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Mathematics Performance of Grade 7 Learners through Catch-Up Numeracy Intervention Program

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Abstract

This study investigated the mathematics performance of Grade 7 learners at Ajuy National High School during School Year 2023–2024 in relation to the implementation of the Catch-Up Numeracy Intervention Program. The primary objective was to determine whether systematic numeracy support could significantly enhance students' mathematical achievement across grading periods. Using a descriptive–quantitative approach, the researchers employed convenience sampling to obtain the academic records of 198 Grade 7 students enrolled in the program. Data were processed and analyzed using the Statistical Package for the Social Sciences (SPSS) to generate descriptive statistics and to examine differences in performance across quarters, gender, and class sections. Findings revealed that participation in the Numeracy Intervention Program was associated with a consistent and significant improvement in mathematics performance. Mean ranks increased steadily from the first to the fourth grading period, indicating progressive gains in mathematical skills over the school year. Positive effects were evident among both male and female learners, suggesting that the program benefited students regardless of gender. When analyzed by section, results similarly demonstrated upward trends in achievement, confirming that the intervention had a broad and sustained impact across classes. Overall, the study supports the conclusion that the Catch-Up Numeracy Intervention Program effectively enhanced the mathematics competencies of Grade 7 learners and contributed to improved academic outcomes. The findings underscore the importance of structured numeracy initiatives in addressing learning gaps and promoting equitable achievement in mathematics. Recommendations for future research include examining long-term retention of skills, exploring qualitative aspects of student engagement, and identifying best practices to further strengthen numeracy interventions in secondary schools.

Keywords: Mathematics Performance, Grade 7 Learners, and Catch-up Numeracy Intervention Program

1. Introduction

Numeracy, or number sense, refers to a student's flexibility and fluency with numbers. It encompasses understanding the meaning of numbers, performing mental calculations, and interpreting the world through numerical comparisons. Numeracy also involves a conceptual understanding of number systems, as well as the properties and operations that guide their lawful application in problem-solving. Students need to comprehend how different number systems relate to each other and be capable of generalizing across these systems (Organization for Economic Cooperation and Development (OECD, 2023).

Mathematics literacy, on the other hand, refers to a broader set of knowledge, understanding, and appreciation of the practical applications of mathematics, rather than mastery of advanced branches or complex formulas (Layug, 2021). According to Maryani (2020) in the *Journal of Physics: Conference*

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Series, mathematics literacy is "the ability to understand and apply basic mathematical concepts, terminologies, facts, and skills in response to real-world situations."

Learning deficiencies in mathematics has become a growing concern among educators at Ajuy National High School. Many low-performing students struggle even with simple mathematical problems. They face challenges in grasping basic concepts and lack an intuitive understanding of how numbers function. This often makes learning mathematical procedures difficult and can lead students to develop negative attitudes toward mathematics, resulting in avoidance behaviors.

The 2022 Programme for International Student Assessment (PISA) highlights this issue at the national level. In the Philippines, only 16% of students attained at least Level 2 proficiency in mathematics, far below the OECD average of 69%. At this level, students can interpret and recognize simple situations mathematically, such as comparing distances across alternative routes or converting prices into another currency. Alarmingly, almost no Filipino students reached the top-performing levels (Level 5 or 6) in mathematics, compared to an OECD average of 9%.

Despite the critical importance of numeracy, many learners at Ajuy National High School still lack foundational skills in the four basic arithmetic operations. This study, therefore, aims to determine the mathematics performance of Grade 7 learners through the implementation of a Catch-up Numeracy Intervention Program at Ajuy National High School (ANHS).

1.1 Objective and Statement of the Porblem

This study aimed to determine the mathematics performance of Grade 7 learners through the Catch-up Numeracy Intervention Program at Ajuy National High School. Specifically, it sought to answer the following questions:

1. What is the mathematics performance of Grade 7 learners through the Catch-up Numeracy Intervention Program in Ajuy National High School across each grading period of the school year 2023–2024?
2. What is the mathematics performance of Grade 7 learners through the Catch-up Numeracy Intervention Program in Ajuy National High School when classified according to sex and section?
3. Is there a significant difference in the mathematics performance of Grade 7 learners in Ajuy National High School across the four grading periods of S.Y. 2023–2024?

1.2 Review of Related Literature

Mathematics literacy encompasses a broad array of knowledge, comprehension, and appreciation of the capabilities of mathematics, emphasizing practical applications over mastery of specific branches or complex formulas (Layug, 2021). According to Maryani (2020), mathematics literacy refers to the ability to understand and apply fundamental mathematical concepts, terminologies, facts, and skills to address real-world situations.

Numeracy, or number sense, refers to a student's proficiency and fluency with numbers. It includes understanding the significance of numbers, performing mental calculations, and applying numerical concepts to real-world contexts. Numeracy also involves conceptual understanding of number systems, including the properties and operations that govern problem-solving. Students must understand the interrelationships between various number systems and be able to generalize concepts across contexts (OECD, 2023).

Early mathematics instruction is critical, as it coincides with the developmental period when pupils are most receptive to learning (Eason, 2018, as cited in Pitogo & Oco, 2023). At-risk learners, in particular, require opportunities to establish a solid mathematical foundation during early childhood, when their cognitive abilities are naturally primed for logic and numeracy (Odiri, 2023). Numeracy skills encompass counting, comparing, describing shapes and locations, and solving problems, forming the cornerstone for future mathematical learning.

The low numeracy levels among Filipino students, as reflected in the PISA results over recent years, have prompted educators to adopt targeted interventions for students performing poorly in mathematics. The Annual Status of Education Report (ASER) assessment tool, as cited in Division Memorandum 765 s. 2019, is designed for classroom-based evaluation of literacy and numeracy skills.

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Results from ASER help teachers design appropriate interventions and activities, identify students' skill levels, and guide school programs to improve learning outcomes (Pitogo & Oco, 2023).

Further, Regional Memorandum No. 279, series 2019, and Regional Memorandum No. 280, series 2021, mandate the administration of pre- and post-numeracy tests to all students. This initiative aims to establish baseline data to inform intervention programs and effectively address numeracy challenges.

Studies demonstrate the long-term benefits of early mathematics interventions. Arthur et al. (2022) reported that early exposure to mathematical concepts significantly improves students' later performance. Peer tutoring is widely recognized for its positive impact on students' academic achievement, enhancing attitudes toward learning, critical thinking, problem-solving, communication, social skills, and academic skills (Barahona et al., 2023). Differentiated instruction, which tailors teaching to students' individual needs, has proven effective in improving comprehension and confidence in mathematics (Gheyssens, 2023). Technology-assisted learning, using interactive math games and online tutorials, allows personalized pacing and immediate feedback, further boosting numeracy skills (Haleem et al., 2022).

Parental involvement also positively impacts mathematics performance, as parents who actively support their children in learning tasks contribute to better academic outcomes (Wang & Wei, 2024). Similarly, targeted interventions for struggling students in the Philippines, such as parent-student conferences, remedial classes, and one-on-one tutorials, have been found effective in improving numeracy (Layug, 2022).

International studies support the efficacy of numeracy intervention programs. Aguhayon et al. (2023) reported that differentiated instruction improves both performance and confidence. Zainuddin et al. (2020) found that personalized tutoring, math games, and visual aids significantly enhanced elementary students' ability to perform basic arithmetic. Strogilos et al. (2021) highlighted that one-on-one and small group interventions boost problem-solving skills and confidence in students with learning difficulties. In the Philippines, Gonzales (2022) demonstrated that after-school tutoring, hands-on activities, and technology use significantly improved Grade1 to 6 learners' numeracy. Similarly, Rosales (2023) showed that collaboration between school and home enhances understanding of mathematical concepts. Sabado (2025) emphasized that teacher training in numeracy intervention strategies is crucial for improving students' skills effectively.

Collectively, these studies underscore the importance of structured, targeted, and individualized numeracy interventions in improving students' mathematics performance, providing a strong foundation for future learning.

1.3 Research Framework

Figure 1 illustrates the conceptual framework of the study. This research is anchored on Lev Vygotsky's Zone of Proximal Development (ZPD) theory, which provides insight into the potential effects of numeracy intervention programs on the mathematical proficiency of Grade 7 students (Vygotsky, 1978). According to the ZPD, learners can perform certain tasks with guidance that they cannot accomplish independently. This framework highlights the importance of scaffolding, where educators offer tailored support to help students engage with tasks within their ZPD, ensuring that intervention activities are both appropriately challenging and achievable (Wood, Bruner, & Ross, 1976).

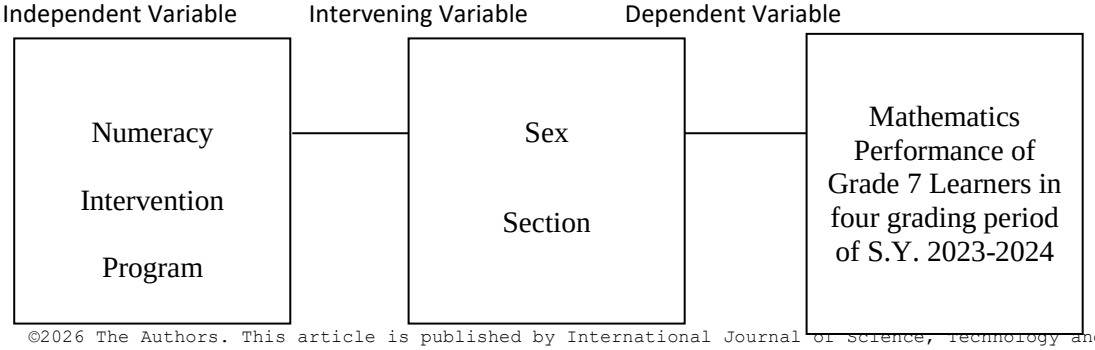

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Figure 1. Conceptual Framework

H1: There is no significant difference in Mathematics performance of Grade 7 learners in Ajuy National High School in four grading period of S.Y. 2023-2024.

2. Methodology

2.1 Research Design

This study employed a descriptive research design to determine the mathematics performance of Grade 7 learners through the Catch-up Numeracy Intervention Program at Ajuy National High School. The descriptive approach was chosen for its ability to systematically collect and analyze data, providing a comprehensive portrayal of the program's effects and outcomes on student performance.

2.2 Research Respondents

The study involved 198 Grade 7 learners, representing 50.5% of the total population of 392 students across eight sections enrolled during the 2023–2024 school year at Ajuy National High School. The respondents were classified according to sex (male and female) and section: Diamond, Aquamarine, Amethyst, Garnet, Pearl, Ruby, Emerald, and Sapphire.

To determine the sample size, the researchers employed Yamane's Formula. Convenience sampling was utilized to ensure adequate representation of learners from different sections, providing a balanced perspective of the overall Grade 7 population.

2.3 Data Gathering Procedure

Permission to collect data was secured through a formal letter addressed to the school authorities. The letter, signed by the Chairperson of the Bachelor of Secondary Education program, the Associate Director of Student Affairs and Services, the research adviser, and the undergraduate thesis adviser, was subsequently approved by the campus administrator and the principal of Ajuy National High School. Data collection involved obtaining the mathematics performance records of the Grade 7 learners for the school year 2023–2024.

2.4 Data Processing and Analysis

The collected data were encoded using Microsoft Excel and subsequently forwarded to the statistician for analysis. Data processing and statistical analysis were conducted using the Statistical Package for the Social Sciences (SPSS). The SPSS outputs were organized and tabulated according to the prescribed format for reporting. To ensure ethical compliance, respondents' identities were kept confidential in accordance with Republic Act 10173 (Data Privacy Act of 2012).

3. Results and Discussion

As presented in Table 1, the results on the mathematics performance of Grade 7 learners participating in the Catch-up Numeracy Intervention Program at Ajuy National High School during each grading period of the 2023–2024 school year demonstrate a consistent increase in mean scores across the grading periods.

Table 1. *Mathematics Performance of Grade 7 Learners through Catch-up Numeracy Intervention Program in Four Grading Period of the School Year 2023-2024*

	n	Mean	Interpretation	SD
Q1 - Math Performance	198	81.83	Satisfactory	4.817
Q2 - Math Performance	198	83.31	Satisfactory	5.858
Q3 - Math Performance	198	83.86	Satisfactory	5.952
Q4 - Math Performance	198	84.39	Satisfactory	6.012

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Below 75 = Did Not Meet Expectation; 75 – 79 = Fairly Satisfactory; 80 – 84 = Satisfactory; 85 – 89 = Very Satisfactory; 90 – 100 = Outstanding

In the first quarter, the Grade 7 learners achieved a mean score of 81.83 with a standard deviation of 4.817. This increased to a mean of 83.31 (SD = 5.858) in the second quarter and further rose to 83.86 (SD = 5.952) in the third quarter. By the fourth quarter, the mean score reached 84.39 with a standard deviation of 6.012. Overall, the learners' mathematics performance remained consistently satisfactory across all four grading periods.

These results indicate that the Catch-up Numeracy Intervention Program had a positive effect on the learners' mathematics performance. The upward trend suggests that sustained support through targeted intervention not only enhances students' familiarity with mathematical concepts but also builds their confidence and competence in handling mathematical tasks over time.

However, certain limitations should be considered when interpreting these findings. The use of convenience sampling may introduce selection bias, and the results may not be fully generalized to the entire Grade 7 population or other schools. Additionally, other uncontrolled factors, such as teacher influence, individual motivation, and home support, may have contributed to the observed improvements in performance.

These findings are consistent with the study of Layug (2021), which demonstrated that numeracy interventions are effective in enhancing students' skills and narrowing the performance gap between learners at risk of failing mathematics and their higher-achieving peers. This reinforces the value of structured intervention programs in improving foundational numeracy and supporting equitable learning outcomes.

As presented in Table 2, both male and female Grade 7 learners demonstrated satisfactory performance in mathematics. Female students, however, achieved a higher mean score of 84.47, compared to 82.45 for their male counterparts, indicating a slightly stronger performance among female learners.

Table 2. *Mathematics Performance of Grade 7 Learners through Catch-up Numeracy Intervention Program When Grouped According to Sex and Section*

Section	n	Mean	Interpretation	SD
SEX				
Male	97	82.45	Satisfactory	5.511
Female	101	84.47	Satisfactory	5.084
SECTION				
Amethyst	25	84.72	Very Satisfactory	3.736
Aquamarine	24	87.71	Very Satisfactory	4.298
Diamond	19	92.63	Outstanding	5.188
Emerald	25	82.40	Satisfactory	4.743
Garnet	26	81.35	Satisfactory	3.577
Pearl	26	81.27	Satisfactory	3.157
Ruby	26	81.77	Satisfactory	2.819
Sapphire	27	78.96	Fairly Satisfactory	2.696
Total	**198**	**83.48**	**Satisfactory**	**5.380**

Below 75 = Did Not Meet Expectation; 75 – 79 = Fairly Satisfactory; 80 – 84 = Satisfactory; 85 – 89 = Very Satisfactory; 90 – 100 = Outstanding

The standard deviation, which reflects the variability of scores, was slightly higher for male students (SD = 5.511) compared to female students (SD = 5.084), indicating that male students' scores were more dispersed around the mean. The combined mean score for all students was 83.48, with a standard deviation of 5.380, demonstrating that the Catch-up Numeracy Intervention Program positively influenced the mathematics performance of both male and female learners, with female students achieving slightly higher average scores.

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When analyzed by section, the results revealed differences in mathematics performance among Grade 7 learners. The Diamond section achieved the highest mean score of 92.63, reflecting an outstanding performance, while Sapphire had the lowest mean score of 78.96, indicating satisfactory performance. Amethyst and Aquamarine demonstrated very satisfactory performance with mean scores of 84.72 and 87.71, respectively, with Aquamarine showing greater variability in scores (SD = 4.298) compared to Amethyst (SD = 3.736). Diamond's higher standard deviation (SD = 5.188) suggests a wider range of individual scores within the section.

Sections Emerald, Garnet, Pearl, and Ruby exhibited satisfactory performances, with mean scores of 82.40, 81.35, 81.27, and 81.77, respectively, and standard deviations ranging from 2.696 to 4.743, indicating moderate variability. Sapphire, despite having the lowest meaning, had a relatively low standard deviation (SD = 2.819), suggesting more consistent performance among its learners.

Overall, the total mean score across all sections was 83.48, signifying a satisfactory level of mathematics performance for Grade 7 learners participating in the Catch-up Numeracy Intervention Program. These findings suggest that while there were performance differences between sections, the intervention had a generally positive effect across the school. However, variability among sections may also reflect external factors not directly addressed by the program, such as teacher experience, peer influence, student behavior, and attendance, which could have influenced the effectiveness of the intervention differently across groups.

The results of this study align with the findings of Munda et al. (2024), which reported significant differences in student performance based on demographic profiles, with female learners generally outperforming males. This consistency underscores the effectiveness of targeted numeracy interventions in improving student performance while highlighting potential variations attributable to learner characteristics and contextual factors.

As presented in Table 3, the mean rank of Grade 7 learners' mathematics performance demonstrated a gradual increase across the four grading periods, starting at 1.79 in the first quarter, rising to 2.40 in the second quarter, 2.66 in the third quarter, and reaching 3.16 in the fourth quarter. This trend indicates a consistent improvement in mathematics performance over time, with learners achieving the highest relative rank in the final quarter.

Table 3. *Significant Difference in Mathematics Performance of Grade 7 Learners through Catch-up Numeracy Intervention Program at 0.05 Level of Significance*

Math Performance	Mean Rank	n	Chi-Square	df	Asymp. Sig.
First Quarter	1.79				
Second Quarter	2.40	198	135.77	3	.000
Third Quarter	2.66				
Fourth Quarter	3.16				

With a sample size of 198 students, the Chi-Square value was calculated at 135.77 with 3 degrees of freedom, and the Asymptotic Significance value was .000, well below the standard threshold of 0.05. These results confirm a statistically significant difference in mathematics performance across the four grading periods, leading to the rejection of the null hypothesis.

The steadily increasing mean ranks—from 1.79 in the first quarter to 3.16 in the fourth quarter—indicate a significant improvement in mathematics performance throughout the school year. This consistent upward trend reflects the positive impact of the Catch-up Numeracy Intervention Program, suggesting that learners benefited from continuous support and scaffolded learning. While the intervention appears effective, it is important to acknowledge that accumulated exposure to mathematical content over the course of the year may have also contributed to the observed improvements. The absence of a control group, therefore, limits the ability to fully isolate the effect of the program from normal learning progression.

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The findings of this study align with Munda et al. (2024), which reported statistically significant differences in participants' performance following numeracy interventions, confirming the program's effectiveness in enhancing students' skills. Similarly, the results are consistent with Frazier (2019) and Layug (2021), who demonstrated that structured interventions significantly improve numeracy outcomes.

These findings highlight the potential of interactive numeracy interventions to accelerate mathematics learning in high school students. The Catch-up Numeracy Intervention Program demonstrated that learners could achieve substantial progress, in some cases exceeding the typical growth of their peers. This underscores the program's capacity to bridge learning gaps and enhance overall academic achievement.

However, the effectiveness of the intervention may vary across different student demographics and educational contexts. The non-intensive nature of the program may not fully meet the needs of learners with more pronounced difficulties, and sustaining gains requires ongoing support and resources. Discontinuation of the intervention may lead to regression in skills, emphasizing the importance of sustainable implementation strategies.

The implications of these findings are far-reaching. Schools can integrate short, targeted numeracy sessions into the curriculum to strengthen foundational mathematics skills. Teachers can benefit from specialized training to effectively implement these interventions, ensuring that learners receive adequate support. Policymakers can also leverage these insights to advocate for structured numeracy programs and allocate resources to support struggling learners, ultimately promoting equitable learning opportunities.

4. Conclusion

The findings of this study indicate that the mathematics performance of Grade 7 learners at Ajuy National High School consistently improved across all four grading periods through the implementation of the Catch-up Numeracy Intervention Program. This improvement can be attributed to the program's differentiated teaching practices, which targeted specific gaps in learners' numeracy skills. Regular assessments, personalized support, and enhanced student engagement further reinforced understanding, boosted confidence, and fostered a positive and inclusive classroom culture that acknowledged individual learning needs and preferences. The program had a clear and measurable impact on learners' mathematical proficiency. By providing structured interventions, teachers were able to enhance students' engagement and promote a more positive attitude toward mathematics. Learners not only developed greater competence in mathematical operations but also increased their appreciation of mathematics and its relevance to daily life. The significant differences observed in mathematics performance across the four grading periods highlight the effectiveness of sustained, targeted interventions in fostering academic growth and motivation. These results underscore the importance of numeracy interventions in bridging learning gaps, enhancing foundational skills, and fostering academic confidence among struggling learners. They also emphasize the need for well-designed, structured programs that address diverse learning needs in mathematics education. For future research, studies could investigate the long-term impact of numeracy interventions, compare the effectiveness of different intervention models, and explore how socio-economic factors influence program outcomes. The integration of technology in numeracy instruction, including digital learning tools, interactive activities, and manipulatives, could also be examined as a means of further enhancing learning outcomes. From a practical standpoint, continuous professional development for teachers, such as trainings, workshops, and seminars, can improve the implementation of innovative teaching strategies. Schools are encouraged to incorporate interactive instructional materials and activities tailored to diverse learning styles, engage parents and communities in supporting learners' numeracy development, and establish systematic evaluation and feedback mechanisms to monitor and improve program effectiveness. Overall, the study demonstrates that structured, differentiated numeracy interventions can effectively improve mathematics performance, foster positive attitudes toward learning, and support students in achieving greater academic success.

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