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Implementing The 2C-2I-1R Approaches on the Learners' Learning Domains and Performance in Mathematics

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Abstract— *The main purpose of the study is to determine the effectiveness of the 2C-2I-1R Approaches in enhancing learners' learning domains and performance in Mathematics, and to identify significant effects of implementing these approaches on learners' learning domains and performance in Mathematics.*

The study employed a quantitative–descriptive research design with 72 Grade 10 learners from Buenavista Integrated National High School, selected through purposive sampling, during the School Year 2025–2026. The survey questionnaire, formative assessments and teacher-made quarterly examination were validated and used as research instruments. Descriptive and inferential statistical tools, including the frequency and percentage, weighted mean, standard deviation, and regression analysis, were utilized for data analysis.

A very high level of implementation of the 2C-2I-1R Approaches was observed, particularly the constructivist, collaborative, integrative, inquiry- based, and reflective strategies used in the teaching of Mathematics. Learners demonstrated a very satisfactory level in cognitive learning domain and outstanding level in affective and psychomotor learning domains. Moreover, learners' performance in Mathematics showed a movement towards mastery, as reflected in their quarterly assessment results. There is a significant effect on the implementation of the 2C-2I-1R Approaches to the cognitive and psychomotor domains while there is no significant effect on the affective domain and quarterly assessments.

The implementation of the 2C–2I–1R Approaches was found to be significantly effective in the cognitive and psychomotor domains, leading to the rejection of the null hypothesis. This means that approaches enhance learners' understanding, reasoning, and application of mathematical skills through active engagement and hands-on activities. On the other hand, no significant effect was found on the affective domain and performance in Mathematics, resulting in the acceptance of the null hypothesis that indicates other factors may influence learners' attitudes and performance.

Based on these findings, it is recommended that teachers continue integrating the 2C–2I–1R Approaches into their lessons to improve learners' understanding, skills, and active participation. Moreover, future researchers may examine how these approaches can be strengthened through other teaching strategies to improve learners' performance in Mathematics.

Keywords— *Implementing, 2C-2I-1R Approaches, learning domains, performance in Mathematics, significant effect.*

I. INTRODUCTION

Teachers used research-based instructional strategies, well-structured activities, and organized lessons within an inclusive, academically supportive environment to promote the engagement of the learners. This strategic approach is shown to enhance not only academic achievement but also the learners' motivation, self-efficacy, and overall attitudes toward learning. Finding ways to promote high engagement with a good attitude towards the subject of general mathematics for all learners has been a major push in this research. In the view of Pino-James (2017), this issue is of relevance because the learner's involvement and engagement are a prerequisite for acquiring knowledge and skills and is also a mediator of achievement and important life outcomes.

In response to national education reforms such as the Enhanced Basic Education Act of 2013, different pedagogical approaches have been promoted to support learner-centered instruction. Among these is the 2C-2I-1R approach, which emphasizes constructivist, collaborative, integrative, inquiry-based, and reflective learning. These methods aim to address common challenges faced by the learners, particularly those who struggle with mathematics, by providing meaningful and engaging learning experiences.

Using this research tool based on the 2C-2I-1R approaches, the researcher seeks to determine whether these instructional methods contribute to the improvement of learners' learning domains and their performance in Mathematics. The learning domains, which include the cognitive, affective, and psychomotor aspects play a crucial role in the holistic development of learners. The cognitive domain pertains to the acquisition, understanding, and application of mathematical concepts. The affective domain involves the learners' attitudes, interests, and motivation toward learning mathematics. Meanwhile, the psychomotor domain focuses on the learners' ability to perform mathematical procedures and apply problem-solving skills. These approaches influence the overall academic performance of learners, which reflects their level of mastery and competence in the subject.

This study aims to examine whether the implementation of the 2C-2I-1R approaches can improve the learning domains and performance in Mathematics of the Grade 10 learners from Buenavista Integrated National High School. It focuses on assessing how these approaches influence the cognitive, affective, and psychomotor aspects of learning in Mathematics. Moreover, the study seeks to determine the extent to which these enhancements contribute to the overall improvement of learners' performance in Mathematics.

1.1 Statement of the Problem

Problem/s which were addressed by the research

The purpose of this study is to evaluate the effectiveness of

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the 2C-2I- 1R Approaches in improving the learning domains and performance of learners in Mathematics.

Specifically, this study sought to address the following questions:

1. What is the level of the Implementation of 2C-2I-1R Approaches by the teacher in terms of:
   1.1. Constructivist;
   1.2. collaborative;
   1.3. integrative;
   1.4. inquiry-based; and
   1.5. reflective?
2. What is the level of Learners' Learning Domains in Mathematics in terms of:
   2.1. Cognitive;
   2.2. affective; and
   2.3. psychomotor?
3. What is the level of Learners' Performance in Mathematics in terms of Quarterly Assessment?
4. Does the Implementation of 2C-2I-1R Approaches have significant effect on the Learners' Learning Domains in Mathematics?
5. Does the Implementation of 2C-2I-1R Approaches have significant effect on the Learners' Performance in Mathematics?

II. Methodology

The researcher employed a quantitative–descriptive research design, using a survey questionnaire to collect data from the respondents in this study. The respondents of this study were 72 Grade 10 learners enrolled in Buenavista Integrated National High School during the 2025–2026 school year. The research instrument used structured questionnaire and teacher-made tests and assessments validated by experts. To analyze the data frequency, percentage, mean, standard deviation and regression analysis were used as statistical treatments.

III. Results and Discussion

This covers the presentation, analyses, and interpretation of the data collected, which showed a significant effect of 2C-2I-1R Approaches on the learners' learning domains and performance in Mathematics.

Implementation of 2C-2I-1R Approaches

In this study, the 2C-2I-1R Approaches were implemented as instructional strategies to improve the learners' learning domains and performance in Mathematics. These approaches emphasize collaboration, communication, interaction, and reflection, which support learners in developing a deeper understanding and in actively participating in the learning process. This aspect of the study highlights the development of the learners' learning domains, particularly in the cognitive, affective, and psychomotor domains. It provides insight into how the use of the 2C-2I-1R Approaches strengthens learners' learning processes and improving their performance in Mathematics.

The level of the Implementation of 2C-2I-1R Approaches in teaching Mathematics in terms of Constructivist, Collaborative, Integrative, Inquiry- based and Reflective is presented in the following tables, which show the statements, mean, standard deviation, remarks, and verbal interpretations. The implementation of the 2C-2I-1R Approaches in Mathematics instruction benefits both learners and teachers by promoting learners' cognitive, affective, and psychomotor development through active engagement and meaningful learning experiences, while enhancing teachers' instructional practices through learner-centered and interactive teaching strategies.

Table 1. Level of 2C-2I-1R Approaches Implementation in terms of Constructivist

Statements The teacher..	Mean	SD	Remarks
…explains new math concepts by relating them to ideas we already understand.	4.61	0.62	Strongly Agree
…allows us to explore mathematical ideas before giving the formal explanation.	4.33	0.84	Strongly Agree
…encourages us to develop our own understanding rather than memorize solutions.	0.25	0.9	Strongly Agree
…gives activities that help us think through the steps we use when solving problems.	4.21	0.8	Strongly Agree
…provides opportunities for us to try different solution methods before guiding us.	4.35	0.86	Strongly Agree
Weighted Mean	4.35		
SD	0.54		
Verbal Interpretation	Very High		

Table 1 shows the level of 2C-2I-1R Approaches implemented by the teacher, as perceived by the learners, in terms of constructivist. The data were treated statistically using the mean and standard deviation to describe the extent to which these strategies are practiced in the classroom.

The results revealed that the mathematics teacher has used very high levels of constructivist practices in her teaching. These findings imply that the mathematics teacher consistently helped learners connect new mathematical concepts to their prior knowledge by allowing them to explore the concepts first before giving formal explanations.

The level of implementation of 2C-2I-1R Approaches by the teacher in terms of constructivist attained the weighted mean of 4.35, standard deviation of 0.54 and was verbally interpreted as very high among the respondents. This implies that the teacher consistently applied constructivist practices in the classroom, effectively supporting learners in building their understanding through active engagement and meaningful learning experiences.

In summary, learners perceive the teacher's implementation of constructivist teaching practices in Mathematics at a very high level, as all of the statements were rated strongly agree. The findings reveal that the teacher frequently encourages active participation, critical and independent thinking, and the development of learners' own understanding of mathematical concepts, which helps learners gain a deeper understanding of the lessons and apply their knowledge more confidently in solving mathematical problems and real- life situations.

Table 2 presents the level of 2C-2I-1R Approaches implemented by the teacher in collaborative learning, as perceived by the learners. It includes the statements with their corresponding means, standard deviations, remarks, and verbal interpretations. The data were treated statistically using the mean and standard deviation to describe the extent to which these strategies are practiced in the classroom.

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Table 2. Level of 2C-2I-1R Approaches Implementation in terms of Collaborative

Statements The teacher..	Mean	SD	Remarks
…assigns group tasks that encourage us to work together.	4.63	0.68	Strongly Agree
…facilitates activities where we can share and compare solution strategies with our classmates.	4.36	0.74	Strongly Agree
…uses group work to help build our confidence in solving mathematical problems.	4.35	0.70	Strongly Agree
…promotes teamwork to encourage us to participate actively in class.	4.46	0.75	Strongly Agree
…creates group activities that make learning mathematics engaging and enjoyable.	4.65	0.61	Strongly Agree
Weighted Mean	4.49		
SD	0.45		
Verbal Interpretation	Very High		

The results indicate that students strongly perceive that their teacher consistently applies a collaborative approach on teaching Mathematics. These findings imply that teachers frequently integrate collaborative activities, such as group tasks, peer discussions, and teamwork in Mathematics lessons, allowing learners to interact, share ideas and strategies, work together, and develop problem-solving skills.

The weighted mean of teacher implementation of collaborative approach in Mathematics was 4.49 with a standard deviation of 0.45, which were verbally interpreted as very high level among respondents. This indicates that collaborative strategies are strongly implemented in the classroom and are widely experienced by learners during mathematics instruction.

In summary, the teacher's collaborative approach is highly practiced in Mathematics instruction, as indicated by the very high weighted mean.

The use of group work, shared problem-solving, and teamwork helps increase learners' active participation, confidence, and engagement in learning Mathematics. This shows that collaborative activities significantly support learners' interaction, cooperation, and understanding of mathematical concepts. Additionally, these practices help create a positive and supportive learning environment among learners.

Table 3 presents the level of 2C-2I-1R approaches implemented by the teacher in terms of integrative as perceived by the learners, including the statements with their corresponding mean, standard deviation, remarks and verbal interpretation.

The results show that all statements were rated Strongly Agree, indicating that learners strongly perceive that their teacher integrates mathematics lessons with real-life contexts and other subject areas. This implies that the teacher frequently connects mathematical concepts to practical situations, making the lessons more meaningful and relevant to students' everyday experiences.

The level of the implementation of 2C-2I-1R Approaches in terms of integrative attained the weighted mean of 4.55 with a standard deviation of 0.56 was verbally interpreted as Very High, indicating that this approach is highly implemented by the teacher in mathematics instruction. This means that learners frequently experience lessons that link mathematics to real-world applications and to interdisciplinary learning.

Table 3. Level of 2C-2I-1R Approaches Implementation in terms of Integrative

Statements The teacher..	Mean	SD	Remarks
…explains math lessons by connecting them to real-life examples and situations.	4.63	0.90	Strongly Agree
…designs lessons that show how mathematics relates to other subjects we study.	4.46	0.78	Strongly Agree
…provides tasks where we us math concepts to solve real-world problems.	4.6	0.61	Strongly Agree
…highlights how mathematics is applied outside the classroom.	4.54	0.79	Strongly Agree
…incorporates real-life applications to make the lessons more meaningful.	4.53	0.67	Strongly Agree
Weighted Mean	4.55		
SD	0.56		
Verbal Interpretation	Very High		

Table 4. Level of 2C-2I-1R Approaches Implementation in terms of Inquiry-Based

Statements The teacher..	Mean	SD	Remarks
…encourages us to ask questions and explore different ways to solve problems.	4.57	0.69	Strongly Agree
…allows us to investigate problems before giving us the final method or answer.	4.43	0.89	Strongly Agree
…provides inquiry activities that help develop our logical and critical thinking skills.	4.64	0.61	Strongly Agree
…guides us in discovering solutions on our own.	4.57	0.77	Strongly Agree
…uses open-ended tasks that make math lessons more thought-provoking.	4.50	0.69	Strongly Agree
Weighted Mean	4.54		
SD	0.53		
Verbal Interpretation	Very High		

Table 4 presents the level of 2C-2I-1R approaches implemented by the teacher in terms of inquiry-based, as perceived by the learners, including the statements, their corresponding means, standard deviations, remarks and verbal interpretations.

The results show that learners strongly perceived that their teacher frequently uses an inquiry-based approach in teaching mathematics. This implies that learners are encouraged to ask questions, explore different solution strategies, and actively participate in the discovery of mathematical concepts. Additionally, this indicates that inquiry-based activities are consistently used to develop learners' logical and critical thinking skills while promoting exploration, independent thinking, and deeper understanding of Mathematics.

The level of implementation of the 2C-2I-1R Approaches in terms of inquiry-based attained a weighted mean of 4.54 with a standard deviation of 0.53 was verbally interpreted as Very High, indicating that the inquiry-based approach is highly implemented by the teacher in mathematics instruction. This means that students regularly experience lessons that encourage questioning, investigation, and critical thinking.

In summary, the inquiry-based approach is very highly implemented in Mathematics instruction, as learners strongly agree that the teacher promotes questioning, exploration, and

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problem-solving activities which show that learners are often given opportunities to investigate problems, discover solutions, and engage in tasks that develop their critical and logical thinking skills. This indicates that inquiry-based learning supports active participation and a deeper understanding of Mathematics.

Table 5 presents the level of 2C-2I-1R approaches implemented by the teacher in terms of reflective, as perceived by the learners, including the statements with their corresponding means, standard deviations, remarks, and verbal interpretations.

Table 5. Level of 2C-2I-1R Approaches Implementation in terms of Reflective

Statements The teacher..	Mean	SD	Remarks
…gives us time to review and reflect on the mistakes we make in mathematics.	4.63	0.66	Strongly Agree
…encourages us to think about how we can improve our problem-solving strategies.	4.64	0.61	Strongly Agree
…asks us to analyze our solutions after completing activities.	4.6	0.73	Strongly Agree
…promotes self-assessment so we can identify our strengths and weaknesses.	4.53	0.69	Strongly Agree
…provides opportunities for us to express what we learned and how we learned it	4.68	0.71	Strongly Agree
Weighted Mean		4.51	
SD		0.59	
Verbal Interpretation		Very High	

The results show that all the statements were rated Strongly Agree, indicating that learners strongly perceived that their teacher frequently uses reflective strategies in teaching mathematics. This implies that this approach helps learners evaluate their thinking, improve problem-solving skills, and develop a deeper understanding of mathematical concepts.

The weighted mean of teacher implementation of the reflective approach was 4.51, with a standard deviation of 0.59, which were verbally interpreted as very high level among respondents, indicating that reflective approaches are highly implemented in mathematics instruction. This means that learners frequently engage in activities that encourage reflection, self-evaluation, and learning from mistakes.

In summary, learners highly recognize the opportunities provided the teacher provides to express what and how they learned it. This suggest that self-assessment practices are also highly implemented, which implies learners are actively involved in reflecting on their own learning, identifying their strengths and weaknesses, and taking greater responsibility for improving their understanding of lessons in Mathematics.

Learners' Learning Domains in Mathematics

In this study, learners' learning domains in mathematics refer to the way in which the learners comprehend mathematical concepts (cognitive), how they feel about learning mathematics (affective), and their ability to do mathematics through both manual and mental processes and to solve mathematics-based problems through the application of learned mathematics skills (psychomotor) as measured through a 25-item teacher-made test administered to Grade 10 learners.

The following tables shows the level of learners' learning domains in mathematics in terms of cognitive, affective and psychomotor domains, which were treated statistically using the frequency, percentage, weighted mean, and standard deviation, together with the corresponding descriptive equivalent and verbal interpretation.

Table 6 presents the level of learners' learning domain in Mathematics in terms of cognitive domain, including the distribution of scores with their corresponding frequency, percentage, and descriptive equivalent and statistically treated using the weighted mean and standard deviation.

Table 6. Level of Learners' Learning Domains in Mathematics in terms of Cognitive Domain

Scores	Frequency	Percentage	Descriptive Equivalent
21-25	26	36.11%	Outstanding
16-20	31	43.06%	Very Satisfactory
11-15	15	20.83%	Satisfactory
6-10	0	0.00%	Fairly Satisfactory
0-5	0	0.00%	Needs Improvement
Total	72	100%	
Weighted Mean		18.79	
SD		3.72	
Descriptive Equivalent		Very Satisfactory	

The results revealed that most learners performed very satisfactorily in the cognitive domain, demonstrating strong understanding, reasoning, and problem-solving abilities in mathematics. The data show that there were 31 (43.06%) learners scored between 16 to 20, indicating that the majority are at very satisfactory level. Meanwhile, 26 (36.11%) of the learners scored 21 to 25, showing outstanding level of performance and mastery in cognitive assessment. On the other hand, 15 (20.83%) of the learners scored 11 to 15, indicating a satisfactory mastery level. No learners fell under the fair-satisfactory (6-10) or needs improvement (0-5) categories.

The results show that the learners demonstrated a very satisfactory level of cognitive domain in mathematics with a weighted mean of 18.79 with standard deviation of 3.72. This indicates that many learners demonstrate a strong level of cognitive learning in mathematics, particularly in comprehension, analysis, and problem-solving.

In summary, learners have generally performed well in Mathematics, with most falling within the very satisfactory and outstanding levels, indicating good understanding, reasoning, and problem-solving skills. This suggests that the teaching approaches being implemented are effective in developing learners' cognitive abilities, particularly in comprehension, analysis, and application of mathematical concepts.

Table 7 shows the level of learners' learning domain in Mathematics in terms of affective domain, including the distribution of scores, their corresponding frequencies, percentages, and descriptive equivalents, and statistically treated using the weighted mean and standard deviation.

The results revealed that most learners performed outstandingly in the affective domain, indicating very positive attitudes, motivation, and interest toward learning mathematics. As shown in the data, 51 (70.83%) learners obtained scores within the range of 21–25, which falls under the outstanding level of mastery that represents the majority of the respondents. Meanwhile, there were 15 (20.83%) students fell within the 16–20 (very satisfactory) range, and 6 (8.33%) learners obtained scores within 11–15 (satisfactory). No students received ratings under fairly satisfactory (6–10) or needs improvement (0–5),

suggesting that all learners demonstrated generally positive emotional engagement with mathematics.

Table 7. Level of Learners' Learning Domains in Mathematics in terms of Affective Domain

Scores	Frequency	Percentage	Descriptive Equivalent
21-25	51	70.83%	Outstanding
16-20	15	20.83%	Very Satisfactory
1-15	6	8.33%	Satisfactory
6-10	0	0.00%	Fairly Satisfactory
0-5	0	0.00%	Needs Improvement
Total	72	100%	
Weighted Mean		21.69	
SD		3.67	
Descriptive Equivalent		Outstanding	

The results further show that learners demonstrated an outstanding level of affective domain in mathematics, with a weighted mean of 21.69 and a standard deviation of 3.67. This shows that most learners have positive attitudes, confidence, and interest in Mathematics, which help them participate actively and continue solving problems.

In summary, learners generally performed outstandingly in the affective domain of Mathematics, with most falling within the outstanding level, indicating positive attitudes, strong interest, confidence, and motivation in learning Mathematics.

This suggests that the teaching approaches being implemented are effective in developing learners' emotional engagement and positive disposition toward learning Mathematics, particularly in encouraging participation, persistence, and enthusiasm in mathematical activities.

Table 8. Level of Learners' Learning Domains in Mathematics in terms of Psychomotor Domain

Scores	Frequency	Percentage	Descriptive Equivalent
21-25	31	43.06%	Outstanding
16-20	25	34.72%	Very Satisfactory
11-15	15	20.83%	Satisfactory
6-10	1	1.39%	Fairly Satisfactory
0-5	0	0.00%	Needs Improvement
Total	72	100%	
Weighted Mean		19.60	
SD		4.48	
Descriptive Equivalent		Outstanding	

Table 8 presents the level of learners' learning domain in Mathematics in terms of psychomotor domain, including the distribution of scores, their corresponding frequencies, percentages, and descriptive equivalents and is statistically analyzed using the weighted mean and standard deviation.

The results indicate that the majority of learners excelled in the psychomotor domain, demonstrating an outstanding level of performance in applying mathematical skills through hands-on, practical activities.

The data show that there were 31 (43.06%) learners who scored between 21 and 25, indicating that the majority are at the outstanding level.

Meanwhile, 25 (34.72%) of the learners scored 16–20, inducating a very satisfactory level of performance in psychomotor skills. On the other hand, 15 (20.83%) learners scored 11–15, which is considered satisfactory. Only 1 (1.39%) learner scored in the fairly satisfactory (6–10) category, while no learners were rated under the needs improvement (0–5) category.

The weighted mean of 19.60 with a standard deviation of 4.48 indicates that learners exhibit an outstanding level of psychomotor domain in mathematics, reflecting consistent competence in performing tasks that require coordination, manipulation of materials, and hands-on problem solving.

In summary, learners generally performed outstandingly in the psychomotor domain of Mathematics, with most falling within the outstanding and very satisfactory levels, indicating strong skills in performing hands-on tasks and applying mathematical concepts.

This suggests that the teaching approaches being implemented are effective in developing learners' practical abilities, coordination, and active participation in Mathematics activities, as learners can confidently manipulate materials, accurately perform mathematical procedures, and actively engage in task-based learning that strengthens their skills.

Learners' Performance in Mathematics

In this study, learners' performance in mathematics refers to the level of achievement demonstrated by the learners in Mathematics 10, as measured by their scores in the quarterly assessment, reflecting their understanding and application of mathematical concepts and mastery of the learning competencies. The learners' performance in Mathematics was analyzed using frequency and percentage based on their quarterly assessment results.

Additionally, the Mean Percentage Score (MPS) was calculated to assess learners' mastery and performance in Mathematics. The MPS represents the average percentage of correctly answered items, reflecting how well the learners achieved the competencies outlined in the DepEd Curriculum Guide for Mathematics 10 for each quarter. This analysis enabled the researcher to evaluate the extent to which the learners met the learning objectives following the implementation of the 2C-2I-1R Approaches on learners' performance in Mathematics.

Table 9 presents learners' performance in Mathematics in the Quarterly Assessment, including the distribution of scores, their corresponding frequencies, percentages, Mean Percentage Score (MPS) brackets, and descriptive equivalents. It provides a clear overview of learners' mastery levels based on their scores and shows how well they performed in the quarterly assessment.

The results revealed that most learners, 49 out of 72 (68.06%), scored within the 33–42 range (Moving Towards Mastery), indicating that they are still developing and consolidating their understanding of mathematical concepts. Meanwhile, 12 learners (16.67%) fell within the 43–47 range (Closely Approximating Mastery), while only 2 learners (2.78%) achieved scores in the 48–50 range (Mastered). In addition, 8 learners (11.11%) obtained scores within the 18–32 range (Average), and 1 learner (1.39%) fell under the 8–17 range (Low). No learners were classified under the 3–7 (Very Low) and 0–2 (No Mastery) categories, demonstrating that all learners have at least a basic understanding of the third quarter topics in Mathematics.

Table 9. Level of Learners' Performance in Mathematics in terms of Quarterly Assessment

Scores	Frequency	percentage	MPS Bracket	Descriptive Equivalent
48-50	2	2.78%	96 – 100	Mastered
43-47	12	16.67%	86-95	Closely Approximating Mastery
33-42	49	68.06%	66 – 85	Moving Towards Mastery
18-32	8	11.11%	35 – 65	Average
8-17	1	1.39%	16 – 34	Low
3-7	0	0.00%	5 – 15	Very Low
0-2	0	0.00%	0 – 4	No Mastery
Total	72	100%		
Weighted Mean			37.94	
SD			6.26	
MPS			75.87	
Descriptive Equivalent			Moving Towards Mastery	

The learners' performance in Mathematics, based on the quarterly assessment, is generally at the moving towards mastery level as reflected in the mean percentage score (MPS) of 75.67. The weighted mean of 37.94 with a standard deviation of 6.26 indicates that learners' performance falls within the moving towards mastery level. This implies that while many students demonstrate strong proficiency in Mathematics, a considerable number are still developing full mastery of concepts and skills, which means that targeted academic support and reinforcement are necessary to help all learners achieve higher levels of mastery and confidence in Mathematics.

In summary, learners' performance in Mathematics is at the moving towards mastery level, indicating that most are still developing their understanding, while few have reached higher mastery. This suggests that learners have already acquired foundational mathematical knowledge and skills. However, many still need further strengthening to achieve full mastery and higher performance levels in Mathematics, which means they must consistently study, practice, and apply what they have learned from the teacher's approaches to deepen their understanding, strengthen their problem- solving skills, and improve retention of concepts, so they can perform better and achieve higher results in quarterly assessments.

Test of Significant Effect of 2C-2I-1R Approaches on the Learners' Learning Domains in Mathematics

The test of the significant effect of 2C-2I-1R Approaches on learners' learning domains in mathematics, across cognitive, affective and psychomotor domains, was treated statistically using Real Statistics Data Analysis Tools using regression analysis.

A multiple regression analysis was conducted to evaluate whether the 2C-2I-1R Approaches in teaching mathematics, namely constructivist, collaborative, integrative, inquiry-based, and reflective approaches, could significantly predict the learners' cognitive domain in mathematics. This statistical analysis was used to determine the extent to which each approach contributed to the learners' cognitive development. Table 10 presents the multiple regression analysis results on the implementation of 2C-2I-1R Approaches on learners' learning domains in Mathematics in terms of cognitive.

The findings revealed that the effects of these approaches on the learners' cognitive domain differ across the various instructional approaches. Although the overall regression model did not reach statistical significance ($F(5, 66) = 2.30$, $p = 0.054$), several individual approaches demonstrated significant contributions to the cognitive domain. Specifically, the constructivist ($B = 1.68$, $t = 2.10$, $p = 0.039$), collaborative ($B = 2.06$, $t = 2.14$, $p = 0.036$), and integrative ($B = 1.69$, $t = 2.20$, $p = 0.031$) approaches significantly influenced learners' cognitive development in Mathematics. These findings indicate that strategies that encourage active learning, collaboration, and the integration of knowledge may help strengthen learners' understanding, reasoning, and problem-solving skills.

Table 10. Significant Effect of 2C-2I-1R Approaches on the Learners' Cognitive Domain in Learning

ANOVA[a]

	Model	Sum of Square	df	Mean Square	F	Sig.
1	Regression	146.26	5	29.25	2.30	0.054
	Residual	837.62	66	12.69		
	Total	983.88	71			

a. Dependent Variable: Learner's Learning Domains _Cognitive
b. Predictors: Constructivist, Collaborative, Integrative, Inquiry-Based and Reflective

Coefficients[a]

Model	Unstandardized Coefficients B	Std. Error	t	Sig.
(Constant)	7.38	4.45	1.66	0.102
Constructivist	1.68	0.80	2.10	0.039*
Collaborative	2.06	0.96	2.14	0.036*
Integrative	1.69	0.77	2.20	0.031*
Inquiry-Based	1.24	0.82	1.51	0.137
Reflective	0.75	0.75	1.00	0.321

On the other hand, the inquiry-based ($B = 1.24$, $t = 1.51$, $p = 0.137$) and reflective ($B = 0.75$, $t = 1.00$, $p = 0.321$) approaches did not significantly predict the cognitive learning domain. This implies that while these approaches may still support learning experiences in Mathematics, their influence on the cognitive domain was not statistically evident in the present study.

In summary, the implementation of the 2C-2I-1R approaches has significant effects on the learners' cognitive domain in Mathematics, particularly through the constructivist, collaborative, and integrative approaches. These approaches significantly enhanced learners' understanding, reasoning, and problem-solving skills by promoting active participation, cooperation, and integration of knowledge.

However, the inquiry-based and reflective approaches did not show significant effects on the cognitive domain in the present study. This suggests that teachers continue strengthening the constructivist, collaborative, and integrative approaches in Mathematics instruction while improving inquiry-based and reflective activities to develop learners' cognitive domain better.

Table 11 conducted a multiple regression analysis to evaluate whether the 2C-2I-1R Approaches in teaching mathematics, namely constructivist, collaborative, integrative, inquiry-based, and reflective approaches, could significantly predict the learner's affective domain in mathematics.

The results of the analysis of variance showed that the regression model did not produce a statistically significant effect ($F(5,66) = 1.41$, $p = 0.231$) on the learners' affective learning domain in Mathematics when the instructional approaches were combined.

Hence, it can be inferred that the constructivist, collaborative,

integrative, inquiry-based, and reflective approaches collectively do not significantly influence the learners' affective domain in the context of this study. Furthermore, none of the individual instructional approaches were found to have a significant influence on the affective domain. Specifically, the constructivist approach (B = −0.29, t = −0.35, p = 0.726), collaborative approach (B = 0.98, t = 1.01, p = 0.316), integrative approach (B = 1.03, t = 1.33, p = 0.187), inquiry-based approach (B = 0.41, t = 0.50, p = 0.616), and reflective approach (B = 0.51, t = 0.70, p = 0.491) did not produce statistically significant effects on the learners' affective learning domain.

Table 11. Significant Effect of 2C-2I-1R Approaches on the Learners' Affective Domain in Learning

ANOVA[a]

	Model	Sum of Square	df	Mean Square	F	Sig.
1	Regression	92.37	5	18.47	1.41	0.231
	Residual	862.91	66	13.07		
	Total	955.28	71			

a. Dependent Variable: Learner's Learning Domains _Affective
b. Predictors: Constructivist, Collaborative, Integrative, Inquiry-Based and Reflective

Coefficients[a]

Model	Unstandardized Coefficients B	Std. Error	T	Sig.
(Constant)	19.33	4.52	4.28	<.001
Constructivist	-0.29	0.81	-0.35	0.726
Collaborative	0.98	0.97	1.01	0.316
Integrative	1.03	0.77	1.33	0.187
Inquiry-Based	0.41	0.82	0.50	0.616
Reflective	0.51	0.74	0.70	0.491

In summary, the implementation of the 2C-2I-1R Approaches has no significant effect on the learners' affective domain in Mathematics. These findings suggest that although the approaches may contribute to positive learning experiences in Mathematics, their influence on learners' attitudes, interests, and emotional engagement toward the subject was not statistically evident in the present study.

This further implies that other factors, such as learners' motivation, personal experiences, and learning environment, may have a greater influence on the development of the affective domain in Mathematics.

Table 12 conducted a multiple regression analysis was conducted to evaluate whether the 2C-2I-1R Approaches in teaching Mathematics, namely constructivist, collaborative, integrative, inquiry-based, and reflective approaches, could significantly predict the learners' psychomotor domain in Mathematics.

The results of the analysis of variance showed that the regression model produced a statistically significant effect ($F(5,66) = 3.83$, $p = 0.004$) on the learners' psychomotor learning domain in mathematics when the 2C-2I-1R Approaches were implemented.

Hence, it can be inferred that the constructivist, collaborative, integrative, inquiry-based, and reflective approaches collectively have a significant influence on the learners' psychomotor domain in the context of this study.

Table 12. Significant Effect of 2C-2I-1R Approaches on the Learners' Psychomotor Domain in Learning

ANOVA[a]

	Model	Sum of Square	df	Mean Square	F	Sig.
1	Regression	174.17	5	34.83	3.83	0.004
	Residual	1253.15	66	18.99		
	Total	1427.32	71			

a. Dependent Variable: Learner's Learning Domains _ Psychomotor
b. Predictors: Constructivist, Collaborative, Integrative, Inquiry-Based and Reflective

Coefficients[a]

Model	Unstandardized Coefficients B	Std. Error	t	Sig.
(Constant)	8.56	5.44	1.57	0.120
Constructivist	2.35	0.95	2.47	0.016*
Collaborative	2.19	1.17	1.88	0.065
Integrative	2.04	0.93	2.20	0.031*
Inquiry-Based	0.52	0.96	2.62	0.011*
Reflective	2.62	0.86	3.06	0.003*

Moreover, several instructional approaches were found to have significant effects on the psychomotor domain. Specifically, the constructivist approach (B = 2.35, t = 2.47, p = 0.016), integrative approach (B = 2.04, t = 2.20, p = 0.031), inquiry-based approach (B = 2.52, t = 2.62, p = 0.011), and reflective approach (B = 2.62, t = 3.06, p = 0.003) produced statistically significant effects on the learners' psychomotor learning domain, while the collaborative approach (B = 2.19, t = 1.88, p = 0.065) did not show a statistically significant effect. This implies that instructional approaches that promote hands-on learning, exploration, integration of concepts, and reflection are more effective in enhancing learners' practical and performance-based mathematical skills.

In summary, the implementation of the 2C-2I-1R Approaches has significant effects on the learners' psychomotor domain in Mathematics. These findings suggest that the approaches help improve learners' hands-on skills, coordination, and ability to apply mathematical concepts through practical and activity-based tasks. This further implies that instructional strategies that promote active participation, exploration, reflection, and learner-centered activities play an important role in developing learners' psychomotor domain while increasing their engagement and confidence in performing mathematical tasks.

Test of Significant Effect of 2C-2I-1R Approaches on the Learners' Performance in Mathematics

The significant effect of 2C-2I-1R Approaches on the learners' performance in mathematics, as measured by quarterly assessment, was statistically analyzed using Real Statistics Data Analysis Tools using multiple regression analysis. This was used to identify the extent to which these teaching approaches contributed to learners' performance in mathematics.

A multiple regression analysis was conducted to determine whether the 2C-2I-1R Approaches in teaching mathematics, specifically constructivist, collaborative, integrative, inquiry-based, and reflective approaches, could significantly predict the learners' performance in mathematics as measured through quarterly assessments.

Table 13. Significant Effect of 2C-2I-1R Approaches on the Learners' Performance in Mathematics Quarterly Assessment

Geralene M. Garcia, "Implementing The 2c-2i-1r Approaches on the Learners' Learning Domains and Performance in Mathematics" *International Journal of Multidisciplinary Research and Publications (IJMRAP)*, Volume 9, Issue 2, pp. 146-153, July 2026.

ANOVA[a]						
Model		Sum of Square	df	Mean Square	F	Sig.
1	Regression	121.85	5	24.37	0.61	0.692
	Residual	2634.8	66	39.92		
	Total	2756.65	71			

a. Dependent Variable: Learner's Learning Domains _ Quarterly Assessment
b. Predictors: Constructivist, Collaborative, Integrative, Inquiry-Based and Reflective

Coefficients[a]				
	Unstandardized Coefficients			
Model	B	Std. Error	T	Sig.
(Constant)	33.43	7.89	4.24	<.001
Constructivist	2.29	2.61	0.88	0.383
Collaborative	-2.65	2.69	-0.99	0.328
Integrative	1.02	2.55	0.40	0.691
Inquiry-Based	2.71	3.01	0.90	0.370
Reflective	-2.33	3.00	-0.78	0.441

Table 13 shows the significant effect of implementing the 2C-2I-1R Approaches on the learners' performance in mathematics, as measured by quarterly assessment. The results did not reveal a statistically significant effect of the 2C-2I-1R approaches on learners' performance in mathematics, as all computed p-values were greater than the 0.05 level of significance ($F(5,66) = 0.61$, $p = 0.692$). This indicates that the overall influence of the instructional approaches was insufficient to significantly predict learners' performance in Mathematics significantly. This suggest that other factors may have contributed to the learners' quarterly assessment results. Regarding the individual predictors for learners' performance in mathematics, none of the 2C-2I-1R approaches produced significant effects in a measurable way within this study. For the Constructivist approach ($B = 2.29$, $t = 0.88$, $p = 0.383$), Collaborative approach ($B = -2.65$, $t = -0.99$, $p = 0.328$), Integrative approach ($B = 1.02$, $t = 0.40$, $p = 0.691$), Inquiry-based approach ($B= 2.71$, $t = 0.90$, $p = 0.370$), and Reflective approach ($B = -2.33$, $t = -0.78$, $p = 0.441$), none of these instructional approaches produced a statistically significant effect on learners' quarterly performance in Mathematics, implying that other factors beyond the implemented approaches may have greater influence on learners' performance.

In summary, the implementation of the 2C-2I-1R Approaches has no significant effect on learners' performance in Mathematics in quarterly assessment. This indicates that the constructivist, collaborative, integrative, inquiry-based, and reflective approaches did not significantly predict learners' quarterly performance in the present study. These findings imply that while the approaches may support classroom learning experiences, other factors, such as learners' study habits, motivation, prior knowledge, home support, and learning environment may have greater influence on their academic performance in Mathematics.

IV. Conclusion and Recommendations

Based on the findings of the study, the following conclusions are drawn:

Most of the indicators of 2C-2I-1R approaches have significant effect on learners' learning domains in Mathematics particularly in cognitive and psychomotor domains, leading to the rejection of the null hypothesis. This indicates that these approaches significantly influence the cognitive and psychomotor domains, particularly in improving learners' understanding, reasoning, and ability to apply mathematical skills through active engagement and hands-on activities. However, the approaches do not show significant effect on the affective domain, indicating that learners' attitudes, motivation, and emotional engagement with Mathematics might be influenced by other factors such as classroom environment, personal interest, and external support systems.

No significant effect was found in the implementation of the 2C-2I-1R Approaches on learners' performance in Mathematics, particularly in quarterly assessment, leading to the acceptance of the null hypothesis. This indicates that learners' performance in quarterly assessments is affected by other factors such as prior knowledge, problem-solving strategies, study habits, motivation, and the learning environment. While the approaches help enhance engagement and understanding, their direct impact on test scores may not be immediately clear, as a mix of instructional and learner-related factors determines academic success.

Considering the conclusions drawn from the study, the following recommendations are proposed: School administrators may consider supporting teachers through professional development programs and instructional resources that promote learner-centered approaches. Additional academic support programs may also be provided to help improve learners' performance.

Teachers may consider sustaining the use of the 2C-2I-1R Approaches, particularly in strengthening learners' understanding and skill application, even in other subjects. It may also be beneficial to integrate strategies that support learners' motivation and interest, and to provide varied assessments and timely feedback to improve academic performance.

Learners may be encouraged to actively engage in collaborative, inquiry-based, and reflective activities to further enhance their cognitive and psychomotor skills. They may also improve their study habits and problem- solving strategies, as these factors influence their performance in Mathematics.

Future researchers may explore other factors influencing learners' performance, such as motivation, prior knowledge, and learning environment. They may also examine the long-term effectiveness of the 2C-2I-1R Approaches to determine whether continuous exposure to these strategies can sustain improvements in learners' cognitive, affective, and psychomotor development over time. Furthermore, future studies may apply the framework in other subject areas and educational contexts to further evaluate its effectiveness in enhancing learning outcomes.

Reference

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