

CHAPTER III

RESEARCH METHODOLOGY

This chapter provided an explanation of all the research's method, in this chapter, writer explained some subsets method that used for the research which divided into several sections, namely research design, population and sample, data collection technique and instrumentation, and data analysis.

A. Research Design

This research used a pre-experimental research design, more specifically the one-group pre-test post-test design. An experimental design systematically manipulates one or more variables in order to evaluate how this manipulation impacts an outcome (or outcomes) of interest. According to Cresswell (2009, pp.145-146), the primary purpose of an experimental design is to examine how a treatment or intervention affects a specific outcome while controlling for other variables that could influence the results. This design is commonly used when the researcher wants to examine the effect of a treatment or intervention on a single group of participants, without comparing it to a control group. However, Cresswell (2012, p.145) stated for some reason the researcher cannot be interested in generalizing findings to a population, but only in describing a small group of participants in a study. This argument affirms that pre-experimental design is useful for initial exploration, but it is not ideal for testing causal relationships. Although it lacks randomization and control, it is useful in

educational settings where it may not be feasible to implement full experimental procedures.

In this research, the SQ3R technique which stands for Survey, Question, Read, Recite, and Review is used as the treatment or intervention to improve students' reading comprehension. The technique is known for promoting active reading and better information retention, making it suitable for junior high school students. In addition, in the one-group pre-test post-test design, participants are tested before the treatment (pre-test), given the treatment (SQ3R technique during reading lessons), and then tested again after the treatment (post-test). The data will analyze quantitatively, as stated by Muijs (2021, p.9), in quantitative research, data gathered are in numerical form, which directly relates to the use of mathematical techniques in the analysis process. This allows the researcher to observe and analyze any improvement or change in students' reading comprehension.

As stated by Campbell & Stanley (2015, p.8), the one-group pretest-posttest design involves measuring or observing a single group both before and after treatment. A diagram of this design is shown below:

Tabel 3.1 One- Group Pretest- Post Test Design

Pre-Test	Treatment	Post-Test
O ₁	X	O ₂

Source: Campbell & Stanley (2015, p.8)

Notes : O_1 : Pre-test

X : Treatment

O_2 : Post-test

1. O_1 (Pre-test): The pre-test is administered before the treatment is given. It serves to measure the students' baseline or initial reading comprehension level. The test consists of questions designed to evaluate students' understanding of a given text.
2. X (Treatment): This refers to the implementation of the SQ3R technique during English reading lessons. The treatment is carried out over a series of instructional sessions (e.g., 1-3 meetings), where students are guided through the five steps of SQ3R:
 - a. Survey: Students preview the text to get a general idea of the content.
 - b. Question: Students generate questions based on headings or key terms in the text.
 - c. Read: Students read the passage thoroughly to find answers to the questions.
 - d. Recite: Students recall and summarize what they have read in their own words.
 - e. Review: Students revisit the material to reinforce their understanding.

3. O2 (Post-test): The post-test was given after the treatment to assess any improvements in reading comprehension. It used a similar format and level of difficulty as the pre-test to ensure comparability.

The difference between the pre-test and post-test scores were analyzed statistically to determine whether the SQ3R technique had a significant impact on students' reading comprehension.

B. The Subject of Research

In conducting research, it is essential to define the subject of the research which consist of population and sample, to ensure that the findings are accurate and applicable to the target group. This section describes the population from which the data are drawn and explains the sample that selected as participants for the research.

1. Population

The population of this research consists of all eighth-grade students at SMP Negeri 2 Sintang during the academic year 2025/2026. Based on the data obtained from the school, there are a total of seven classes of eighth-grade students which being taught by one teacher that I conducted the data with, with an estimated total of around 245 students and 350 students of all the eight grade in total. These students vary in terms of their English proficiency, learning motivation, and previous exposure to reading strategies.

2. Sample

The sample of this study was selected using purposive sampling, a non-probability sampling technique in which the researcher deliberately chooses a particular group that is considered most suitable for the objectives of the study. In this case, one class of eighth-grade students was selected based on the pre-observation and by English teacher's recommendation. One class that selected was class eight I (VIII I) which consists of 33 students, 18 boys and 15 girls. They all were participating in the pre-test, treatment sessions using the SQ3R technique, and the post-test.

C. Research Variable

In a research study, variables are the key components that are measured, manipulated, or controlled. Variables are characteristics or attributes of people, such as gender or opinions that researchers observe to understand how they relate to each other. Cresswell and Guetterman (2021, p.37) stated the purpose of examining these relationships is to identify whether one variable may affect another. For this pre-experimental research, there are two main types of variables: the independent variable and the dependent variable.

1. Independent Variable (X)

The independent variable is the variable that is manipulated or introduced by the researcher to observe its effect. In this research, the independent variable is SQ3R technique (Survey, Question, Read,

Recite, Review) which known as a reading strategy that used to help students understand, retain, and recall reading materials more effectively. In this research, the technique was applied during classroom reading sessions over a series of instructional meetings.

2. Dependent Variable (Y)

The dependent variable is the variable that is measured to assess the impact of the independent variable. In this research, the dependent variable is reading comprehension which refers to students' ability to understand, interpret, and analyse written texts. It was measured by students' scores on reading comprehension tests given before and after the treatment.

After analyse the relation between 2 variables above, the purpose of this research aimed to investigate whether the implementation of the SQ3R technique (independent variable) had a significant effect on students' reading comprehension (dependent variable).

D. Data Collection Technique and Instrumentation

In this research, the success and validity of the findings heavily depend on how the data is collected and what instruments are used to gather that data. Data collection technique refers to the method used by the researcher to obtain information from participants, while instrumentation refers to the tools or devices used to measure the variables in the study. Data collection is a systematic procedure that enables researchers to gather empirical evidence in a consistent and structured manner in order to address

the research questions or hypotheses. As stated by Pandey and Pandey (2015, p.67) the data must be collected and recorded in a most suitable for the intended analysis, because the primary purpose of collecting research is to inform action and or contribute to knowledge development. This means that if the data collection technique and instrumentation is not well-chosen or properly executed, the accuracy and credibility of the entire study may be compromised.

1. Data Collection Technique

In this research, researcher used measurement, questionnaire and documentation as a data collection technique.

a. Measurement

Measurement in research refers to the systematic process of assigning numbers, scores, or values to specific characteristics, abilities, behaviours, or attitudes of research subjects, based on clear and consistent rules or criteria. Measurement is fundamental to all research. It provided a means of objectively describing and quantifying variables and allows researchers to test hypotheses. This means Research often deals with variables, such as reading comprehension. These variables are often abstract and cannot be observed directly. Measurement provides a way to turn these abstract ideas into concrete, countable, or comparable data.

b. Indirect Communication

Indirect communication is a data collection technique in which researchers gather information without engaging in direct interaction with the participants. Instead, the data is obtained through mediated or non-interactive sources such as written documents, archival records, self-administered questionnaires, personal journals, and various forms of media. This method is widely used in qualitative and mixed-method research because it allows researchers to collect information in a non-intrusive and often more objective manner. Examples of indirect communication include document analysis (such as academic reports, student journals, or reflection logs), archival data (such as attendance records or exam scores), and online surveys filled out independently by participants. One of the main advantages of this technique is that it provides access to large-scale or historical data without influencing the behaviour of the subjects. However, it also presents limitations, such as the lack of contextual depth, the risk of misinterpretation, and the inability to verify data accuracy directly. It shows if indirect communication techniques like document and archival analysis are essential components of systematic and valid data collection strategies in educational research.

c. Documentation

Documentation is a data collection technique conducted by gathering documents related to the research object. These documents may include archives, photos, videos, students' assignments, test results, attendance lists, or other written records that already exist or are collected during the research process. This method allows researchers to obtain supporting information that reflects the reality of what occurred during the study, documents are an important source of data because they can be used to strengthen the results of observation or interviews. As to providing visual and written evidence of the treatment process (e.g., classroom activities, student worksheets, test papers), documentation also serves as supportive evidence that ensures the research findings are not only measurable but also trustworthy and verifiable.

2. Instrumentation

Instrumentation in research refers to the tools, devices, or procedures used to collect data and measure variables in a study. It includes the test (pre-test and post-test), questionnaires and documentation that help the researcher gather reliable and valid data.

a. Test

A test is a research instrument used to measure participants' knowledge, skills, or performance in a particular area. In educational research, tests are essential for assessing learning

outcomes, especially in experimental or pre-experimental designs where researchers aim to evaluate the effect of an intervention. Test is a structured and standardized instrument used to collect data about participants' performance or achievement in a specific area. This means that a test must be designed with clear objectives, scoring procedures, and validity criteria to ensure the data collected is accurate and meaningful. In pre-experimental research (such as the one-group pre-test post-test design), tests are administered at two different points:

- 1) Pre-test, pre-test was given before the treatment (in this case, before applying the SQ3R technique) that used to measure students' initial reading comprehension level (baseline data).
- 2) Post-test, post-test was given after the treatment to assess learning gains or changes in comprehension after the use of SQ3R.

In the opinion of Fraenkel, Wallen, and Hyun (2012, p.270). A pre-test-post-test design allowed researcher to observe changes in participants' ability as a result of an experimental treatment. This supports the use of tests as central instruments in measuring the effectiveness of an educational intervention.

3.2 Rubric of Reading Comprehension

Category	Criteria	Score
Literal Comprehension	The student is able to identify explicitly stated information from the text (e.g., facts, names, dates).	10
Inferential Comprehension	The student can draw logical conclusions or inferences based on information implied in the text.	10
Critical Evaluation	The student can evaluate the author's intent, tone, or purpose, or identify bias/persuasive elements.	10
Vocabulary Understanding	The student can determine the meaning of words or phrases based on contextual clues within the text.	10

There will be 10 questions of reading comprehension which each category will have maximum score as 10 points. To measure literal comprehension, researcher will use multiple choice with four question and the total of score per question is 2,5 points. Furthermore, to measure inferential comprehension, critical evaluation and vocabulary understanding, researcher will used essay type question and measure using rubric as follow:

3.3 Aspect of Reading Comprehension Essay

Aspects	Inferential Comprehension	Critical Evaluation	Vocabulary Understanding
Purpose	Drawing conclusions from implied information in the text	Evaluating the content, purpose, and structure of the text	Understanding and using key vocabulary in context
Description	Ability to infer feelings, motivations, or lessons that are not directly	Ability to reflect on the author's purpose, storytelling	Ability to define key words from the text based on context and use

		stated in the text.	effectiveness, and personal reaction.	them appropriately.
S C O R E	5	Clearly and accurately infers complex ideas or feelings using strong text-based evidence.	Provides thoughtful, in-depth critique with clear justification and evidence from the text.	Demonstrates full understanding and uses words accurately in new sentences.
	4	Makes mostly accurate inferences with some supporting evidence.	Offers reasonable evaluation and opinion, though not deeply developed.	Understands most words and uses them mostly correctly.
	3	Makes basic inferences; may lack depth or completeness.	Shows basic opinion, may lack justification or clarity.	Understands some words; limited or partially correct use.
	2	Weak inference with little relevance or limited connection to the text.	Minimal attempt to evaluate; mostly retelling or general comments.	Misinterprets many words; little or no ability to use them meaningfully.
	1	No inference made or completely off-topic.	No evaluation or critical thought shown.	Does not understand or use vocabulary from the text.

Total score depends on the number of comprehension questions aligned to each category.

$$\text{Score} = (\text{Obtain Score} / \text{Max Score}) \times 100$$

For example,

$$\text{Score} = (25 / 40) \times 100 = 62,5$$

b. Questionnaire

A questionnaire is a research instrument used to collect data from respondents through a structured set of written questions. This instrument is commonly used to gather information about opinions, attitudes, perceptions, motivations, or experiences of the research subjects. According to Elangovan and Sundaravel (2021, p.2), questionnaire allow researchers to gather information from a large number of participants within a short period and at minimal cost. In addition, they are convenient for respondents, ensure anonymity, reduce interviewer bias, and provide standardized questions for consistent data collection. In this research, along with reading comprehension test, a questionnaire with likert scale is used as an additional instrument to gather students' responses and attitudes toward the implementation of the SQ3R technique.

As stated by Cohen, Manion, and Morrison (2018, p 492), the ordering of the questionnaire itself is important, for early questions may set the tone or the mindset of the respondent to later questions. It helped the researcher understand the effectiveness of the method or technique by analyze students' perspective in reading comprehension.

Table 3.4 The Indicators of Questionnaires

No	Indicator	Description	Item's Number	Total Items
1	Identifying the main idea.	Students are able to locate and understand the main idea of the text	1, 2, 3, 4	4
2	Determining important information.	Students are able to identify keywords or key points in the text	5, 6, 7, 8	4
3	Vocabulary understanding through context	Students are able to infer the meaning of unfamiliar words based on sentence context.	9, 10, 11, 12	4
4	Understanding text structure	Students are able to recognize parts of the text such as the introduction, body, and conclusion.	13, 14, 15, 16	4
5	Confidence in reading English	Students feel assured when engaging with English texts.	17, 18, 19, 20	4

c. Photo Documentation

Photo documentation is a data collection technique in which photographs are used as visual evidence to support or enhance the findings of a research study. It involves capturing images during the research process such as learning activities, student participation, classroom settings, or instructional materials as complementary data that reflect actual conditions or behaviours in the research setting. Photographic documentation allows researchers to capture a visual record of behaviours, settings, and interactions that can complement field notes and interview data. This method is

particularly useful to record events or interactions that are not easily captured through written or verbal data alone.

E. Data Analysis

In this study, the data will be analyzed quantitatively to determine whether there is a significant difference in students' reading comprehension before and after the implementation of the SQ3R technique. The purpose of the data analysis is to evaluate the effectiveness of the treatment in improving students' reading comprehension. The following steps will be used in analyzing the data:

1. Descriptive Analysis

Students' answers from the pre-test and post-test will be collected and scored based on a predetermined rubric. Each correct answer will be given one point, and the total score represented each student's reading comprehension ability.

a. Calculating the Mean Scores

After that the mean (average) scores of the pre-test and post-test will be calculated to see the general improvement in students' performance after the treatment.

$$\text{Pre-test mean score: } \bar{x}_1 = \frac{\sum x_1}{N}$$

$$\text{Post-test mean score: } \bar{x}_2 = \frac{\sum x_2}{N}$$

b. Standard Deviation

Standard deviation will show how much the individual scores deviate from the group's mean. In simpler terms, it shows how consistent or spread out the participants' scores are. A smaller standard deviation in the post-test compared to the pre-test may indicate more consistent learning outcomes after the treatment. Otherwise, a large standard deviation might mean the treatment affected individuals differently.

c. Score Range

Score range is the difference between the highest and lowest scores in a dataset. It gives a quick snapshot of score dispersion and helps assess how wide or narrow the spread of scores is.

$$\text{Range} = \text{Maximum Score} - \text{Minimum Score}$$

The purpose of the range is to show if there are abnormal values (e.g., one student scoring much lower or higher than others). It is also helpful to identify students who may need extra support or those who excelled.

d. Measuring the Gain

The difference between the pre-test and post-test scores will be calculated for each student to determine individual

improvement.

Gain percentage :

$$\langle g \rangle = \frac{\langle S_{post} \rangle - \langle S_{pre} \rangle}{100\% - \langle S_{pre} \rangle}$$

The result of calculation of gain will be interpreting using the classification as follow:

Table 3.5 Gain Value Interpretation

Gain Value (g)	Interpretation
$G > 0,70$	High
$0,30 < G < 0,70$	Medium
$G < 0,30$	Low

Adapted from Hake (cited in Fadaei, 2019, p.37)

e. Percentage Distribution

Percentage distribution refers to expressing the frequency of responses to each questionnaire item as a percentage of the total number of participants. It helps to easily visualize and compare how participants responded before and after the experimental treatment.

The formula of percentage distribution is as follow:

$$Percentage = \frac{\text{Total number of respondents}}{\text{Number of respondents fo a choice}} \times 100$$

2. Inferential Analysis

To determine whether the implementation of the SQ3R technique significantly improves students' reading comprehension, inferential statistical analysis is used. Specifically, a paired sample t-test is applied to compare students' reading comprehension scores before (pre-test) and after (post-test) the treatment.

The paired sample t-test is suitable for this study because it assesses the mean difference between two related groups, in this case, the same

students' performance measured twice: before and after the application of the SQ3R technique.

a. Normality Test

Before conducting the paired sample t-test, a normality test must be performed to determine whether the data distribution of students' reading comprehension scores (pre-test and post-test) is normal. To test the significance of the difference between the pre-test and post-test scores, a paired sample t-test (if the data are normally distributed) or a Wilcoxon signed-rank test (if the data are not normally distributed) with significance level (α) = 0,05. This test will be conducted using SPSS or Microsoft Excel to determine whether the SQ3R technique had a statistically significant effect on students' reading comprehension.

b. Hypotheses testing

Hypothesis testing is a statistical method used to determine whether there is sufficient evidence to support a specific claim about a population based on sample data. It begins with formulating two hypotheses: the null hypothesis (H_0), which assumes there is no effect or no difference, and the alternative hypothesis (H_a), which suggests that there is an effect or a difference.

H_0 (Null Hypothesis): The data is normally distributed.

H_a (Alternative Hypothesis): The data is not normally distributed.

Researchers then collect and analyze data, often using a test statistic such as a t-test or Wilcoxon signed-rank test, and calculate the p-value, which indicates the probability that the observed results occurred by chance if the null hypothesis are true. If the p-value is less than or equal to the predetermined significance level (commonly 0.05), the null hypothesis is rejected in favor of the alternative. This process helps researchers make informed decisions about the effectiveness of a treatment or intervention. For example, in an educational context, hypothesis testing can be used to evaluate whether a reading strategy like SQ3R significantly improves students' comprehension.