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## CHAPTER III

### RESEARCH METHODOLOGY

#### 3.1. Research Design

This research was an experimental design with non-equivalent (pre-test and post-test) without control group design which focuses on quantitative research. According to L. R Gay (2000: 353), the comparative design involved select two groups differing on some independent variables and comparing them on some dependent variables. The researcher selected two groups of participants usually referred to as experimental 1 and experimental 2, but more accurately referred to as a comparison groups.

The groups might differ in a number of ways. One group might possess a characteristic that the other did not, one group may possess more of a characteristic than the other, or the two groups may have had different kind of experiences. Both groups take pre-test and post-test. Both the experimental groups receive the treatment. This research had three variables; PLAN Strategy (X1) and SMART Strategy (X2) were independent variables, while the students' reading comprehension is dependent variable (Y). The research design can be seen as follows:

**Table III.1**  
**Research Design**

| Group | Pre-test | Treatment | Post test |
|-------|----------|-----------|-----------|
| EG 1  | O1       | X1        | O2        |
| EG 2  | O1       | X2        | O2        |

Figure Creswell (2009, p.160)



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- EG 1 : Experimental Group 1  
 EG 2 : Experimental Group 2  
 O1: Pre - test  
 O2: Post - test  
 X1: Independent variable (PLAN Strategy)  
 X2: Independent variable (SMART Strategy)

Gay (2000, p.392) states that this design requires at least two groups, each of which is formed by random assignment. Both groups are administered a pre-test and each group receives a different treatment. Both groups are post-tested at the end of the study. The post-test scores are compared to determine the effectiveness of the treatments.

### **3.2. Location and Time of the Research**

The research was conducted at SMAN 11 Pekanbaru located on Jl. Segar, Kulim, Pekanbaru from August to September 2017.

### **3.3.The Population and the Sample**

#### **3.3.1. Population**

The population of this research was the students of the twelfth grade students of SMAN 11 Pekanbaru. The total number of the population was 154. The target population was the twelfth grade students of SMAN 11 Pekanbaru which consisted of 5 classes. Based on the population of this



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research, the sample was selected by using cluster sampling. According to (Gay and Airasian, 2000), cluster sampling randomly selects groups not individuals. All the members of selected groups had similar characteristics, and two classes were chosen by using cluster sampling in this research.

**Table III.2 the Population and Sample**

| No | Class        | Male      | Female    | Total Number of Students |
|----|--------------|-----------|-----------|--------------------------|
| 1  | XII IPA 1    | 12        | 18        | 30                       |
| 2  | XII IPA 2    | 12        | 19        | 31                       |
| 3  | XII IPA 3    | 14        | 18        | 32                       |
| 4  | XII IPA 4    | 12        | 19        | 31                       |
| 5  | XII IPA 5    | 13        | 18        | 31                       |
|    | <b>Total</b> | <b>63</b> | <b>92</b> | <b>155</b>               |

Source: SMA Negeri 11 Pekanbaru

### 3.4.2. Sample

The kind of sample of this research was cluster sampling, Gay (2000:12) states that cluster sampling randomly selects groups, not individual. All the members of selected groups had similar characteristics. The homogenous characteristics were the consideration. Because all classes were homogenous, the sample chosen randomly, XII IPA 4 as Experimental

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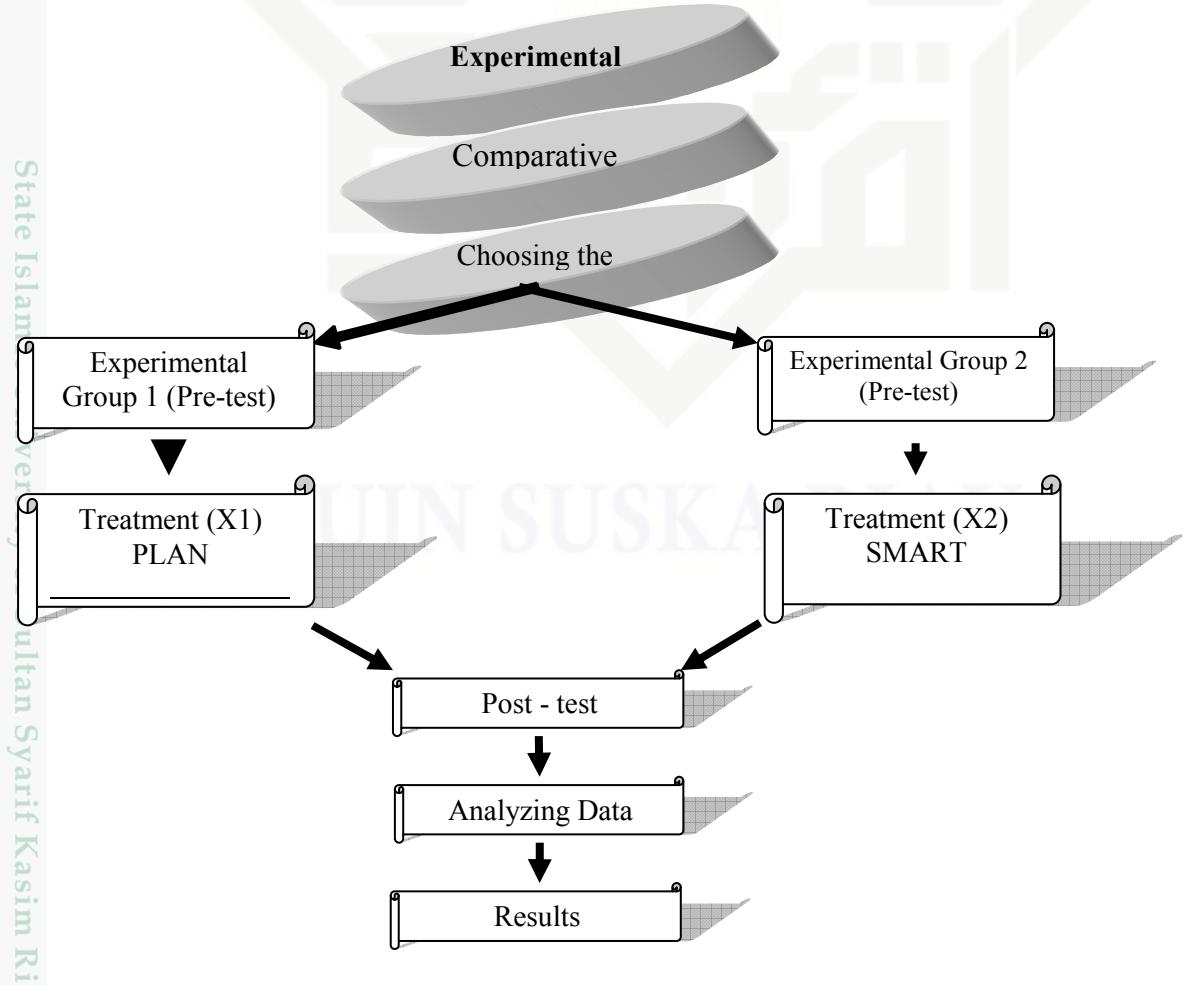
class 1 by using PLAN strategy, XI IPA 5 as Experimental class 2 by using SMART Strategy.

**Table III.3.**  
**Sample of grade twelfth at SMAN 11 Pekanbaru**

| No | Class        | Male      | Female    | Total     |
|----|--------------|-----------|-----------|-----------|
| 1  | XII IPA 4    | 12        | 19        | 31        |
| 2  | XII IPA 5    | 13        | 18        | 31        |
|    | <b>Total</b> | <b>25</b> | <b>37</b> | <b>62</b> |

### 3.5 Research Procedure

**Figure III.1 Research Design**



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### 3.6 Research Instruments

To collect the data, a reading test was administered as the instrument of this study. The pre-test and post-tests were administered to two classes which consisted of XII IPA 4 and XII IPA 5. The pre-test was administered before the treatment, and the post-test to find out the students' reading comprehension after the treatment. The treatment was given by teaching PLAN Strategy and SMART Strategy.

**Table III.IV**  
**The Blue Print Instruments of Reading Comprehension Test**

| NO           | INDICATOR   | NUMBER OF QUESTION |
|--------------|---|--------------------|
| 1.           | The students are able to identify main idea of descriptive text   | 1,6,11,16,21.      |
| 2            | The students are able to identify the detailed information of descriptive text. (What, who, when, where, and how) | 2,7,12,17,22       |
| 3            | The students are able to identify the synonym/antonym in a descriptive text.                                      | 3,8,13,18,23.      |
| 4            | The students are able to identify the reference in a descriptive text.  | 4,9,14,19,24.      |
| 5            | The students are able to identify the inference in a descriptive text.  | 5,10,15,20,25      |
| <b>TOTAL</b> |   | <b>25</b>          |

### 3.7. Data Collection Technique

#### 3.7.1. Observation List

Observation was used to observe directly the students who used for PLAN strategy and SMART strategy to improve students' reading comprehension. In observation, it was needed to make a list of



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observational items to be observed in the class during teaching and learning process by both strategies for the teacher and the students. The list of observation for PLAN Strategy can be shown on the table below:

**Table III.V**  
**List of Observation for PLAN Strategy**

| No.        | Indicators  | Observation Checklist |    |
|------------|---|-----------------------|----|
|            |   | Yes                   | No |
| 1.         | The teacher introduced PLAN Strategy.   |                       |    |
| 2.         | The teacher distributed descriptive text to the students.   |                       |    |
| 3.         | The teacher asked the students to scan the text (Predict).  |                       |    |
| 4.         | The teacher prepared a map to draw the main point of the text.  |                       |    |
| 5.         | The teacher Connected the ideas using lines or arrows, and remember to designate main ideas and smaller ideas.  |                       |    |
| 6.         | The teacher asked the students to determine text which information that they have already known, and which will they have to find when they read the textbook more thoroughly (Locate).   |                       |    |
| 7.         | The teacher asked the students to start drawing predictive map.   |                       |    |
| 8.         | The teacher asked students to close all materials given by the teacher.   |                       |    |
| 9.         | The teacher asked the students to include as much information as possible for each topic, but also try to determine which ideas were the most prominent or important while reading (Add). |                       |    |
| 10.        | The teacher asked students to develop and prepare the information (Note).   |                       |    |
| 11.        | The teacher determined to prepare multiple choice to measure the students' reading comprehension.   |                       |    |
| 12.        | Finally, teacher guided the students to take a conclusion of the lessons that they have learned.  |                       |    |
| TOTAL      |   |                       |    |
| PERCENTAGE |   |                       |    |

Table III.V describes the list of activities that the teacher does in the class. The teacher directed the students to do some steps in pre-activity, while activity and post- activity. The researcher directed the teacher to follow step by step in the observation list before doing the



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research. In pre- activity, the teacher did warm up and gave motivation to the students before study. Then, the teacher presented what the students would study. They discussed the material together. The teacher did the while activity by applying PLAN strategy. In this activity, the teacher did the activities based on the procedure of PLAN strategy to improve the students' reading comprehension. After the teacher and the students finished the while activity depend on the procedure of PLAN strategy, they made a conclusion as the closing lesson at that day.

**Table III.VI**  
**List of Observation for SMART Strategy**

| No.        | Indicators   | Observation Checklist |    |
|------------|--|-----------------------|----|
|            |  | Yes                   | No |
| 1.         | Teacher introduced SMART Strategy  |                       |    |
| 2.         | The teacher distributed descriptive text to the students.  |                       |    |
| 3.         | The teacher asked the students to read the text silently.  |                       |    |
| 4.         | The teacher asked the students to place a check mark individually  |                       |    |
| 5.         | The teacher asked the students to create a mark (✓) next to each sentence that they understand.              |                       |    |
| 6.         | The teacher asked the students to create a mark (?) next to each sentence that they understand.              |                       |    |
| 7.         | The teacher asked the students to reread the text.   |                       |    |
| 8.         | Students go back and reread the text with question mark.   |                       |    |
| 9.         | The teacher asked students about their understanding about the text.   |                       |    |
| 10.        | The teacher asked students to identify what was the problem in the word or sentence.                         |                       |    |
| 11.        | The teacher asked students to evaluate information that they already got.                                    |                       |    |
| 12.        | The teacher asked students to remark the question mark (?) to a checkmark (✓) if the confusion was overcome. |                       |    |
| 13.        | Teacher monitored the students and gave them assistance.   |                       |    |
| 14.        | Finally, teacher guided the students to take a conclusion of the lessons that they have learned.             |                       |    |
| TOTAL      |  |                       |    |
| PERCENTAGE |  |                       |    |



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Table III.VI describes the list of activities that the teacher does in the class. The teacher directed the students to do some steps in pre-activity, while activity and post- activity. The researcher directed the teacher to follow step by step in the observation list before doing the research. In pre- activity, the teacher did warm up and gave motivation to the students before study. Then, the teacher presented what the students would study. They discussed the material together. The teacher did the while activity by applying SMART strategy. In this activity, the teacher did the activities based on the procedure of SMART strategy to improve the students' reading comprehension. After the teacher and the students finished the while activity depend on the procedure of SMART strategy, they made a conclusion as the closing lesson at that day.

### **3.8. Validity and Reliability Test**

#### **3.8.1. The validity of instrument**

Before collecting the data, each item of question was tested in order to be ideal to try out. The purpose of the try out was to find out the quality of the test items. Brown (2000, p.22) states that test is method of a measuring a person's ability, knowledge, or performance in a given domain. Validity is the extent to which inferences make from assessment results which are appropriate, meaningful, and useful in terms of the purpose of the assessment.

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Split-Half formula using SPSS 20 version by looking at the corrected item - total correlation (correlation between score item and score total item =  $r_{\text{counted}}$ ) in table Item-Total Statistics to find out the validity of the items of test. To know whether the test valid or not, the value of  $r_{\text{counted}}$  must be compared with  $r_{\text{table}}$ . For example, the number of students was 10. The degree of freedom is  $25-2=23$ ,  $r_{\text{table}}$  on  $df=23$  are 0,3961 (5%).

If the value of  $r_{\text{counted}} > r_{\text{table}}$  = valid,

If the value of  $r_{\text{counted}} < r_{\text{table}}$  = invalid.

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The result as below:

**Table III.7 Instrument Validity before Try Out**

|               | Corrected Item-<br>Total Correlation | R Table<br>$\alpha = 0,05 ; n= 20$ | Categories |
|---------------|--------------------------------------|------------------------------------|------------|
| <b>ITEM1</b>  | ,283                                 | < 0,422                            | Invalid    |
| <b>ITEM2</b>  | ,417                                 | > 0,422.                           | Valid      |
| <b>ITEM3</b>  | ,731                                 | > 0,422.                           | Valid      |
| <b>ITEM4</b>  | ,849                                 | > 0,422.                           | Valid      |
| <b>ITEM5</b>  | ,849                                 | > 0,422.                           | Valid      |
| <b>ITEM6</b>  | ,849                                 | > 0,422                            | Valid      |
| <b>ITEM7</b>  | ,849                                 | > 0,422.                           | Valid      |
| <b>ITEM8</b>  | ,542                                 | > 0,422.                           | Valid      |
| <b>ITEM9</b>  | ,850                                 | > 0,422.                           | Valid      |
| <b>ITEM10</b> | ,156                                 | < 0,422.                           | Invalid    |
| <b>ITEM11</b> | ,361                                 | < 0,422                            | Invalid    |
| <b>ITEM12</b> | ,110                                 | < 0,422.                           | Invalid    |
| <b>ITEM13</b> | ,173                                 | < 0,422.                           | Invalid    |
| <b>ITEM14</b> | ,244                                 | < 0,422.                           | Invalid    |
| <b>ITEM15</b> | ,363                                 | < 0,422.                           | Invalid    |
| <b>ITEM16</b> | ,323                                 | > 0,422                            | Valid      |
| <b>ITEM17</b> | ,289                                 | < 0,422.                           | Invalid    |
| <b>ITEM18</b> | ,248                                 | < 0,422.                           | Invalid    |
| <b>ITEM19</b> | ,515                                 | > 0,422.                           | Valid      |
| <b>ITEM20</b> | ,323                                 | < 0,422.                           | Invalid    |
| <b>ITEM21</b> | ,236                                 | < 0,422                            | Invalid    |
| <b>ITEM22</b> | ,464                                 | > 0,422.                           | Valid      |
| <b>ITEM23</b> | ,341                                 | < 0,422.                           | Invalid    |
| <b>ITEM24</b> | ,731                                 | > 0,422.                           | Valid      |
| <b>ITEM25</b> | ,699                                 | > 0,422.                           | Valid      |
| <b>ITEM26</b> | ,236                                 | < 0,422                            | Invalid    |
| <b>ITEM27</b> | ,464                                 | > 0,422.                           | Valid      |
| <b>ITEM28</b> | ,341                                 | < 0,422.                           | Invalid    |
| <b>ITEM29</b> | ,731                                 | > 0,422.                           | Valid      |
| <b>ITEM30</b> | ,699                                 | > 0,422.                           | Valid      |

From the results of calculation by using SPSS, it is clear and concluded that 16 items are valid; item 2, item 3, item 4, item 5, item 6, item 7, item 8, item 9, item 16, item 19, item 22, item 24, item 25, item 27, item 29, item 30 and 14items are invalid; item 1, item 10, item 11, item 12,



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item 13, item 14, item 15, item 17, item 18, item 20, item 21, item 23, item 26 and item 28. So, the invalid items were removed by the researcher, and the result of validity after the invalid items were changed can be apparent below:

**Table III.8 Instrument Validity after Try Out**

|               | Corrected Item-<br>Total Correlation | R Table<br>$\alpha = 0,05 ; n= 25$ | Categories |
|---------------|--------------------------------------|------------------------------------|------------|
| <b>ITEM1</b>  | ,969                                 | > 0,422                            | Valid      |
| <b>ITEM2</b>  | ,969                                 | > 0,422.                           | Valid      |
| <b>ITEM3</b>  | ,851                                 | > 0,422.                           | Valid      |
| <b>ITEM4</b>  | ,851                                 | > 0,422.                           | Valid      |
| <b>ITEM5</b>  | ,851                                 | > 0,422.                           | Valid      |
| <b>ITEM6</b>  | ,851                                 | > 0,422                            | Valid      |
| <b>ITEM7</b>  | ,756                                 | > 0,422.                           | Valid      |
| <b>ITEM8</b>  | ,932                                 | > 0,422.                           | Valid      |
| <b>ITEM9</b>  | ,932                                 | > 0,422.                           | Valid      |
| <b>ITEM10</b> | ,932                                 | > 0,422.                           | Valid      |
| <b>ITEM11</b> | ,932                                 | > 0,422                            | Valid      |
| <b>ITEM12</b> | ,932                                 | > 0,422.                           | Valid      |
| <b>ITEM13</b> | ,969                                 | > 0,422.                           | Valid      |
| <b>ITEM14</b> | ,969                                 | > 0,422.                           | Valid      |
| <b>ITEM15</b> | ,932                                 | > 0,422.                           | Valid      |
| <b>ITEM16</b> | ,969                                 | > 0,422                            | Valid      |
| <b>ITEM17</b> | ,969                                 | > 0,422.                           | Valid      |
| <b>ITEM18</b> | ,874                                 | > 0,422.                           | Valid      |
| <b>ITEM19</b> | ,969                                 | > 0,422.                           | Valid      |
| <b>ITEM20</b> | ,969                                 | > 0,422.                           | Valid      |
| <b>ITEM21</b> | ,874                                 | > 0,422                            | Valid      |
| <b>ITEM22</b> | ,969                                 | > 0,422.                           | Valid      |
| <b>ITEM23</b> | ,969                                 | > 0,422.                           | Valid      |
| <b>ITEM24</b> | ,969                                 | > 0,422.                           | Valid      |
| <b>ITEM25</b> | ,874                                 | > 0,422.                           | Valid      |

It is apparent after removing the invalid items, the results of all items' calculation were valid. Finally, 25 items for the test.



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### 3.8.2. The reliability of Instrument

Reliability is an important characteristic of a good test. In order to calculate the reliability of the test, the mean of the students' scores the standard deviation is seek. In finding reliability of instruments, several formulas will be used such as Split-Half formula, Spearmen-Brown formula, Flanagan formula, Rulon formula, Hoyt formula, Alpha formula, Kuder-Richardson 20 (K-R 20) formula and Kuder- Richardson 21 (K-R 21) formula ( Arikunto, 2006, p.223). From these formulas, the researcher was used Slit-Half formula by using SPSS and result of reliability can be seen through Guttman Split-Half Coefficient in reliability statistics on output of SPSS.

**Table III.9 Criteria Coefisien of Reliability**

| Coefisien Reliability                          | Criteria            |
|--|---------------------|
| <b><math>0,80 \leq r_{11} \leq 1,00</math></b> | Highest reliability |
| <b><math>0,60 \leq r_{11} \leq 0,79</math></b> | High reliability    |
| <b><math>0,40 \leq r_{11} \leq 0,59</math></b> | Middle reliability  |
| <b><math>0,20 \leq r_{11} \leq 0,39</math></b> | Low reliability     |
| <b><math>0,00 \leq r_{11} \leq 0,19</math></b> | Lowest reliability  |

(Arikunto, 2006, p.223)



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The result of test reliability can be seen as follow:

| <b>Reliability Statistics</b> |  |            |
|-------------------------------|--|------------|
| Cronbach's Alpha              | Cronbach's Alpha Based on Standardized Items | N of Items |
| ,993                          | ,993   | 25         |

From the results of calculation by using SPSS, it is obvious that the value of Cronbach's Alpha Based on Standardized Items ( $r_{11}$ ) for test is 0,956. So,  $0,80 \leq 0,993 \leq 1,00$ . It means that the instrument is highest reliability.

### 3.9 Data Analysis Technique

The scoring guide was chosen as the criteria of scoring representing the basic aspects of reading. The reading results were evaluated by considering five aspects and each aspect has a score or a level. The specifications of the aspects are; topic, main idea, specific idea, textual reference, and word meaning.

In analyzing the data, the researcher used the scores of the pre-test and the post-test of experimental groups. Those scores were analyzed statistically for both descriptive and inferential statistic using SPSS 20. This study was used SPSS 20 to analyze the scores and the analyses.



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### 3.9.1. Independent sample t-test

To find out whether there is a significant difference or there is no significant difference between two or more variables can be analyzed by using Independent Sample T-test. Gay added that the t-test for independent sample is used to determine whether there is probably a significant difference between the means of independent samples t-test and dependent sample t-test is used to find out the results of the first and second hypotheses. The sig (2-tailed) has the function to see if there is a significant differences among the mean of the score of both experimental class 1 and experimental class 2, by using SPSS 20 version (Statistic Package for the Social Sciences). The sig (-tailed) score (p) is consulted with 0,05 , which is statistically hypothesized:

$$H_a: p < 0,05$$

$$H_0: p > 0,05$$

$H_a$  is accepted if  $p / \text{sig (2-tailed)} < 0,05$  or there is significant differences after giving the treatment by using PLAN Strategy and SMART Strategy on the students' reading comprehension.

$H_0$  is accepted if  $p / \text{sig (2-tailed)} > 0,05$  or there is no significant differences after giving the treatment by using PLAN Strategy and SMART Strategy on the students' reading comprehension.

To analyze the final-test scores of experimental group 1 and experimental group 2, the following formula will be used:



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$$t = \frac{M_X - M_Y}{\sqrt{\frac{(SD_X)^2}{N_1 - 1} + \frac{(SD_Y)^2}{N_2 - 1}}}$$

Where:

$T$  = The value of comparing two means

$M_X$  = Mean of the score in pre-test in experimental group 1

$M_Y$  = Mean of the score in pre-test in experimental group 2

$SD_X$  = Standard deviation of experimental group 1

$SD_Y$  = Standard deviation of experimental group 2

$N_1$  = Number of the sample in pre-test in experimental group 1

$N_2$  = Number of the sample in pre-test in experimental group 2

1 = the constant number

The t-table has the function to see if there is a significant difference among the mean of the score of both experimental class 1 and experimental class 2. The  $t$ -obtained value is consulted with the value of t-table at the degree of freedom ( $df$ ) =  $(N_1+N_2)-2$  which is statistically hypothesized:

$H_a$ :  $t_o > t\text{-table}$

$H_o$ :  $t_o < t\text{-table}$

$H_a$  is accept if  $t_o > t\text{-table}$  or there is significant differences after giving the treatment by using PLAN Strategy and SMART Strategy on the students' reading comprehension.



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b. Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.

$H_0$  is accept if  $p < t\text{-table}$  or there is no significant differences after giving the treatment by using PLAN Strategy and SMART Strategy on the students' reading comprehension.

### 3.9.2. Paired Sample t-test

According to Gay (2000: 488) states that t-test for non independent samples is used to compare groups that are formed by some type of matching or to compare a single group's performance on a pre- and post-test or on two different treatments. Paired Sample t-Test is known also as Non-independent sample t-test. In this time, paired sample T-test is used to find out whether there is significant difference before and after giving the treatment by using PLAN Strategy and SMART Strategy on the students' reading comprehension by using the pre-test and post-test score of experimental group 1 and experimental group 2. The sig (2-tailed) has the function to see if there is a significant differences among the mean of the score of both experimental class 1 and experimental class 2, by using SPSS 20 version (Statistic Package for the Social Sciences). The sig (-tailed) score (p) is consulted with 0,05 , which are statistically hypothesized:

$$H_a: p < 0,05$$

$$H_0: p > 0,05$$



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  - b. Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.
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$H_a$  is accepted if  $p / \text{sig (2-tailed)} < 0,05$  or there is significant differences after giving the treatment by using PLAN Strategy and SMART Strategy on the students' reading comprehension.

$H_o$  is accepted if  $p / \text{sig (2-tailed)} > 0,05$  or there is no significant differences after giving the treatment by using PLAN Strategy and SMART Strategy on the students' reading comprehension.

To analyze the final-test scores of experimental group 1 and experimental group 2, the following the formula of paired-sample t-test:

$$t = \frac{\bar{D}}{\sqrt{\frac{\sum D^2 - \frac{(\sum D)^2}{N}}{N(N-1)}}}$$

$D$ : Gain Score ( $D=X_2-X_1$ )

The t-table has the function to see if there is a significant difference among the mean of the score of both pre-test and post-test. The t-obtained value is consulted with the value of t-table at the degree of freedom (df)  $N-1$  which is statistically hypotheses:



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- b. Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.
2. Dilang mengumumkan dan memperbanyak sebagian atau seluruh karya tulis ini dalam bentuk apapun tanpa izin UIN Suska Riau.

$H_0$ :  $t_{\text{obs}} < t_{\text{table}}$

$H_a$ :  $t_{\text{obs}} > t_{\text{table}}$

$H_0$  is accepted if  $t_{\text{obs}} < t_{\text{table}}$  or there is no significant effect after giving the treatment by PLAN Strategy and SMART Strategy on the students' reading comprehension.

$H_a$  is accepted if  $t_{\text{obs}} > t_{\text{table}}$  or there is significant effect after giving the treatment by PLAN Strategy and SMART Strategy on the students' reading comprehension.

Afterward, it is better to find the coefficient effect of T-test by following formula<sup>1</sup>:

$$r^2 = \frac{t^2}{t^2 + n - 1}$$

$$kp = r^2 \times 100\%$$

Where:

Kp: Coefficient effect

$r^2$  : Coefficient



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  - b. Pengutipan tidak merugikan kepentingan yang wajar UIN Suska Riau.

2. Dilang mengumumkan dan memperbanyak sebagian atau seluruh karya tulis ini dalam bentuk apapun tanpa izin UIN Suska Riau.

Afterward, it is better to find the effect size of T-test by following

formula<sup>2</sup>:

$$\tilde{\eta}^2 = \frac{t^2}{t^2+n-1}$$

$$\text{eta squared} = \tilde{\eta}^2 \times 100\%$$

Where:

$\text{eta squared}$  : Coefficient effect

$\tilde{\eta}^2$  : Coefficient

#### Effect Size Classification:

$0,2 \leq d < 0,5$  = small effect

$0,5 \leq d < 0,8$  = medium effect

$0,8 \leq d \leq 2,0$  = large effect