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IMPROVING THE MASTERY IN LENGTH UNIT CONVERSION AMONG GRADE 7 STUDENTS THROUGH MNEMONICS

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ABSTRACT

This study is intended to determine the knowledge in length unit conversion among Grade 7 students. This study was conducted to determine the significant difference between the pre-test and post-test scores of the students in employing mnemonics in unit length conversion. A pre-experimental research design was utilized to measure the effect of the intervention. Data were gather from 35 Grade 7 students at Baltazar Nicor Valenzuela National High School, selected through purposive sampling. Data collection was done through pre-test and post-test administration. Findings revealed a substantial difference in the scores before and after the intervention. The mean pre-test score was 14.55% (Poor), while the mean post-test score was 63% (Satisfactory). The paired t-test results indicated a significant improvement in students' scores from the pre-test to the post-test, with $t(35) = 16.91$, $p < .001$. This substantial difference suggests a strong effect of the intervention on students' ability to mnemonics, indicating a highly significant and positive impact on their computational fluency. To provide a comprehensive understanding of the students' experiences, the researchers conducted in-depth interviews with selected participants. From their responses, nine themes was identified from the insights of students: Mnemonics Clarify the Process of Solving in Conversions, Mnemonics Make Unit Conversion Less Confusing, Use of First Letter and Order of Words Provides Clarity, Keywords Serve as Reference Points for Specific Units, Difficulty in Remembering Specific Words or Their Meaning, Use of Visual Aids in Found More Effective, Use of Rhythm for Easier Memorization, Mnemonics Boosted Student's Confidence, and Mnemonics Increased Students' Learning Motivation. It can be concluded that the implementation of the mnemonics was helpful to the performance of the students in mastery in length unit conversion. Since there is a significant relationship between the implementation of mnemonics before and after the implementation of intervention.

KEYWORDS: *Mnemonics, Conversion, Length, Grade 7 students, pre-experimental, Philippines*

INTRODUCTION

Unit conversion, particularly within the context of distance measurement, represents a fundamental mathematical competency that is essential for both academic success and real-world application. However, a significant number of students encounter persistent challenges when converting between units such as kilometers, meters, and centimeters (Baranova, 2021). These difficulties often stem from an insufficient understanding of the hierarchical relationships among measurement units and the inability to accurately apply conversion formulas. Students may struggle with more advanced mathematical tasks and fail to recognize the practical significance of unit conversion in everyday contexts. Traditional instructional approaches, which frequently emphasize rote memorization rather than conceptual comprehension, contribute to disengagement and hinder long-term retention of knowledge (Miller & Rodrigues, 2022). Given the critical role of unit conversion in developing overall mathematical proficiency, it is imperative to address these instructional shortcomings to improve student performance and support meaningful application of mathematical concepts in diverse situations (Maria & Chen, 2023).

In United States, many students struggle to master mathematical concepts, particularly unit conversions in distance measurements. A study revealed that on students also showed persistent challenges in length conversions, particularly for two-dimensional units. Pre-test results revealed common misconceptions when translating between units like square feet and square meters even after instruction (Sowby, 2023). Similarly, in Turkey, students also face challenges in examined nearly by 73 teachers and found widespread confusion in multi-step metric conversions. For instance, 48 % incorrectly converted the cm to m, often applying one-dimensional logic to area conversions demonstrating misconceptions about squared unit relationships (Dincer & Osmanoglu, 2023). Moreover, in Puerto Rico, in a study of mechanical-engineering undergraduates, Morales (2020) reported significant struggles with metric prefixes and unit conversions. For example, only 66.7 % of students correctly converted horsepower to microwatts, and a mere 42 % managed to convert millibar to inches of mercury underscoring frequent errors when chaining conversions or reversing tables

In the Philippines, students and communities in various regions continue to face persistent challenges in mastering unit conversions, particularly in distance measurements. In Manila,

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results from the National Achievement Test (NAT) have shown that many students struggle with converting between meters, kilometers, and miles, prompting the Department of Education (DepEd, 2021) to call for targeted educational interventions. In Marawi City, within the Bangsamoro Autonomous Region in Muslim Mindanao (BARMM), limited access to quality STEM education has led to difficulties in metric conversions among both students and adult learners, resulting in practical issues in daily tasks and delays in construction projects (DepEd & UNICEF, 2020). Similarly, in the Cordillera Administrative Region (CAR), province in Benguet have experienced problems with public infrastructure projects such as farm-to-market roads, where the coexistence of traditional indigenous measurements and the metric system has led to unit conversion errors (NEDA-CAR, 2024).

In the Division of Davao del Norte, particularly at Baltazar Nicor Valenzuela National High School, students face persistent challenges in mastering unit conversions, especially in the context of distance measurements. Teachers have observed that students often struggle with converting units such as meters, kilometers, and miles. This difficulty leads to confusion and errors during both class activities and assessments, which in turn diminishes students' academic performance and engagement with the subject. Addressing this issue is critical, as students' inability to accurately apply unit conversion formulas hinders their overall progress in mathematics. Implementing effective instructional strategies focused on improving unit conversion skills can help students gain confidence and mastery in this key mathematical area.

This action research addresses the prevalent challenges faced by students in mastering unit conversions, particularly in distance measurements. It responds to the increasing concern of students' struggles with applying conversion formulas between units such as meters, kilometers, and miles. This issue has significant implications for students' performance in mathematics, as it hampers their ability to understand and solve problems involving unit conversions. Given the importance of mastering this fundamental mathematical skill, this study is both timely and essential for developing effective strategies to help students overcome these difficulties. By exploring and evaluating potential interventions, this research aims to provide insights into how to support students in mastering unit conversions and improving their overall problem-solving abilities in mathematics. The findings of this study will contribute to a broader understanding of the challenges students face in mathematics education and inform future efforts to improve their mathematical competence.

This study underscores a significant gap in understanding an issue in terms of converting unit length with the Grade 7 students. Previous study mostly focus on the topic about enhancing unit conversion, teaching approaches in unit conversion and students perception on learning unit conversion. Further, in the review of relevant literature addressing students' struggles with unit conversions, the researcher found the study of Delgado and Tan (2021) entitled “Enhancing Unit Conversion Skills: A Focus on Retention Strategies in Mathematics”, Yumul and Reyes (2022) entitled “Bridging the Gap in Unit Conversion: A Study on Practical Teaching Approaches” and Rashid et al. (2021) entitled “Students Perception on Learning Unit Conversion through Smart Conversion Card Tool”. These study is in fact different in the other study given the facts that this study is used intervention to improve the mastery of unit length conversion of the students. Moreover the study was conducted at Baltazar Nicor Valenzuela National High School, and this interest the primarily the grade 7 students. Several study have made regarding to the problem to identify reasons and attempt to arrive at solution. Hence, a gap in unit length conversion is identified.

However, upon reviewing the scope and locale of this study, the researcher found no existing studies using the descriptive quantitative method with a one-group pre- test post-test design that specifically addresses students' difficulties in mastering unit conversions, particularly in distance measurements. This identifies a research gap, underscoring the need for further investigation into effective interventions to improve students' mastery of unit conversions.

Research Questions

This study aimed to determine the effectiveness of mnemonics as an intervention in improving
the mastery in length unit conversion among Grade 7 students at Baltazar Nicor Valenzuela National High School. To be specific, this study sought to answer the following questions:

1. What is the level of knowledge in length unit conversion among grade 7 students before the mnemonics intervention has been implemented?
2. What is the level of knowledge in length unit conversion among grade 7 students after the mnemonics intervention has been implemented?
3. What is the significant difference between pre-test and post-test employing the mnemonics intervention?
4. What are the insights of the students in the implementation of mnemonics intervention in learning unit conversion of length?

Proposed Intervention

The mnemonics “King Henry Died by Drinking Chocolate Milk” is a focused intervention designed to master the distance unit conversion among Grade 7 students. This approach utilizes mnemonic techniques, such as acronyms and patterns to help students’ associate distance unit conversion with easily memorable cues. By embedding these associations into the learning process, the mnemonics aims to enhance students' ability to recall the pattern efficiently. The intervention encourages active engagement through targeted exercises, which not only improve retention but also promote a deeper understanding in converting units. This method fosters greater confidence in students when applying methods to problem-solving, ultimately contributing to improved performance in mathematics.

The researchers developed an intervention called "Mnemonics" specifically designed to master the distance unit of conversion of among the students from the chosen school. Upon implementation of the intervention, identified students will be having their session in weekdays every last period in the afternoon which is 3:30pm to 4:30pm since it is their “Catch-

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up-Friday", and it lasts in over a month, which is intentionally implemented to further address the needs of diverse students.

Before the conduct of the study, the researcher shall collaborate with the teachers of Grade 7 to identify who among the students are qualified for the study. The teacher of the grade 8 Mathematics will choose students based on their acquired historical data in identifying the participants. There will be a total of thirty-five (35) students in grade 7 which was identified by the teachers as the respondents who are observed to that needs mastery in unit conversion. Then, Pre-Test will be administered to identify their prior level of mastery and knowledge. Afterward, various strategies will be employed to support the goal of mastery in unit conversion. These strategies will include mnemonic techniques, visual aids, and repetitive recall exercises to retain the information. After the activities, a Post-Test will be administered to identify whether there will be an increase of level of mastery among respondents. Then, a comparative analysis will then be conducted between the data obtained from the pre-test and the data obtained after the intervention is implemented.

Before commencing the action research, a thorough orientation will be conducted for participants, introducing the intervention along with a detailed explanation of the study's intentions and methodologies. Afterward, participants was informed, ensuring that their identity will remain anonymous and with utmost discretion. Moreover, to safeguard the well-being of participants, the researchers will engage in a comprehensive discussion highlighting the benefits of having a mnemonics. This discussion will serve as a guide, outlining the diverse activities participants will undertake during the intervention. The researchers are committed to ensuring that the instruments and strategies employed significantly contribute to the participants' development and enhancement of reading comprehension in every session conducted.

The primary objective of this study is to cultivate and master the conversion of unit of grade 7 students at Baltazar Nicor Valenzuela National High School. In the pursuit of this goal, the researchers will adhere to a set of guiding questions to structure and inform the study's direction. The mnemonics "King Henry Died by Drinking Chocolate Milk" provides targeted support to help Grade 7 students master the conversion of distance. By utilizing this mnemonic techniques such as visualization and acronyms, it offers personalized instruction tailored to individual learning needs. This approach enhances students' ability to determine the measurement, boosting their confidence and overall mathematical performance. By focusing on specific mastery, mnemonics empowers students to better retain and apply mathematical concepts, laying the groundwork for continued academic success.

After the implementation, the researchers are eager to witness the participants' progress and advancements in solving the formulas as well as their mastery. The expectation is for a positive transformation in the academic development of the participants, envisioning heightened success in their educational journey. The researchers are optimistic that the invested efforts using the intervention will translate into a more successful and fulfilling academic experience for the participants, setting the stage for ongoing progress and achievement.

Session	Estimated Time Duration	What will happen?
Week 1	1 hour	Diagnose Phase: Pre-Test
Week 2	1 hour	Introduce the intervention which is the mnemonics "King Henry Died By Drinking Chocolate Milk". Also, they will be given a chance to memorize the mnemonics and randomly select a student to recite the mnemonics.
Week 3	1 hour	Conducting the mnemonics as an intervention in length unit conversion. Also, they will be given drills and board works.
Week 4	1 hour	Conducting the mnemonics as an intervention in length unit conversion. Also, they will be given drills and board works.
Week 5	1 hour	Conducting the mnemonics as an intervention in length unit conversion. Also, they will be given drills and board works.
Week 6	1 hour	Diagnose Phase: Post Test

METHODS

Research Design

This study employed quantitative research through a one-group pre-test-post-test design, a type of pre-experimental approach. It assessed changes resulting from an intervention or project by comparing values before (baseline) and after the intervention (end-line evaluation). Unlike experimental designs, pre-experimental designs lack a control group for comparison; instead, they focus on changes within a single group over time. The observed differences between baseline and end-line values are attributed to the project, suggesting its impact on the outcomes (Wamunyima & Nyirenda, 2023).

In this context, this method is necessary for conducting action research, aiming to evaluate the effectiveness of an intervention with an experimental group assigned to the study. The experimental group in improving in length unit conversion among Grade 7 students, namely the mnemonics.

Additionally, this study adopted an experimental-qualitative design, combining measurable outcomes with students' experiential insights. Using a one-group pretest-posttest setup, it evaluated the mnemonics effectiveness in improving the mastery in length unit conversion. Qualitative data on learning

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Mnemonic Keyword is more effective in helping students to memorize and store vocabulary in the short and long term (Kurniarahman, 2023).

Population and Sample

This research study involved 35 grade 7 students from Baltazar Nicor Valenzuela National High School. The study focused on mastery in unit conversion of these students. Grade 7 students were chosen were this stage marks the foundation of their knowledge in improving the mastery in length unit conversion for intervention. In implementing the mnemonics, the study employed teaching strategies that incorporate visual tool and drills. These approaches support students in developing a deeper understanding in converting unit abstract concepts more concrete and relatable.

The intervention used in the study was the mnemonics, designed to enhance students' mastery of the students in unit conversion. This section was chosen to highlights the core purpose of the quantitative method, which aligns directly with the goals of the study. Since the research seeks to assess students' mastery in unit length conversion, it requires objective, measurable data that can be analyzed statistically. By using tests or structured assessments, the researchers are able to gather reliable numerical evidence of student performance. This allows for the identification of patterns, strengths, and areas for improvement, making the findings more accurate and generalizable to a larger population. Quantitative analysis also adds credibility to the study by minimizing subjectivity and enabling comparisons of the result.

Instrumentation

This study utilized a researcher-made questionnaire to assess the level of mastery in length unit conversion among Grade 7 students, as well as their attention and engagement during the learning process. The test items were carefully modified to align with the specific objectives of the study and underwent content validation by a panel of experts to ensure clarity, relevance, and appropriateness. Prior to its implementation, the instrument was further reviewed by the research panel and pilot-tested to establish its validity and reliability.

To ensure a standardized interpretation of student performance, a scoring framework was developed. This instrument is derived from the work of Hidegkuti (2019), ensuring its relevance and alignment with the objectives of the study. The math drill questionnaire included twenty (20) items. In assessing the mastery in length unit conversion of Grade 7 students at Baltazar Nicor Valenzuela National High School, the following scale was used:

Range of Mean	Descriptive Level	Interpretation
90% – 100%	Outstanding	This means that the level of mastery in length unit conversion of Grade 7 students is outstanding.
72% – 89%	Highly Satisfactory	This means that the level of mastery in length unit conversion of Grade 7 students is highly satisfactory.
54% – 71%	Satisfactory	This means that the level of mastery in length unit conversion of Grade 7 students is satisfactory.
36% – 53%	Fair Satisfactory	This means that the level of mastery in length unit conversion of Grade 7 students is fairly satisfactory.
18% – 35%	Needs Improvement	This means that the level of mastery in length unit conversion of Grade 7 students needs improvement.
0% – 17%	Poor	This means that the level of mastery in length unit conversion of Grade 7 students did not meet expectation.

Statistical Treatment of Data

The statistical tools employed in this study, namely the mean and the t-test, played a crucial role in analyzing the gathered data. The mean, a fundamental measure of central tendency, provided insights into the average performance of students in both the pretest and post-test phases. By calculating the mean scores from the total scores of students in each phase, researchers were able to gauge the overall level of skills on solving work-related problems involving fractions among participants before and after the intervention.

Moreover, the t-test enabled a comparison of means between two populations. It helped determine whether differences in mean scores between pretest and post-test phases were statistically significant, shedding light on the intervention's impact on skills on solving work-related problems. Additionally, the t-test identified significant variations in skill levels pre- and post-intervention, offering valuable evidence to support the study's conclusions.

Data Analysis

The researchers used thematic analysis to interpret participants' responses by coding and clustering similar ideas. Coding involved labelling key points from the data, followed by data reduction to organize and simplify the responses. These codes were then grouped into categories to identify emerging themes. To ensure credibility, the assigned themes were reviewed and validated by experts.

In this study, the researchers gathered data from both pre-test and post-test evaluations. They calculated the mean of the data and then compared the means of the pre-test and post-test using a paired t-test, alongside examining the standard deviation n to assess the variation within the dataset. This analysis aimed to identify any notable differences and assess whether the mean demonstrated an increase, indicating the efficacy of the intervention.

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Moreover, the collected data from the in-depth interviews were transcribed, translated, and analyzed, following Creswell's (2009) proposed process for data analysis. The translated responses of the participants were coded to create a thematic analysis of the data for this study. Thematic analysis, also known as coding, involves categorizing responses and identifying recurring themes in the text to develop a structured representation of thematic ideas. Through the systematic process of thematic analysis, the researcher organized the dataset into themes or patterns. This enabled the researcher to identify and develop themes based on the obtained data, as described by Dye (2021). During the data analysis, the researcher relied on the transcripts and translations of the informants' responses. The researcher grouped and organized the repeated responses using coding to generate a comprehensive theme analysis. The concepts were sorted and evaluated based on their relationships, similarities, and contrasts with the assistance of a data analyst.

Procedure

The researchers conducted assessments before and after the intervention to evaluate the effectiveness. The pre-test aimed to measure the conversion difficulties of students prior to the intervention, while the post-test was designed to assess their knowledge and progress by using mnemonics. This underscores the significance of employing appropriate data collection procedures to ensure reliable data from diverse sources. In this study, the researchers implemented a pre-and post-test method to collect data.

A one-group pre-test and post-test design was used to assess the effect of the mnemonics on the mastery in unit conversion of Grade 7 students. To identify participants, the researchers collaborated with the Grade 7 Mathematics teacher, who selected the most suitable candidates for the study. Once the participants were chosen, the researchers respectfully asked for their voluntary consent to participate, emphasizing that no deception would be used, in accordance with ethical standards. In cases where students declined, the researchers expressed gratitude for their time and honesty. Following the acquisition of consent, a pre-test was administered to establish baseline mastery in unit conversion. The mnemonics intervention will then be introduced and conducted every Friday throughout the study period to ensure consistency and reinforce learning. A post-test will subsequently be conducted to measure the impact of the intervention on students' mastery of unit conversion.

RESULTS

This chapter presents the findings gathered from the study. This includes the level of the student's mastery in unit length conversion as measured in the pre-test, their performance in post-test and the statistical significance of the difference between pre-test and post-test scores.

Research Question No. 1: What is the level of knowledge in length unit conversion among grade 7 students before the mnemonics intervention has been implemented?

To find the answer for the first research objective, the researchers used a questionnaire to suit the context of the study. The set of the questionnaires dealt with the student mastery in unit length conversion. As shown in Table 1 were the mean for the student's mastery before the implementation of mnemonics.

Table 1. Level of knowledge in length unit conversion among grade 7 students before the mnemonics intervention has been implemented.

Pre-Test Scores	Frequency	Percentage
0	3	8.57%
1	11	31.43%
2	4	11.43%
3	7	20.00%
4	4	11.43%
5	1	2.86%
6	2	5.71%
7	1	2.86%
11	2	5.71%
Total	**35**	**100%**
Mean Percentage Score		**14.55%**
Description		**Poor**

Presented in Table 1 was the results of the pre-test, which indicated the mastery in length unit conversion levels among 35 students before the implementation of mnemonics. The overall mean score was 14.55%, with a descriptive level of poor, indicating that the level of mastery in unit length conversion among Grade 7 students did not meet expectations. The highest score was 11 out of 20, which had an equivalent percentage of 55%, and was achieved by 2 student or 5.71% of the population. The lowest score was 0, achieved by 3 students or 8.57% of the population, with an equivalent percentage of 0%. Meanwhile, the most frequent score was 1, recorded by 11 students, accounting for 31.43% of the population (n = 35). In terms of the mean scores, the pretest showed a mean of 2.91, with a standard deviation (SD) of 2.68. This poor performance implied that the majority of the Grade 7 students struggled with the mastery in unit length conversion.

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This study support the findings of Dincer and Osmanoglu (2020) which reported that explored the knowledge and difficulties that prospective science teachers face with metric unit conversion. Using a test with both multiple-choice and open-ended questions, the study revealed that many participants struggled with converting between different metric units of length, area, volume, and mass. Moreover, similar study to Feudo (2023) the study findings revealed that engineering students had difficulties with such essential skills, although they were already supposed to have knowledge on them. More specifically, they were expected to be able to convert metric units such as converting micrograms to kilograms and/or centimeters to nanometers etc. Furthermore, it was supported by the study of Gilma (2020) showed that by examining students' misconceptions about metric conversion and their challenges with unit estimation, the researcher concluded that students experienced difficulty with unit conversions regardless of the direction of the conversion. The findings highlight the need for improved teaching strategies to strengthen understanding of metric conversions.

Research Question No. 2: What is the level of knowledge in length unit conversion among grade 7 students after the mnemonics intervention has been implemented?

To find the answer for the second research objective, the researchers used a questionnaire to suit the context of the study. The set of the questionnaires dealt with the student mastery in unit length conversion. As shown in Table 2 were the mean for the student's mastery after the implementation of mnemonics.

Table 2. Level of knowledge in length unit conversion among grade 7 students after the mnemonics intervention has been implemented.

Pre-Test Scores	Frequency	Percentage
7	3	8.57%
8	3	8.57%
9	4	11.43%
10	5	14.28%
11	3	8.57%
12	4	11.43%
13	4	14.29%
14	2	5.71%
15	2	5.71%
16	1	2.86%
18	1	2.86%
20	3	8.57%
Total	35	**100.00%**
Mean Percentage Score		**63%**
Description		**Satisfactory**

Presented in Table 2 was the results of the post-test, which indicated the mastery in length unit conversion levels among 35 students before the implementation of mnemonics. The overall mean score was 63%, with a descriptive level of satisfactory, indicating that the level of mastery in unit length conversion among Grade 7 students satisfactory performance. The highest score was 20 out of 20, which had an equivalent percentage of 100%, and was achieved by 3 student or 8.57% of the population. The lowest score was 7, achieved by 3 students or 8.57% of the population, with an equivalent percentage of 37%. Meanwhile, the most frequent score was 10, recorded by 5 students, accounting for 14.28% of the population (n = 35). In terms of the mean scores, the pre-test showed a mean of 12.0, with a standard deviation (SD) of 3.60. This improvement implied that the mnemonics intervention to the Grade 7 students helped them to master in unit length conversion.

This study support the findings of Myers (2021) which stated that by using the mnemonic device "King Henry Died Unexpectedly Drinking Chocolate Milk," learners can more easily memorize and retain the sequence of metric prefixes. Furthermore, a similar to the study of Hill (2022). The findings reveal that mnemonic devices can significantly enhance students' retention, with an average improvement of approximately 9%, demonstrating their effectiveness as a memory aid in learning. Moreover, it was supported by the study of Fatima (2022) showed that mnemonic can motivate the students and the classroom that is more interesting. This technique is a way to help the students remember the information more effectively and easily. This simple yet effective memory aid reinforces the order of metric units from largest to smallest, making the process of unit conversion more intuitive and accessible.

Research Question No. 3: What is the significant difference between Pre-test and Post-test employing the mnemonics intervention?

To find the answer for the third research objective, the researchers used a questionnaire to suit the context of the study. The set of the questionnaires dealt with the student mastery in unit length conversion. As shown in Table 3 were the mean for the student's mastery before and after the implementation of mnemonics.

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Table 3. Significant Difference between Pre-test and Post-test

Paired Sample T-test								
		t	df	p	Mean difference	SE difference		Effect Size
Pre-test	Post-test	16.91	34.0	<.001	8.971	0.531	Cohen's d	2.858

Presented in Table 3 are the results of the significant difference between the pre-test and post-test scores, indicating the performance levels of 35 students mastery in length unit conversion, $t(35) = 16.91$, $p < .001$. Since the probability value ($p < .001$) is less than the level of significance ($\alpha = 0.05$), the null hypothesis is rejected. This means that there is a significant difference between the pre-test and post-test scores.

These results suggest that the observed improvement in scores after the intervention was unlikely to have occurred by chance. Therefore, the null hypothesis—which stated that there would be no significant difference between the pre-test and post-test scores—was rejected. The results confirm that mnemonics intervention was effective in enhancing students' performance in converting units.

Moreover, the effect size, represented by Cohen's $d = 2.858$, falls within the medium to large range. This means that the impact of the intervention was satisfactory, indicating not only a statistical significance but also a meaningful improvement in student learning in improving the mastery in converting length units.

Based on the results it was found that there is a significant difference between the pre-test and post-test score of the students. This indicates that the mnemonics intervention was effective in improving the mastery in length unit conversion among Grade 7 students. This finding supports the research conducted by Barrington et al. (2020), which states that integrating computational approaches in math instruction leads to positive student outcomes. In their study, students who engaged in computational problem-solving techniques demonstrated improved critical thinking and enhanced problem-solving abilities.

Moreover, the study of Siagian et al. (2023) stated that the mnemonic strategies can help primary school pupils improve their long-term memory. A variety of techniques are included in the mnemonic device techniques, including (1) rhyme, (2) abbreviations, (3) peg word system, (4) loci method, and (5) keyword system. Students can maximize their brains' encoding and retrieval processes, which will boost memory retention, by using the proper mnemonic strategy during the learning process. Furthermore, the study of Marcos et al. (2024) showed a significant improvement in students' scores following the use of mnemonics in instruction, as evidenced by the rise in the mean average score, the rejection of the null hypothesis, and a positive correlation between mnemonic use and student performance. The study recommended the continued integration of mnemonic strategies in teaching Araling Panlipunan 9, offering remedial support for low-performing students, and encouraging active student participation in the learning process.

Research Question No. 4: What are the insights of the students in the implementation of mnemonics intervention in learning unit conversion of length?

There were nine major themes emerged in this study: 1) Mnemonics Clarify the Process of Solving in Conversions; 2) Mnemonics Make Unit Conversion Less Confusing; 3) Use of First Letters and Order of Words Provides Clarity; 4) Keywords Serve as Reference Points for Specific Units; 5) Difficulty in Remembering Specific Words or Their Meaning; 6) Use of Visual Aids is Found More Effective; 7) Use of Rhythm for Easier Memorization; 8) Mnemonics Boosted Students' Confidence; 9) Mnemonics Increased Students' Learning Motivation. These themes are shown in Table 4.

Table 4. Insights from the Students on the Implementation of the Mnemonics-Based Intervention in Learning Unit Conversion of Length

Emerging Themes	Supporting Statements
Mnemonics Clarify the Process of Solving in Conversions	• "Teacher, it is easy for me to understand when to multiply or divide." IDI-03 • "Teacher, it helped me know where to multiply or divide." IDI-04 • "Teacher, the mnemonic helped me understand conversions easily." IDI-05 • "Teacher, it is very clear which unit to use because of the mnemonic." IDI-06 • "Teacher, it helped me clearly see how many decimal places I need to move." IDI-10
Mnemonics Make Unit Conversion Less Confusing	• "The mnemonic really helped, teacher, because I no longer get confused when converting units." IDI-01 • Teacher, I am very thankful because the mnemonic helped me avoid confusion with the units." IDI-02 • "Teacher, I am no longer afraid of metric conversions because it's now easy." IDI-08

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	• "Teacher, the first-letter guide helps me stay on track." IDI-09
Use of First Letters and Order of Words Provides Clarity	• "Teacher, the part where the first letters are clearly followed really helped me." IDI-01 • "The most helpful part, teacher, was the order of the words." IDI-02 • "Following the letters, teacher, helped me not get confused." IDI-04 • "Following the first letters, teacher, helped me the most." IDI-06 • "Following King Henry up to Chocolate Milk, teacher, was the best help for me." IDI-10
Keywords Serve as Reference Points for Specific Units	• "Chocolate Milk,' teacher, was really my reference for the smaller units." IDI-03 • "'King' and 'Milk' are my favorite parts, teacher, because they are very clear." IDI-05 • "'Henry Died,' teacher, helped me know when to divide." IDI-09 • "'By Drinking Chocolate Milk,' teacher, is easy for me to remember." IDI-07 • "The story-like sentence, teacher, helped me the most." IDI-08
Difficulty in Remembering Specific Words or Their Meaning	• "Yes, teacher, sometimes I forget what 'By' means, but I can easily remember it again." IDI-01 • "Teacher, I sometimes get confused between 'Died' and 'Drinking,' (…)." IDI-02 • "Teacher, sometimes I forget the exact meaning of the words, (…)." IDI-10
Use of Visual Aids is Found More Effective	• "Teacher, maybe it would be better if there were drawings or colors so we'd enjoy it more." -IDI-01 • "Maybe it would be good, teacher, to add drawings to make the steps clearer." IDI-03 • "It might be better, teacher, to put a poster in the classroom so we can see the mnemonic." IDI-04 • "Maybe it would help, teacher, to make posters or stickers for the mnemonic." IDI-08 • "Maybe it would also be good, teacher, to use flashcards." IDI-06
Use of Rhythm for Easier Memorization	• "Maybe, teacher, it would be nice to add a song so it is easier to memorize." IDI-02 • "Maybe it would be better, teacher, to make a rap song for the mnemonic." IDI-09 • "Maybe adding some actions and sounds, teacher, would make the mnemonic livelier." IDI-07
Mnemonics Boosted Students' Confidence	• "Teacher, my confidence increased because the steps in unit conversion became clear." IDI-01 • "Teacher, I am more confident in answering because I now have a clear guide." IDI-03 • "Teacher, I am very thankful because I am now more comfortable solving problems." IDI-05 • "Teacher, my confidence in solving conversions increased." IDI-07
Mnemonics Increased Students' Learning Motivation	• "My motivation increased, teacher, because I enjoyed learning." IDI-02 • "Teacher, I am more motivated to practice because it is easy to follow." IDI-04 • "Teacher, I am more motivated because I know that I understand what I am doing." IDI-06 • "Teacher, I am motivated because I'm proud that I really understood it." IDI-08 • "Teacher, I am motivated because solving is now easy and it feels light." IDI-10

The first theme that emerged under insights is that mnemonics clarify the process of solving conversions. The utilization of mnemonic-based methods has led to a noticeable rise in students' ability to solve conversions. The results indicated that students often used self-generated mnemonic cues to remember difficult or abstract information. These mnemonics were effective in transforming abstract content into meaningful units, linking new information to existing knowledge, and

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establishing distinct retrieval pathways that enhanced recall (Tullis & Maddox, 2020). Similarly, mnemonics significantly improved students' processing skills. Learners who received mnemonic instruction demonstrated better comprehension and problem-solving compared to those taught through traditional methods (Talingdan, 2021).

Moreover, the second theme, mnemonics make unit conversion less confusing when utilized. The use of a mnemonic-based tool called the Smart Conversion Card enhanced students' understanding of unit conversions. The tool provided a structured and visual aid that simplified the conversion process, significantly reducing students' confusion and increasing their confidence in solving related problems (Md Rashid et al., 2021). Additionally, Conversion, which incorporates mnemonic strategies, enhanced students' understanding of unit conversions. Participants reported reduced confusion and anxiety, increased confidence, and clearer guidance in solving conversion problems. (Castillo & Punzalan, 2021).

In addition, the third theme, use of first letters and the order of words provides clarity. The results of the study revealed that readers consistently recognized the first letter of a word more accurately and rapidly than the subsequent letters, regardless of the word's length. This first-letter advantage was attributed to spatial attention mechanisms, indicating that readers naturally direct more focus to the beginning of words, which in turn facilitates faster and more precise word recognition (Aschenbrenner et al., 2020). Additionally, mnemonic strategies, particularly those involving the use of first letters and ordered cues, significantly improve students' ability to remember and apply mathematical concepts. These strategies helped reduce confusion and increased clarity when learning complex procedures (Boon et al., 2020).

Furthermore, the fourth theme, keywords serve as reference points for specific units. Associating keywords with specific units of meaning, students were better able to identify main ideas and understand the structure of texts. The intervention led to a significant improvement in students' reading comprehension scores, indicating that keywords can serve as effective reference points for understanding and recalling textual information (Laia et al., 2023). Similarly, use of mnemonic strategies led to significant improvement in learners' understanding of complex concepts. Results revealed enhanced comprehension, while participants reported that mnemonics served as effective tools in aiding memory retention and reducing confusion during learning (Shivolo, 2024).

Additionally, the fifth theme, difficulty in remembering specific words or their meanings. Students frequently encountered challenges in remembering specific vocabulary words and their meanings. Common issues included difficulties with correctly recalling word meanings, confusing similar-sounding or visually similar words, and struggling to retain new vocabulary over time (Sadewi et al., 2024). Additionally, use of mnemonic devices, alongside self-paced learning and spaced repetition, significantly improved memory recall among students. Students who applied mnemonic strategies were better able to retain and retrieve information, suggesting that such techniques effectively support learning and reduce confusion in remembering complex terms (Guzman, 2023).

On the contrary, the sixth theme, use of visual aids is found more effective. The use of visual aids had a significant positive impact on students' learning motivation and achievement. The study demonstrated that students who learned with visual aids performed better academically, with a 54.6% contribution to achievement, compared to only 19.1% among students who did not use visual aids (Fitri, 2020). Additionally, integration of visual aids significantly enhanced students' motivation, participation, and comprehension, particularly in grammar and vocabulary acquisition. The study underscores the effectiveness of visual aids in fostering a more engaging and interactive learning environment, thereby improving students' academic performance and enthusiasm for learning (Kochkorova, 2025).

Correspondingly, the seventh theme, use of rhythm for easier memorization. The study emphasized that using rhythm and music in learning materials enhances memorization and engagement, supporting participants' suggestions to incorporate songs or actions into mnemonics (Crowther et al., 2023). Similarly, incorporating rhythmic elements into musical mnemonics significantly improved memory recall among both younger and older adults (Goh et al., 2022).

Correspondingly, the eighth theme, mnemonics boosted students' confidence. The utilization of mnemonics increased students' confidence in solving problems. Mnemonic strategies significantly improved students' recall of multiplication facts. Those who used techniques such as visual imagery and story-linking performed with greater accuracy and speed than those who did not. These results suggest that mnemonics not only enhance memory but also boost students' confidence in solving mathematical problems, supporting the present theme where students reported feeling more confident and comfortable using mnemonics (Wulandary & Kawai, 2024). The effective use of mnemonics enhanced students' ability to encode and retrieve information, which in turn contributed to increased confidence in their learning and problem-solving abilities (Siagian et al., 2023).

Lastly, the ninth and final theme, mnemonics increased students' learning motivation. Research supports that significant improvement in students' performance post-intervention, suggesting that mnemonic strategies not only aid in memory retention but also enhance students' engagement and motivation in learning complex mathematical concepts (Padernal, 2023). Moreover, mnemonic device strategies significantly enhanced students' motivation. Students reported greater enjoyment and engagement, attributing their increased motivation to the ease and memorability of the learning process (Sudirman & Tawali, 2023).

CONCLUSION

After a thorough analysis of the data gathered in this study, conclusions was drawn in answer to the set of research questions of the study.

The level of knowledge in length unit conversion among Grade 7 students before the mnemonics intervention has been

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implemented was observed to be generally low. This implies that the students struggled with basic unit conversion concepts, likely due to limited prior exposure and difficulty in recalling standard metric prefixes and conversion steps.

Furthermore, the level of knowledge in length unit conversion among Grade 7 students after the mnemonics intervention has been implemented showed a marked improvement. This implies that the Grade 7 students were able to better understand and retain the steps involved in converting length units, demonstrating increased confidence and accuracy.

Also, there is a significant difference between pre-test and post-test employing the mnemonics intervention. This implies that the students benefited meaningfully from the intervention, as the mnemonic strategy helped them process and memorize conversion rules more effectively, resulting in improved performance.

Lastly, the insights of the students in the implementation of mnemonics intervention in learning unit conversion of length revealed positive perceptions. This implies that the students found the mnemonic approach engaging, easier to follow, and helpful in overcoming the confusion typically associated with metric system conversions.

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