

CHAPTER III

RESEARCH METHODOLOGY

3.1 Research Design

The research method used is descriptive quantitative. The process to collect the data by assembling and comprehending narratives of specific events/or personal experiences (Jameel et al., 2018). The variables in the study and their relationships, the participant, and the research site are all included in the design of a quantitative purposes statement. The suggested vital variable in a study is identified in a quantitative purpose statement (King, 1991). This method is suitable for this research, which identifies the class activity in learning speed using the Cambridge curriculum. In this research, the observation design was used. The researcher observed the participant's roles, actions, and behavior (Walshe et al., 2012) during the class.

3.2 Population and Sample

The population of this research was the seventh-grade students with 42 students in two classes in one Private Junior High School in Bandung, which uses the Cambridge curriculum. The convenience sampling method used is by considering that the target population meets specific practical criteria, such as easy accessibility and availability during the study (Etikan et al., 2016). Since the rest of the students did not follow the procedures of the experiment implementation completely, the total number of available students was 34 at the end.

3.3 Operational Definition

The operational definitions are presented to summarize and avoid any misunderstandings about this research. The following are the research variables:

- 1) Critical thinking in this research includes student's ability to make the reasonable assessment both in the classroom and in daily life because it's a crucial goal as a result, and it's considered by some to be the mark of a well-educated individual, as well as essential for being a globally involved citizen. In this research, students' critical thinking skill is measured using observation sheet filled by the researcher during the learning activity. The objective test

consists of 20 multiple choices in speed topic given after the learning activity as an experiment implementation. The question given is considering the fifth - indicator of Ennis theory consists of elementary clarification, basis for the decision or basic support, inference, advanced clarification, and strategic and tactics (Fazriyah et al., 2017).

3.4 Research Instrument

To gain the data needed for this research, several types of research instruments will be employed in this study. The data needed are the activity during the class in implementing Cambridge curriculum to student's critical thinking. Including an observation sheet and an objective test. Table 3.1 shows the instrument that was used to collect the data in this study.

Table 3.1
The Research Instrument Used to Obtain the Data

Data Required	Instrument Used
The learning activity in Cambridge curriculum implementation	Observation Sheet
Student's Critical Thinking	Objective Test

In order to gain the data needed, the instrument in the list in Table 3.1 was constructed. The instrument used in this research is described as following.

1) Observation Sheet

The observation Sheet is used to observe the class activity during the teaching-learning process in implementing the Cambridge curriculum. According to Marshall & Rossman (1989), Observation is the systematic description of the events, behaviors, and artifacts. In other words, observation is a technique for gathering information about people, processes, and cultures (Kawulich, 2012).

The common observation is made by considering the main elements of the curriculum that need to be there in the learning process, such as Aims and objectives, Contents/Subjects matter, Methods, and Evaluation. Curriculum as a

process in this meaning is the interaction of teacher, students, and knowledge rather than a physical thing. It is more than the interaction or, in other words, the curriculum is what happens in the classroom and what people do to prepare and evaluate it (Hassan, 2013). The observation checklist is shown in Table 3.2.

Table 3.2
Observation Table of Critical Thinking

1. Teaching Strategies		Appropriate	Un- appropriate	Description	
Learning Activities					
2. Aims and Objectives		Available	Unavailable	Description	
Reach the skill strands thinking	Critical thinking Creative thinking Communication Collaboration				
Working scientifically	Questioning and predicting Planning and conducting an investigation Processing and analyzing data Presenting the data result				
3. Content/Subject Matter		Excellent (4)	Good (3)	Average (2)	Poor (1)
Class activities	Instruction	All students are able to follow the instruction given by the teacher	Around 75% of students are able to follow the instruction given by the teacher	Around 50% of students are able to follow the instruction given by the teacher	Less students are able to follow the instruction given by the teacher
	Request	All students follow teacher guidance in doing something directly and indirectly	Around 75% of students follow teacher guidance in doing something directly and indirectly	Around 50% of students follow teacher guidance in doing something directly and indirectly	Less students follow teacher guidance in doing something directly and indirectly
	Announcement	All students give	Around 75% of	Around 50% of	Less students give respond and

		respond and follow teacher information in-class activity	students give a response and follow teacher information in-class activity	students give a response and follow teacher information in-class activity	can follow teacher information in-class activity
	Do-hands on science using everyday equipment	All students do a kind of hands-on science simple experiment	Around 75% of students do a kind of hands-on science simple experiment	Around 50% of students do a kind of hands-on science simple experiment	Less students do a kind of hands-on science simple experiment
	Use English	The whole students use English during a class activity	Around 75% of students use English during a class activity	Around 50% of students use English during a class activity	Students less on use English during a class activity
Student's skill improvement	Critical thinking	Students are able to post a question that claims to link for seeking the truth for solving the problem	Students are able to post a question but don't have any link for seeking the truth for solving the problem	Students are unable to post a question that claims a link for seeking the truth but, they are able to solve the problem	Students don't claim any question and solve the problem
	Creative thinking	Students can think uniquely and be able to practice thinking in a way they are thinking out of the box	Students can think in a way that's unique but is unable to practice thinking outside the box	Students don't think uniquely, but they are able to practice thinking outside the box	Students are unable to think uniquely.
	Communication	Students are able to practice conveying ideas quickly and clearly and learn how to convey ideas efficiently	Students are able to practice conveying ideas quickly and clearly but don't learn how to convey	Students are able to practice conveying ideas quickly and clearly but learn how to convey ideas efficiently	Students are unable to practice conveying ideas quickly and clearly. Also, they don't learn how to convey ideas efficiently.

	Collaboration	Students are able to practice working together to create something bigger and better than on their own	ideas efficiently Students are able to practice working together but don't create something bigger and better than on their own	students are working together	Students are working individually
		Available	Unavailable	Description	
Instrument	Media Textbook Worksheet				
4.	Evaluation/ Assessment	Available	Unavailable	Description	
Continues assessment: type of question	Multiple Choice True/False question The open-ended question				

(Latifah, 2021)

To score the second element, 4-scaled rating is used as seen in the Table 3.3. according to (Suwadarma et al., 2020), this scale is appropriate to cover the result of the observation. The higher the interval score, the better the criteria.

Table 3.3
Interval score for second element (content/subject matter)

Interval score	Criteria
$3,0 < \bar{x} \leq 4,0$	Excellent
$2,0 < \bar{x} \leq 3,0$	Good
$1,0 < \bar{x} \leq 2,0$	Average
$0,0 < \bar{x} \leq 1,0$	Poor

$$\text{Where } \bar{x} = \frac{\text{The total score of all items in all meetings}}{\text{The number of meetings}}$$

(Suwadarma et al., 2020)

2) Objective Test

The objective test is used to measure student's critical thinking. The objective test was given to students after the learning activity for the whole topic of speed is already given. The sub-topic on speed is divided into four parts following the Cambridge Curriculum in Upper Secondary School Science. The objective test question is made by considering the aspects indicator of Critical Thinking according to Ennis theory, including Elementary clarification, Basis for the decision or basic support, Inference, Advanced clarification, and Strategies and tactics (Fazriyah et al., 2017). Furthermore, the indicators involve the sub-indicators contained. The unrevised blueprint of scientific literacy test items on climate change topics is shown in Table 3.4.

Table 3. 4
Indicators and Sub-Indicators Critical Thinking Skills in Research

No.	Indicators of Critical Thinking Skills	Sub Indicators of Critical Thinking Skills in Research	Number Problem
1	Elementary Clarification	Analyze the argument: identify conclusions	1
		Analyze the argument: identify the reason	1
		Asking clarifying question	1
		Answering questions of clarification	1
2	The basis for the decision or basic support	Assessing the credibility of the source criteria: the existing procedure	1
		Assessing the credibility of the source based on the following criteria: the ability to give a reason	1
		Assessing reports observation based on the following criteria: Note of observation	1
		Assessing component or the suitability of the technology	1
3	Inference	Hypothesis explanation: claims of general causal	1
		Induction: Activities of investigation, especially aspects of experimental design	1
		Induction: Provide a reasonable assumption	2
		Induction: Generalization of the chart	2
		Make a statement of values based on: their alternatives	1
4	Advanced clarification	Make a statement of values: the consequences	1
		Assessing the definition: Definition of the report	2
5	Strategic and tactics	Interacting with others: A coherent strategy	2

(Fazriyah et al., 2017)

The expert first judged the test items and then validated them by testing them on students who had already learned about speed topic, filled by 16 students from Private Junior High School of 8th grader when the research was conducted. Due to distance learning, the initial test items validation is conducted online. The validity,

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reliability, difficulty level, discriminating power, and distractor of the student's validation score were then examined using ANATES V4 to determine its validity, reliability, difficulty level, and distractor. The validity of test items is represented in the correlation between item score and total score. After being analyzed, it has resulted that the item reliability score is 0,89, which is good (Mohamad et al., 2015). The recapitulation of test items analysis is presented in Table 3.5 as followed.

Table 3.5
The recapitulation of test items analysis

Question Number	Discriminating Power (%)	Difficulty Level	Correlation	Significant Correlation	Acceptance
1	75.00	Medium	0.592	Very Significant	Accepted
2	50.00	Very Easy	0.467	Significant	Accepted
3	75.00	Medium	0.592	Very Significant	Accepted
4	100.00	Medium	0.736	Very Significant	Accepted
5	75.00	Medium	0.503	Significant	Accepted
6	0.00	Easy	0.232	(-)	Revision
7	50.00	Medium	0.529	Significant	Accepted
8	100.00	Medium	0.784	Very Significant	Accepted
9	75.00	Medium	0.592	Very Significant	Accepted
10	75.00	Medium	0.639	Very Significant	Accepted
11	100.00	Medium	0.710	Very Significant	Accepted
12	100.00	Medium	0.738	Very Significant	Accepted
13	100.00	Medium	0.731	Very Significant	Accepted
14	0.00	Very Difficult	0.102	(-)	Revision
15	75.00	Medium	0.736	Very Significant	Accepted
16	100.00	Medium	0.736	Very Significant	Accepted
17	0.00	Medium	0.082	(-)	Revision
18	100.00	Medium	0.736	Very Significant	Accepted
19	50.00	Easy	0.686	Very Significant	Accepted
20	0.00	Medium	0.274	(-)	Revision

The revision questions are considered to be used by considering the expert's suggestion and the distribution of the indicator used to measure the student's critical

thinking. The final test item used is 20 multiple choices with the recapitulation as followed.

Table 3.6
Blueprint of Critical Thinking Test Item in Speed

Sub-Topic	Indicator				Strategic and tactics
	Elementary clarification	Basic support	Inference	Advanced clarification	
Speed records	2		1, 9		
Measuring speed	3	4	5, 6		12
The distance /time graph	14	7	20	10	
Velocity	13	15, 16	8, 11,17	18	19

Regarding the students' critical thinking ability, a specific criterion is chosen to represent the category. Arikunto cited in (Akrom & Nurhasanah, 2020) has grouped requirements for student's critical thinking skills can be seen in Table 3.6. As seen from the table, it can be concluded that the higher the score the better the criteria.

Table 3.7
Criteria for Critical Thinking Ability

Score	Criteria
80% - 100%	Very High
66% - 79%	High
56% - 65%	Medium
≤ 55%	Low

(Akrom & Nurhasanah, 2020)

3.5 Research Procedure

The research procedure carried out in this research are explained as follows:

- 1) Preparation Stage
 - a. Problem investigating by observing and reading journals and articles related to the problem happens in need of required skills for the 21st-century era.
 - b. The specific topic is selected to be addressed in this research

- c. Several aspects that support this research are analyzed: the Cambridge curriculum implementation and critical thinking skills.
 - d. Research instruments consist of an observation sheet and critical thinking objective test consisting of 20 multiple-choice questions.
 - e. The expert judges the instruments.
 - f. The instruments are revised.
 - g. The trial test was conducted to measure the instrument's validity, reliability, and other essential aspects.
 - h. The instruments are revised
 - i. The possible school, class, and time to conduct the research are determined.
- 2) Implementation Stage
- a. Observe the learning process during the class activity taught by the teacher who is experienced in implementing the Cambridge curriculum.
 - b. Conduct test of critical thinking skills toward science.
- 3) Completion Stage
- a. Analyze the data collected by interpreting the result.
 - b. Drawing discussion and conclusion from the data analysis
 - c. The finding is reported.

The flowchart which derives the research process systemically is shown in Figure 3.1.

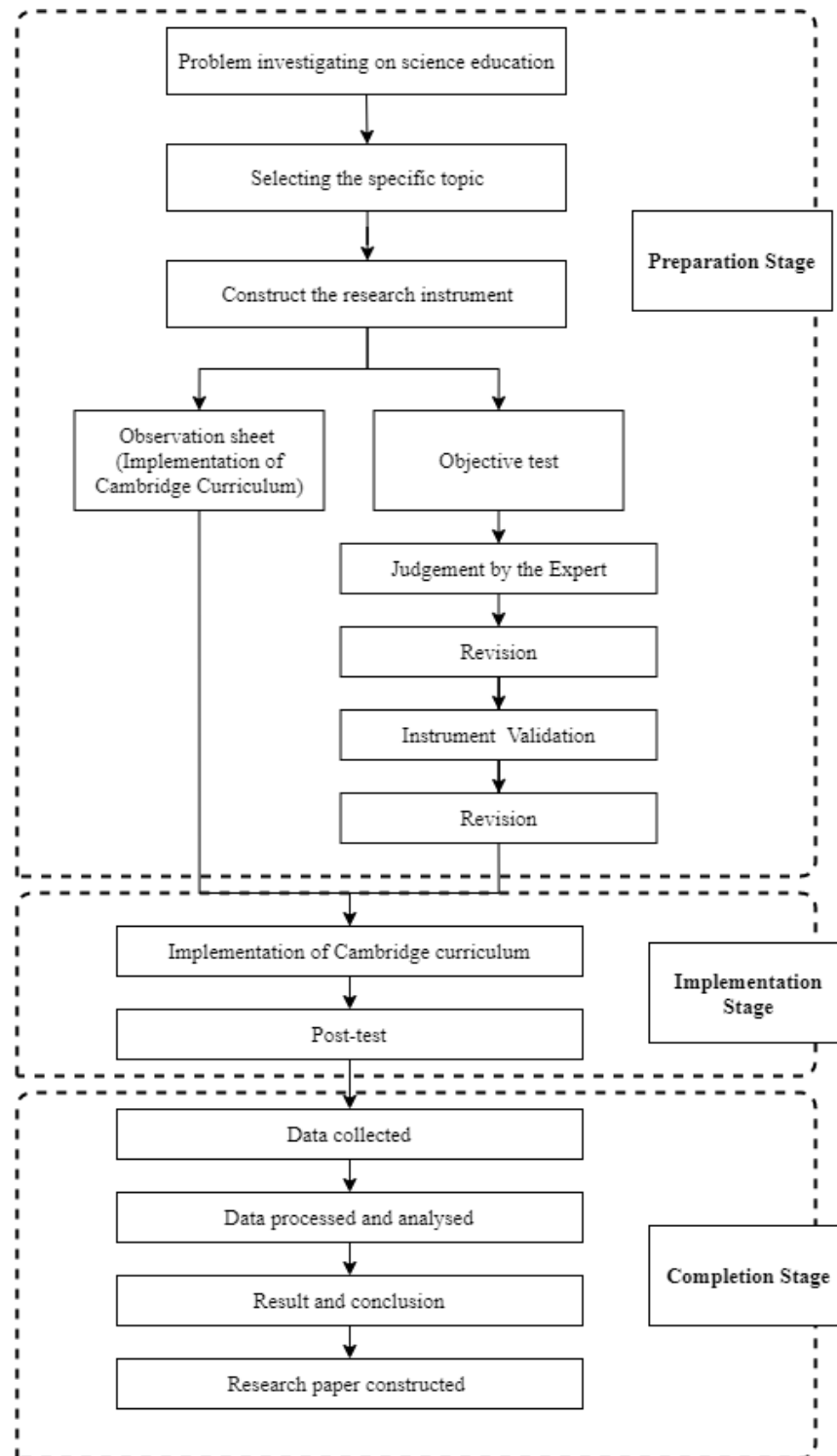


Figure 3.1 The flowchart of Research Procedure