

## CHAPTER III

### RESEARCH METHODOLOGY

#### 3.1 Research Method and Research Design

In order to achieve the goal of the research requires a certain method and design that would encourage knowledge enrichment and the science learning process. The research method and research design employed in the implementation of the research is described below.

##### 3.1.1 Research Method

The research method use quantitaive research with pre experimental methods, one group pre-test post-test design. Pre-experimental research involves observing a single group to which an intervention is applied without the comparison of a control group (Fraenkel, Wallen, & Hyun, 2012). This methods allows researchers to determine the specific effects of the intervention on the variables and to assess the outcomes for further analysis (Cohen, Manion, & Morrison, 2007). The pre-experimental method was used in this research in line with the main objectives of this research, which is to investigate the improvement of students health literacy after using comics.

##### 3.1.2 Research Design

The research used the one group pretest-posttest design, a method where a single group of participants is observed before and after a specific treatment. This design is useful for assessing the effects of the treatment on the participants by comparing their performance on the pretest and posttest. It does not require the random assignment of subjects to different groups as all participants are subjected to the treatment (Fraenkel et al., 2012). The research design is shown in Table 3.1.

Table 3. 1 The One-Group Pretest-Posttest Design

O <sub>1</sub>	X	O <sub>2</sub>
Pre Test	Treatment (Comic)	Post Test

(Fraenkel et al., 2012)

O<sub>1</sub>: Pre-test of students health literacy

X: Implementation of comic “The Dangers Behind People Pleasure”

O<sub>2</sub>: Post-test of students’ health

The treatment is by implementing of Comics: The Danger Behind People Pleasure provide in APPENDIX A.3 as media on their learning process. This research design used to see the use of comics to enhance students’ health literacy in learning the dangers of smoking on human respiratory system topic.

### 3.2 Population and Sample

The population of this research was the 8<sup>th</sup> junior high school, while the sample was 30 students in one class at one public junior high school in Bogor that used Curriculum Merdeka, which attended at a period of 2024/2025. The group being studied is the main focus of the research, which aims to examine or provide treatment to this particular population (Majid, 2018). The sampling technique in this study is convenience sampling is a category of nonprobability or nonrandom sampling. This method involves including members of the target population who fulfill specific practical criteria, such as being easily accessible, geographically close, available at a particular time, or willing to participate in conducting the study (Etikan, 2016). The detail of the sample, which is classified based on its gender, is explained in Table 3.2 below.

Table 3. 2 Research Sample

Gender	Number of Samples
Female	19
Male	11
Total	30

### 3.3 Assumption

Comics can improve health literacy because they combine text with visualizations that make complex health concept easier to understand. By using engaging images and narratives, comics can explain medical information in a more relatable and memorable way. Comics can also be adapted for students, making them more accessible to those who are not used to long texts or have limited literacy

skills. In addition, entertaining and informative comics can help raise awareness of health issue and encourage healthy behaviours. Easy to distribute in print and digital forms, comic are an effective and engaging way to communicate health information to a students.

### 3.4 Hypothesis

The hypotheses that would be tested in this study are as follows:

H<sub>0</sub>: There is no significant differences in students' health literacy before and after using comics as media in learning the danger of smoking on human respiratory systems

H<sub>1</sub>: There is an significant differences in students' health literacy before after using comics as media in learning human respiratory systems.

### 3.5 Research Instrument

In this research, an instrument is necessary to obtain the data. Two types of instruments will be used in this research will be shown in Table 3.3 below:

Table 3. 3 Research Instrument

Instrument	Data Obtained
Health Literacy Test	Students' Health Literacy
Questionnaire	Students' Impression

Further description of the instruments described as follows:

#### 3.5.1 Health Literacy Test

The health literacy test in this research is a set of multiple-choice questions about the danger of smoking to the human respiratory system to measure students' health literacy skills. In this research, the health literacy test was constructed based on (Nutbeam, 2015) which covers three indicators such as access, understanding, and use/apply. The type of questions is multiple choice, which consists of 25-item questions and the final instrument in APPENDIX B.2. Table 3.4 summarizes the blueprint for the health literacy test.

Table 3. 4 Blueprint of Health Literacy Test

Aspect	Number of Question	Total
Aspect 1 (Access)	1,2,3,5,7,11,14,23	8
Aspect 2 (Understanding)	8,9,10,15,17,18,19,21	8
Aspect 3 (Use/Apply)	4,6,12,13,16,20,22,24,25	9
Total		25

The test item was judged by the experts, and then the researcher revised it based on suggestions from the experts, a form of validation provided in APPENDIX B.1 The test item also tested on the students who have learned about the dangers of smoking on the human respiratory system from 9th grade level. The results of validation were then examined using ANATES was used in the process of validity of the instrument. to determine validity, reliability, difficulty level, and discriminating power.

#### 1) Validity test

Validity is defined as the extent to which a concept is accurately measured in a quantitative study (Heale & Twycross, 2015). It also as the correspondence between a test score and the quality to be measured. The validity of the instrument is employed in this research to determine if it can or cannot evaluate students' health literacy skills on the topic of the danger of smoking. The validity interpretation is shown in Table 3.5.

Table 3. 5 Validity Interpretation

The amount of r value	Interpretation
$0,80 < r \leq 1,00$	Very High
$0,60 < r \leq 0,80$	High
$0,40 < r \leq 0,60$	Enough
$0,20 < r \leq 0,40$	Low
$0,00 < r \leq 0,20$	Very Low

(Minium, King, & Bear, 1993)

## 2) Reliability

Reliability is a problem with the extent to which a measurement can be trusted for its reliability. One instrument with answer choice 2 or more is said to be reliable when multiple measurements against the same subject (test-retest) obtained relatively the same result or in one measurement with different instruments (equivalent) obtained relatively the same result (Yusup, Studi, Biologi, Islam, & Antasari, 2018). Reliability refers to the consistency of scores or answers from one instrument to another item and from one set of items to another set. Consequently, a measuring device is reliable if the measurement results are performed in the same situation, even if tested at various periods. The classification result of the reliability test is dependent on the value of  $r$ , shown in Table 3.6.

Table 3. 6 Reliability Interpretation

Gained $r$ value	Interpretation
0,80 - 1,00	Very High
0,60 - 0,80	High
0,40 - 0,60	Average
0,20 - 0,40	Low
0,00 - 0,20	Very Low

(Minium et al., 1993)

## 3) Difficulty Level

Difficulty Level items defined as the proportion of examining marked items. Item difficulty is the percentage of students that correctly answers the item, also referred to as the  $p$ -value, then the difficulty index levels categorized in the following table 3.7 as follow:

Table 3. 7 Difficulty Level Categorization

Difficulty Level	Test Item Category
0.00 – 0.30	Difficult
0.31 – 0.70	Average
0.71 – 1.00	Easy

(Cohen et al., 2007)

#### 4) Discrimination Power

The discrimination power of a test item is the ability of the question to distinguish between high achievers and low achievers students. If the question is not good enough, then it could be answered by lower and higher-achiever students. In another case, if the question could not be answered by both low and high-achiever students, it also indicated that the question had discrimination power. Discriminating power interpretation is presented in Table 3.8 below:

Table 3. 8 Interpretation of Discriminating Power

Discrimination Index	Interpretation
0,00 – 0,20	Poor
0,20 – 0,40	Satisfactory
0,40 – 0,70	Good
0,70 – 1,00	Excellent
D = Negative	Question is deleted

(Exhcoba & Reyna, 2015)

The test item that was analysed using ANATES is the Test to Assess Health Literacy of Students. The test contains 25 questions. The test item was filled in by students of the 9th grade of a junior high school. After the test item was analysed, the detailed summary analysis in APPENDIX C.3. The summary of the analysis result of the test item is shown in Table 3.9.

Table 3. 9

The Summary of Students' Health Literacy Analysis

Question Number	Discriminating Level	Difficulty Level	Validity	Status
1	46,15 (Good)	Medium	0,415 (Average)	Used
2	79,92 (Excellent)	Medium	0,629 (High)	Used
3	30,77 (Satisfactory)	Medium	0,216 (Low)	Used
4	46,15 (Good)	Very Easy	0,49 (Average)	Revision
5	53,85 (Good)	Medium	0,439 (Average)	Used
6	30,77	Medium	0,269	Revision

Question Number	Discriminating Level	Difficulty Level	Validity	Status
	(Satisfactory)		(Low)	
7	46,15 (Good)	Medium	0,41 (Average)	Used
8	30,77 (Satisfactory)	Very Easy	0,34 (Low)	Revision
9	61,54 (Good)	Easy	0,526 (Average)	Used
10	53,85 (Good)	Medium	0,51 (Average)	Used
11	84,62 (Excellent)	Medium	0,703 (High)	Used
12	46,15 (Good)	Medium	0,333 (Low)	Used
13	46,15 (Good)	Easy	0,415 (Average)	Revision
14	53,85 (Good)	Medium	0,513 (Average)	Used
15	46,15 (Good)	Medium	0,369 (Low)	Used
16	61,54 (Good)	Medium	0,534 (Average)	Used
17	61,54 (Good)	Medium	0,447 (Average)	Used
18	69,23 (Good)	Medium	0,51 (Average)	Used
19	30,77 (Satisfactory)	Difficult	0,464 (Average)	Used
20	61,54 (Good)	Medium	0,477 (Average)	Used
21	38,46 (Satisfactory)	Difficult	0,3 (Low)	Used
22	69,23 (Good)	Medium	0,594 (Average)	Used
23	61,54 (Good)	Medium	0,509 (Average)	Used
24	92,31 (Excellent)	Medium	0,748 (High)	Used
25	76,92 (Excellent)	Medium	0,612 (High)	Used

According to the result, there were 25 multiple-choice questions in the test, which are suitable enough to be used in data collection with some revisions, as the reliability score of all these items is 0.85, which is categorised as very high reliability. So, the researcher decided to apply 25 questions from above so that the distribution of questions of each indicator is balanced due to limited questions.

### 3.5.2 Students' Impression Questionnaire

The questionnaire provides to assess students' impressions of humorous media in learning about the risks of smoking on the human respiratory system. The students' impressions are calculated using a Likert scale. The scale ranges from one to four; one represents "strongly disagree," two represents "disagree," three represents "agree," and four represents "strongly agree." Comic media, learning experience, understanding, and health literacy are among the aspect evaluated. The students' impression questionnaire is provided in Table 3.10.

Table 3. 10 Students' Impression Questionnaire

Indicators	Statement
Comic Media	<p><i>Media komik ini menyediakan informasi yang jelas dan dipahami tentang bahaya merokok pada sistem pernapasan</i></p> <p><i>Media komik ini menggunakan bahasa yang sesuai dan mudah dipahami</i></p> <p><i>Media komik ini mempunyai ilustrasi atau gambar yang menarik dan tidak membosankan</i></p>
Learning experience	<p><i>Membaca komik ini merupakan pengalaman belajar yang menarik dan menyenangkan.</i></p> <p><i>Saya merasa lebih termotivasi untuk menerapkan perilaku hidup</i></p>



Indicators	Statement
Understanding	<p><i>sehat demi menjaga sistem pernapasan setelah menggunakan komik</i></p> <p><i>Saya ingin mencari tahu lebih banyak tentang kesehatan setelah membaca komik ini.</i></p> <p><i>Saya mendapatkan pengetahuan baru tentang kesehatan sistem pernapasan setelah membaca komik ini.</i></p> <p><i>Saya dapat memahami dengan jelas informasi tentang bahaya yang mengancam sistem pernapasan manusia setelah membaca komik ini.</i></p> <p><i>Saya dapat menjelaskan kepada orang lain tentang bahaya sistem pernapasan manusia dan cara mencegahnya setelah membaca komik ini.</i></p>
Health literacy	<p><i>Saya menyadari bahwa mendapatkan akses informasi kesehatan dari sumber terpercaya sangat penting</i></p> <p><i>Melalui media komik, saya menjadi lebih memahami bagaimana literasi kesehatan berperan penting dalam meningkatkan kualitas hidup, terutama dalam hal pencegahan kebiasaan merokok.</i></p>

Indicators	Statement
	<i>Media komik ini meningkatkan kesadaran saya untuk dapat mengambil tindakan dan memutuskan agar menjaga kesehatan sistem pernapasan.</i>

### 3.6 Data Analysis

#### 3.6.1 Students' Health Literacy

##### 1) Scoring of Test

After collecting research data through health literacy tests in the pre-test and post-test, the test items consisted of 25 multiple-choice questions, with each correct answer worth 4 and incorrect answers getting 0, for a maximum score of 100. The students' scores were then calculated to determine the answer score. Table 3.11 describes the category of health literacy scores.

Table 3. 11 Health Literacy Score Category

Score	Category
80 – 100	Excellent
60 – 80	Good
40 – 60	Fair
20 – 40	Poor
0 – 20	Very Poor

(Kutner, Greenberg, Jin, & Paulsen, 2006)

##### 2) Normality Test

The normality test is an initial test to determine whether the hypothesis test will be carried out through parametric or non-parametric statistical tests. The processing of prerequisite test data is carried out using IBM SPSS software.

##### 3) Hypothesis Test

The hypothesis test conducted is through the average difference test between two paired samples obtained in the research sample. Normally

distributed data is conducted using the t-test, while if the data is not normally distributed, the Wilcoxon test is conducted.

#### 4) N-gain Test

The gain score is the difference between the pre-test and post-test scores, which aims to allow researchers to measure the increase in students' health literacy between before and after learning. Normalized gain is determined after the measurement of the actual gain to obtain the gain index. The normalized gain score is then interpreted and calculated based on Hake (1999) criteria. The formula of normalized gain is shown below:

$$\langle g \rangle = \frac{Sf - Si}{Smax - Si}$$

Where,

$\langle g \rangle$  = Normalized gain

$Smax$  = Maximal Score

$Sf$  = Score of Post-test

$Si$  = Score of Pre-test

The N-gain score has been categorised for the purpose of data description.

This category of -gain score is shown in Table 3.12.

Table 3. 12 N-Gain Score Category

N-Gain Score	Category
$g > 0.3$	Low
$0.3 \leq g \leq 0.7$	Medium
$g > 0.7$	High

### 3.6.2 Students' Impression

A questionnaire was used to assess students' impressions of comic as media in learning the dangers of smoking. The questionnaire has 12 items on four scales: strongly agree, agree, disagree, and strongly disagree. Suherman (2003) method was used to calculate the worth of students' impressions. It involves multiplying the total response score by the value of the response and dividing by the total number of respondents. The formula is shown in below:

*Students' Impression Value*

$$= \frac{\text{Total Response} \times \text{Value of Response}}{\text{Total Number of Respondese}}$$

(Suherman, 2003)

Table 3.12 presents the interpretation of students' impression values.

Table 3. 13 Impression Interpretation

Value	Interpretation
<3.00	Negative Impression
>3.00	Positive Impression

(Suherman, 2003)

### 3.7 Research Procedures

In order to make the research well organize, the arrangement of research procedure is planed based on the stage of guided-inquiry learning model using web-based inquiry implementation. There are three stages of procedure consists of preparation stage, implementation stage and completion stage. Those three stages are explained as follow.

- 1) Preparation stage
  - a. Formulate the research of the problem going to be analyzed
  - b. Conducting literature review on comic learning media, the danger smoking on respiratory system, and health literacy
  - c. Arranging the proposal of research that will be presented in proposal seminar
  - d. Designing instrument health literacy test and students' impression questionnaire and asking expert to judged
  - e. Revising the research instrument after judged by expert
  - f. Validating and analyzed research instrument
  - g. Revising research instrument
- 2) Implementation stage
  - a. Pre-test given to the students at the initial condition
  - b. Implementing comic to the students

- c. Post-test are given to the students to get the final condition
  - d. Collecting the data
- 3) Completion stage
- a. Analyze the data result
  - b. Discussing the findings
  - c. Conclude data of analysis result
  - d. Research report arrangement

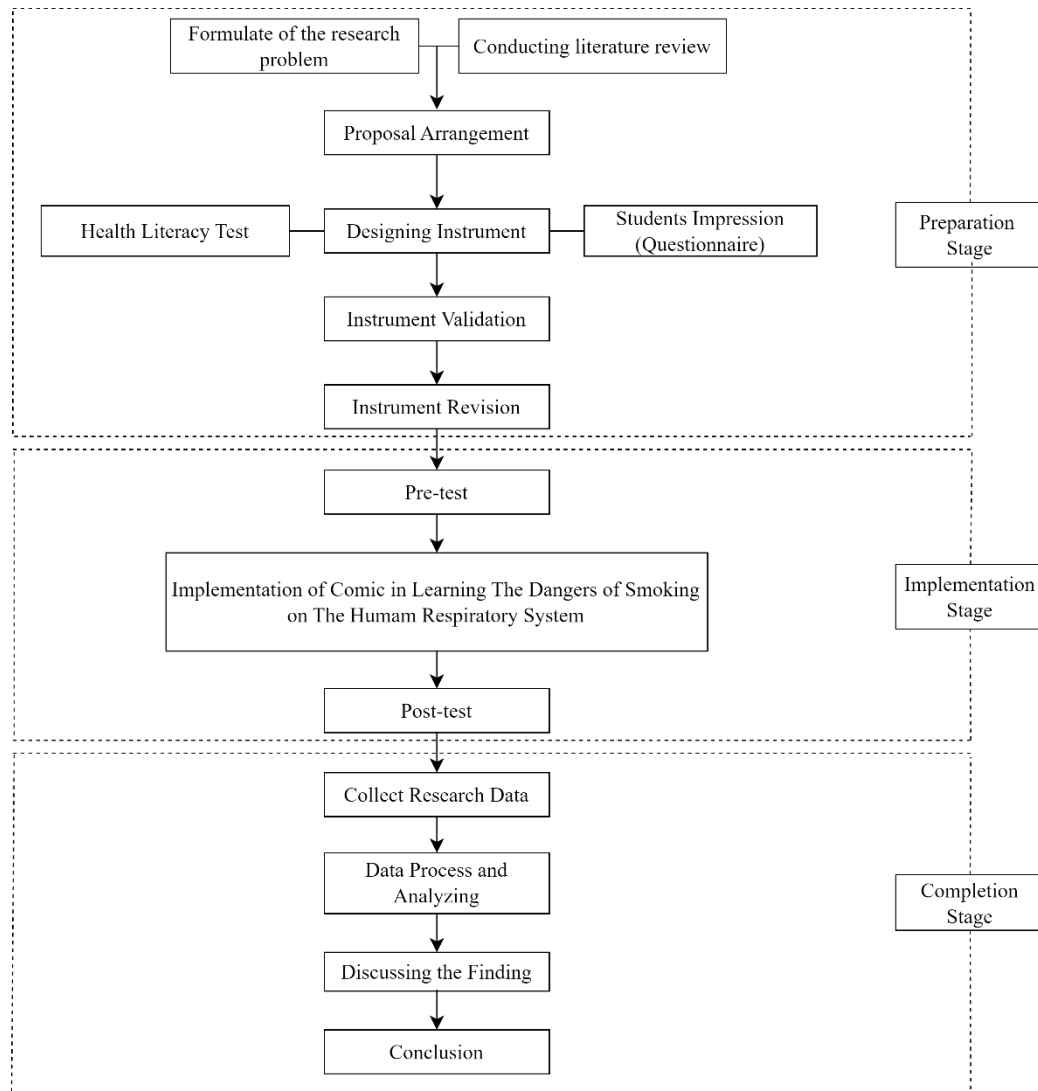


Figure 3. 1 Research Procedure list