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**The Effectiveness of MNEMONIC Technique in Teaching Statistics 7 in Improving Students' Retention**



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**ABSTRACT**

The purpose of this research was to investigate the effectiveness of MNEMONIC technique on the performance of grade 7 students in Mathematics specifically in Statistics at Jacobo Z. Gonzales Memorial National High School during the school year 2022-2023. The main objectives were to assess pre-intervention student academic performance levels and post-intervention results. This study used a Quantitative method and quasi-experimental research design. The researcher also used purposive and stratified sampling techniques and 65 students took part in the study and they were divided into two groups: the experimental group and the control group.

The effectiveness of mnemonics was tested using empirical means such as mean percentage scores (MPS) and non-parametric statistics such as the Wilcoxon Signed-rank test, and Mann-Whitney U-test.

Findings revealed that the performance of the students in the experimental group has improved compared to the control group after implementing the mnemonic technique in teaching statistics lessons. The result of the Wilcoxon Signed rank test in the experimental group was significant with a p-value of 0.001. Also, the performance of the students in the experimental group was significantly greater than the control group after using the Mann-Whitney U test with a p-value of 0.001. Therefore, it can be concluded that the application of mnemonics in teaching Statistics positively impacted the performance of the students.

The outcome of this study supports the assumption that memory techniques help students retain Mathematical concepts. This research shows that new teaching approaches can greatly enhance learning among underachieving learners. It also emphasizes the need to redesign and improve teaching styles so as to fit into evolving education paradigms and learners' diverse needs.

**Keywords:** *Mnemonic-Aided Instruction, Teaching Techniques, Memory Enhancing Strategies*

## INTRODUCTION

Improving students' mathematical problem-solving skills is an essential goal in teaching and learning. However, the persistent challenge of retaining the concept in their minds hinders their performance in Mathematics which causes them to struggle in various assessments such as quarterly tests, national achievement tests, and entrance tests.

This dilemma was evident in the results of mean percentage scores from our school's periodical tests from the first quarter to the third quarter. Last school year 2022-2023, Mathematics was ranked the lowest in mean percentage scores (MPS) among other subjects in our school Jacobo Z. Gonzales Memorial National High School which highlights the urgent need for alternative teaching methods.

In response to this and in alignment with the DepEd MATATAG agenda which is to “MAke the curriculum relevant to produce competent and job-ready, active, and responsible citizens” that ensures a more strengthened literacy and numeracy programs, the researcher has searched for an available alternative solution- the MNEMONIC Technique. This approach is about using mnemonic devices such as acronyms and acrostics, method of loci, songs and rhymes, chunking, and association which are tailored to address the issue of concept retention, offering students a pathway to remember mathematical concepts effectively ([www.psychcentral.com](http://www.psychcentral.com)).

Mnemonic is an interesting way of teaching in the field of education, in which, the continuous exploration for new methods of pedagogy is paramount.

Studies like Mendoza and Santos (2019) established the foundation for this research by showing the benefits that mnemonic techniques use in encouraging the comprehension of mathematical notions. They asserted that efficient use of memory-enhancing strategies, in addition to improving initial learning, can also contribute significantly towards long-term retrieval. This research, along with others, is meant to advance our search for real-life applications

of mnemonic strategies in the specific setting in which Filipinos are educated.

Mendoza and Santos (2019) carried out an all-inclusive examination of mnemonics' effect in a statistics class in the Philippines. Acronyms as well as illustrations were used in the study to aid students on how some statistical terms could be remembered and others related to different formulas. This resulted in improved recall, and application of the concepts as well as solved problems among the students. Mnemonics for improving long-term memory retention of math among Filipino students.

In addition, a study by Cruz et al. (2021) on the usefulness of mnemonic visualization techniques for teaching statistics to Filipinos. Visual representations that were both catchy and memorable were utilized in the study. This helped students recall and understand statistical concepts much more effectively. Engaging students through mnemonics makes mathematical concepts more meaningful.

Therefore, this study aimed to find out if mnemonics can be an effective technique for the retention of Mathematical concepts. The findings of the study also provided sufficient information to enable educational leaders to produce relevant and quality-centered educational programs. In addition, the results of this study also gave useful and current data that could form a basis to creating learning goals and initiatives.

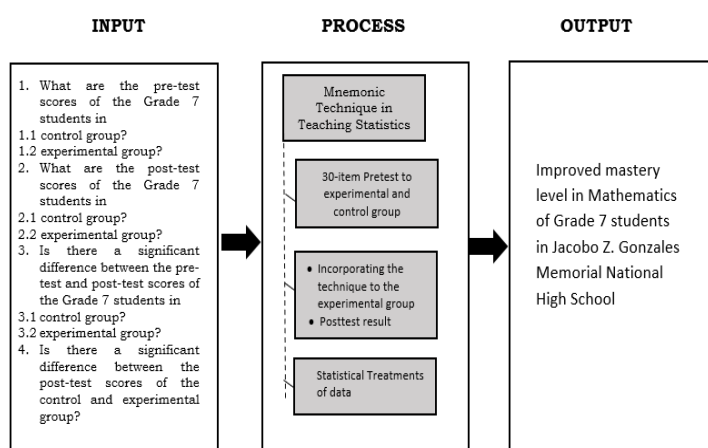
## METHODOLOGY

The study utilized a Quantitative-Quasi-Experimental Research Design. The researcher used purposive and stratified sampling techniques to select the participants from all the students she is handling in Grade 7. The criterion of the participants was the average in the third grading period in Mathematics 7 ranging from 70-79. The six sections were divided into two groups. One group which was composed of selected students from three sections was assigned as an experimental group and the other group with selected students from three sections was assigned as the control group.

The primary innovation in this research was the use of the mnemonic technique in teaching Statistics to grade 7 students. The researcher crafted lesson plans for teaching concepts in Statistics subject in which mnemonic techniques were incorporated. The said lesson plans were evaluated by two Mathematics master teachers and one Mathematics department head teacher with the use of a validation questionnaire.

Pre-tests were conducted among the experimental and control groups. Then the technique was utilized among the experimental group while the traditional method was utilized among the control group. After utilizing the said technique, a post-test was conducted, and statistical treatments were applied to determine its effectiveness.

The diagram below shows the Input-Process-Output model of the study. The Input shows the problems answered in the study. The Process included the interventions made by the researcher to answer the problems posted. First, the students took the 30-item pre-test. Second, the researcher utilized the technique on the experimental group of students, and the traditional method was utilized among the control group. Third, the students took the post-test and then statistical treatments were applied to the data gathered. Moreover, the output showed the outcome of the study which is an improved mastery level in Mathematics of Grade 7 students at Jacobo Z. Gonzales Memorial National High School.



## RESULTS

### 1. What are the pre-test scores of the Grade 7 students in

#### 1.1 control group?

#### 1.2 experimental group?

### 2. What are the post-test scores of the Grade 7 students in

#### 2.1 control group?

#### 2.2 experimental group?

**Table 1**  
Pre-test Scores and Post-test Scores of the Control Group

Scores	Pre-test		Post-test	
	Frequency	Percentage	Frequency	Percentage
26-30	0	0%	0	0%
21-25	0	0%	0	0%
16-20	0	0%	19	59.38%
11-15	11	34.38%	10	31.25%
6-10	17	53.13%	3	9.38%
1-5	4	12.50%	0	0%
<b>TOTAL</b>	<b>32</b>	<b>100%</b>	<b>32</b>	<b>100%</b>

The table reveals that the control group exhibited the highest frequency of scores in the post-test, with 59.38% falling within the 16-20 range, as compared to the pre-test where 53.53% fell within the 6-10 range.

**Pre-test Scores and Post-test Scores of the Experimental Group**

Scores	Pre-test		Post-test	
	Frequency	Percentage	Frequency	Percentage
26-30	0	0%	9	27.27%
21-25	0	0%	14	42.42%
16-20	0	0%	4	12.12%
11-15	16	48.49%	4	12.12%
6-10	17	51.52%	2	6.06%
1-5	0	0%	0	0%
<b>TOTAL</b>	<b>33</b>	<b>100%</b>	<b>33</b>	<b>100%</b>

The table illustrates that the experimental group achieved the highest frequency of scores in the post-test, with 42.42% falling within the 21-25 range, in contrast to the pre-test where 51.52% fell within the 6-10 range.

### 3. Is there a significant difference between the pre-test and post-test scores of the Grade 7 students in

#### 3.1 control group?

#### 3.2. experimental group?

**Table 2**

**Mean Percentage Score of the Pretest and Posttest of the Control Group**

Pretest		Verbal Interpretation		Posttest		Verbal Interpretation	
Mean	MPS			Mean	MPS		
9.31	31.03		Low	15.78	52.60		Average

96-100%	Mastered
86-95%	Closely Approximating Mastery
66-85%	Moving Towards Mastery
35-65%	Average
15-34%	Low
5-14%	Very Low
0-4%	Absolutely No Mastery



From the results presented in the table, the performance of the students in the pre-test and post-test of the control group yielded a mean value of 9.31 and 15.78 respectively, with a Mean Percentage Score of 31.03 (low) and 52.60 (average) respectively.

It can be deduced that the use of traditional teaching techniques was not enough to attain students' higher academic performance in Statistics.

Table 3

Test of Significant Difference Between the Pretest and Posttest of the Control Group

Variables	Median	Z	p-value	Interpretation
Pretest	9.00	4.86	0.001	Significant
Posttest	16.50			

Significant at .05 level

**Interpretation:** Wilcoxon Signed-Rank Test revealed that the post-test scores were significantly higher after the intervention ( $Md = 16.50$ ) compared to the pre-test scores ( $Md = 9.00$ ),  $z = 4.86$ ,  $p = 0.001$ .

Table 4

Mean Percentage Score of the Pretest and Posttest of the Experimental Group

Pretest		Verbal Interpretation	Posttest		Verbal Interpretation
Mean	MPS		Mean	MPS	
10.24	34.13	Low	21.91	73.03	Moving Towards Mastery
96-100% Mastered 86-95% Closely Approximating Mastery 66-85% Moving Towards Mastery 35-65% Average 15-34% Low 5-14% Very Low 0-4% Absolutely No Mastery					

From the results presented in the table, the performance of the students in the pre-test and post-test scores of the experimental group yielded a mean value of 10.24 and 21.91 respectively, with a Mean Percentage Score of 34.13 (low) and 73.03 (moving towards mastery) respectively.

It can be deduced that the use of mnemonic technique in teaching Statistics had a positive effect in the learning of the students.

Table 5

Test of Significant Difference Between the Pretest and Posttest of the Experimental Group

Variables	Median	Z	p-value	Interpretation
Pretest	10.00	4.88	0.001	Significant
Posttest	24.00			

Significant at .05 level

**Interpretation:** Wilcoxon Signed-Rank Test revealed that the post-test scores were significantly higher after the intervention ( $Md = 24.00$ ) compared to the pre-test scores ( $Md = 10.00$ ),  $z = 4.88$ ,  $p = 0.001$ .

#### 4. Is there a significant difference between the post-test scores of the control and experimental group?

Table 6

Mean Percentage Scores of the Posttests of the Control and Experimental Groups

Control Group		Verbal Interpretation	Experimental Group		Verbal Interpretation
Mean	MPS		Mean	MPS	
15.78	52.60	Average	21.91	73.03	Moving Towards Mastery
96-100% Mastered 86-95% Closely Approximating Mastery 66-85% Moving Towards Mastery 35-65% Average 15-34% Low 5-14% Very Low 0-4% Absolutely No Mastery					

From the results presented in the table, the performance of the students in the post-tests scores of the control group and experimental group yielded a mean value of 15.78 and 21.90 respectively, with a Mean Percentage Score of 52.60 (average) and 73.03 (moving towards mastery) respectively.

The post-test score of the experimental group was far greater than the control group. It can be concluded that the use of mnemonic technique in teaching Statistics had a positive effect on the learning of the students.

Table 7

Test of Significant Difference Between the Posttest Scores of the Experimental and Control Groups

Variable	Mean Rank		U	T	p	Interpretation
	Control Group	Experimental Group				
Posttest Scores	22.28	43.39	185.00	-4.512	0.001	Significant

Significant at .05 level

A two-tailed Mann-Whitney two-sample test was conducted to examine whether there was a significant difference between the post-test scores of the experimental and control groups. The result of the two-tailed Mann-Whitney U test was significant,  $U = 185$ ,  $z = -4.512$ ,  $p = 0.001$ . The median score of the experimental group ( $Mdn=24.00$ ) was greater than the median score ( $Mdn=16.50$ ) of the control group. Therefore, it can be concluded that the use of the mnemonic technique in teaching Statistics was far more effective than using the traditional method of teaching.

## DISCUSSION

The research findings highlight a stark contrast between the effectiveness of the traditional teaching method and the innovative teaching technique of the mnemonic technique in the context of Statistics education. The control group, subjected to traditional teaching methods, exhibited a Mean Percentage Score (MPS) that moved from a low 31.03 in the pre-test to a modest 52.60 in the post-test, signifying only an average improvement in academic

performance. In contrast, the experimental group, which received instruction enhanced by the mnemonic technique, demonstrated a significant shift from a low 34.13 in the pre-test to a remarkable 73.03 in the post-test. The Wilcoxon Signed Rank Test results confirmed the significance of these improvements in both groups.

Furthermore, a direct comparison between the post-test results of the control and experimental groups clearly illustrates the substantial advantage of the mnemonic technique using the Mann-Whitney U-Test formula. The post-test MPS for the experimental group (73.03) significantly outperformed that of the control group (52.60), substantiating the positive impact of incorporating mnemonic techniques in Statistics lessons. Therefore, it can be firmly concluded that the application of mnemonic techniques in teaching Statistics has a notable and beneficial effect on students' learning, ultimately leading them toward mastery of the subject matter. This research underscores the importance of innovative teaching approaches to enhance academic performance and highlights the potential of mnemonic techniques in addressing the challenges of concept retention in Mathematics.

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