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## Research Article

### The Effectiveness of Using Venn Diagrams and Fishbone Technique in Enhancing the Performance Level of Grade VI Students in Edukasyon sa Pagpapakatao for the School Year 2023-2024

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#### ABSTRACT

This study evaluated the effectiveness of Venn Diagrams and the Fishbone Technique in enhancing the performance levels of Grade VI students in Edukasyon sa Pagpapakatao (ESP). It specifically addressed the following questions: (1) What was the performance level of Grade VI students in ESP prior to using the tools? (2) What changes were observed after implementing the tools in the lessons? (3) What was the performance level of Grade VI students in ESP after using the tools?

The study was conducted at Sto. Tomas Elementary School (STES) and involved 25 Grade VI students (12 males and 13 females) as respondents. Data collection included pre-tests, post-tests, and group activities. Statistical analyses, including frequency distribution, mean comparison, and standard deviation, were employed to evaluate the results.

Findings revealed that students initially performed at an average level in ESP. After implementing the Venn Diagram and Fishbone Technique, a significant improvement was observed, with post-test results indicating an excellent performance level. These tools enabled students to construct meaning, develop deeper understanding, and perform more effectively in ESP lessons.

The study concluded that the effectiveness of the Venn Diagram and Fishbone Technique depends on the teacher's ability to design and deliver lessons systematically, aligned with learning competencies. It recommended further studies to explore the applicability of these tools in other subject areas to enhance students' academic performance.

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**Keywords:** Venn Diagram, Fishbone Technique, Edukasyon sa Pagpapakatao, Grade VI students, instructional tools, performance level, educational strategies, teaching techniques, student improvement

## Introduction

Fostering critical thinking and ethical understanding is essential in today's education, particularly in **Edukasyon sa Pagpapakatao (ESP)**, a subject designed to cultivate moral and social values among students (**DepEd, 2016**). For Grade 6 learners at Sto. Tomas Elementary School, developing the ability to thoughtfully analyze ethical situations and understand cause-and-effect relationships is crucial in shaping responsible, value-driven decision-making.

To enhance these skills, this study examines the use of visual tools—**Venn Diagrams** and the **Fishbone Technique**—as interactive teaching strategies. Venn Diagrams help students compare and contrast ideas, enabling them to identify similarities and differences between ethical concepts (**Mason, Burkett, & Freeman, 2019**). This skill is vital for analyzing complex moral issues involving multiple perspectives and values. Similarly, the Fishbone Diagram, also known as the Cause-and-Effect Diagram, allows students to explore the root causes of ethical dilemmas. This approach promotes systematic analysis and critical thinking (**Ishikawa, 1990**). By breaking down complex scenarios, students can conduct deeper analyses and develop a systematic approach to ethical reasoning.

Integrating these visual tools into ESP lessons aims to enhance student engagement and improve academic performance. This approach aligns with the subject's goal of fostering strong ethical foundations while equipping students with critical thinking skills applicable beyond the classroom (**Brown & Abell, 2020**). Through this research, Sto. Tomas Elementary School seeks to establish an instructional model that promotes active, reflective, and effective learning in values education.

### Statement of the Problem

This study aims to determine the effectiveness of using the Venn Diagram and Fishbone Technique in improving the performance and

independence of students in learning *Edukasyon sa Pagpapakatao (ESP)*. Specifically, it seeks to answer the following questions:

1. What is the performance level of Grade VI students in ESP prior to using the tools?
2. What changes are observed after implementing the tools in the lessons?
3. What is the performance level of Grade VI students in ESP after using the tools?

### Hypothesis

The use of Venn Diagrams and the Fishbone Technique does not significantly impact the performance levels of students in *Edukasyon sa Pagpapakatao*.

### Methodology

#### Research Design

This study utilized a quasi-experimental research design, specifically the pre-test and post-test group design. This approach was chosen to assess the impact of the Venn Diagram and Fishbone Technique on the learning outcomes of students in *Edukasyon sa Pagpapakatao* lessons. The respondents were divided into groups and subjected to interventions where these techniques were applied. Comparisons between pre-test and post-test results enabled the evaluation of their effectiveness in improving student performance.

### Instruments

The instruments employed in this study included:

- Diagnostic Tests: Used to assess the baseline knowledge and performance levels of the respondents before the intervention.
- Pre-tests and Post-tests: Designed to measure learning progress and the effectiveness of the instructional techniques.
- Group Activities: Facilitated collaborative learning and provided qualitative insights into the respondents' application of the Venn Diagram and Fishbone Technique.

**Data Analysis**

The data gathered in this study were analyzed using a range of statistical methods to ensure a comprehensive evaluation:

- Frequency Distribution of Scores: This was employed to determine the distribution of correct answers in the pre-test and post-test, offering an overview of performance trends among respondents.
- Item Analysis: Identified the frequency of correct responses for each test item, evaluating the effectiveness of specific questions and their alignment with learning objectives.
- Mean Analysis and Standard Deviation: The mean computed the average performance levels of the respondents, while the standard deviation measured the variability in their scores, providing insights into consistency and improvement.
- Comparison of Mean and Standard Deviation: This method compared pre-test and post-test results to identify significant changes in performance.
- Quizzes Analysis:
  - Sample Computation: Assessed individual respondent performance for each evaluation.
  - Comparison of Quizzes: Tracked progress over time during the implementation of the Venn Diagram and Fishbone Technique.

These statistical methods provided both quantitative measures and detailed insights into the learning progress of respondents, ensuring robust data interpretation.

**Scoring Rubric**

Scores	Rating
25-30	Excellent
19-24	Above Average

13-18	Average
7-12	Below Average
0-6	Poor

**Formulas Used**

The results of the pre-test and post-test were analyzed using the following formulas:

- Mean ( $\bar{x}$ ):  

$$\bar{x} = \frac{\sum fx}{N}$$
 where  $\sum fx$  represents the sum of all scores, and  $N$  is the total number of respondents.
- Standard Deviation (SD):  

$$SD = \sqrt{\frac{\sum f(x - \bar{x})^2}{N}}$$
 where  $x$  is the individual score,  $\bar{x}$  is the mean score, and  $N$  is the total number of respondents.

These computations provided a quantitative basis for assessing performance levels, identifying trends, and evaluating the effectiveness of the instructional techniques applied in this study.

**Results and Discussions**

Presented in this part are the results of data analysis. It also includes the tabular presentations of the data gathered regarding the level of performance of the respondents prior to the conduct of the study.

**Level of Performance of the Respondents Prior to the Use of Venn Diagram and Fishbone Technique**

To identify the Level of performance of the pupils in Edukasyon sa Pagpapakatao prior to the use of Venn Diagrams, a pretest was administered. To determine the level of the respondents in terms of their performance a prepared frequency distribution of the respondents' scores is presented on Table 1.

*Table 1. Frequency Distribution of Respondents Scores Based on Pre-Test Raw Scores (N=25)*

27	26	25	23	23
20	20	20	19	19
19	18	18	18	17
17	17	16	16	16
15	15	15	14	14

SCORES	f	x
26-27	2	26.5
24-25	1	24.5
22-23	2	22.5
20-21	3	20.5
18-19	6	18.5
16-17	6	16.5
14-15	5	14.5
<b>Mean=18.66</b>		<b>SD=3.52</b>

**Rating Scale:**

25-30- **Excellent**                      19-24- **Above Average**                      13-18 **Average**  
 7-12- **Below Average**                      0-6- **Poor**

Shown on table 1 was the frequency of distribution of the scores in the pretest. The scores have interval of 1. Two pupils got scores from 26-27. One pupil who got scores ranging from 24-25. Two pupils on the other hand got scores from 22-23. And three pupils also got scores from 20-21. While six pupils got scores within 18-19. Then six pupils also got scores from 16-17, lastly five pupils got scores from 14-15.

The total number of scores as shown in Appendix A was 466.5 These scores when to be divided in the total number of cases (25) will result to a mean score of 18.66. Multiplying the

frequency (f) to the sum of the squared differences of midpoint and mean  $f(x-\bar{x})^2$ , will lead to a sum total 311.22. Dividing the result to the total number of cases and extracting its square root will lead to standard deviation of 3.52.

The 18.66 computed the mean represents the class as a whole. If it is to be interpreted using the rating scale, it falls on the Average Level. Therefore, the class performance level was described as Average. The computed standard deviation which is 3.52 means that the distances of the scores are close to one another and the class is homogenous.

**The Graph of Mean and Standard Deviation Based on Pre-Test**

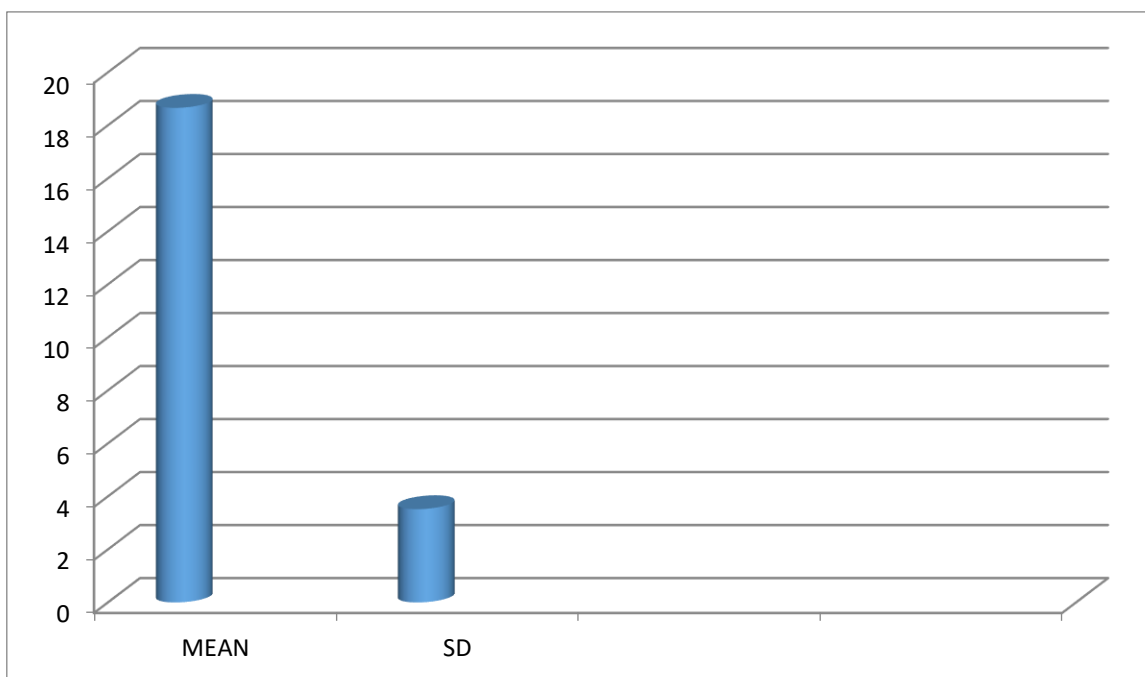


Table 2. Frequency of Students with Correct Answers Based on Pre-Test Result

Knowledge	Frequency	Comprehension	Frequency	Application	Frequency
1	21	3	19	5	17
9	23	10	14	7	19
13	18	15	12	17	14
20	17	23	11	19	16
26	18	29	27	25	11
<b>Mean=19.4</b>		<b>Mean=16.6</b>		<b>Mean=15.4</b>	

Analysis	Frequency	Synthesis	Frequency	Evaluation	Frequency
2	15	4	9	1	14
11	14	8	10	12	10
14	15	16	19	18	17
22	15	24	18	21	8
28	10	27	11	30	11
<b>Mean=13.8</b>		<b>Mean=13.4</b>		<b>Mean=12</b>	

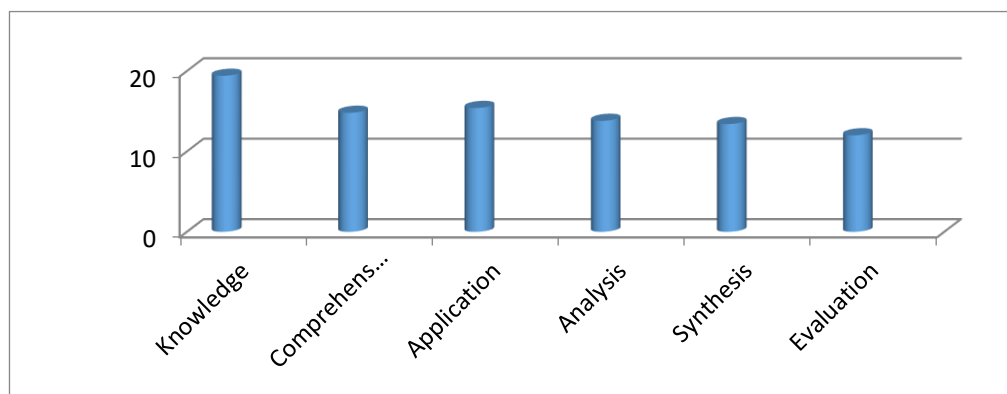
Presented on Table 2 was the frequency of the correct answers based on the result of the pre-est. The 30 item was categorized into six levels namely Knowledge, Comprehension, Application, Analysis, Synthesis and Evaluation.

The respondents got a mean score of 19.4 under the Knowledge level, 16.6 on the Comprehension level. 15.4 on Application level

13.8 on Analysis level and 12 on Evaluation level.

It can be interpreted from those six categories only one got the higher mean which is the knowledge level with the mean of 19.4. Which from the knowledge level the respondents perform well while Evaluation level who got the lowest score is where they perform the least.

**The Graph of Frequency of Correct Answers Based on Pre-Test Result**



**Actual Application of the Venn Diagram and Fishbone Technique**

The Venn Diagram and Fishbone Technique that was applied by the researcher went to several phases:

1. Preparatory Activity

Review the previous lesson was conducted to recall the important topics in connects to the new lesson.

2. Motivation

motivation you motivate your learners to cope up with your new lesson or grasp fastly, and caught their interest trough presenting In your motivation

3. Presentation

In presenting the lesson the researcher uses the Venn Diagram and Fishbone Technique. Then let the student to observe what they viewed.

4. Concept Formation

In concept formation the Teacher asked the students what they observed and you will lead them to the topic. And let the students to discover your topic.

5. Generalization

In generalization the students will generalize about the topic that there are some

questions. And let the students to answer. Then the teachers see if they have learned about the topic.

6. Application

In application the pupils apply the lesson they've learned the top there are some activities that fit to your topics that they need to see or to apply.

7. Evaluation

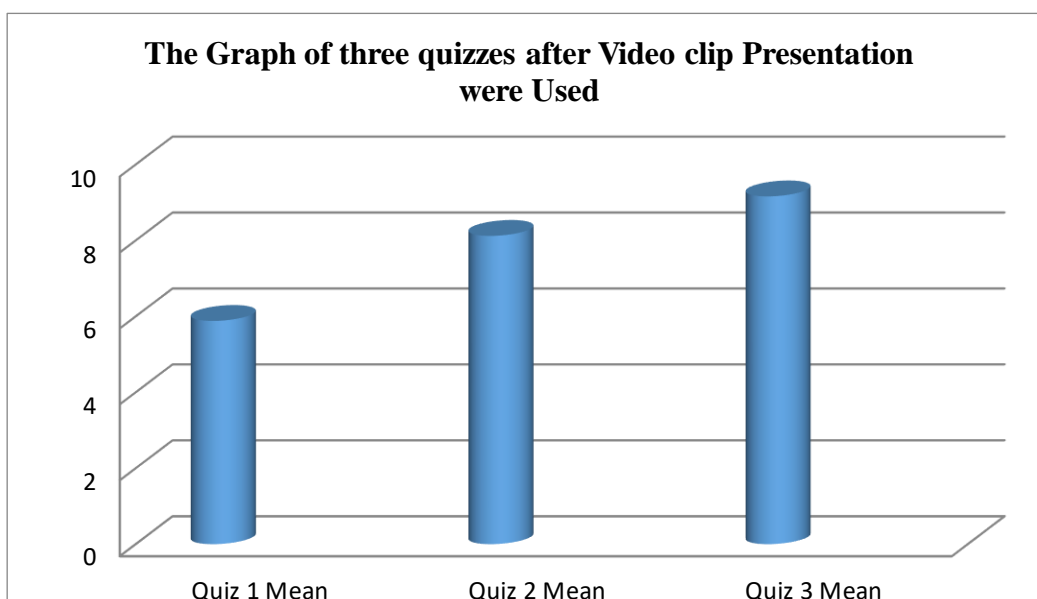
This part is one of the most important parts which are assessing the students learning.

Table 3

Respondents	Quiz 1	Quiz 2	Quiz 3
1	6	7	9
2	5	8	8
3	4	9	10
4	7	9	10
5	5	10	10
6	6	7	9
7	8	8	9
8	7	9	10
9	6	7	8
10	4	8	9
11	8	7	8
12	9	10	10
13	4	8	9
14	5	10	10
15	6	8	9
16	7	8	9
17	5	7	9
18	4	7	8
19	8	9	10
20	7	8	10
21	5	7	8
22	6	9	9
23	4	7	10
24	4	7	8
25	7	9	10
<b>Mean=5.9</b>	<b>Mean=8.2</b>	<b>Mean=9.16</b>	

The progress of the quiz scores from the three quizzes. There was an increase in the scores in three quizzes. In the first quiz the respondents got mean with 5.9. In the second

quiz the respondents got the mean with an 8.2. In their third quiz the respondents got a big increase in their Mean which is 9.16.



**Changes in the Level of Performance of the Respondents after Venn Diagram and Fishbone Technique were implemented**

To determine if there is a change in the pupils' level of performance in Edukasyon sa Pagpapakatao after Venn Diagrams and Fishbone Technique was implemented a Post-Test was administered. The content of the posttest was the same as the pretest to compare the

performance of the pupils before and after the use of Venn Diagrams and Fishbone Technique.

A frequency distribution revealed on table 4 was presented to determine the change on their level of performance after Venn Diagrams and Fishbone Technique were employed.

**Frequency Distribution of Respondents Scores Based on Post-Test Raw Scores (N=25):**

**Table 3**

30	30	30	30	30
30	30	30	30	29
28	29	28	28	28
28	27	27	27	27
27	27	26	24	21

SCORES	f	x
21-22	1	21.5
23-24	1	23.5
25-26	1	25.5
27-28	10	27.5
29-30	12	29.5

**Mean=27.98**

**SD=1.98**

**Rating Scale**

25-30-Excellent

7-12-Below Average

19-24-Above Average 13-18-Average

0-6 Poor

Shown on the table 3 was the frequency distribution of the scores in the Post-Test. The scores have interval 1. One pupil got score from 21-22. One pupil also got score from 23-24. One pupil got score ranging from 25-26. Ten pupils on the other hand got score from 27-28. Lastly twelve pupils got score from 29-30.

The total number of scores as shown in Appendix B. These scores divided in the total number of class (25) will result to a mean score of 27.98. Multiplying frequency (f) to the sum of squared differences of midpoint and mean  $f(x-\bar{x})^2$ , will lead to a sum total of 98.23.

Dividing the result to the total number of cases (25) and extracting its square root will lead to a standard deviation of 1.98.

The computed mean which is 27.98 means that the level of class now on the excellent level as interpreted using the rating scale used in the Pre-Test. Therefore, the class performance level is now described as excellent. The computed standard deviation which is 1.98 means that the distances of the scores are now closer to one another and the class is still homogeneous.

Table 4. Frequency of students with Answers Based on Post-Test

knowledge	Frequency	Comprehension	Frequency	Application	Frequency
1	25	3	24	2	25
11	23	7	23	12	23
14	23	18	24	17	23
19	23	22	23	20	23
25	22	30	21	26	23
<b>Mean=23.2</b>		<b>Mean=23</b>		<b>Mean=23.4</b>	

Analysis	Frequency	Synthesis	Frequency	Evaluation	Frequency
6	23	5	24	4	22
9	24	8	23	10	23
13	22	16	21	15	24
23	23	21	23	24	24
27	21	28	21	29	21
<b>Mean=22.6</b>		<b>Mean=22.4</b>		<b>Mean=22.8</b>	

As shown on the table 4, Knowledge got mean score of 23.2, Comprehension level got exactly 23 score of mean. Application level got 23.4, Analysis level got 22.6, Synthesis level got 22.4, while Evaluation level got a mean of 22.8.

There was a change on the mean scores in the Pre-Test. All six categories level got mean scores higher than 20. Their weakest level on their Pre-test which was Evaluation has now a mean of 22.8

Table 5

TEST	MEAN	LEVEL	STANDARD DEVIATION
<b>PRE-TEST</b>	<b>18.66</b>	<b>Average</b>	<b>3.52</b>
<b>POST-TEST</b>	<b>27.98</b>	<b>Excellent</b>	<b>1.98</b>

As gleamed on table 5 from the computed mean 18.66 in the Pre-Test there is an increase of 9 in the computed mean of Post-Test which became 27.98. From the class previous Average level it is now reached excellent level after the intervention has been injected in the lesson. There is also a difference in the computed

standard deviation of Pre-test and Post-Test. The computed standard deviation of Pre-test was 3.52 became 1.98 when Post-Test was administered. This means that there is a change in the distance on the Pre-test.



Hence, there is an increase in the respondents' performance when Venn Diagram and Fishbone Technique was used.

### Summary of Findings, Conclusion and Recommendation

This chapter presents the summarized findings after conducting study conclusions drawn from the conducted statistical procedure were also presented in this chapter. Recommendations regarding the use of the strategy were also conducted.

#### Summary

1. The level of performance of Grade-VI pupils in Edukasyon sa Pagpapakatao was at average level prior to the use of Venn Diagrams and Fishbone Technique as gleamed from the result of Pre-Test. After intervention was used, Post-Test was administered to determine if there is change in the class performance level result of the Post-Test verified the class to be on the now in excellent level.
2. Changes in the performance of the respondents were observed from the previous mean score of 18.66; their mean score after employing the tool became 27.98. There is an increase of 9 points in their mean score.
3. The mean scores of the different cognitive levels also increased from the computed mean score lower than 20, they went up to mean scores higher than 22 after the tool was employed.
4. There was a change and progress in their quizzes every time the tool is used in the lesson. There was a gradual increase in the final scores of the quiz as the tool. Scores lower than four became score higher than four and some of the students got a perfect score.

#### Conclusion

The study demonstrates a significant improvement in the performance levels of Grade VI pupils following the integration of Venn Diagrams and the Fishbone Technique in *Edukasyon sa Pagpapakatao (ESP)*. These tools effectively enhanced the students' ability to

construct meaning and acquire a deeper understanding of ethical concepts and relationships.

By utilizing these visual techniques, pupils were able to engage more actively in lessons, analyze complex scenarios, and develop critical thinking skills, resulting in improved academic performance and a stronger grasp of the subject matter.

#### Recommendations

Based on the findings of the study on the use of Venn Diagrams and the Fishbone Technique, the following recommendations are proposed:

##### 1. Effective Implementation

The effectiveness of Venn Diagrams and the Fishbone Technique relies on the teacher's ability to systematically develop and construct presentations tailored to the lesson and aligned with the learning competencies. Teachers should receive training on how to integrate these tools effectively into their teaching strategies to maximize student engagement and learning outcomes.

##### 2. Further Research:

Additional studies should be conducted to explore the use of Venn Diagrams and the Fishbone Technique in improving the performance levels of students, not only in *Edukasyon sa Pagpapakatao (ESP)* but also in other subjects. Future research could include control groups to provide a more robust comparison of the tools' impact on student learning.

##### 3. Inclusion of Other Visual Tools

Investigate the effectiveness of other visual tools, such as concept maps, flowcharts, or mind maps, in enhancing students' critical thinking and understanding in values education and other academic areas.

##### 4. Longitudinal Studies

Conduct longitudinal studies to examine the long-term effects of using visual tools like Venn Diagrams and the Fishbone Technique on students' critical thinking skills, retention of knowledge, and academic performance.

##### 5. Adaptation for Diverse Learners

Develop modifications of these tools to accommodate diverse learning styles and abilities. For instance, using interactive digital versions of Venn Diagrams and Fishbone Diagrams could make the tools more accessible to students with special needs or those who thrive in a digital learning environment.

By addressing these recommendations, educators and researchers can continue to refine teaching strategies, ensuring that students benefit from innovative and effective learning methods.

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**APPENDIX A**

**Computation of Mean and Standard Deviation of Pre-test**

**Range=Hs-LS**

**=27-14**

**R=13**

27	26	25	23	23
20	20	20	19	19
19	18	18	18	17
17	17	16	16	16
15	15	15	14	14

C.I.	f	x	fx	(x- $\bar{x}$ ) <sup>2</sup>	f(x- $\bar{x}$ ) <sup>2</sup>
14-15	5	14.5	72.5	17.30	86.5
16-17	6	16.5	99	4.66	27.96
18-19	6	18.5	111	0.02	0.12
20-21	3	20.5	61.5	3.38	10.14
22-23	2	22.5	45	14.74	29.48
24-25	1	24.5	24.5	34.10	34.1
26-27	2	26.5	53	61.46	122.92

$\sum fx=466.5$	$f(x-\bar{x})^2=311.22$
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$$SD = \frac{\sqrt{\sum f(x-\bar{x})^2}}{N}$$

$$SD = \frac{\sqrt{311.22}}{25}$$

$$SD = \sqrt{12.4488}$$

$$\bar{x} = \frac{\sum fx}{N}$$

$$\bar{x} = \frac{466.5}{25}$$

$$\bar{x} = 18.66$$

**SD=3.52**

**APPENDIX B**

**Computation of Mean and Standard Deviation of Post-Test**

**Range =Hs-Ls**

**=30-21**

**R=9**

30	30	30	30	30
30	30	30	30	30
29	29	28	28	28
28	27	27	27	27
27	27	26	24	21

C.I.	f	x	fx	$(x-\bar{x})^2$	$f(x-\bar{x})^2$
21-22	1	21.5	21.5	38.94	41.99
23-24	1	23.5	23.5	18.66	20.07
25-26	1	25.5	25.5	5.38	6.15
27-28	10	27.5	330	0.23	2.3
29-30	12	29.5	295	2.37	27.72
			$\sum fx=695.5$	$f(x-\bar{x})^2=98.23$	