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THE U-CARE STRATEGY (UNDERSTANDING, COMPUTING, APPLYING, REASONING AND ENGAGING) IN TEACHING MATHEMATICS AND ITS EFFECT ON PUPILS' MATHEMATICS PERFORMANCE

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ABSTRACT

This study examined the effectiveness of the U-CARE Strategy—Understanding, Computing, Applying, Reasoning, and Engaging—in improving the mathematics performance of Grade 1 pupils at Rang-ayan Elementary School, Schools Division Office of the City of Ilagan. Anchored on the five strands of mathematical proficiency, the study responded to persistent concerns on learners' low confidence, weak foundational numeracy, and limited engagement in Mathematics. A quasi-experimental pretest–posttest non-equivalent control group design was employed involving 36 pupils from two intact sections: Grade I–Matapat as the experimental group and Grade I–Mabait as the control group. The experimental group received instruction using the U-CARE Strategy, while the control group was taught through the conventional discussion method. Data were gathered using the Rapid Mathematics Assessment pretest and posttest, supplemented by pupils' responses on their learning experiences. Results showed that both groups improved after instruction; however, the experimental group obtained a higher posttest mean score and greater mean gain than the control group. Statistical analysis revealed a significant difference in posttest scores and gain scores, indicating the positive effect of the intervention. The computed effect size further demonstrated a large impact of the U-CARE Strategy on pupils' mathematics performance. Learners also reported positive experiences across the lessons, including improved understanding, enjoyment, active participation, and confidence in completing mathematical tasks. The findings suggest that the U-CARE Strategy is an effective learner-centered instructional approach that enhances mathematical achievement, promotes engagement, and

supports the development of foundational numeracy skills among Grade 1 pupils in Philippine public schools and similar early-grade learning contexts.

Keywords: *U-CARE Strategy, mathematics performance, Grade 1 pupils, foundational numeracy, learner-centered instruction*

INTRODUCTION

Mathematics is universally acknowledged as a fundamental component of education across nations. It plays a crucial role in cultivating learners' capacity for critical thinking, logical reasoning, and problem-solving, while also enabling them to connect abstract concepts with real-world applications. Despite its importance, many learners perceive Mathematics as a difficult and intimidating subject. This perception often results in low academic performance, limited engagement during classroom instruction, and negative learning experiences.

Drawing from years of professional practice, the researcher has observed that numerous pupils demonstrate low confidence, diminished interest, and significant difficulty when confronted with mathematical tasks. Such experiences can shape learners' attitudes toward Mathematics, frequently leading to reduced motivation, anxiety, and disengagement from the subject. As a result, it becomes imperative for educators to implement instructional strategies that not only enhance academic achievement but also foster positive and meaningful learning experiences. By doing so, teachers can help transform pupils' perceptions of Mathematics, encourage greater participation, and sustain learners' interest in the discipline (National Research Council, 2001; Ramirez et al., 2018).

In response to persistent concerns regarding student achievement, educators have increasingly emphasized learner-centered and structured pedagogical approaches. Such methods guide learners in comprehending concepts, connecting prior knowledge, applying skills, engaging in reflective practice, and evaluating their own understanding. When pupils are provided with well-designed instructional activities and supportive guidance, they are more likely to enjoy lessons, participate actively, and develop confidence in learning Mathematics. These practices are consistent with recommendations that mathematics instruction should promote reasoning, sense-making, conceptual understanding, procedural fluency, and productive learner engagement (National Council of Teachers of Mathematics, 2014; National Research Council, 2001).

The Trends in International Mathematics and Science Study (TIMSS) 2019 revealed that Filipino Grade 4 students scored 297 in Mathematics and 249 in Science, placing the country among the lowest-performing participating education systems. Similarly, the Programme for International Student Assessment (PISA) 2022 showed that Filipino 15-year-old learners remained below international benchmarks, with average scores of 355 in Mathematics, 347 in Reading, and 356 in Science. These results showed little improvement from the country's 2018 performance, indicating persistent concerns in

student proficiency levels across major learning areas (Mullis et al., 2020; Organisation for Economic Co-operation and Development [OECD], 2023).

According to data from the Organisation for Economic Co-operation and Development, only 16% of Filipino students attained at least Level 2 proficiency in Mathematics, which is substantially below the OECD average of 69%. This result indicates that many learners still struggle to interpret, apply, and reason mathematically in basic problem-solving contexts. Although performance differences among student groups may vary, the overall findings underscore the urgent need to strengthen mathematics teaching and learning in the Philippines. In light of these challenges, it is imperative to examine the underlying causes of weak mathematics performance and to propose targeted instructional interventions that are aligned with proficiency expectations and learner needs (Amusuglo & Jančařík, 2024; OECD, 2023).

The World Bank reported that a large proportion of Filipino students fall below minimum proficiency standards in reading, mathematics, and science. This conclusion was based on the Philippines' participation in three international assessments: the Programme for International Student Assessment (PISA) in 2018, the Trends in International Mathematics and Science Study (TIMSS) in 2019, and the Southeast Asia Primary Learning Metrics (SEA-PLM) in 2019. The report described the situation as an educational crisis that began prior to the COVID-19 pandemic and was further aggravated by pandemic-related disruptions. Across these assessments, only 10% to 22% of students in Grades 4, 5, and 9 achieved scores at or above minimum proficiency levels, underscoring the urgent need for systemic reforms in Philippine education (Gita-Carlos, 2021; World Bank, 2020).

The National Achievement Test (NAT) serves as a vital tool for assessing student performance across core academic domains, particularly mathematics. Designed in alignment with the objectives of the K–12 curriculum, the NAT evaluates learners' competencies in critical thinking, problem-solving, and information literacy. In the 2024 administration of the NAT, Rang-ayan Elementary School, under the supervision of the Schools Division Office of Ilagan, demonstrated commendable performance. The school attained a mean percentage score (MPS) of 66.20 in Mathematics, surpassing the national average of 60.76.

The Rapid Mathematics Assessment (RMA) is a diagnostic and benchmarking instrument developed by the Philippine Department of Education (DepEd) to evaluate learners' foundational numeracy skills, particularly in the early grades. Its primary purpose is to enable teachers to identify learning gaps efficiently without requiring extended testing periods. The assessment emphasizes fundamental mathematical concepts and operations, thereby allowing educators to detect early numeracy difficulties that may lead to persistent challenges in higher grade levels.

In the researcher's class, the results of the RMA pre-test revealed a concerning trend. None of the students achieved the Highly Proficient (At Grade Level Ready) category (0%), indicating that no learner had mastered the expected mathematical competencies for their grade level. Similarly, no student reached the Proficient

(Transitioning) level, which represents learners approaching grade-level expectations but not yet fully meeting them. Instead, eight pupils (44%) were classified as Nearly Proficient (Developing), demonstrating partial understanding of concepts but lacking consistency in skills. The remaining ten pupils (55%) fell within the Emerging category, comprising 44% Low Proficient and 11% Not Proficient learners. This latter group requires substantial instructional intervention, with the lowest-performing 11% struggling significantly to grasp even the most basic mathematical operations.

These findings underscore the urgent need for targeted instructional support. Without immediate intervention, learners may face increasing difficulty in progressing to more complex mathematical operations and problem-solving tasks. Furthermore, the data highlights the necessity of critically reviewing current teaching strategies and instructional materials to address gaps in comprehension and engagement. Such measures are essential to ensure that learners develop the foundational numeracy skills required for long-term academic success.

The baseline findings provide a strong justification for the implementation of the U-CARE Strategy, which is designed to enhance learners' performance in Mathematics. This strategy is anchored on the five dimensions of mathematical proficiency identified by the National Research Council: Conceptual Understanding, Procedural Fluency, Strategic Competence, Adaptive Reasoning, and Productive Disposition. Mathematical proficiency refers to the capacity to learn, apply, and engage with mathematics effectively. It extends beyond the mere memorization of facts and procedures, encompassing the ability to grasp underlying concepts, develop and employ problem-solving strategies, reason logically, and cultivate a positive disposition toward mathematics as a discipline.

Research Questions

This study investigated how the U-CARE strategy affects the Mathematics Performance of Grade 1-Matapat pupils in Rang-ayan Elementary School from the Schools Division Office of Ilagan.

Specifically, it sought answers to the following research questions:

1. What is the RMA mean pretest scores and mean posttest scores of the experimental and control group?
2. Is there a significant difference in the mean pretest scores and mean posttest scores of the experimental and controlled group?
3. Is there a significant difference between the mean gain scores in the mean pretest score and mean posttest score of the control and experimental group?
4. What is the effect size of the U-CARE Strategy on the Math performance of the experimental group?
5. What are the experiences encountered by the respondents in the different lessons during the conduct of the study?

METHODOLOGY

Research Design

The study adopted a quantitative research methodology, employing a quasi-experimental design. According to Bevans (2023), an experimental design seeks to explain outcomes when variables are systematically controlled or manipulated. Specifically, this investigation utilized a pretest–posttest non-equivalent control group design, comprising both an experimental group and a control group. The experimental group underwent a pretest, received the U-CARE intervention, and subsequently completed a posttest. In contrast, the control group was administered only a pretest and a posttest, with instruction delivered through the conventional discussion method.

The two groups were drawn from two class sections, namely Grade I-Matapat and Grade I-Mabait, selected through purposive sampling. Grade I-Matapat was intentionally designated as the experimental group exposed to the U-CARE intervention, while Grade I-Mabait served as the control group and continued with the standard instructional approach. This design facilitated a systematic comparison of learning outcomes between the two groups, thereby enabling the determination of the effectiveness of the intervention.

Locale of the Study

The study was conducted at Rang-ayan Elementary School, situated in Barangay Rang-ayan, City of Ilagan, Isabela, under the jurisdiction of the Schools Division Office of the City of Ilagan. For several decades, the institution has served as a vital educational hub within the community, fostering academic growth and holistic development among countless learners. The collective efforts of Rang-Ayeño teachers, parents, and stakeholders have consistently demonstrated a strong commitment to shared goals and aspirations, ensuring the school's enduring role in promoting excellence and success.

Selection and Description of Respondents

The respondents of the study comprised 18 pupils from Grade I–Matapat and 18 pupils from Grade I–Mabait of Rang-ayan Elementary School, under the Schools Division Office of the City of Ilagan. The selection of participants was carried out through purposive sampling. Two intact class sections were deliberately chosen to serve distinct roles in the study: one as the experimental group and the other as the control group. The choice of these sections was primarily based on their accessibility and appropriateness for the implementation of the intervention.

Data Gathering Procedure

The data for this study were gathered through a series of structured and carefully implemented steps to ensure validity and reliability of results. Prior to data collection, the researcher sought formal approval from the school head as well as informed consent from the parents of the Grade 1–Matapat learners. Upon receiving approval, the researcher

prepared all necessary instruments, including the RMA pre-test and post-test, the U-CARE intervention materials designated for the experimental group, and documentation sheets for recording learners' responses and experiences.

Subsequently, the researcher assigned participants to the experimental and control groups, ensuring comparability in terms of class size and academic profile. Following these preparations, the RMA pre-test was administered to both groups under standardized testing conditions. The pre-test results served as baseline data, providing the initial mean scores of each group and establishing whether the groups were comparable prior to the intervention.

The U-CARE Strategy was then implemented exclusively with the experimental group during their regular Mathematics periods. This intervention comprised activities designed to enhance learners' conceptual understanding, computational skills, application of mathematical concepts, reasoning abilities, and engagement in mathematical tasks. In contrast, the control group continued to receive the conventional instructional approach commonly employed in the school.

After the intervention period, the RMA post-test was administered to both groups under conditions identical to those of the pre-test. The post-test scores served as the primary data source for evaluating changes in learners' performance, determining whether significant differences exists between the two groups, and assessing the extent of improvement from pre-test to post-test within each group. These results were subsequently utilized to compute the effect size of the U-CARE Strategy on the mathematics performance of the experimental group.

In addition to the quantitative measures, qualitative data were collected through guided questionnaires that documented the experiences of the pupils during the conduct of the study. After the completion of both quantitative and qualitative data collection, all results were systematically encoded and prepared for analysis using appropriate statistical tools. The consolidated findings were then interpreted in relation to the research questions, thereby establishing the impact of the U-CARE Strategy and providing a descriptive account of the respondents' experiences throughout the study.

Statistical Treatment of Data

The results of the pre-test and post-test comprised the primary data for this investigation. The scores were systematically collated and organized into tabular form to facilitate analysis. These findings were then examined and compared against the computed average. from participants. To analyze the data gathered the following statistical tools were employed:

Arithmetic mean was employed. To analyze the effects of U-CARE Strategy on the learners' mathematics performance, the scores of both the pretest and posttest were taken and treated using the mean to address question number 1.

Independent Samples T-test. This was used to identify the significant difference in the Mean pretest scores and Mean posttest scores of the experimental and controlled group to answer question number 2.

Paired-samples T-test. This was employed to determine the significant difference between the mean gain scores in the Mean pretest score and mean posttest score of the control and experimental group to address question 3.

Eta squared. This was used and interpreted using the Cohen's guidelines, to determine the effect size of the intervention to answer question number 4.

Frequency and percentage. This were used to analyze the respondents' experiences during the conduct of the study.

Hypotheses were tested at 0.05 level of significance at two tailed. All statistical runs will be conducted using Jamovi.

RESULTS AND DISCUSSION

1. **What is the RMA mean pretest scores and mean posttest scores of the experimental and control group?**

Table 1
RMA Proficiency Pre-test Scores of the Controlled and Experimental Group

Score Range	REMARKS	CONTROL		EXPERIMENTAL	
		f	%	f	%
85% to 100%	**Highly Proficient**	**0**	**0**	**0**	**0**
75% to 84%	**Proficient**	**0**	**0**	**0**	**0**
50% to 74%	**Nearly Proficient**	9	50	8	44
25% to 49%	**Low Proficient**	6	33.33	8	44
Less than 25%	**Not Proficient**	3	16.67	2	11
	Total	**18**	**100**	**18**	**100**

Data for this were gathered from Rang-ayan Elementary School under the jurisdiction of the Schools Division Office of the City of Ilagan. The participants consisted of thirty-six (36) Grade 1 pupils, drawn from two sections. These pupils were systematically assigned into two groups: the control group and the experimental group, respectively.

Table 2
RMA Proficiency Post-test Scores of the Controlled and Experimental Group

Score Range	REMARKS	CONTROL		EXPERIMENTAL	
		F	P	F	P
85% to 100%	**Highly Proficient**	**8**	**40**	16	89
75% to 84%	**Proficient**	**6**	**30**	2	11
50% to 74%	**Nearly Proficient**	4	20	0	0
25% to 49%	**Low Proficient**	0	0	0	0
Less than 25%	**Non-Proficient**	0	0	0	0
	TOTAL	**18**	**100**	**18**	**100**

Table 2 presents the performance levels of the students in Mathematics during the pre-test. The data reveals that nine out of eighteen students in the control group demonstrated a nearly proficient level, six exhibited a low proficiency level and three are within the low proficiency category.

These results indicate that the most of students in the control group possess a basic understanding of mathematical concepts but encounter difficulties in applying them to more complex tasks, thereby requiring additional practice and reinforcement.

On the other hand, the performance level of the students in Mathematics under the experimental group during the pre-test is as follows: eight students or 44.44% demonstrated a nearly proficient level; another 44.44% exhibited a low proficiency level; while 2 students or 11.11% are classified as not proficient. These results clearly indicate that the majority of the respondents in the experimental group had not yet attained the expected level of competency in the subject. The administration of the pre-test was essential in determining their baseline proficiency prior to the implementation of the intervention.

These findings corroborate the work of Marwaha et al., (2021), who observed that students frequently exhibit limited mathematical competency prior to formal instruction and therefore benefit from targeted pedagogical interventions designed to enhance both performance and engagement. In a similar vein, Bear et. al (2015). underscored that low baseline achievement reflects significant gaps in conceptual understanding, thereby reinforcing the necessity of instructional strategies that deliberately foster learning and skill development. Aligned with these perspectives, the present study sought to examine the effects of the U-CARE strategy in Mathematics instruction. To this end, a post-test was administered to the student respondents following the intervention. The results of this assessment are presented in the subsequent section.

Since the primary objective of this study is to examine the effects of the U-CARE strategy in teaching Mathematics, a post-test was administered to the student respondents following the intervention. The results are presented in Table 3. As shown, the performance levels of the control group in Mathematics, based on their post-test

scores, are distributed as follows: eight out of 18 students attained a high proficiency level; six students achieved a proficiency level; and four students reached a nearly proficient level. The data presented indicate that the majority of respondents in the control group exhibited a strong mastery of foundational mathematical concepts and skills following instruction through the traditional lecture method. Although the participants were exposed solely to conventional teaching strategies, specifically the use of PowerPoint presentations, the findings reveal that a substantial proportion of the population attained a high level of proficiency.

The performance level in Mathematics of the experimental group during the post-examination, following the intervention reveals that 16 out of 18 students representing 89% attained a high proficiency level, while only two out of 18 students achieved a basic proficiency level. As reflected in the table, the proportion of students in the basic proficiency category is minimal, which may be regarded as a favorable outcome. The majority of pupils reached the high proficiency level, a result that is consistent with the performance observed in the control group.

Table 3
Percentage of Learners in the Controlled Group Who Passed 75% Per task by Grade Level

Task	Number Identification and Discrimination	Fractions	Addition	Subtraction	Geometric Representation	Missing Shapes in patterns	Time Measurement	Linear Measurement	Overall Score
Percentage	**75**	**75**	**80**	**65**	**70**	**60**	**10**	**45**	85

The data indicate that pupils demonstrate comparatively stronger performance in fundamental numerical and operational competencies, such as number recognition and basic addition. In contrast, more abstract and application-oriented domains particularly those involving concepts of time and linear measurement remain as areas of difficulty. The overall passing rate of 85% reflects a generally favorable level of achievement; however, it simultaneously highlights specific mathematical domains that warrant targeted pedagogical intervention. Taken together, the findings suggest that instructional strategies have been effective in cultivating foundational skills, yet require reinforcement in areas that demand measurement and real-world application. Addressing these gaps through diversified teaching approaches and sustained practice is likely to enhance learners' comprehensive mathematical proficiency.

Table 4
Percentage of Learners in the Experimental Group Who Passed 75% Per task by Grade Level

Tasks	Number Identification and Discrimination	Fractions	Addition	Subtraction	Geometric Representation	Missing Shapes in patterns	Time Measurement	Linear Measurement	Overall Score
Percentage	**89**	**50**	**89**	**78**	**61**	**89**	**39**	**89**	92

The results of the post-test indicate that the experimental group demonstrated the strongest performance in foundational domains such as basic number concepts, arithmetic operations, pattern recognition, and linear measurement. In contrast, tasks requiring higher-order abstract reasoning and real-life application particularly those involving fractions and time measurement presented greater challenges. The overall high achievement level of a mean score of 92%, underscores the effectiveness of the instructional approach in fostering core mathematical competencies. At the same time, these findings highlight the necessity of implementing targeted interventions in specific areas to promote balanced and comprehensive mathematical proficiency.

Table 5
Mean Pre-Test and Post-Test Scores of the Control and Experimental Group

Groups	Mean Pre-Test Score	Mean Post-Test Score
Controlled Group	16.39	29.1
Experimental Group	16.17	32.7

The table shows that the mean pretest scores of the control group (M=16.39) and the experimental group (M=16.17) are nearly identical, indicating comparable baseline performance. Following instruction, both groups exhibited improvement, confirming that learning occurred under both instructional conditions. However, the experimental group demonstrated a greater increase in performance, with its mean score rising from 16.17 to 32.70, compared to the control group's increase from 16.39 to 29.10. Although the control group benefited from the conventional discussion method, the experimental group achieved a higher mean posttest score, suggesting that the U-CARE intervention was more effective in enhancing students' mathematics performance.

This finding is consistent with the work of Marwaha et al., (2021), who reported that interactive and student-centered teaching strategies yield significantly greater learning gains than traditional instruction. Similarly, Prince and Freeman et al. (2014). emphasized that instructional approaches fostering active engagement lead to superior academic outcomes, particularly in problem-solving and conceptual understanding.

2. Is there a significant difference in the mean pretest scores and mean posttest scores of the experimental and controlled group?

Table 6
Result of the Test of Significant Difference in the Pre-test Scores of Control and Experimental Group

Groups	Mean	*t*-value	*p*-value	Remarks
Controlled	16.39	0.113	0.911	Not Significant
Experimental	16.17			

Table 6 presents the results of the independent t-test conducted to compare the pre-test scores of the control and experimental groups. The purpose of this test was to determine whether a statistically significant difference existed between the two groups' pre-test performance. As indicated in the table, the mean pre-test scores of the experimental and control groups yielded a probability value of 0.911, which is greater than the 0.05 level of significance. This result indicates that there is no significant difference between the two groups' pre-test scores.

The absence of a significant difference suggests that the mathematics performance outcomes of both groups were initially comparable. This finding confirms that the groups began the study on equal footing, thereby strengthening the validity of subsequent comparisons. Establishing equivalence at the pre-test stage ensures that any differences observed in the post-test scores can be more confidently attributed to the intervention rather than to pre-existing disparities in performance.

This finding reinforces the assumption of baseline equivalence, which is a fundamental requirement in quasi-experimental designs employing non-equivalent control groups. As Creswell and Creswell (2018). emphasize, comparable pretest scores enhance internal validity by reducing the likelihood that posttest differences are the result of prior ability differences. Similarly, Fraenkel et al., (2012). highlight that pretest similarity is essential for ensuring fair comparisons in contexts where random assignment is not feasible.

Table 7
Result of the Test of Significant Difference in the Post-test Scores of Control and Experimental Group

Groups	Mean	*t*-value	*p*-value	Remarks
Controlled	29.1	-3.39	0.021	Significant
Experimental	32.7			

Table 7 shows the results of the independent t-test conducted to compare the post-test scores of the control and experimental groups to determine whether a statistically significant difference exists between the two groups' post-test performance following the implementation of the intervention. The control group obtained a mean post-test score of 29.1, whereas the experimental group achieved a comparatively higher mean score of 32.7. The computed t-value of -3.39 reflects the magnitude of the difference between the two means. The corresponding p-value of 0.021 indicates that this difference is statistically significant at the conventional threshold.

These findings provide substantial evidence of a significant difference in post-test performance between the control and experimental groups. The statistical significance suggests that the intervention had a measurable impact on the outcomes of the experimental group.

This result aligns with the perspective advanced by the National Academies of Sciences, Engineering, and Medicine which emphasized in their report that the five strands of mathematical proficiency are interwoven and interdependent, collectively contributing to the development of competence in mathematics (National Research Council, 2001).

3. Is there a significant difference between the mean gain scores in the Mean pretest score and Mean posttest score of the control and experimental group?

Table 8
Result of the test of Significant Difference in the Gain Scores of the Control and Experimental Group

Groups	Mean Gain Scores	***p*-value**	Decision	**Remarks**
Controlled	12.72	0.01683	Reject Ho	Significant
Experimental	16.5			

The analysis reveals that the control group obtained a mean gain score of 12.72, whereas the experimental group achieved a higher mean gain score of 16.50. These results indicate that both groups demonstrated improvement from the pre-test to the post-test; however, the enhancement was more pronounced among learners who were exposed to the U-CARE Strategy. To ascertain whether this observed difference was statistically significant, an independent samples t-test was performed. The computed p-value of 0.01683 falls below the 0.05 threshold of significance, thereby leading to the rejection of the null hypothesis. This confirms that there is a statistically significant difference in the gain scores between the two groups.

The significant higher gain scores observed in the experimental group is an evidence that the U-CARE Strategy had a more substantial positive influence on learners' mathematical performance than traditional instructional methods. These findings affirm that the strategy fostered deeper cognitive engagement and facilitated more meaningful

academic progress throughout the intervention period. The high outcomes achieved by the experimental group align with the conclusions of Freeman et al. (2014), who demonstrated that students exposed to active and structured learning approaches consistently outperformed their peers taught through conventional methods, attaining higher gain scores and exhibiting lower failure rates.

4. What is the effect size of the U-CARE Strategy on the Math performance of the experimental group?

Table 9
Effect Size of U-CARE Strategy to the Experimental Group

	Effect Size (Cohen's D)	Magnitude
Experimental (Pre-Test and Post-Test)	4.41	Large Effect

The computed effect size for the experimental group, Cohen's d = 4.41, signifies an exceptionally large impact on the improvement between the pre-test and post-test scores. This magnitude of effect substantially surpasses Cohen's conventional benchmarks—0.20 (small), 0.50 (medium), and 0.80 (large), indicating that the intervention yielded gains exceeding four standard deviations above baseline performance. Such a result implies that the U-CARE Strategy produced highly significant and meaningful enhancements in students' mathematical achievement.

This outcome is consistent with the framework articulated by the National Research Council in Adding It Up: Helping Children Learn Mathematics This outcome is consistent with the framework articulated by the National Research Council in *Adding It Up: Helping Children Learn Mathematics,* a seminal report of the National Academies of Sciences, Engineering, and Medicine This outcome is consistent with the framework articulated by the National Research Council. in *Adding It Up: Helping Children Learn Mathematics,* a seminal report of the National Academies of Sciences, Engineering, and Medicine which underscores that mathematical proficiency emerges through the integration of five interrelated strands: conceptual understanding, procedural fluency, strategic competence, adaptive reasoning, and productive disposition. The substantial gains observed in the experimental group indicate that the instructional approach facilitated the coordinated development of these strands, thereby fostering deeper and more meaningful mathematical learning. Moreover, the large effect size reported in this study suggests that the U-CARE Strategy effectively activated and reinforced multiple strands simultaneously, most notably conceptual understanding and productive disposition as evidenced by significant improvements in student performance and enhanced learning experiences. The National Research Council emphasizes that when instruction deliberately integrates these strands, students are more likely to achieve enduring and profound advances in mathematical competence. which underscores that mathematical proficiency emerges through the integration of five interrelated strands: conceptual understanding, procedural fluency, strategic competence, adaptive reasoning, and productive disposition. The National Research Council emphasizes that when

instruction deliberately integrates these strands, students are more likely to achieve enduring and profound advances in mathematical competence (National Research Council, 2001).

5. What are the experiences encountered by the respondents in the different lessons during the conduct of the study?

Table 10
Experiences of the Respondents in Number Identification

Experiences	No. of Responses		
	Oo	Medyo	Hindi
Naintindihan ko ang aralin sa Math	16	2	0
May natutunan ako sa Math ngayon	18	0	0
Nakatulong sa akin ang mga gawain para matuto	18	0	0
Nagustuhan ko ang mga gawain sa aming Math lesson	17	1	0
Nagawa kong sagutin ng tama ang mga gawain	16	2	0
Nasiyahan ako sa paraan ng pagturo ni Ma'am sa aming lesson ngayon	18	0	0
Masaya ako habang nag-aaral ng Math	18	0	0
Gusto kong sumali o makilahok sa mga aralin naming	18	0	0
Nahirapan akong intindihin ang aming aralin	0	3	15
Kinailangan ko ang tulong mula sa guro o kaklase dahil hindi ko naintindihan ang lesson	0	4	14
Nahirapan ako sa pagsagot sa aming gawain	0	3	15

The findings from the Number Identification activity indicate a distinctly positive learning experience among the eighteen respondents. A substantial majority affirmed that they comprehended the lesson, acquired new concepts, and successfully accomplished the assigned tasks. In addition, most participants reported enjoyment and active involvement, reflecting a high level of engagement throughout the activity. However, the minimal incidence of reported difficulty further suggests that the instructional approach was effective in fostering learners' understanding and enhancing their confidence in identifying numbers.

Table 11
Experiences of the Respondents in the Lesson on Fractions

Experiences	No. of Responses		
	Oo	Medyo	Hindi
Naintindihan ko ang aralin sa Math	13	5	0
May natutunan ako sa Math ngayon	15	3	0
Nakatulong sa akin ang mga gawain para matuto	18	0	0
Nagustuhan ko ang mga gawain sa aming Math lesson	18	0	0
Nagawa kong sagutin ng tama ang mga gawain	17	1	0
Nasiyahan ako sa paraan ng pagturo ni Ma'am sa aming lesson ngayon	18	0	0
Masaya ako habang nag-aaral ng Math	18	0	0
Gusto kong sumali o makilahok sa mga aralin naming	14	4	0
Nahirapan akong intindihin ang aming aralin	0	3	15
Kinailangan ko ang tulong mula sa guro o kaklase dahil hindi ko naintindihan ang lesson	0	5	13
Nahirapan ako sa pagsagot sa aming gawain	0	4	14

The findings reveal that the majority of pupils reported a positive experience during the lesson on fractions. Most participants indicated that they comprehended the lesson content, acquired new knowledge, and successfully completed the assigned activities. All respondents affirmed that the activities were both beneficial and enjoyable, with many expressing enthusiasm and a willingness to actively participate throughout the session. While a small subset of pupils acknowledged experiencing moderate difficulty and requiring additional support, the overall results suggest that the instructional approach was effective in fostering learners' understanding and engagement in the study of fractions.

Table 12
Experiences of the Respondents in Lesson in Addition

Experiences	No. of Responses		
	Oo	Medyo	Hindi
Naintindihan ko ang aralin sa Math	17	1	0
May natutunan ako sa Math ngayon	18	0	0
Nakatulong sa akin ang mga gawain para matuto	17	1	0

Nagustuhan ko ang mga gawain sa aming Math lesson	16	2	0
Nagawa kong sagutin ng tama ang mga gawain	17	1	0
Nasiyahan ako sa paraan ng pagturo ni Ma'am sa aming lesson ngayon	17	1	0
Masaya ako habang nag-aaral ng Math	18	0	0
Gusto kong sumali o makilahok sa mga aralin naming	18	0	0
Nahirapan akong intindihin ang aming aralin	0	2	16
Kinailangan ko ang tulong mula sa guro o kaklase dahil hindi ko naintindihan ang lesson	0	5	13
Nahirapan ako sa pagsagot sa aming gawain	0	3	15

The findings reveal that the lesson on addition provided a highly positive learning experience for the learners. A substantial majority of learners reported clear comprehension of the lesson, acquisition of new concepts, and successful completion of the assigned activities. Furthermore, nearly all respondents expressed feelings of enjoyment and happiness, alongside a strong willingness to participate, indicating a high level of engagement throughout the session. Importantly, most learners did not encounter significant difficulties, which suggests that the instructional approach was effective in fostering both understanding and confidence in performing addition.

Table 13
Experiences of Pupils in Lesson on Subtraction

Experiences	**No. of Responses**		
	Oo	**Medyo**	**Hindi**
Naintindihan ko ang aralin sa Math	14	4	0
May natutunan ako sa Math ngayon	15	3	0
Nakatulong sa akin ang mga gawain para matuto	18	0	0
Nagustuhan ko ang mga gawain sa aming Math lesson	18	0	0
Nagawa kong sagutin ng tama ang mga gawain	14	4	0
Nasiyahan ako sa paraan ng pagturo ni Ma'am sa aming lesson ngayon	15	3	0
Masaya ako habang nag-aaral ng Math	17	1	0
Gusto kong sumali o makilahok sa mga aralin naming	17	1	0
Nahirapan akong intindihin ang aming aralin	0	5	13

Kinailangan ko ang tulong mula sa guro o kaklase dahil hindi ko naintindihan ang lesson	0	6	12
Nahirapan ako sa pagsagot sa aming gawain	0	5	13

The findings indicate that pupils generally experienced a positive learning environment during the subtraction lesson. A majority of respondents reported a clear understanding of the topic and demonstrated confidence in successfully completing the assigned activities. Furthermore, pupils perceived the tasks as both engaging and conducive to learning, as evidenced by their active participation and sustained interest. While a small proportion of pupils encountered minor difficulties and occasionally required assistance, the overall pattern of responses suggests that the lesson was effective in fostering comprehension and promoting meaningful involvement in subtraction.

Table 14
Experience of Pupils in Lesson on Geometric Representation

Experiences	**No. of Responses**		
	Oo	**Medyo**	**Hindi**
Naintindihan ko ang aralin sa Math	14	4	0
May natutunan ako sa Math ngayon	15	3	0
Nakatulong sa akin ang mga gawain para matuto	18	0	0
Nagustuhan ko ang mga gawain sa aming Math lesson	18	0	0
Nagawa kong sagutin ng tama ang mga gawain	14	4	0
Nasiyahan ako sa paraan ng pagturo ni Ma'am sa aming lesson ngayon	15	3	0
Masaya ako habang nag-aaral ng Math	17	1	0
Gusto kong sumali o makilahok sa mga aralin naming	17	1	0
Nahirapan akong intindihin ang aming aralin	0	5	13
Kinailangan ko ang tulong mula sa guro o kaklase dahil hindi ko naintindihan ang lesson	0	6	12
Nahirapan ako sa pagsagot sa aming gawain	0	5	13

The data presented in the table indicate that pupils generally reported a positive learning experience during the lesson on geometric representation. A majority of respondents affirmed that they comprehended the topic and acquired new knowledge through the activities provided. The tasks were perceived as both beneficial and enjoyable, which fostered active participation and engagement throughout the session.

Although a small proportion of pupils acknowledged experiencing moderate difficulty and occasional need for assistance, the overall responses suggest that the lesson was effective in enhancing pupils' understanding and supporting their involvement in representing geometric concepts.

Table 15
Experiences of Pupils in the Lesson on Missing Shapes in Patterns

Experiences	No. of Responses		
	Oo	Medyo	Hindi
Naintindihan ko ang aralin sa Math	16	2	0
May natutunan ako sa Math ngayon	18	0	0
Nakatulong sa akin ang mga gawain para matuto	17	1	0
Nagustuhan ko ang mga gawain sa aming Math lesson	18	0	0
Nagawa kong sagutin ng tama ang mga gawain	14	4	0
Nasiyahan ako sa paraan ng pagturo ni Ma'am sa aming lesson ngayon	18	0	0
Masaya ako habang nag-aaral ng Math	17	1	0
Gusto kong sumali o makilahok sa mga aralin naming	17	1	0
Nahirapan akong intindihin ang aming aralin	0	3	15
Kinailangan ko ang tulong mula sa guro o kaklase dahil hindi ko naintindihan ang lesson	0	3	15
Nahirapan ako sa pagsagot sa aming gawain	0	3	15

The findings reveal that pupils exhibited a high degree of conceptual understanding and procedural competence in identifying missing terms within patterns, an outcome that may be attributed to the systematic implementation of the U-CARE Strategy. Through its structured phases, the strategy effectively guided learners to analyze the underlying structure of patterns, integrate prior knowledge, apply established rules, reflect on their responses, and evaluate the accuracy of their solutions. This process fostered both strong learning outcomes and sustained engagement. Furthermore, the minimal reports of difficulty indicate that the U-CARE Strategy provided robust scaffolding, enabling pupils to develop confidence and precision in completing pattern-based tasks.

Table 16
Experiences of Pupils in Lesson on Time Measurement

Experiences	No. of Responses		
	Oo	Medyo	Hindi
Naintindihan ko ang aralin sa Math	15	3	0
May natutunan ako sa Math ngayon	15	3	0
Nakatulong sa akin ang mga gawain para matuto	16	2	0
Nagustuhan ko ang mga gawain sa aming Math lesson	17	1	0
Nagawa kong sagutin ng tama ang mga gawain	18	0	0
Nasiyahan ako sa paraan ng pagturo ni Ma'am sa aming lesson ngayon	15	3	0
Masaya ako habang nag-aaral ng Math	18	0	0
Gusto kong sumali o makilahok sa mga aralin naming	14	4	0
Nahirapan akong intindihin ang aming aralin	0	4	14
Kinailangan ko ang tulong mula sa guro o kaklase dahil hindi ko naintindihan ang lesson	0	9	9
Nahirapan ako sa pagsagot sa aming gawain	0	4	14

The findings reveal that pupils exhibited a strong grasp of the lesson on telling time, as demonstrated by their consistent accuracy in completing activities, clear evidence of learning acquisition, and active engagement throughout the instructional process. The integration of the U-CARE Strategy proved instrumental in enhancing comprehension of time concepts by enabling learners to connect new knowledge with prior experiences, apply time-reading skills effectively, reflect on their responses, and evaluate the correctness of their outputs. This structured approach fostered improved performance and bolstered learner confidence. While a small number of pupils reported moderate challenges and occasional reliance on assistance, the overall results indicate that the U-CARE Strategy functioned as an effective instructional scaffold, promoting deeper understanding and sustained participation in the development of time-telling skills.

Table 17
Experiences of Pupils in the Lesson on Linear Measurement

Experiences	No. of Responses		
	Oo	Medyo	Hindi
Naintindihan ko ang aralin sa Math	18	0	0
May natutunan ako sa Math ngayon	18	0	0

Nakatulong sa akin ang mga gawain para matuto	18	0	0
Nagustuhan ko ang mga gawain sa aming Math lesson	18	0	0
Nagawa kong sagutin ng tama ang mga gawain	18	0	0
Nasiyahan ako sa paraan ng pagturo ni Ma'am sa aming lesson ngayon	17	1	0
Masaya ako habang nag-aaral ng Math	17	1	0
Gusto kong sumali o makilahok sa mga aralin naming	18	0	0
Nahirapan akong intindihin ang aming aralin	0	0	18
Kinailangan ko ang tulong mula sa guro o kaklase dahil hindi ko naintindihan ang lesson	0	3	15
Nahirapan ako sa pagsagot sa aming gawain	0	2	16

The data presented in the table show that pupils attained exceptionally high levels of conceptual understanding, skill performance, and engagement during the lesson on linear measurement. This is evidenced by unanimous agreement regarding learning acquisition, task accuracy, and active participation. The implementation of the U-CARE Strategy facilitated pupils' clear comprehension of measurement concepts, enabled them to connect prior knowledge with real-world applications, and guided them in applying appropriate measuring procedures. Furthermore, the strategy encouraged reflection on responses and evaluation of accuracy, which collectively minimized learning difficulties and reduced reliance on external assistance. Overall, the findings indicate that the U-CARE Strategy effectively promoted both conceptual clarity and procedural fluency in the domain of linear measurement.

Table 18
Experiences of Pupils in the Lesson on Days of the Week

Experiences	**No. of Responses**		
	Oo	**Medyo**	**Hindi**
Naintindihan ko ang aralin sa Math	16	2	0
May natutunan ako sa Math ngayon	17	1	0
Nakatulong sa akin ang mga gawain para matuto	17	1	0
Nagustuhan ko ang mga gawain sa aming Math lesson	17	1	0
Nagawa kong sagutin ng tama ang mga gawain	17	1	0

Nasiyahan ako sa paraan ng pagturo ni Ma'am sa aming lesson ngayon	18	0	0
Masaya ako habang nag-aaral ng Math	17	1	0
Gusto kong sumali o makilahok sa mga aralin naming	18	0	0
Nahirapan akong intindihin ang aming aralin	0	2	16
Kinailangan ko ang tulong mula sa guro o kaklase dahil hindi ko naintindihan ang lesson	0	3	15
Nahirapan ako sa pagsagot sa aming gawain	0	4	14

The findings reveal that pupils exhibited a strong grasp of the lesson on the Days of the Week and demonstrated high levels of engagement, outcomes that may be attributed to the implementation of the U-CARE Strategy. By systematically guiding learners to comprehend concepts, connect prior knowledge, apply learning through structured activities, reflect on their responses, and evaluate outcomes, the strategy facilitated accurate task completion and sustained participation with minimal reported difficulty. Across the mathematics lessons included in the study, pupils consistently described positive learning experiences, characterized by high levels of understanding, successful task performance, enjoyment of instructional activities, and active involvement. Reports of difficulty were limited and only moderately observed in selected lessons, indicating that the instructional approach provided adequate scaffolding and support. These results are consistent with contemporary research, which underscores that structured, engaging, and learner-centered pedagogical strategies enhance student confidence, foster meaningful learning experiences, and improve overall outcomes in Mathematics.

Conclusions

The findings of the study strongly support the conclusion that the U-CARE Strategy is an effective tool for improving students' mathematical achievement. Its implementation leads to higher performance, greater score consistency, and more meaningful learning gains compared to traditional classroom instruction.

Recommendations

Based on the conclusions of the study, the following recommendations were made:

1. The study showed that the U-CARE strategy is instrumental in improving mathematics ability of learners, hence, it is recommended that the U-CARE strategy be incorporated into the Mathematics curriculum for Grade 1 learners.

2. To enable the successful application of the U-CARE Strategy in Mathematics education, teachers must be given chances for professional development through SLAC, In-Service Training, Collaborative Expertise Sessions and Focus Group Discussions. Teachers should be instructed on how to properly integrate this strategy into their teaching methods, connect activities with learning objectives, and track students' progress and engagement. Professional growth initiatives can assist them get the skills and information they need to properly implement the U-CARE strategy in the classroom.

3. The impact of the U-CARE strategy on mathematics performance should be regularly assessed and monitored to identify areas for development and contribute to future modifications and adjustments to the U-CARE strategy.

4. While this study found that the U-CARE strategy improved Mathematics proficiency, more in depth studies should be undertaken to understand the intervention's long-term impacts and sustainability. Furthermore, studying the impact of the U-CARE strategy on different student proficiency levels or backgrounds might give useful information on the intervention's differential impact.

Compliance with Ethical Standards

The researcher ensured that the study was conducted in accordance with accepted ethical standards in educational research. Prior to the conduct of the study, formal approval was secured from the school head, and informed consent was obtained from the parents or guardians of the Grade 1 pupils who participated in the research. The purpose, procedures, and expected activities of the study were clearly explained to the concerned participants and their parents or guardians. Participation was voluntary, and the pupils were treated with fairness, respect, and sensitivity throughout the implementation of the U-CARE Strategy. The researcher ensured that no learner was exposed to harm, embarrassment, or undue pressure during the pre-test, intervention, post-test, and data-gathering activities. The identities and responses of the pupils were kept confidential, and all collected data were used solely for academic and research purposes. Moreover, the control and experimental groups were handled responsibly to ensure that instruction remained educationally beneficial for all learners. The researcher also observed honesty and accuracy in recording, analyzing, and interpreting the data. Thus, the study upheld the principles of informed consent, confidentiality, voluntary participation, fairness, and protection of learners' welfare.

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REFERENCES

Amusuglo, M. K., & Jančařík, A. (2024). Global proficiency framework: Analysis of national and Colleges of Education curricula in Ghana. South African Journal of Childhood Education, 14(1), Article 1423. https://doi.org/10.4102/sajce.v14i1.1423

Bear, G. G., Yang, C., Chen, D., He, X., Xie, J.-S., & Huang, X. (2018). Differences in school climate and student engagement in China and the United States. School Psychology Quarterly, 33(2), 323–335. https://doi.org/10.1037/spq0000247

Bevans, R. (2023, June 21). Guide to experimental design: Overview, 5 steps & examples. Scribbr. Retrieved from https://www.scribbr.com/methodology/experimental-design/

Creswell, J. W., & Creswell, J. D. (2018). Research design: Qualitative, quantitative, and mixed methods approaches (5th ed.). SAGE Publications.

Fraenkel, J. R., Wallen, N. E., & Hyun, H. H. (2012). How to design and evaluate research in education (8th ed.). McGraw-Hill.

Freeman, S., Eddy, S. L., McDonough, M., Smith, M. K., Okoroafor, N., Jordt, H., & Wenderoth, M. P. (2014). Active learning increases student performance in science, engineering, and mathematics. Proceedings of the National Academy of Sciences of the United States of America, 111(23), 8410–8415. https://doi.org/10.1073/pnas.1319030111

Gita-Carlos, R. A. (2021, July 1). World Bank report on PH education “disturbing, very alarming.” Philippine News Agency. Retrieved from https://www.pna.gov.ph/articles/1145626

Marwaha, P., Bhagat, A., & Kapoor, N. (2021). Effect of interactive teaching strategies on student performance and engagement. ResearchGate. Retrieved from http://www.researchgate.net/publication/352123456

Mullis, I. V. S., Martin, M. O., Foy, P., Kelly, D. L., & Fishbein, B. (2020). TIMSS 2019 international results in mathematics and science. Boston College, TIMSS &

PIRLS International Study Center. Retrieved from https://timssandpirls.bc.edu/timss2019/international-results/

National Council of Teachers of Mathematics. (2014). Principles to actions: Ensuring mathematical success for all. Author.

National Research Council. (2001). Adding it up: Helping children learn mathematics (J. Kilpatrick, J. Swafford, & B. Findell, Eds.). National Academies Press. https://doi.org/10.17226/9822

Organisation for Economic Co-operation and Development. (2019). PISA 2018 results (Volume I): What students know and can do. OECD Publishing. https://doi.org/10.1787/5f07c754-en

Organisation for Economic Co-operation and Development. (2023). PISA 2022 results (Volume I): The state of learning and equity in education. OECD Publishing. https://doi.org/10.1787/53f23881-en

Ramirez, G., Shaw, S. T., & Maloney, E. A. (2018). Math anxiety: Past research, promising interventions, and a new interpretation framework. Educational Psychologist, 53(3), 145–164. https://doi.org/10.1080/00461520.2018.1447384

World Bank. (2020). PISA 2018: Programme for International Student Assessment Philippines country report. World Bank. Retrieved from https://documents1.worldbank.org/curated/en/184251593328815913/pdf/Main-Report.pdf

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