

CHAPTER III

RESEARCH METHODOLOGY

In this chapter, the present researcher describes; research type, research design, place of the study, population and sample of the study, research instrument, data collection, and data analysis.

A. Research Type

Since the writer intends to find out the validity and the reliability of a test, this study belongs to the quantitative method. Quantitative research is explaining phenomena by collecting numerical data that are analyzed using mathematically based methods.

B. Research Design

The design of this study is descriptive. It is because this study is collect, arrange and classify the data, analyze and interpret the data. The data needed in this study will be collected from the questions sheet, answers sheet resulted from the English summative test which will be conducted in SMA Muhammadiyah 1 Palangka Raya. The data will be collected from the two packages of English summative test that will be conducted once. Another data needed is curriculum or syllabus of SMA Muhammadiyah 1 Palangka Raya especially curriculum or syllabus for English subject of the second grade.

The admissibility of the data means data which can be accepted in this study. As Hornby, "*Admissible means that can be allowed or accepted*"¹. So,

¹AS Hornby, *Oxford Advanced Learner's Dictionary of Current English*, Oxford, Oxford University Press, 2006, h. 19.

The data will be regarded as admissible as the an English summative test are really constructed by the English teacher of the second grade of SMA Muhammadiyah 1 Palangka Raya in the second semester.

C. Place of The Study

In this study, the writer only analyze of validity and reliability of English summative test made by the English teacher need to make this study reasonable and acceptable and take a place at second grade of SMA Muhammadiyah 1 Palangka Raya.

D. Object and Subject of The Study

1. Object

The object of this study is an English summative test which is made by the English teacher of the second grade of SMA Muhammadiyah 1 Palangka Raya in the second semester.

2. Subject

Since this study only analyze one teacher-made test, so the subject of this study is analysis validity and reliability of English summative test which is made by the English teacher of the second grade of SMA Muhammadiyah 1 Palangka Raya in the second semester.

E. Research Instruments

1. Documentation

In this documentation, aims to find out related documents to the study. Some documents those were needed:

- a. The students' English score

- b. English summative test made by English teacher
- c. Syllabus
- d. Photo.

2. Research Instruments Try Out

They are the question sheet and the result sheet of the English summative test that conducted in SMA Muhammadiyah 1 Palangka Raya.

3. Research Instruments Reliability

Reliability is a necessary characteristic of any good test for it to be valid at all. A test must first be reliable as a measuring instrument. It is the degree of consistency with which it measures whatever it is measuring.² It is refer to the degree to which a measuring procedure gives consistent set of scores for a group of individuals if it was administered independently on several occasions. Calculating the reliability of the test by using the Kuder-Richardson's formula (KR-20).

$$r_{11} = \left(\frac{n}{n-1} \right) \left(\frac{S^2 - \sum pq}{S^2} \right)$$

Where:

- r_{11} : Instrument reliability
- n : The number of items in the test
- S : Total variance
- p : Proportion of correct answer
- q : Proportion of wrong answer ($q=1-p$)
- $\sum pq$: summary of p multiply q

The interpretations of reliability coefficient based on Sudijono are as follows:

- ≥ 0.70 : reliable
- < 0.70 : unreliable

²Donald Ary, Lucy Cheser Jacobs, Chir Sorensen, Asghar Razavieh, *Introduction to Research in Education*, Wadsworth: USA, 2010, p. 236

4. Research Instrument Validity

Since the writer intends to find out the validity and the reliability of a test, this study belongs to the quantitative descriptive method. It is because this study will collect, arrange and classify the data, analyze and interpret the data. In other words, this study only describe the validity and reliability of the data.

A. Content Validity

This kind of validity depends on a careful analysis of the language being tested and of the particular course objective. Content validity can be checked by examining the agreement between the objective of the course and the test items used.³ Related to writing test, the content validity can be checked by examining the agreement between the objectives of the course and the test are use to measure the objectives.

B. Construct Validity

If a test has construct validity, it is capable of measuring certain specific characteristic in accordance with a theory of language behavior and learning. Construct validity refers to the practical tests developed from a theory⁴:

C. Empirical Validity

A fourth type of validity is usually referred to as statistical or empirical or empirical validity. This validity is obtained as a result of

³ John Brian.Heaton, *Language Testing*, New York: Longman, 1987, p. 160.

⁴ Riduan, *Metode dan teknik Menyusun Thesis*, Bandung: Alfabetap, 2004, p. 110.

comparing the result of the test with the result of some criterion measure such as :

- a. An existing test, known or believed to be valid and given at the same time; or
- b. The teacher's ratings or any other such form of independent assessment given at the same time, or
- c. The subsequent performance of the testes on a certain task measured by some valid test, or
- d. The teacher's rating or any other such form of independent assessment given later.

F. Data Collection Procedure

1. Documentation

Data document is commonly used in both qualitative and quantitative research. Secondary data provides data which provides a framework for the research project, development of research questions, and validation of study findings. Document is fact corps and on file data in the form of or text of artefak. this documentation technique is often used to become especial technique in research of analysis or history.⁵ This research used document of summative test made by English teacher.

⁵ Musfiqon, *Metodologi Penelitian Pendidikan*, Jakarta: Prestasi Pustaka Publisher, 2012, p. 131.

2. Analysis

To find out the reliability and validity, the writer collect and analysis the data of students' results. The data is the students' results of the English summative test questions.

G. Data Analysis Procedure

1. Reliability

To analyze the reliability of the test, the writer will do the following steps:

- a. Calculating the right answers of each item.
- b. Calculating the score of the right answers of each item.
- c. Calculating the value of p and q of each item.
- d. The writer tabulate the students' result in a well-arranged form. Well-arranged form means the data presented in tables. In order to take care of the privacy of the students, the names of the students will be changed into codes. In examples, A1, B1, C1, etc.
- e. The witer calculate some formulas. The tabl made as follow:

NO.	CODE	ITEMS					TOTAL SCORE
		1	2	3	...	50	
	Key Answer						
1.	A1						
2.	A2						
3.	A3						
Etc.	...						
S U M	Np						
	P						
	Q						
	Pq						$\Sigma pq = \dots$

- f. Calculating the reliability of the test by using the Kuder-Richardson's formula (KR-20) based on Suharsimi Arikunto⁶

$$r_{11} = \left(\frac{n}{n-1} \right) \left(\frac{S^2 - \sum pq}{S^2} \right)$$

Where:

- r_{11} : Instrument reliability
 n : The number of items in the test
 S : Total variance
 p : Proportion of correct answer
 q : Proportion of wrong answer ($q=1-p$)
 $\sum pq$: summary of p multiply q

The interpretations of reliability coefficient based on Sudijono (2003:209) are as follows:

- ≥ 0.70 : reliable
 < 0.70 : unreliable

2. Validity

To analyze the validity, the writer used the following steps:

- a. Calculating the right answers of each item.
- b. Calculating the score of the right answers of each item.
- c. The writer tabulate the students' result in a well-arranged form. Well-arranged form means the data presented in tables. In order to take care of the privacy of the students, the names of the students will be changed into codes. In examples, A1, B1, C1, etc.
- d. The witer calculate some formulas. The table made as follow:

⁶ Suharsimi Arikunto, *Dasar-dasar Evaluasi Pendidikan*, Jakarta: Bumi Aksara, 2009, h. 98.

NO.	CODE	ITEMS					TOTAL SCORE
		1	2	3	...	50	
	Key Answer						
1.	A1						
2.	A2						
3.	A3						
Etc.	...						
	Total score						

- e. Calculating the validity of the test by using the Pearson's formula product moment correlation with deviation or product moment correlation with a rough figure.

$$r_{xy} = \frac{\sum xy}{\sqrt{(\sum x^2)(\sum y^2)}}$$

Where:

- r_{xy} = Coefficient correlation between variable X and variable Y.
Two variable correlation ($x=X-M$) and ($y=Y-M$).
- $\sum xy$ = summary of x multiply y
- x^2 = square x (deviation x)
- y^2 = square y (deviation y)

product moment correlation with a rough figure

$$r_{xy} = \frac{N\sum XY - (\sum X)(\sum Y)}{\sqrt{(N\sum X^2 - (\sum X)^2)(N\sum Y^2 - (\sum Y)^2)}}$$

Where :

- r_{xy} = Coefficient correlation between variable X and variable Y
- $\sum xy$ = Summary of x multiply y
- $\sum x^2$ = Total square x
- $\sum y^2$ = Total square y
- $(\sum x)^2$ = Total X then square
- $(\sum y)^2$ = Total Y then square

3. Item Analysis

1) Level of difficulty

- a. Calculating the right answers of each item
- b. Calculating the score of the right answers of each item.
- c. The writer tabulate the students' result in a well-arranged form. Well-arranged form means the data presented in tables. In order to take care of the privacy of the students, the names of the students changed into codes. In examples, A1, B1, C1, etc.
- d. The witer calculate some formulas. The table made as follow:

NO.	CODE	ITEMS					TOTAL SCORE
		1	2	3	...	50	
	Key Answer						
1.	A1						
2.	A2						
3.	A3						
Etc.	...						
	Total score						

- e. Calculating the level of difficulty with formula

$$P = \frac{B}{JS}$$

Where :

P = level of difficulty

B = represents the number of correct answers

JS = the number of students taking the test.

2) Level of discrimination

- a. Calculating the right answers of each item

- b. Arrange the scripts in rank order of total score and divide into two groups, upper and lower groups.
- c. Count the number of those candidates in the upper group answering the first item correctly; then count the number of lower-group candidates answering the item correctly.
- d. Subtract the number of correct answers in the lower group from the number of correct answers in the upper group: find the difference in the proportion passing in the upper group and the proportion passing in the lower group.
- e. The witer calculate some formulas. The table made as follow:

Upper Group

Lower Group

NO	SCORE
1	
2	
3	
Etc	

NO	SCORE
1	
2	
3	
Etc	

- f. Calculating the level of discrimination with formula

$$D = \frac{B_A}{J_A} - \frac{B_B}{J_B} = P_A - P_B$$

Where :

- D = Discrimination
 J = the number of students taking the test
 J_A = total upper group
 J_B = total lower group
 B_A = total upper group the number of correct answer
 B_B = total lower group the number of correct answer

P_A = proportion upper group the number of correct answer (P as difficulty index)

P_B = proportion lower group the number of correct answer

3) Function of distracters

- a. Calculating the right answers of each item
- b. Arrange the scripts in rank order of total score and divide into two groups, upper and lower groups.
- c. Count the number of those candidates in the upper group answering the first item correctly; then count the number of lower-group candidates answering the item correctly.
- d. Subtract the number of correct answers in the lower group from the number of correct answers in the upper group: find the difference in the proportion passing in the upper group and the proportion passing in the lower group.
- e. The witer calculate some formulas. The table be made as follow:

NO ITEM	GROUP	ITEM						TOTAL
		A	B	C	D	E	O	
1	Under	0	2	14	3	1	0	20
	Lower	2	4	13	1	0	0	20
	Total	2	6	27	4	1	0	40
2	Under	1	2	0	17	0	0	20
	Lower	3	1	0	16	0	0	20
	Total	4	3	0	33	0	0	40
3	Under	0	1	18	0	1	0	20
	Lower	1	0	16	0	2	1	20
	Total	1	1	34	0	3	1	40
Etc...	Under	16	1	0	2	1	0	20
	Lower	18	0	0	2	0	0	20
	Total	34	1	0	4	1	0	40