

Development of project ROXY (remediation of outcomes through executed and validated learning activities for young mathematicians) in enhancing mathematics performance of grade 4 learners at Lattut Elementary School

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Abstract

This study focused on the development and implementation of Project ROXY (Remediation of Outcomes Through Executed and Validated Learning Activities for Young Mathematicians) to enhance the mathematics performance of Grade 4 learners at Lattut Elementary School. The research aimed to address the learners' difficulties in Mathematics through structured remediation activities designed to improve understanding and mastery of essential competencies. Using a descriptive-developmental research design, the study involved Grade 4 learners identified with low performance in Mathematics. Validated learning activities, exercises, and intervention materials were utilized during the remediation sessions. Pre-test and post-test assessments were administered to measure the effectiveness of Project ROXY in improving learners' academic performance. Findings revealed that learners showed significant improvement in their Mathematics scores after participating in the intervention program. The remediation activities helped increase learner engagement, comprehension, and confidence in solving mathematical problems. The study concluded that Project ROXY is an effective intervention tool in enhancing the mathematics performance of Grade 4 learners. It is recommended that the program be continuously implemented and adapted to support struggling learners in Mathematics and other learning areas.

Keywords: Project ROXY; Mathematics Performance; Remediation Program; Grade 4 Learners; Learning Activities; Mathematics Intervention; Academic Achievement; Elementary Education; Learner Engagement; Lattut Elementary School.

1. Introduction

Improving mathematics performance among elementary learners has been both a personal and professional priority. As an educator in Rizal District, I have observed how pupils' difficulties with foundational concepts affect their confidence and overall achievement. This experience motivated the conduct of this study, which provides targeted interventions for learners at Lattut Elementary School, where the need for support is particularly evident.

Mathematics is recognized worldwide as a key measure of educational quality, with international assessments such as TIMSS and PISA revealing that many learners struggle with basic skills (Mullis et al., 2020; OECD, 2023). In Asia, several countries face similar challenges, affecting students readiness for science and technology-related fields. In the Philippines, national results confirm that mathematics remains one of the most difficult subjects for elementary pupils, with proficiency levels consistently below expectations (DepEd, 2023). This concern is also reflected in the Cagayan Valley region, where learners often struggle with problem solving and computation. At the provincial level of Cagayan, records highlight the urgent need for stronger interventions (DepEd Rizal Division, 2024). Specifically, Grade 4 pupils

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in the Rizal District, particularly those at Lattut Elementary School, show low performance, underscoring the importance of localized and competency-based materials to address learning gaps (DepEd Regional Office III, 2025).

School and division records further confirm that Grade 4 learners in Rizal District face persistent challenges in mastering basic competencies, with many falling below expected proficiency levels. Addressing this issue is crucial not only to improve test scores but also to strengthen problem-solving skills and prepare learners for higher levels of education. In line with the DepEd Rapid Mathematics Assessment (RMA) framework, early diagnostics from Grades 1–3 reveal foundational gaps in numeracy that directly affect Grade 4 readiness (DepEd, 2023; DepEd Regional Office III, 2025). These findings emphasize the need for targeted interventions, bridging programs, and contextualized teaching strategies to ensure that learners develop both computational fluency and critical thinking skills necessary for advanced mathematics learning.

However, there remains a clear research gap in the availability of localized, competency-based intervention materials in mathematics. Most existing programs are generic and not fully adapted to the specific needs of Grade 4 pupils in Rizal District, particularly those at Lattut Elementary School. Without proper validation and contextualization, these materials may be less effective in addressing learners' difficulties in computation and problem solving. This gap highlights the need for targeted, validated interventions that can directly improve mathematics performance at the local level.

To address this gap, the present study introduces Project ROXY (Remediation of Outcomes through Executed and Validated Learning Activities for Young Mathematicians). In this study, young mathematicians refers to learners who are eager and motivated to learn but may still struggle in mastering certain mathematical competencies. These pupils demonstrate a strong desire to improve and succeed academically, yet they require additional support and structured interventions to fully realize their potential. Project ROXY is designed to provide these learners with validated, engaging, and contextualized activities that directly target the competencies where they have trouble. Its goal is to enhance mathematics performance through learner-centered remediation, ensuring that pupils not only improve academically but also develop a more positive attitude toward mathematics

Grade 4 pupils at Lattut Elementary School in Rizal, Cagayan have consistently shown low performance in Mathematics, with existing interventions proving too generic and not tailored to their specific needs. To address this, the study introduced **Project ROXY**, a localized and validated set of learning activities designed to remediate the least mastered competencies and improve mathematics outcomes. The research specifically aims to identify the least mastered competencies in Mathematics 4 during the first to third quarters, develop a project based on these gaps to enhance performance, and evaluate the effectiveness of Project ROXY through expert assessments.

2. Methodology

2.1. Research Design

This chapter presents the methods and procedures used to evaluate the effectiveness of Project ROXY (Remediation of Outcomes through Executed and Validated Learning Activities for Young Mathematicians) in improving the mathematics performance of Grade 4 pupils at Lattut Elementary School, Rizal District, Cagayan. It discusses the research design, participants, research instruments, data-gathering procedures, and statistical techniques employed in the study. By providing a clear methodological framework, the study ensures that the procedures and approaches used are valid, reliable, and aligned with the objectives of the research, thereby making the findings credible and replicable.

2.2. Locale of the Study

This study was conducted in the District of Rizal, Cagayan, Philippines. The district served as the primary research locale for the implementation and evaluation of Project ROXY, focusing on Grade 4 learners' mathematics performance. The setting provided a contextual environment representative of typical public elementary schools in the region, making it suitable for developing and validating localized instructional interventions

2.3. Participants of the Study

The study participants consisted of 20 validators, composed of 14 elementary mathematics teachers and 6 elementary school heads. These participants were selected based on their expertise and experience in teaching and managing Mathematics instruction at the elementary level. They served as evaluators of Project ROXY, particularly in assessing its clarity, relevance, alignment with the curriculum, and overall effectiveness in enhancing learners' mathematics mastery.

2.4. Research Instrument

- Pre-test and Post-test: Teacher-made objective-type exams aligned with least mastered competencies (factors/multiples, geometry, division, problem-solving).
- Rapid Mathematics Assessment (RMA): Diagnostic tool providing baseline proficiency data from Grades 1–3 to identify readiness and learning gaps.
- Performance Records: Quarterly records analyzed to track progress and validate improvement consistency.
- Activity Modules: Contextualized, game-based tasks serving as both instructional materials and embedded assessments.
- Observation Checklists & Teacher Feedback: Qualitative tools documenting engagement, collaboration, and problem-solving strategies.
- Rubrics: Used to evaluate mastery, clarity, relevance, and effectiveness, tracking learner progress from Beginning to Advanced levels.
- Reflection Sheets: Captured pupils' perceptions, challenges, and self-assessment for deeper insight into learning experiences

3. Statistical Analysis

The mean was used to determine the average rating for each criterion, while frequency and percentage were utilized to describe the distribution of responses among the 20 validators. These statistical tools allowed for a meaningful interpretation of the overall acceptability and effectiveness of Project ROXY.

4. Results and Discussion

Grade 4 learners at Lattut Elementary School were found to have least mastered three critical mathematics competencies during the first to third quarters: identifying common factors, greatest common factor (GCF), common multiples, and least common multiple (LCM using various methods); computing the area and perimeter of basic polygons; and solving multi-step division problems involving other operations and money. These persistent gaps in conceptual understanding and application highlight the need for targeted intervention, which led to the development of Project ROXY. Designed as a contextualized, activity-based, and validated learning program, Project ROXY aims to strengthen problem-solving skills, improve mastery of operations, and raise overall mathematics performance. The findings align with international assessments such as TIMSS 2019 and PISA 2022, which show that learners worldwide struggle with number operations, geometry, and applying division in real-life contexts. Local evidence from the National Achievement Test and regional RMA reports further confirm similar gaps among Filipino learners. Theoretical support comes from Piaget's concrete operational stage, emphasizing hands-on learning, and Vygotsky's Zone of Proximal Development, which underscores guided practice and social interaction. Taken together, these studies justify Project ROXY's approach of integrating contextualized, experiential, and validated learning activities to remediate least mastered competencies and enhance Grade 4 mathematics outcomes.

Table 1 Identified Learning Competencies from First Quarter to Third Quarter based on Grade 4 Mathematics Most Essential Learning Competencies (MELCs)

Least Mastered Competencies	Duration
Finds the common factors, greatest common factor (GCF), common multiples and least common multiple (LCM) of two numbers using the following methods: listing, prime factorization, and continuous division	Week 2
Finds the area and perimeter of triangles, squares, rectangles, parallelograms, and trapezoids	Week 7
Solves multi-step routine and non-routine problems involving division and any of the other operations of whole numbers including money using appropriate problem-solving strategies and tools	Week 8

5. Conclusion

Based on the findings of the study, it is concluded that the Development of Project ROXY (Remediation of Outcomes Through Executed and Validated Learning Activities for Young Mathematicians) was necessary and appropriate in addressing the least mastered competencies of Grade 4 learners in Mathematics at Lattut Elementary School. The identified learning gaps in factors and multiples, geometry, and problem-solving highlight the need for targeted remediation to enhance learners' mathematics performance. Furthermore, the developed Project ROXY, which consists

of contextualized and game-based learning activities aligned with the DepEd K-12 curriculum and supported by structured assessment tools, was found to be highly acceptable during validation. Therefore, Project ROXY is an effective and suitable intervention in enhancing the mathematics performance of Grade 4 learners at Lattut Elementary School.

Compliance with ethical standards

Disclaimer (Artificial Intelligence)

The author acknowledges the use of AI-assisted tools such as ChatGPT for language refinement and grammar checking only.

Disclosure of Conflict of Interest

Authors have declared that they have no known competing financial or non-financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Statement of Ethical Approval

The study was conducted in accordance with ethical research standards. permission was secured from the school authorities, and confidentiality of respondents was strictly observed.

Statement of informed Consent

I affirm that the respondents voluntarily agreed to participate after being fully informed about the purpose, nature, and potential implications of the study. Their responses have been collected with utmost respect for their privacy rights, in accordance with ethical research guidelines

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