III. METHOD

This chapter discusses about research design, population and sample, instruments, validity and reliability of instruments, research procedure, data analysis, and hypothesis testing.

3.1. Research Design

In this research, the researcher intended to find out the significant difference between field dependent students and field independent students in reading comprehension achievement. In addition, to gain the answer to the research question in this research, the researcher carried out a quantitative study with ex post facto design. It is a design which concerned in finding direct relationship between two variables, that is, field dependent and field independent variables. Ex post facto is used when the researcher did not have control over the selection and manipulation of the independent variables.

Ex post facto design that the researcher used in this research is called a criterion group design. In this design, the two groups of the students were compared on one measure. The design is formulated as follows:

\[
\begin{array}{c|c}
G1 & T \\
G2 & T \\
\end{array}
\]
Where:

G1 : Field dependent students as independent variable
G2 : Field independent Students as independent variable
T : Reading comprehension test as dependent variable

Referring to the design above, it can be stated that there are two independent variables: field dependent students and field independent students. Meanwhile, the dependent variable is reading comprehension test.

3.2. Population and Sample

The population of this research was all the second grade students at SMAN 1 Kotaagung in academic year 2014/2015 consisting of 32 students in each class. There were seven classes available at the second grade. The researcher took one class as try out class, that was XI MIA 3 and one class as the sample of the research, that was, XI MIA 2. Class XI MIA 2 consisted of 32 students and the same for class XI MIA 3. The students in the sampled class were classified into two groups, they were field dependent and field independent students.

3.3. Research Instruments

The instruments that the researcher used in this research were questionnaire and reading comprehension test.

3.3.1. Questionnaire

Questionnaire is a set of statements to be answered by the students to categorize them into two groups, that was, field dependent and field
independent. The researcher developed the questionnaire from the field dependent/independent checklist (See Appendix 2) by Wyss (2002). Development of the questionnaire was aimed to adjust with the sample of this research. The questionnaire was used by the researcher because it consisted of the simple and understandable statements, so it could be easily to divide the students into field dependent and field independent. There would be 26 items in the questionnaire.

**Table 1. Table Specification of the Questionnaire**

<table>
<thead>
<tr>
<th>No.</th>
<th>Indicator</th>
<th>Statement</th>
<th>Total Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Personal Orientation</td>
<td>1, 2, 7</td>
<td>3</td>
</tr>
<tr>
<td>2.</td>
<td>Holistic</td>
<td>3, 4, 5, 6, 11</td>
<td>5</td>
</tr>
<tr>
<td>3.</td>
<td>Dependent</td>
<td>8, 9, 10</td>
<td>3</td>
</tr>
<tr>
<td>4.</td>
<td>socially sensitive</td>
<td>12, 13</td>
<td>2</td>
</tr>
<tr>
<td>5.</td>
<td>Impersonal orientation</td>
<td>14, 15, 20</td>
<td>3</td>
</tr>
<tr>
<td>6.</td>
<td>Analytic</td>
<td>16, 17, 18, 19, 24</td>
<td>5</td>
</tr>
<tr>
<td>7.</td>
<td>Independent</td>
<td>21, 22, 23</td>
<td>3</td>
</tr>
<tr>
<td>8.</td>
<td>Not so socially aware</td>
<td>25, 26</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td><strong>Total Number</strong></td>
<td></td>
<td><strong>26</strong></td>
</tr>
</tbody>
</table>

### 3.3.2. Reading Comprehension Test

Reading comprehension test was given to the students to find out the differences between field dependent and field independent in reading comprehension achievement of the students. This test consisted of 60 questions for 90 minutes in the try out test and the researcher would take 40 questions for the test. The researcher used multiple choice test items in assessing the students’ reading comprehension. The researcher used five aspects of reading comprehension in this test. The five aspects of reading comprehension were main idea, specific information (supporting details), inference, reference, and vocabulary.
Table 2. Table Specifications of Reading Try Out Test

<table>
<thead>
<tr>
<th>No.</th>
<th>Reading Aspects</th>
<th>Items Number</th>
<th>Percentage of item</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Identifying main idea</td>
<td>1, 2, 7, 12, 13, 19, 20, 25, 30, 37, 44, 51, 53</td>
<td>21.67%</td>
</tr>
<tr>
<td>2.</td>
<td>Identifying supporting details</td>
<td>4, 9, 14, 15, 22, 33, 39, 40, 45, 46, 54</td>
<td>18.33%</td>
</tr>
<tr>
<td>3.</td>
<td>Making inference</td>
<td>6, 11, 18, 21, 26, 27, 31, 32, 36, 43, 49, 56, 60</td>
<td>21.67%</td>
</tr>
<tr>
<td>4.</td>
<td>Identifying reference</td>
<td>3, 8, 16, 24, 29, 35, 42, 47, 52</td>
<td>15 %</td>
</tr>
<tr>
<td>5.</td>
<td>Understanding vocabulary</td>
<td>5, 10, 17, 23, 28, 34, 38, 41, 48, 50, 55, 57, 58, 59</td>
<td>23.33%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>60 items</td>
<td>100%</td>
</tr>
</tbody>
</table>

3.4. Try Out of the Research Instruments

Try out test was administered on May 15th 2015 in class XI MIA 3. The try out was given to XI MIA 3 to investigate the quality of the instruments; here the instruments are questionnaire and reading comprehension test. The try out class consisted of 32 students, but one student did not attend at that time. Try out test consisted of questionnaire and reading comprehension test.

3.4.1. Questionnaire

The researcher made the questionnaire to classify the students into field dependent and field independent. The questionnaire consisted of some aspects. There were four aspects in field dependent: personal orientation, holistic, dependent, and socially sensitive. In field independent also classify in four aspects, there were impersonal orientation, analytic, independent, and not so socially aware.

3.4.1.1. Validity of the Questionnaire

Validity means that the instrument could be used to measure what should be measured (Sugiyono, 2012: 173). This research would use content and
construct validity to measure whether the questionnaire had a good validity. Content validity can be done by comparing the content of instrument and the theory about field dependent and field independent. While to measure construct, validity could use judgement experts. In this case, after the instrument was constructed with the indicators that will be measured based on the theory, furthermore the instrument was consulted with the expert.

### 2.4.1.2. Reliability of the Questionnaire

The researcher gained the data by using quantitative description. First of all, the result of questionnaires were scored based on Likert scale. The range of score was 1 to 4. To measure the consistency of items of the questionnaires the researcher used Cronbach Alpha Coefficient since it was the most common use to measure the consistency among the indicators of the questionnaire.

The alpha coefficient range between 0 and 1. The higher the alpha is the more reliable the questionnaire will be (Setiyadi, 2006:167). Arikunto (1986:106) explains the way to examine the reliability level or questionnaire reliability by using Alpha Formula, as follows:

\[
    r = \left( \frac{n}{(n-1)} \right) \left( \frac{1}{\sigma} \left( \sum \sigma_i^2 \right) \right)
\]

Explanation:

- \( r \) = reliability
- \( n \) = the number of item
\[ \sum \sigma_i^2 = \text{total variance of all items} \]

\[ \sigma_i^2 = \text{the total variance} \]

To find out the variance, the researcher used the formula as follows:

\[ \sigma = \frac{\sum X^2 - (\sum X)^2}{N} \]

Explanation:

\[ \sigma \quad = \text{variance} \]

\[ \sum X^2 \quad = \text{the total square of the number of data} \]

\[ (\sum X)^2 = \text{square of the total number of data} \]

\[ N \quad = \text{the number of data} \]

The criteria of reliability were as follows:

a. Between 0.80 to 1.00 \( = \) very high reliability
b. Between 0.60 to 0.80 \( = \) high reliability
c. Between 0.40 to 0.60 \( = \) moderate reliability
d. Between 0.20 to 0.40 \( = \) low reliability
e. Between 0.00 to 0.20 \( = \) very low reliability

Based on the try out questionnaire, the results showed that the questionnaire had very high reliability. The reliability of the questionnaire was 0.94. It meant that the questionnaire was able to classify the students into field dependent and field independent groups. The reliability of the questionnaire was very high, which meant that the questionnaire had good testing stability (See Appendix 5).
2.4.1.3. Categorizing the Sample of the Questionnaire

The questionnaire was used to categorize the students into two groups that were field dependent and field independent. The researcher used Likert scale to measure the items of questionnaire. In Likert scale, the answers of every item from questionnaire had gradation from very positive until very negative, that was, absolutely agree, agree, disagree, and absolutely disagree. In the quantitative research, the researcher used scores to analyze the answers of the questionnaire.

The scoring of categorizing the answer of the questionnaire was as follows:

- Strongly agree : 4
- Agree : 3
- Disagree : 2
- Strongly disagree : 1

The questionnaire consisted of 26 items where the item numbers 1-13 were indicated for field dependent group and the item numbers 14-26 were indicated for field independent group. Based on the explanation above, the maximum score of the whole questionnaire was 104 and the minimum score was 26. The maximum score of the questionnaire for field dependent was 52 and the minimum score was 13, and they were also the same for field independent.
3.4.2. Reading Comprehension Test

Individual assessment task provided limited representation of reading comprehension, however, many reading researchers continued to use only task to measure comprehension. In this research, the researcher used multiple-choice test items in assessing the students’ reading comprehension.

3.4.2.1. Validity of Reading Comprehension Test

A good test could be seen from its validity. Validity refers to which an instrument really measures the objective to be measured and suitable with the criteria (Hatch and Farhady, 1982: 250). Heaton (1988:159) also states that validity of the test was the extent to which it measures what it is supposed to measure.

There are four types of validity as follows:

1. Face validity, concerns with the layout of the test;
2. Content validity, depends on a careful analysis of the language being stated;
3. Construct validity: measures certain specific characteristic in accordance with a theory of language learning;
4. Criterion-related validity, concerns with measuring the success in the future, as in replacement test.

Based on the types of validity above, the researcher used content and construct validity to measure whether the test had a good validity. The
validity of the test could be seen from the content validity. The content validity emphasized on the equivalent between the materials had been given and the items tested. While construct validity is concerned with whether the test was actually in line with the theory of what it meant to know the language (Shohamy, 1985: 74). Validity of the test was important because the items in the test must represent the material that had been taught.

1. Content Validity

Content validity is the extent to which the test measures a representative sample of the subject matter content (Hatch and Farhady, 1982: 251). A good test is the test which is appropriate with the material has been taught and the material had been developed from the education goal. To find out the content validity of the test, the researcher adopted the Education goal stated on Curriculum 2013 and syllabus for second grade students of senior high school.

2. Construct Validity

Regarding the construct validity, it measured whether the construction had already referred to the theory, meaning that the test construction had already in line with the objective of the learning (Hatch and Farhady, 1982: 251). To find the construct validity of the try out test, the theory of reading in determining main idea, finding specific information, reference, inference, and vocabulary, were formulated in the test items.
3.4.2.2. Reliability of Reading Comprehension Test

A test is called reliable if the score gained by the examinees is constant whenever and by whomever the test is conducted. A test will not be a good parameter unless the test is stable or constant. Reliability refers to the extent to which a test produces consistent result when administered under similar condition (Hatch and Farhady, 1982: 243). The researcher used Pearson Product Moment to measure the correlation coefficient of the reliability between odd and even number (reliability of half test) in the following formula:

\[ r_{xy} = \frac{N \sum xy - (\sum x)(\sum y)}{\sqrt{[N \sum x^2 - (\sum x)^2][N \sum y^2 - (\sum y)^2]}} \]

where:

- \( r_{xy} \): the correlation coefficient of reliability between odd and even
- \( N \): the number of students who take part in the test
- \( x \): the total numbers of odd number items
- \( y \): the total numbers of even number items
- \( x^2 \): square of \( x \)
- \( y^2 \): square of \( y \)
- \( \sum x \): total score of odd number items
- \( \sum y \): total score of even number items

(Hatch and Farhady, 1982: 199)

After getting the reliability of half test, the researcher used “Spearman Brown’s prophecy formula” (Hatch and Farhady, 1982: 246) to determine the reliability of the whole tests.
The formula is as follows:

$$r_k = \frac{2 r_{xy}}{1 + r_{xy}}$$

where:

$r_k$ : the reliability of the whole tests
$r_{xy}$ : the reliability of half test

(Hatch and Farhady, 1982: 247)

The criteria of reliability are as follows:

0.90 – 1.00 : high
0.50 – 0.89 : moderate
0.00 – 0.49 : low

The result of the computation by using Pearson Product Moment formula showed that the reliability of the half test ($r_{xy}$) was 0.69 (See Appendix 12). Then, by using Spearman Browns Prophecy formula, it was found that the reliability of the whole test ($r_k$) was 0.82 (See Appendix 12). Based on the criteria of the reliability test, the reliability of 0.82 point belonged to moderate level. Therefore, it indicated that the instrument in this research was reliable and good reflecting their consistent reading ability.

The researcher believed that the test could show how far the students could make sense of the idea of the text, because the most important things whether the text was suitable or not for the students, not on the quantity of the themes and items. It meant that the text was not too difficult or too easy for the students. The researcher assumed that the text was suitable for
the students because it was made based on curriculum and syllabus of the second grade students of senior high school. Therefore, the researcher believed that the test had good content and construct validity. The reliability of the test was quite good (0.82), which meant that the test had good testing stability.

3.4.2.3. Level of Difficulty

Level of difficulty relates to “how easy or difficult the item is from the point of view of the students who took the test. It is important since test items which are too easy can tell us nothing about differences within the test population” (Shohamy, 1985: 79). The level of difficulty is calculated by using the following formula:

\[ LD = \frac{R}{N} \]

Where:

LD : the level of difficulty

R : the number of students who answer correctly

N : the total of students in the higher and lower group

(Shohamy, 1985: 79)

The criteria are as follows:

- \( < 0.30 \) : difficult
- \( 0.30 - 0.70 \) : average
- \( > 0.70 \) : easy
There were three categories of level of difficulty; easy, average and difficult. The test items if they were not too easy and not too difficult or in other word, the difficulty level was average. The result of try out test showed that there were 24 easy items, 12 difficult items, and 24 average items (See Appendix 10).

3.4.2.4. Discrimination Power of the Test

Discrimination power refers to the extent to which the items are able to differentiate between high and low level students on the test. Discrimination power used to differentiate between the students who had high ability and those who had low ability. A good item according to the criteria was one that good students would do well and bad students would fail. To determine the discrimination power, the researcher used the following formula:

\[ DP = \frac{U - L}{\sqrt{\frac{1}{2}N}} \]

Notes:

- **DP**: discrimination power
- **U**: the number of upper class who answer correctly
- **L**: the number of lower class who answer correctly
- **N**: the total number of the students in upper and lower classes

(Heaton, 1991:182)

The criteria are:

- **0.00 – 0.20**: poor
- **0.2 – 0.40**: satisfactory
0.41 – 0.70 : good
0.71 – 1.00 : excellent
- (negative) : bad items (should be omitted)

From the table discrimination power of try out test (See Appendix 10), it was shown that there were 1 bad item, 22 poor items, 32 satisfactory items, 4 good items, and 1 excellent item. Based on the test analysis, it was found that there were 20 items omitted and 40 items administered. At least, there was 33.33% of the test items omitted and 66.67% of the test items administered from 60 items. Finally, the researcher took 40 items as reading test for the students.

3.5. Scoring System

The researcher used multiple choices in order to gain the objectivity of the result. In scoring the students’ work, the researcher used Arikunto’s formula (2005:236). The possible highest score is 100. The score of the test was calculated by using the following formula:

\[
S = \frac{R}{T} \times 100
\]

Where:

S : The score of the test
R : Number of the right answers
T : Total number of the items on the test

(Arikunto, 2005: 236)
3.6. Research Procedures

The research went through the following procedures: (1) determining the population and sample of the research; (2) administering the try out of reading test and questionnaire; (3) administering the questionnaire; (4) administrating the reading test; (5) analyzing the data; and (6) drawing findings and conclusions from the data.

1. Determining the population and sample of the research

The population of this research was the second grade students of SMAN 1 Kotaagung. This research used one class as the sample class, that was, class XI MIA 2 and one class as the try out class, that was, XI MIA 3 choosing randomly.

2. Administering the try out of reading test and questionnaire

It was conducted to measure the reliability of the instruments and to make sure whether the instruments were good or bad for the students. It was administered to find out the quality of the test before it is used, whether the items were good or not in validity, reliability, level of difficulty, and the discrimination power. In try out, the reading test consisted of 60 questions for 90 minutes and the questionnaire consisted of 26 statements.

3. Administering the questionnaire

The questionnaire was used to categorize the students into two groups, that was, students of field dependent and students of field independent.

4. Administering the reading test

Reading test is used to get the data of students’ reading comprehension. The test was gave to the students consisted of 40 questions for 60 minutes.
5. Analyzing the data

The result of reading comprehension test was compared between field dependent and field independent, which groups had a good score from the test. It was tested in order to find out whether there was any significant difference in students’ reading comprehension achievement both of the two groups. The data were statistically computed through the Statistical Package for Social Science (SPSS).

6. Drawing findings and conclusions from the data

3.7. Data Analysis

After collecting the data, the researcher analyzed the data by using the following steps below:

1. Scoring questionnaire and reading comprehension test.

2. Tabulating the results of questionnaire and reading comprehension test and calculating the score.

3. Administering normality test

Normality test is used to measure whether the data of the test was normally distributed or not. The score of the students both of groups here meant field dependent and field independent were analyzed to gain to the normally test. The researcher used SPSS (One Sample Kalmogrov-Smirnov Test).

The criteria of normal distribution are as follows:

The hypothesis is accepted if the result of normality test is higher than 0.05 (sign > \( \alpha \)). In this case, the researcher used level of significance of 0.05.
4. Drawing conclusion from the tabulated results of questionnaire and reading comprehension test, that was by statistically analyzing the data using statistical computerization i.e. *Independent Groups T-Test of Statistical Package for Social Science (SPSS)*.

### 3.8. Hypothesis Testing

After collecting the data, the researcher analyzed the data to find out the difference between students’ field dependent and field independent in reading comprehension achievement. The researcher used *Independent Group t-Test* SPSS Parametric to compare two kinds of data or mean from the different sample. Moreover, the result of *Independent Group t-Test* was used to know whether there was any significant difference between the students’ reading achievement and to prove whether the proposed hypothesis was accepted or rejected. In this case, the researcher used significant level of 0.05 in which the probability of error in the hypothesis is only about 5%. The formulae are as follows:

\[
t = \frac{\bar{X}_1 - \bar{X}_2}{s \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}
\]

With:

\[
s^2 = \frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2}
\]

Where:

\(\bar{X}_1\) = Mean of field dependent students

\(\bar{X}_2\) = Mean of field independent students

\(n_1\) = The number of students in field dependent

\(n_2\) = The number of students in field independent
The total variance = The total variance

$s_1^2$ = Variance of the first sample

$s_2^2$ = Variance of the second sample

The criteria for accepting or rejecting the hypothesis testing are as follows:

1. If t-table is lower than T-ratio: $H_1$ is accepted

   It means that there is a significant difference between field dependent students and field independent students in reading comprehension achievement.

2. If t-table is higher than T-ratio: $H_0$ is accepted

   It means that there is no significant difference between field dependent students and field independent students in reading comprehension achievement.

   (Hatch and Farhady, 1982: 111)