the explanatory mixed methods design with follow-up model, the analysis of the quantitative and qualitative data was done separately and directly interpreted and presented at the end of the process (Ary et al., 2010; Creswell & Plano Clark, 2006). The researcher interpreted both data using different data analysis methods described as follows:

3.6.1 Data Analysis from Pre-test and Post-test

The quantitative data obtained by assessing pre-test and post-test to the students were analyzed using descriptive statistics and calculated via IBM SPSS Statistics for Windows (Version 25). There are two tests to analyze the data: Shapiro-Wilk normality of distribution test and the Wilcoxon Signed-rank test to test the hypotheses of the study. The details of each test are described as follows:

Shapiro-Wilk Normality of Distribution Test

The normality of the distribution test is used to determine whether there is a normal distribution of the sample data (Coolidge, 2000). The Shapiro-Wilk test of normality was employed to test the normality of distribution in this study because the sample data is less than 50 (Razali & Yap, 2011). Below are the formulated hypotheses of the test.

H_0 : The sample data is not normally distributed ($p < 0.05$)

H_a : The sample data is normally distributed ($p > 0.05$)

The alpha level of significance for the test is 5% or 0.05. If the probability (p-value) or Asymp. Sig (2-tailed) is lower than 0.05, the data is not normally distributed. It means that this study fails to reject H_0 and reject H_a. In this case, a

non-parametric Wilcoxon Signed-rank test should be performed as the next step to test the hypotheses of this study.

On the other hand, if the p-value is greater than 0.05, it means that H_0 is rejected and H_a is not rejected as the data is normally distributed. Therefore, a parametric Paired *t*-test needs to be conducted to test the hypotheses as the next step.

Wilcoxon Signed-rank Test

The Wilcoxon Signed-rank test is a statistical test used to compare means of a pair of matched data (Wilcoxon, 1945). This test is a non-parametric alternative to the paired t-test if the data is not normally distributed (Grech & Kalleja, 2018). In this study, the Wilcoxon Signed-rank test was employed to test the hypotheses of this study by analyzing whether there is a difference between students' pre-test and post-test mean scores. Below are the hypotheses of the test.

H_0 : There is no significant difference between pre-test and post-test mean scores ($p > 0.05$)

H_a : There is a significant difference between pre-test and post-test mean scores ($p < 0.05$)

The decision rule for Wilcoxon Signed-rank test is if the p-value is more than alpha level of significance 0.05, H_0 is failed to be rejected and this study rejects H_a. It means that students' mean scores show no difference after using the technique. Meanwhile, if the p-value is less than 0.05, it is considered that there is a significant difference between students' pre-test and post-test mean scores. In other words, H_0 is rejected and H_a is not rejected.

3.6.2 Data Analysis from Classroom Observation and Grouped Interview

In relation to the research aim of this study, that is to find out how the Pomodoro technique as the independent variable can help students improve EFL reading comprehension as the dependent variable, a thematic analysis was employed as the qualitative data analysis method obtained by conducting classroom observation and grouped interview to answer the research question. Thematic

analysis is suitable to use as it eases the researcher to analyze patterns or themes in the observation field notes and students' interview answers in order to seek in-depth explanation of the data. In this case, it was used to analyze the data obtained regarding the topic of Pomodoro time management technique and students' reading comprehension.

Braun and Clarke (2006) defined thematic analysis as a widely used qualitative analysis method to identify, analyze, and report patterns or themes of the data. After conducting the observation and interview, this study followed the three stages in analyzing qualitative data proposed by Ary et al. (2010). The stages are: (1) organizing and familiarizing, (2) coding and reducing, and (3) interpreting and representing. Aligned with the thematic analysis process, the guideline adapted to analyze the data is described as follows:

1. Organizing and familiarizing the data

    In the first stage, after the data were gathered, the researcher should become familiar with and immersed in the data. The familiarizing could be done by reading, reviewing, and highlighting the data. Data collected from the observation field notes were organized and reviewed to avoid any missing details. As for the interview data, the researcher transcribed the recorded grouped interview directly without changing any words or phrases from the students' answers. Once the transcription has been completed, the data were organized, reviewed, and highlighted to examine the important points. This initial stage involves a major task of transcribing, organizing the raw data and the backup copies, then taking notes from the data collected before identifying a coding scheme.

2. Coding and reducing the data

    Once the researcher is familiar with the data and done with the organizing, the raw data collected are sorted by examining units of meaning, such as significant words, sentences, or behavior patterns that are significant or appear to occur frequently in the observation and interview. It is necessary

for the researcher to do this coding or categorizing process in order to build a concept before developing it into some major themes.

3. Interpreting and representing the data

The last stage of qualitative data analysis involves the data interpretation and data report. After the data is organized, reduced, and divided into some themes, the researcher interpreted and represented the data depending on the themes sorted. The final report is displayed with explanation and actual examples of the interview transcript (Miles & Huberman, 1994), as well as the observation results. Both data were presented altogether under each theme to unveil how the implementation of Pomodoro technique can help EFL students improve their reading comprehension.

3.7 Concluding Remarks

This chapter has elaborated the methodological components of conducting this study, such as the research design, research hypotheses, research site and participants, data collection technique, as well as the data analysis to answer the research questions. This chapter also has described the procedure of doing this research thoroughly.