International Journal of Sustainability and Advanced Integrated Research
Volume 2, Issue 1 (January-March 2026) | ISSN: 3107-7854
DOI: https://doi.org/10.65339/ijsair.V2.I1.73

# Effects of Mathematics Intervention Program on the Numeracy Skills of Grade Six Pupils

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Publication history: Received: February 6, 2026; Revised: February 10, 2026; Accepted: February 22, 2026
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## Abstract

This study determined the effects of the Mathematics Intervention Program on the numeracy skills of Grade Six pupils in selected public elementary schools in Binangonan District, Schools Division Office of Rizal, during the School Year 2025–2026. Specifically, it assessed the extent of the program's effects on pupils' numeracy skills in terms of basic arithmetic and number sense, measurement and spatial reasoning, and problem solving and critical thinking. The study also examined the relationship between the perceived effects of the intervention and pupils' academic performance in Mathematics.A descriptive survey research design and documentary analysis were employed. The respondents consisted of 398 Grade Six pupils, representing 50% of the total population of 796 pupils, selected through simple random sampling. A researcher-made questionnaire checklist was utilized to measure pupils' perceptions of the effects of the Mathematics Intervention Program. Documentary analysis of pupils' first-quarter average grades in Mathematics was conducted to determine academic performance.Findings revealed that most pupils were male, first-born, from families with two to three children, and belonged to low-income households. Results showed that the Mathematics Intervention Program had a high effect on pupils' numeracy skills across all domains. No significant differences were found in the perceived effects of the program when grouped according to sex, sibling position, number of children in the family, monthly family income, and parents' educational attainment. However, parents' occupation showed a significant difference. Pupils demonstrated an overall Satisfactory level of academic performance. A significant positive relationship was found between the perceived effects of the intervention program and pupils' academic performance.The study concluded that the Mathematics Intervention Program significantly supports pupils' numeracy development and is positively associated with academic achievement. Implementation of the proposed action plan and continuous program evaluation are recommended.

**Keywords:** Mathematics Intervention Program, numeracy skills, Grade Six pupils, academic performance, descriptive survey research

## 1. Introduction

Education is a systematic process of transmitting knowledge, skills, values, and attitudes that enable individuals to lead productive and meaningful lives. It plays a vital role in human resource development and is closely linked to personal well-being and improved quality of life. As enshrined in Article XIV, Section 1 of the 1987 Philippine Constitution, the State shall protect and promote the right of all citizens to quality education at all levels and make such education accessible to all. This constitutional mandate emphasizes the responsibility of educational institutions to provide programs that address learners' needs and prepare them for lifelong success.One of the core learning areas in basic education is Mathematics. It develops critical thinking, logical reasoning, and problem-solving skills essential for academic and real-life situations. In response to the need to strengthen foundational competencies, the Department of Education issued DepEd Order No. 10, s. 2024, implementing the MATATAG Curriculum which prioritizes foundational literacy and numeracy skills and promotes the development of 21st-century competencies. This reform highlights the urgency of improving learners' numeracy levels, particularly in the elementary grades.

However, international and local assessments reveal persistent challenges. The 2023 Trends in International Mathematics and Science Study (TIMSS) reported that a large percentage of Filipino learners did not reach even the low benchmark in Mathematics, indicating gaps in fundamental numeracy skills. These findings are supported by several studies. Munda (2024) found that structured intervention programs significantly improved students' numeracy skills, while Bryant (2021) and Aunio (2021) confirmed that early and targeted interventions positively influence mathematical development. Similarly, local studies by Magtolis (2023), Enrique (2021), Lopez (2023), Layug (2021), and Legal (2024) demonstrated that remedial and enrichment programs contribute to improved mathematical performance and learner confidence.Despite these promising results, most existing studies utilized experimental or quasi-experimental designs and

focused on kindergarten, Grade 4, Grade 5, or Grade 7 learners. Limited research has explored the perceived effects of Mathematics intervention programs among Grade Six pupils using a descriptive approach while examining relationships with academic

Based on the researcher's observations in public elementary schools, many Grade Six pupils continue to struggle with basic arithmetic operations, measurement concepts, and problem-solving tasks. These difficulties often result in low academic performance and weak numeracy foundations. Although intervention programs are implemented, systematic evaluation of their perceived effectiveness and relationship to pupils' academic outcomes remains insufficientAnchored on these gaps and observations, this study was conceived to determine the effects of the Mathematics Intervention Program on the numeracy skills of Grade Six pupils and its relationship to their academic performance, thereby providing basis for strengthened instructional planning and intervention strategies.

## 2. Materials and methods

### 2.1 Research Design

Descriptive survey research design was applied utilizing a researcher-made questionnaire checklist as the main instrument in gathering the needed data

### 2.2 Research Setting

The study was conducted in selected public elementary schools in Binangonan District , Schools Division Office of Rizal during the School Year 2025-2026. These schools include Casimiro A. Ynares Sr. Elementary School, Macamot Elementary School, Mahabang Parang Elementary School and Tatala Elementary School..

### 2.3 Respondents

The study considered 50% of the total population of grade six pupils in the cited schools. Hence, out of 796 grade six pupils, 398 pupils were included. They were chosen utilizing simple random sampling technique. They were described in terms of sex, sibling position, number of children in the family, monthly family income, parents' educational attainment, and parents' occupation.

### 2.4 Research Instruments

The study utilized a researcher-made questionnaire checklist as the main instrument in gathering the needed data. The said instrument measured the extent of effects of Mathematics intervention program on the numeracy skills of grade six pupils as perceived by themselves with respect to basic arithmetic and number sense, measurement and spatial reasoning and problem solving and critical thinking. Documentary analysis was applied since the average grades in Mathematics in the first quarter were obtained as basis of pupils' academic performance.

### 2.5 Data Collection

The researcher followed the Gantt Chart of Activities in the conduct of the study. This includes the formulation of research problem up to the revision of the manuscript and submission of the final copy. After the validation of the instrument, permission to conduct the study was obtained from the Office of the Schools Division Superintendent. The questionnaire-checklist was administered to the respondents through the Google Survey form and printed questionnaire checklist in compliance with the Data Privacy Act of 2012. After the retrieval, the data were encoded and processed through the Statistical Package for Social Sciences(SPSS) in the College Statistical Center. Analysis and interpretation of data followed. Based on the interpreted data, summary of findings, conclusions and recommendations were formulated. After the oral defense, suggestions made by the panel members were incorporated. The manuscript was subjected to anti-plagiarism test in the statistical center. After the final editing and revision, hardbound copies were submitted to the Office of the Dean of the Graduate Studies Program and other offices concerned.

### 2.6 Data Analysis

For the analysis and interpretation of data, appropriate statistical tools were employed. Frequency, percentage, and rank distribution were used to describe the profile of the respondents according to the selected variables. To determine the extent of the effects of the Mathematics Intervention Program on the numeracy skills of Grade Six pupils as perceived by themselves across the identified domains, the weighted mean was utilized. One-way Analysis of Variance (ANOVA) was applied to test the significant differences in the perceived effects of the intervention program when respondents were grouped according to their profile variables. The level of academic performance in Mathematics was determined using frequency, mean, and standard deviation. Finally, correlation analysis was conducted to examine the significant relationship between the pupils' perceived extent of the effects of the Mathematics Intervention Program and their level of academic performance.

### 2.7 Ethical Considerations

The study ensured the protection of the rights and welfare of all respondents. Participation was voluntary, and respondents were informed about the purpose of the study. Confidentiality and anonymity of all information provided were strictly maintained, and data were used solely for research purposes. The researcher ensured that the respondents were treated with respect and that no harm, whether physical, emotional, or psychological, would result from their participation in the study.

## 3. Results and Discussion

### 3.1. Profile of the Respondents in Terms of the Selected Variables

It can be seen from the table that the distribution of respondents according to sex shows that the largest group is composed of males, with 215 or 54.0%, while females, with 183 or 46.0%, make up the smaller proportion. In terms of sibling position, most respondents are first-born, with 100 individuals or 25.1%, followed by second-born siblings with 90 or 22.6%, whereas those who are fifth-born and above, totaling 66 or 16.6%, form the smallest group. Regarding the number of children in the family, the majority come from families with two to three children, accounting for 150 or 37.7%, followed by those with four to five children, with 138 or 34.7%, while only 20 respondents or 5.0% belong to families with six or more children. For monthly family income, the highest proportion of respondents fall within the ₱20,000–₱24,999 income range, consisting of 190 or 47.7%, followed by the ₱25,000–₱29,999 group with 108 or 27.1%, whereas the lowest number, 28 or 7.1%, come from families earning below ₱20,000. In terms of fathers' educational attainment, the largest group is composed of college undergraduates at 118 or 29.6%, followed by college graduates with 96 or (24.1%, while the smallest group consists of elementary graduates with only 9 or 2.3%. Mothers show a similar pattern, with college undergraduates comprising the largest group at 152 or 38.2%, followed by college graduates at 99 or 24.9%, and elementary graduates representing the smallest group with 14 or 3.5%. As for fathers' occupation, the majority are locally employed, totaling 128 or 32.2%, followed by 93 or 23.4% who are self-employed fathers, while only 12 or 3.0% of the fathers work as OFWs, making them the smallest group. Mothers' occupation mirrors this trend, with the largest group being locally employed at 115 or 28.9%, followed by self-employed mothers numbering 88 or 22.1%, and the smallest group being OFWs, with only 7 or 1.8%.

Table 1: *Profile of the Respondents*

| **Sex** | **f** | **%** | **R** |
|---|---|---|---|
| Male | 215 | 54.0 | 1 |
| Female | 183 | 46.0 | 2 |
| **Total** | **398** | **100.0** | |
| **Sibling Position** | | | |
| !st | 100 | 25.1 | 1 |
| 2nd | 90 | 22.6 | 2 |
| 3rd | 68 | 17.1 | 4 |
| 4th | 74 | 18.6 | 3 |
| 5th & above | 66 | 16.6 | 5 |
| **Total** | **398** | **100.0** | |
| **Number of Children in the Family** | | | |
| 1 | 90 | 22.6 | 3 |
| 2-3 | 150 | 37.7 | 1 |
| 4-5 | 138 | 34.7 | 2 |
| 6 & above | 20 | 5.0 | 4 |
| **Total** | **398** | **100.0** | |
| **Monthly Family Income** | | | |
| ₱ 30.000 and above | 72 | 18.1 | 3 |
| ₱ 25.00-₱ 29,999 | 108 | 27.1 | 2 |
| ₱ 20,000-₱ 24,000 | 190 | 47.7 | 1 |
| below ₱ 20,000 | 28 | 7.1 | 4 |
| **Total** | **398** | **100.0** | |

| **Educational Attainment** | **Father** | | | **Mother** | | |
|---|---|---|---|---|---|---|
| | **f** | **%** | **R** | **f** | **%** | **R** |
| College Graduate | 96 | 24.1 | 2 | 99 | 24.9 | 2 |
| College Undergraduate | 118 | 29.6 | 1 | 152 | 38.2 | 1 |
| High School Graduate | 90 | 22.6 | 3 | 69 | 17.3 | 3 |
| High Undergraduate | 85 | 21.4 | 4 | 64 | 16.1 | 4 |
| Elementary Graduate | 9 | 2.3 | 5 | 14 | 3.5 | 5 |

| Total | 398 | 100.0 | | 398 | 100.0 | |
|---|---|---|---|---|---|---|
| **Parents' Occupation** | **Father** | | | **Mother** | | |
| | **f** | **%** | **R** | **f** | **%** | **R** |
| Employed (Local) | 128 | 32.2 | 1 | 115 | 28.9 | 1 |
| OFW | 12 | 3.0 | 6 | 7 | 1.8 | 6 |
| Self Employed | 93 | 23.4 | 2 | 88 | 22.1 | 2 |
| Entrepreneur | 84 | 21.1 | 3 | 68 | 17.1 | 4 |
| Housewife/ Househusband | 55 | 13.8 | 4 | 75 | 18.8 | 3 |
| Others | 26 | 6.5 | 5 | 45 | 11.3 | 5 |
| **Total** | **398** | **100.0** | | **398** | **100.0** | |

### 3.2. Extent of Effects of Mathematics Intervention Program on the Numeracy Skills of Grade Six Pupils as Perceived by Themselves With Respect to the Different Aspects

The table shows that the Mathematics Intervention Program has a High Effect on the numeracy skills of Grade Six pupils, with a composite weighted mean of 3.53. Among the three aspects, Basic Arithmetic and Number Sense ranked first (3.58), followed by Measurement and Spatial Reasoning (3.52), while Problem Solving and Critical Thinking ranked last (3.48), though still interpreted as High Effect.These findings indicate that the program effectively strengthens foundational numeracy skills and supports pupils' understanding of mathematical concepts. However, the relatively lower mean in problem solving suggests the need to further enhance higher-order thinking activities. This aligns with Libato (2022), who emphasized that mathematics intervention programs help address learning gaps and build strong foundational skills essential for academic success.

Table 2: *Extent of Effects of Mathematics Intervention Program on the Numeracy Skills of Grade Six Pupils as Perceived by Themselves With Respect to the Different Aspects*

| Aspects | Overall $W\bar{X}$ | Verbal Interpretation | Rank |
|---|---|---|---|
| Basic Arithmetic and Number Sense | 3.58 | High Effect | 1 |
| Measurement and Spatial Reasoning | 3.52 | High Effect | 2 |
| Problem Solving and Critical Thinking | 3.48 | High Effect | 3 |
| **Composite $W\bar{X}$** | 3.53 | High Effect | |

### 3.3. Significant Difference on the Extent of Effects of Mathematics Intervention Program on the Numeracy Skills of Grade Six Pupils as Perceived by Themselves with Respect to the Different Aspects in Terms of Their Profile

The table presents the F-test results examining whether significant differences exist in the perceived effects of the Mathematics Intervention Program on the numeracy skills of Grade Six pupils when grouped according to profile variables. Findings reveal that sex, sibling position, number of children in the family, monthly family income, and parents' educational attainment all obtained p-values greater than 0.05, leading to the acceptance of the null hypothesis. This indicates that there are no significant differences in pupils' perceptions of the program's effects across Basic Arithmetic and Number Sense, Measurement and Spatial Reasoning, and Problem Solving and Critical Thinking when grouped according to these variables.However, parents' occupation showed p-values less than 0.05, resulting in the rejection of the null hypothesis. This signifies a significant difference in pupils' perceived extent of the program's effects when grouped according to fathers' and mothers' occupation.These results suggest that the Mathematics Intervention Program is generally equitable and consistent in its impact across most learner profiles. Nevertheless, parental occupation appears to influence pupils' perceptions, possibly due to differences in home learning support and exposure. This finding aligns with Munda (2024), who reported that intervention programs can yield significant differences in learner performance, confirming their measurable effectiveness across groups.

Table 3: *Significant Difference on the Extent of Effects of Mathematics Intervention Program on the Numeracy Skills of Grade Six Pupils as Perceived by Themselves with Respect to the Different Aspects in Terms of Their Profile*

| Aspects/Variables | F-value | p-value | Ho | Verbal Interpretation |
|---|---|---|---|---|
| **Sex** | | | | |
| Basic Arithmetic and Number Sense | 0.653 | 0.422 | Accepted | Not Significant |
| Measurement and Spatial Reasoning | 1.746 | 0.159 | Accepted | Not Significant |
| Problem Solving and Critical Thinking | 0.725 | 0.587 | Accepted | Not Significant |
| **Sibling Position** | | | | |
| Basic Arithmetic and Number Sense | 1.028 | 0.347 | Accepted | Not Significant |
| Measurement and Spatial Reasoning | 0.478 | 0.727 | Accepted | Not Significant |
| Problem Solving and Critical Thinking | 0.721 | 0.557 | Accepted | Not Significant |
| **Number of Children in the Family** | | | | |
| Basic Arithmetic and Number Sense | 0.848 | 0.412 | Accepted | Not Significant |
| Measurement and Spatial Reasoning | 0.154 | 0.954 | Accepted | Not Significant |
| Problem Solving and Critical Thinking | 0.498 | 0.754 | Accepted | Not Significant |
| **Monthly Family Income** | | | | |
| Basic Arithmetic and Number Sense | 1.832 | 0.332 | Accepted | Not Significant |
| Measurement and Spatial Reasoning | 0.219 | 0.876 | Accepted | Not Significant |
| Problem Solving and Critical Thinking | 0.532 | 0.679 | Accepted | Not Significant |
| **Fathers' Educational Attainment** | | | | |
| Basic Arithmetic and Number Sense | 1.305 | 0.821 | Accepted | Not Significant |
| Measurement and Spatial Reasoning | 1.130 | 0.387 | Accepted | Not Significant |
| Problem Solving and Critical Thinking | 1.835 | 0.565 | Accepted | Not Significant |
| **Mothers' Educational Attainment** | | | | |
| Basic Arithmetic and Number Sense | 0.032 | 0.321 | Accepted | Not Significant |
| Measurement and Spatial Reasoning | 0.398 | 0.886 | Accepted | Not Significant |
| Problem Solving and Critical Thinking | 0.419 | 0.743 | Accepted | Not Significant |
| **Fathers' Occupation** | | | | |
| Basic Arithmetic and Number Sense | 12.02 | 0.008 | Rejected | Significant |
| Measurement and Spatial Reasoning | 9.494 | 0.003 | Rejected | Significant |
| Problem Solving and Critical Thinking | 10.978 | 0.004 | Rejected | Significant |
| **Mothers' Occupation** | | | | |
| Basic Arithmetic and Number Sense | 10.958 | 0.003 | Rejected | Significant |
| Measurement and Spatial Reasoning | 8.620 | 0.039 | Rejected | Significant |
| Problem Solving and Critical Thinking | 11.716 | 0.009 | Rejected | Significant |

### 3.4. Level of Academic Performance of Grade Six Pupils in Mathematics as Revealed by Their Average Grades in the Subject in the First Quarter

The table reveals the level of academic performance of Grade Six pupils in Mathematics based on their first-quarter average grades. The largest group of pupils, 38.7%, obtained grades within the "Satisfactory" range (80–84), followed by 26.1% who achieved "Very Satisfactory" and 15.8% who reached the "Outstanding" level. Meanwhile, 16.9% were "Fairly Satisfactory," and only 2.5% did not meet expectations. The computed mean grade of 84.03, interpreted as "Satisfactory," indicates that overall performance reflects moderate proficiency. The standard deviation of 3.841 shows minimal variation in scores, suggesting relatively consistent performance among learners.These findings imply that most Grade Six pupils demonstrate acceptable mastery of first-quarter mathematical competencies, with only a small percentage requiring intensive support. However, the results highlight the need for differentiated instruction and strengthened numeracy reinforcement to help learners move toward higher achievement levels.This finding is consistent with Enrique (2021), who reported that the Mathdali Intervention Program significantly improved students' mathematics performance through interactive and engaging strategies, demonstrating that structured interventions can positively influence academic outcomes..

Table 4:. *Level of Academic Performance of Grade Six Pupils in Mathematics as Revealed by Their Average Grades in the Subject in the First Quarter*

| Grades | Verbal Interpretation | F | % |
|---|---|---|---|
| 90 and above | Outstanding | 63 | 15.8 |
| 85 - 89 | Very Satisfactory | 104 | 26.1 |
| 80 - 84 | Satisfactory | 154 | 38.7 |
| 75 - 79 | Fairly Satisfactory | 67 | 16.9 |
| below 75 | Did not meet expectations | 10 | 2.5 |
| **Total** | | **398** | **100** |
| **Highest Grade** | | **90** | |
| **Lowest Grade** | | **74** | |
| **Mean** | | **84.03 – Satisfactory** | |
| **Standard Deviation** | | **3.841** | |

### 3.5. Significant Relationship Between the Perceived Effects of Mathematics Intervention Program on the Numeracy Skills of Grade Six Pupils and Their Level of Academic Performance

The findings reveal that the computed r-values indicate a significant relationship between the perceived effects of the Mathematics Intervention Program and the academic performance of Grade Six pupils. All three aspects—Basic Arithmetic and Number Sense, Measurement and Spatial Reasoning, and Problem Solving and Critical Thinking—obtained p-values less than 0.05, leading to the rejection of the null hypothesis. This means that pupils who perceived greater positive effects from the intervention program also tended to achieve higher academic performance in Mathematics. Among the domains, Basic Arithmetic and Number Sense showed the strongest correlation, highlighting the importance of foundational skills in influencing overall achievement.These results affirm that the Mathematics Intervention Program enhances multiple dimensions of numeracy that collectively contribute to improved academic outcomes. The significant relationships suggest the need for sustained implementation and continuous refinement of the program. Strengthening foundational competencies through targeted drills, diagnostic assessments, and mastery-based strategies may further improve performance.This finding is consistent with Lopez (2023), who reported a significant relationship between the implementation of mathematics intervention strategies and students' academic achievement, emphasizing that well-structured and consistently applied interventions positively influence learners' performance.

Table 5: *Significant Relationship Between the Perceived Effects of Mathematics Intervention Program on the Numeracy Skills of Grade Six Pupils and Their Level of Academic Performance*

| Aspects | r-values | p-values | Ho | Verbal Interpretation |
|---|---|---|---|---|
| Basic Arithmetic and Number Sense | 0.846 | 0.010 | Rejected | Significant |
| Measurement and Spatial Reasoning | 0.737 | 0.003 | Rejected | Significant |
| Problem Solving and Critical Thinking | 0.667 | 0.039 | Rejected | Significant |

## 4. Conclusion & Recommendations

Based on the findings, it can be concluded that the Mathematics Intervention Program has a consistently positive effect on the numeracy skills of Grade Six pupils, regardless of most demographic factors such as sex, sibling position, family size, monthly income, or parents' educational attainment. Pupils perceive the program as effective across all three domains—Basic Arithmetic and Number Sense, Measurement and Spatial Reasoning, and Problem Solving and Critical Thinking—indicating that the program provides equitable benefits across diverse learner profiles. Moreover, a significant positive correlation exists between pupils' perceived effects of the program and their academic performance, showing that greater engagement with the intervention translates into higher achievement in Mathematics.

In light of these conclusions, it is recommended that school administrators and teachers continue to strengthen and expand the intervention program. Targeted supports such as after-school tutoring, parent engagement initiatives, and learning materials for home use can help ensure that all pupils, regardless of home environment, benefit fully. Teachers are encouraged to integrate non-routine problems, inquiry-based tasks, and real-world applications to further develop higher-order thinking skills. Continuous monitoring, differentiated instruction, and the implementation of the proposed action plan can enhance the program's effectiveness, while future studies may explore additional variables to build on these findings.

## Compliance with ethical standards

The author declares no conflict of interest. This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors. This study was self-funded. The authors thank the participating university and the nursing students for their contributions

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