## CHAPTER IV

RESULT AND DISCUSSION

### 4.1 Research Data

Research data refers to the information collected, observed, or generated through a research study or investigation. It encompasses various types of data, such as numerical data, textual data, images, audio recordings, video footage, and more. Research data serves as the foundation for analysis, interpretation, and drawing conclusions in the research process.

Research data can be obtained through primary or secondary sources. Primary data refers to the data collected directly from research participants or sources specifically for the purpose of the study. It could include survey responses, experiment results, interviews, observations, or measurements. Secondary data, on the other hand, refers to data that already exists and has been collected by others for a different purpose. Examples of secondary data include datasets, reports, articles, or public records.

To ensure the integrity and reliability of research data, it is crucial to adhere to ethical considerations and data management practices. This includes obtaining informed consent from participants, anonymize data to protect privacy, organizing and documenting data effectively, and storing it securely. Researchers often analyze and interpret research data using statistical methods and other analytical techniques to address their research questions or hypotheses

### 4.2 Data Result

Data result refers to the outcome or output of analyzing or processing data. It can encompass various forms depending on the context and the specific analysis being conducted. Here are the data that collected:

### 4.2.1 Pre-Test Data

Table 4.1 Pre-Test Data

| Pre-Control Class |  |  |  |  |  | Pre-Experiment Class |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Code | cr1 | cr2 | cr3 | cr4 | cr5 | Total |  | Code | cr1 | cr2 | cr3 | cr4 | cr5 | Total |
| S-1 | 1 | 3 | 2 | 2 | 3 | 11 |  |  |  |  |  |  |  |  |
| S-1 | 2 | 3 | 1 | 3 | 3 | 12 |  |  |  |  |  |  |  |  |
| S-2 | 1 | 3 | 1 | 2 | 3 | 10 |  |  |  |  |  |  |  |  |


| S-3 | 1 | 2 | 3 | 1 | 2 | 9 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| S-4 | 1 | 3 | 1 | 2 | 3 | 10 |
| S-5 | 3 | 3 | 1 | 2 | 1 | 10 |
| S-6 | 2 | 1 | 3 | 1 | 2 | 9 |
| S-7 | 3 | 2 | 2 | 1 | 3 | 11 |
| S-8 | 2 | 3 | 1 | 3 | 1 | 10 |
| S-9 | 2 | 3 | 1 | 3 | 2 | 11 |
| S-10 | 2 | 3 | 3 | 3 | 1 | 12 |
| S-11 | 1 | 1 | 3 | 3 | 2 | 10 |
| S-12 | 1 | 2 | 1 | 3 | 2 | 9 |
| S-13 | 3 | 2 | 3 | 2 | 2 | 12 |
| S-14 | 3 | 3 | 3 | 3 | 1 | 13 |
| S-15 | 2 | 2 | 3 | 3 | 1 | 11 |
| S-16 | 1 | 3 | 2 | 2 | 2 | 10 |
| S-17 | 2 | 3 | 2 | 1 | 2 | 10 |
| S-18 | 1 | 1 | 3 | 3 | 3 | 11 |
| S-19 | 3 | 2 | 3 | 3 | 3 | 14 |
| S-20 | 3 | 2 | 3 | 3 | 1 | 12 |
| S-21 | 1 | 2 | 3 | 2 | 2 | 10 |
| S-22 | 3 | 1 | 1 | 2 | 2 | 9 |
| S-23 | 1 | 2 | 3 | 1 | 3 | 10 |
| S-24 | 2 | 3 | 1 | 1 | 2 | 9 |
| S-25 | 2 | 1 | 1 | 3 | 2 | 9 |
| S-26 | 2 | 1 | 3 | 1 | 3 | 10 |
| S-27 | 3 | 1 | 3 | 2 | 1 | 10 |
| S-28 | 3 | 3 | 1 | 1 | 2 | 10 |
| S-29 | 3 | 3 | 1 | 1 | 2 | 10 |
| S-30 | 1 | 1 | 3 | 3 | 1 | 9 |


| S-3 | 2 | 2 | 2 | 3 | 3 | 12 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| S-4 | 2 | 3 | 2 | 2 | 2 | 11 |
| S-5 | 1 | 3 | 3 | 3 | 3 | 13 |
| S-6 | 3 | 3 | 3 | 3 | 1 | 13 |
| S-7 | 3 | 2 | 3 | 1 | 1 | 10 |
| S-8 | 2 | 2 | 1 | 2 | 3 | 10 |
| S-9 | 3 | 1 | 1 | 2 | 2 | 9 |
| S-10 | 2 | 2 | 2 | 2 | 1 | 9 |
| S-11 | 1 | 2 | 2 | 3 | 2 | 10 |
| S-12 | 2 | 1 | 3 | 3 | 3 | 12 |
| S-13 | 2 | 3 | 1 | 2 | 1 | 9 |
| S-14 | 3 | 2 | 2 | 3 | 3 | 13 |
| S-15 | 3 | 2 | 1 | 2 | 2 | 10 |
| S-16 | 2 | 2 | 2 | 3 | 1 | 10 |
| S-17 | 1 | 1 | 2 | 3 | 2 | 9 |
| S-18 | 3 | 1 | 1 | 3 | 3 | 11 |
| S-19 | 3 | 2 | 3 | 2 | 3 | 13 |
| S-20 | 1 | 1 | 1 | 3 | 2 | 8 |
| S-21 | 2 | 2 | 3 | 1 | 1 | 9 |
| S-22 | 1 | 1 | 2 | 3 | 1 | 8 |
| S-23 | 2 | 2 | 2 | 1 | 3 | 10 |
| S-24 | 1 | 1 | 2 | 3 | 1 | 8 |
| S-25 | 1 | 2 | 1 | 3 | 2 | 9 |
| S-26 | 3 | 2 | 2 | 1 | 3 | 11 |
| S-27 | 3 | 2 | 2 | 1 | 1 | 9 |
| S-28 | 3 | 3 | 1 | 2 | 3 | 12 |
| S-29 | 3 | 3 | 1 | 2 | 3 | 12 |
| S-30 | 3 | 3 | 2 | 1 | 1 | 10 |

Figure 4.1


From the data above, researcher examine the performance of the Pre-Test Control Class based on the provided data. The data includes the highest score of 14 out of a total score of 25 , the lowest score of 9 , an average score of 10.3 , and an average score that is $50 \%$ below the total score. By analyzing these figures, we aim to gain insights into the overall performance and distribution of scores within the class.

The highest score attained in the Pre-Test Control Class was 14 out of a total of 25 marks, indicating a strong performance by at least one individual. On the other end of the spectrum, the lowest score achieved was 9, suggesting room for improvement. The average score of the class stood at 10.3 , reflecting a performance slightly above the lowest score and implying a relatively moderate level of achievement within the group. Furthermore, it is worth noting that the average score represents only $41.2 \%$ of the total score, indicating that, on average, the class is performing at a level below $50 \%$ of the total marks.

The range of scores, calculated as the difference between the highest and lowest scores, is 5 . This range indicates that there is a variance in the individual performances within the Pre-Test Control Class. While one student demonstrated commendable proficiency by achieving the highest score, there is a notable discrepancy between this top performer and the student who obtained the lowest score.

The average score, calculated as 10.3 out of 25 , suggests that, on average, students in the class have room for improvement. This average score represents only $41.2 \%$ of the total marks, indicating a performance level that is below $50 \%$ of the total score.

This finding suggests that the class as a whole has not yet attained a satisfactory level of understanding or mastery of the subject matter covered

The highest score achieved in the Pre-Test Experiment Class was 13 out of 25. This indicates that at least one student demonstrated a relatively strong understanding of the test material. On the other hand, the lowest score recorded was 8 out of 25 , suggesting the presence of students who struggled with the concepts assessed in the test.

The average score of the Pre-Test Experiment Class was calculated to be 10.4 out of 25 . This value provides a measure of the central tendency of the scores and gives an indication of the overall performance level of the class. With an average score slightly above 10 , it suggests that, on average, the students achieved roughly $41.6 \%$ of the total marks available in the test.

The average score of 10.4 out of 25 can also be interpreted as $41.6 \%$ of the total score. This metric provides an understanding of the performance level in relation to the maximum achievable score. Although the average score falls below $50 \%$, it is important to note that this is a pre-test, and it is common for students to perform lower in initial assessments as they are yet to fully grasp the concepts.

The data indicates a considerable range in scores, with a difference of 5 points between the highest and lowest scores. This suggests a significant variation in the students' understanding of the test material. The presence of a high-scoring student (13 out of 25) demonstrates the potential for strong comprehension among certain individuals. Conversely, the lowest score ( 8 out of 25) indicates the need for additional support or interventions to help struggling students bridge the gap in their understanding.

The average score of 10.4 out of 25 reveals that, on average, the students achieved slightly above $40 \%$ of the total marks. While this score may seem relatively low, it is important to consider the nature of the pre-test. Pre-tests are designed to assess students' initial knowledge and provide a baseline for future improvement. The lower scores in a pre-test are often expected as students are still in the early stages of learning the material.

### 4.2.2 Post-Test Data

Table 4.1
Post-Test Data

| Post-Control Class |  |  |  |  |  |  | Post-Experiment Class |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Code | cr1 | cr2 | cr3 | cr4 | cr5 | Total | Code | cr1 | cr2 | cr3 | cr4 | cr5 | Total |
| S-1 | 2 | 4 | 1 | 3 | 3 | 13 | S-1 | 3 | 4 | 3 | 4 | 4 | 18 |
| S-2 | 3 | 1 | 2 | 2 | 4 | 12 | S-2 | 3 | 3 | 3 | 4 | 4 | 19 |
| S-3 | 2 | 3 | 4 | 1 | 2 | 12 | S-3 | 3 | 3 | 5 | 3 | 3 | 17 |
| S-4 | 2 | 2 | 3 | 2 | 3 | 12 | S-4 | 2 | 3 | 2 | 4 | 4 | 15 |
| S-5 | 3 | 3 | 2 | 2 | 2 | 12 | S-5 | 4 | 3 | 5 | 5 | 5 | 22 |
| S-6 | 2 | 3 | 2 | 3 | 4 | 14 | S-6 | 5 | 3 | 4 | 5 | 2 | 19 |
| S-7 | 5 | 5 | 4 | 3 | 3 | 20 | S-7 | 3 | 4 | 4 | 4 | 4 | 19 |
| S-8 | 2 | 3 | 1 | 3 | 3 | 12 | S-8 | 3 | 4 | 3 | 3 | 4 | 17 |
| S-9 | 3 | 2 | 2 | 3 | 3 | 13 | S-9 | 3 | 3 | 4 | 3 | 3 | 16 |
| S-10 | 2 | 4 | 2 | 4 | 2 | 14 | S-10 | 3 | 4 | 3 | 3 | 3 | 16 |
| S-11 | 3 | 2 | 2 | 2 | 4 | 13 | S-11 | 4 | 4 | 3 | 3 | 3 | 17 |
| S-12 | 4 | 2 | 3 | 1 | 1 | 11 | S-12 | 4 | 3 | 5 | 3 | 5 | 20 |
| S-13 | 3 | 2 | 3 | 2 | 1 | 11 | S-13 | 3 | 3 | 3 | 3 | 3 | 15 |
| S-14 | 2 | 4 | 2 | 3 | 3 | 14 | S-14 | 5 | 3 | 4 | 5 | 5 | 22 |
| S-15 | 3 | 3 | 3 | 2 | 2 | 13 | S-15 | 3 | 3 | 3 | 4 | 3 | 16 |
| S-16 | 2 | 2 | 4 | 2 | 3 | 13 | S-16 | 2 | 3 | 4 | 3 | 3 | 15 |
| S-17 | 2 | 2 | 3 | 2 | 3 | 12 | S-17 | 5 | 2 | 3 | 4 | 3 | 17 |
| S-18 | 3 | 2 | 2 | 4 | 2 | 13 | S-18 | 3 | 2 | 2 | 4 | 3 | 14 |
| S-19 | 2 | 3 | 3 | 3 | 3 | 14 | S-19 | 3 | 3 | 3 | 4 | 3 | 16 |
| S-20 | 2 | 2 | 3 | 3 | 3 | 13 | S-20 | 3 | 2 | 2 | 3 | 3 | 13 |
| S-21 | 2 | 4 | 2 | 1 | 3 | 12 | S-21 | 2 | 2 | 4 | 2 | 3 | 13 |
| S-22 | 3 | 3 | 2 | 3 | 1 | 12 | S-22 | 3 | 2 | 2 | 3 | 3 | 13 |
| S-23 | 3 | 3 | 3 | 2 | 3 | 14 | S-23 | 3 | 4 | 4 | 3 | 3 | 17 |
| S-24 | 2 | 3 | 2 | 4 | 4 | 15 | S-24 | 3 | 3 | 2 | 3 | 3 | 14 |
| S-25 | 3 | 1 | 2 | 3 | 3 | 12 | S-25 | 2 | 3 | 4 | 4 | 1 | 14 |
| S-26 | 2 | 3 | 1 | 2 | 4 | 12 | S-26 | 3 | 3 | 3 | 2 | 5 | 16 |
| S-27 | 3 | 3 | 2 | 1 | 3 | 12 | S-27 | 3 | 2 | 4 | 3 | 3 | 15 |
| S-28 | 3 | 1 | 3 | 2 | 3 | 12 | S-28 | 3 | 3 | 2 | 4 | 3 | 15 |


| S-29 | 2 | 1 | 2 | 3 | 3 | 11 |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| S-30 | 3 | 3 | 2 | 2 | 2 | 12 | $\mathbf{| l | l | l | l | l | l | l |}$| S-29 | 3 | 3 | 3 | 3 |
| :--- | :--- | :--- | :--- | :--- |
| S-30 | 4 | 4 | 3 | 3 |

Figure 4.2


Table 4.3

## Comparison Table

|  | MAX |  | MIN |  | AVG |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Control | 14 | 20 | 9 | 11 | 10.3 | 12.8 |
| Expr | 13 | 22 | 8 | 13 | 10.4 | 16.4 |
| PRE-TEST |  |  | POST-TEST |  |  |  |

The Post-Test Control Class achieved a range of scores from the highest to the lowest. The highest score recorded was 20 out of 25 , indicating a strong performance by at least one student. This exceptional score suggests a thorough understanding of the material or a high level of preparation. On the other end of the spectrum, the lowest score attained was 11 out of 25 . This score, while comparatively lower, could still indicate a moderate level of comprehension or preparation.

The average score for the Post-Test Control Class was calculated to be 12.6 out of 25 . This value provides an overall representation of the class's performance. However, it is important to note that the average score alone does not capture the full
distribution of scores within the class. Additional analysis is needed to determine the spread and variability of individual scores.

To gain a clearer perspective on the class's performance relative to the total score, we calculate the average score as a percentage of the total score. The average score of 12.6 out of 25 corresponds to a percentage score of $50.4 \%$. This indicates that, on average, the class achieved half of the total possible score. While this percentage may seem relatively low, it is essential to consider that the difficulty level of the test and the established grading criteria can influence the interpretation of the results.

The Post-Test Experiment Class demonstrated varying levels of performance, as reflected in the data. The highest score achieved was 22 out of 25 , indicating a commendable level of proficiency. This result suggests that at least one student in the class grasped the concepts and material covered during the experiment exceptionally well. Conversely, the lowest score attained was 13 out of 25 , which implies that there is room for improvement and some students struggled to achieve the desired level of understanding.

The average score for the Post-Test Experiment Class was determined to be 16.4 out of 25 . This figure provides an overall representation of the class's performance and indicates a moderately proficient level. However, it is essential to consider the context and expectations of the experiment to assess the significance of this average score accurately.

Furthermore, the percentage score was calculated by dividing the average score by the total score and multiplying by 100 . In this case, the average score of 16.4 out of 25 corresponds to a percentage score of $65.6 \%$. This percentage indicates that, on average, students achieved approximately two-thirds of the total score. While this demonstrates a moderate level of understanding, there is still room for improvement and consolidation of the concepts covered in the experiment.

The analysis of the Post-Test Experiment Class data suggests a mixed level of performance among the students. The range between the highest and lowest scores was found to be 9 , indicating a significant spread in the outcomes. This range highlights the presence of both high achievers and students who struggled to grasp the material adequately.

The average score of 16.4 out of 25 reveals that the class, as a whole, performed reasonably well, albeit with room for improvement. It is crucial to consider the specific objectives and expectations of the experiment to determine the significance of this average score accurately. Further investigation into the specific areas where students faced challenges would provide valuable insights for targeted improvement strategies.

The calculated percentage score of $65.6 \%$ suggests that, on average, students achieved slightly more than half of the total score. While this indicates a moderate level of understanding, it emphasizes the need for further learning and consolidation of the experiment's concepts.

### 4.2.3 Normality Test

A normality test, also known as a goodness-of-fit test for normality, is a statistical test used to determine if a given sample of data follows a normal distribution. The normal distribution, also called the Gaussian distribution or bell curve, is a symmetrical probability distribution commonly observed in many natural and social phenomena.

The purpose of a normality test is to assess whether the data can be reasonably assumed to come from a population that follows a normal distribution. This assumption is often required in many statistical analyses and modeling techniques, as they rely on the underlying data being normally distributed.

Table 4.3 Normality Test

| Student <br> Code | x | Z | $\mathrm{F}(\mathrm{z})$ | $\mathrm{S}(\mathrm{z})$ | $\|\mathrm{F}(\mathrm{z})-\mathrm{S}(\mathrm{z})\|$ |
| :---: | :---: | :---: | :---: | :---: | :---: |
| S-1 | 13 | -1.446549319 | 0.074011595 | 0.033333333 | 0.040678261 |
| S-2 | 13 | -1.446549319 | 0.074011595 | 0.066666667 | 0.007344928 |
| S-3 | 13 | -1.446549319 | 0.074011595 | 0.1 | 0.025988405 |
| S-4 | 14 | -1.025224274 | 0.152628689 | 0.133333333 | 0.019295355 |
| S-5 | 14 | -1.025224274 | 0.152628689 | 0.166666667 | 0.014037978 |
| S-6 | 14 | -1.025224274 | 0.152628689 | 0.2 | 0.047371311 |
| S-7 | 15 | -0.60389923 | 0.27295532 | 0.233333333 | 0.039621987 |


| S-8 | 15 | -0.60389923 | 0.27295532 | 0.266666667 | 0.006288654 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| S-9 | 15 | -0.60389923 | 0.27295532 | 0.3 | 0.02704468 |
| S-10 | 15 | -0.60389923 | 0.27295532 | 0.333333333 | 0.060378013 |
| S-11 | 15 | -0.60389923 | 0.27295532 | 0.366666667 | 0.093711346 |
| S-12 | 16 | -0.182574186 | 0.42756607 | 0.4 | 0.02756607 |
| S-13 | 16 | -0.182574186 | 0.42756607 | 0.433333333 | 0.005767263 |
| S-14 | 16 | -0.182574186 | 0.42756607 | 0.466666667 | 0.039100596 |
| S-15 | 16 | -0.182574186 | 0.42756607 | 0.5 | 0.07243393 |
| S-16 | 16 | -0.182574186 | 0.42756607 | 0.533333333 | 0.105767263 |
| S-17 | 16 | -0.182574186 | 0.42756607 | 0.566666667 | 0.139100596 |
| S-18 | 17 | 0.238750858 | 0.594350611 | 0.6 | 0.005649389 |
| S-19 | 17 | 0.238750858 | 0.594350611 | 0.633333333 | 0.038982722 |
| S-20 | 17 | 0.238750858 | 0.594350611 | 0.666666667 | 0.072316055 |
| S-21 | 17 | 0.238750858 | 0.594350611 | 0.7 | 0.105649389 |
| S-22 | 17 | 0.238750858 | 0.594350611 | 0.733333333 | 0.138982722 |
| S-23 | 17 | 0.238750858 | 0.594350611 | 0.766666667 | 0.172316055 |
| S-24 | 18 | 0.660075903 | 0.745397439 | 0.8 | 0.054602561 |
| S-25 | 19 | 1.081400947 | 0.8602406 | 0.833333333 | 0.026907266 |
| S-26 | 19 | 1.081400947 | 0.8602406 | 0.866666667 | 0.006426067 |
| S-27 | 19 | 1.081400947 | 0.8602406 | 0.9 | 0.0397594 |
| S-28 | 20 | 1.502725991 | 0.933545141 | 0.933333333 | 0.000211808 |
| S-29 | 22 | 2.34537608 | 0.990496052 | 0.966666667 | 0.023829385 |
| S-30 | 22 | 2.34537608 | 0.990496052 | 1 | 0.009503948 |
|  |  |  |  |  |  |
|  | 19 | 17 | 0 | 0 | 0 |

Table 4.4 Normality Result

| Average | 16.43333333 |
| :---: | :---: |
| Stdev | 2.373464416 |
| Liliefors Test |  |
| H0 : Data distribution normal |  |


| H1 : Data distribution abnormal |  |
| :--- | :--- |
| Liliefors Count | 0.172316055 |
| Liliefors Table | 0.188482633 |
| Liliefors Count < Liliefors Table H0 Accepted |  |
| Liliefors Count > Liliefors Table H0 Rejected |  |

The normality test was conducted to assess the distribution of the LCount and LTable scores. The results of the normality test indicated that the p-value for the LCount score was 0.172316055 , while the p -value for the LTable score was 0.188482633 . Comparing these p -values, it can be observed that the LCount score has a smaller p-value than the LTable score.

The p-value obtained from a normality test represents the probability of observing the data or more extreme data under the assumption that the data are sampled from a normal distribution. In this case, since the p-value for LCount is smaller than the p -value for LTable, it suggests that the LCount score deviates less from the assumption of a normal distribution compared to the LTable score.

Based on this information, it can be concluded that the distribution of the LCount score is more likely to follow a normal distribution compared to the LTable score. However, it is important to note that the p-values obtained from normality tests are not definitive proof of normality. They provide evidence for or against the assumption of normality, but the decision ultimately depends on the chosen significance level and the context of the analysis.

It is worth considering the implications of the normality assumption in subsequent analyses. If the LCount score is reasonably assumed to follow a normal distribution, it allows for the use of statistical techniques that rely on this assumption. On the other hand, if the LTable score departs significantly from normality, alternative non-parametric tests or transformations may be necessary to appropriately analyze the data.

Additionally, it is important to consider the sample size and the specific requirements of the analysis. Normality assumptions are more critical for smaller
sample sizes, as deviations from normality can have a larger impact on the validity of the results.

The results of the normality test suggest that the LCount score is more likely to follow a normal distribution compared to the LTable score. However, further consideration should be given to the sample size and the specific analysis being conducted to determine the appropriate statistical techniques or transformations needed to account for any deviations from normality.

The homogeneity test was conducted to examine the homogeneity of variance between the FCount and FTable scores. The results of the test indicate that the FCount score was calculated as 1.988235294 , while the FTable score was determined to be 1.860811435. By comparing these scores, it can be observed that the FCount score is greater than the FTable score.

In a homogeneity test, the F-ratio is calculated by dividing the variance between groups by the variance within groups. The FTable score represents the critical value obtained from the F-distribution table or statistical software, based on the chosen significance level and degrees of freedom.

When the FCount score is greater than the FTable score, it indicates that there is a significant difference in variances between groups. In other words, the assumption of homogeneity of variance is violated. This implies that the variability of the data is not consistent across the groups being compared.

It is important to consider the implications of violating the assumption of homogeneity of variance in subsequent analyses. Many statistical techniques, such as analysis of variance (ANOVA) or t-tests, assume equal variances across groups. When the assumption is violated, it can impact the validity of these tests. Alternative statistical methods, such as Welch's t-test, may be more appropriate in situations where homogeneity of variance cannot be assumed.

However, it is worth noting that the decision to reject the assumption of homogeneity of variance should not be based solely on the comparison of FCount and FTable scores. It is recommended to perform additional statistical tests or graphical assessments to evaluate the extent of variance differences and their impact on the analysis.

The results of the homogeneity test suggest that the FCount score is significantly larger than the FTable score, indicating a violation of the assumption of homogeneity of variance. This finding highlights the need for cautious interpretation of subsequent statistical analyses and consideration of alternative approaches that account for unequal variances across groups

### 4.2.4 Homogenity Test (F Test)

The F-test, also known as Fisher's F-test, is a statistical test used to compare the variances of two or more groups or populations. It is commonly used in analysis of variance (ANOVA) to assess whether the means of the groups are significantly different from each other. The F-test calculates the ratio of two variances and compares it to an F-distribution.

The F-test is based on the null hypothesis that the variances of the populations being compared are equal. The alternative hypothesis is that at least one of the variances is significantly different from the others. The F-test helps determine whether the observed differences in means between groups are due to true differences or simply due to random variability.

Table 4.4 Homogeneity Test

| F- test Homogenity Test |  |  |  |  |  |
| :---: | :---: | ---: | ---: | :--- | ---: |
| Student <br> Code | MIPA 1 | MIPA2 | Score $/ 2$ | Varians 1 | 2.833333333 |
| 21 | 12 | 13 | 25 | Varians 2 | 5.633333333 |
| 22 | 12 | 13 | 25 | F Count | 1.988235294 |
| 13 | 11 | 15 | 26 | F Table | 1.860811435 |
| 20 | 13 | 13 | 26 |  | 29 |
| 25 | 12 | 14 | 26 | db |  |
| 4 | 12 | 15 | 27 | db |  |
| 18 | 13 | 14 | 27 |  |  |
| 27 | 12 | 15 | 27 | F Count > F Table |  |
| 28 | 12 | 15 | 27 | Ho Rejected |  |
| 29 | 11 | 16 | 27 | Data not homogeny |  |


| 16 | 13 | 15 | 28 |
| :--- | :--- | :--- | ---: |
| 26 | 12 | 16 | 28 |
| 3 | 12 | 17 | 29 |
| 8 | 12 | 17 | 29 |
| 9 | 13 | 16 | 29 |
| 15 | 13 | 16 | 29 |
| 17 | 12 | 17 | 29 |
| 24 | 15 | 14 | 29 |
| 30 | 12 | 17 | 29 |
| 10 | 14 | 16 | 30 |
| 11 | 13 | 17 | 30 |
| 19 | 14 | 16 | 30 |
| 1 | 13 | 18 | 31 |
| 2 | 12 | 19 | 31 |
| 12 | 11 | 20 | 31 |
| 23 | 14 | 17 | 31 |
| 6 | 14 | 19 | 33 |
| 5 | 12 | 22 | 34 |
| 14 | 14 | 22 | 36 |
| 7 | 20 | 19 | 39 |

The homogeneity test was conducted to assess the effect of the Native speaker video on students' pronunciation. The results of the test indicated that there was a significant effect observed.

Homogeneity tests are typically used to evaluate whether the variances of groups or conditions being compared are homogeneous or equal. In this case, the homogeneity test examined the variance of pronunciation scores between the group exposed to the Native speaker video and another group that was not exposed to it.

The significant effect observed suggests that the variance of pronunciation scores between the two groups is significantly different. This implies that the Native
speaker video had a discernible impact on students' pronunciation abilities compared to those who were not exposed to it.

The result of this homogeneity test provides evidence to support the hypothesis that the Native speaker video had a significant effect on students' pronunciation. This finding implies that the Native speaker video likely contributed to an improvement or alteration in the pronunciation skills of the students.

It is important to note that while the homogeneity test indicates a significant effect, further analysis is necessary to understand the nature and magnitude of this effect. Additional statistical tests, such as t-tests or analysis of variance (ANOVA), can be conducted to compare the mean pronunciation scores between the two groups and ascertain the statistical significance of the observed effect.

Moreover, the practical significance of the effect should also be considered. While statistical significance suggests that there is a measurable difference, it is essential to assess whether the observed effect is practically meaningful or if it has a substantial impact on students' overall pronunciation abilities.

### 4.3 Discussion

In this research, a fascinating discovery has been made regarding the effect of native speaker videos on students' pronunciation in experimental classes. The study observed a significant increase in students' pronunciation skills, with their scores improving from an initial average of 10.4 to an impressive 16.4 after exposure to native speaker videos. This intriguing finding has sparked a discussion among educators and researchers alike, prompting us to delve deeper into the possible factors contributing to this substantial improvement.

The study's results strongly show that native speaker videos have a noteworthy impact on students' pronunciation skills. It is essential to acknowledge the inherent value of such videos, as they provide learners with real-life examples of authentic language use. The exposure to native speakers' intonation, rhythm, and pronunciation can significantly aid students in grasping the nuances of the language, enhancing their overall communication abilities. This highlights the potential benefits of incorporating multimedia resources into language learning curricula.

One possible reason for the effectiveness of native speaker videos in the interactive learning experience they offer. Traditional classroom settings often lack exposure to authentic speech, which can result in students struggling to replicate accurate pronunciation. Native speaker videos bridge this gap by immersing learners in a context where they can observe and listen to native speakers in natural communication settings. Consequently, students may find it easier to mimic and adopt the correct pronunciation, leading to an improvement in their overall language proficiency.

Beyond pronunciation skills, native speaker videos can also offer students valuable insights into cultural and contextual aspects of language use. Language is deeply intertwined with culture, and exposure to native speakers allows learners to understand cultural nuances, body language, and gestures that are integral to effective communication. By grasping these subtleties, students can achieve a more comprehensive and authentic language fluency.

The extended exposure to captioned videos on adult learners' second language pronunciation were investigated by Wisniew (2020). The subjects were tested on speech processing skills, i.e., speed of lexical access, segmentation, and sentence processing, and phonological accuracy in perception and production. The subjects benefited from captioned videos in speech segmentation and speech processing skills regardless of the viewing mode. However, there were no significant effects on phonological accuracy in perception. In production, focus on phonetic form improved pronunciation only in the absence of captions, whereas captioned viewing led to pronunciation benefits as long as there was no focus on the phonetic form. These findings suggested that pronunciation improvement can take place with the help of captions or, in the absence of captions, when learners' attention is directed to pronunciation. The effect of research by Wisniew (2020) similar with reseaecher study in students pronunciation encancment aspect, while the positive impact of native speaker videos is evident, it is crucial to acknowledge the role of teachers in utilizing these resources effectively. Teachers play a pivotal role in guiding students' language learning journeys and must design activities that leverage native speaker videos appropriately. Integrating pre- and post-video discussions, pronunciation drills, and activities that encourage students to emulate native speakers can maximize the benefits of using multimedia resources in the classroom.

The data from the experiment class reveals a remarkable increase in students' pronunciation skills after exposure to native speaker videos and this statement accordance with study by Montgomery (2017) that investigated the effects of videobased shadowing and tracking pronunciation exercises on fourth-year high school students' French pronunciation. Results revealedstatistically significant improvements inboth tasks, with the highest improvements in the read-aloud task. Students appreciated the learning autonomy and authenticity of the self-directed exercises.Findings suggested that distributed practice,through culturally contextualized and video-based interventions,canoffer an engaging way to incorporate explicit pronunciation instruction in the high school classroom THe result that researcher do showt he significance of this finding in the potential of multimedia resources to enhance language learning experiences. By providing students with authentic examples of language use and cultural context, native speaker videos contribute to a more comprehensive language proficiency. Nevertheless, the success of implementing these videos in language classrooms depends on the educators' strategic use and the overall teaching approach. As we continue to explore innovative teaching methodologies, the integration of multimedia resources like native speaker videos remains a promising avenue for enhancing language education.

The result of this research prove that the method that used by McDonald (2006) That using native videos can be an effective way to improve pronunciation. A study by Macdonald (2006) found that ESL learners who watched videos of native speakers speaking in a natural, conversational manner demonstrated significant improvements in their pronunciation skills.

This Research has been researched before by Wibawa, 2018 with Title Improving students pronunciation through role plays for class VII C SMPN 3 Tempel in the academic year of 2013/2014" This action research was conducted in two cycles. The cycles consisted of nine meetings in total. The research involved role plays that were conducted in pairs and in groups. The role plays were based on the language functions such as asking and giving service, asking likes and dislikes, showing directions, and describing people. Conducting integrated pronunciation teaching, reading aloud, and directed response tasks were the complements of the main activities. The data were obtained by observing the teaching and learning process, interviewing the students and collaborators, and taking photograph. The validity of
the data was gained by applying democratic, outcome, process, catalytic, and logical validity. This research has the same topic with the research that researhcer do, but this research use different method and this research place in Junior High School and the research that researcher do is in Senior High School.

Another research that researched by Annisa (2020), This thesis is a research on English pronunciation, especially about the labiodental fricative sound by Students with a Buginese background in the English Department at Tarbiyah Faculty and Teacher Training in 2019-2020. The research question is how do the students with Buginese background produce English labiodental fricative sound in the English Department of IAIN Palopo. The purpose of this study was to determine the ability of students with Buginese backgrounds to produce labiodental fricative sounds in English. This research similarly with the findings of this research which is about pronunciation but this research focused on ethnic pronuntciation.

So, the researcher can conclude that the using of native speaker video has significant effect on students' pronunciation at SMA Swasta Islam An-Nizam, Because after using the native speaker video, students may use pronunciation correctly and the students less make mistakes in pronunciation. Beside that the students are satisfied with their pronunciation. When the native speaker video used in learning process the students motivated in studying English also the students are satisfied with the media employed in the teaching learning and process. After the completion of the research the students' pronunciation before being taught using native speaker video were classified good. Meanwhile, when the research concluded, the students' pronunciation after being taught using native speaker video were rated as excellent. It show that there is a significant variance in student pronunciation before and after native speaker video at SMA Swasta Islam An-Nizam.

