

Immediate and Delayed Effect of an Integrated Literacy-Numeracy Remediation Program

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Abstract

This study evaluated the effectiveness of an Integrated Literacy-Numeracy Remediation Program in improving the literacy and numeracy performance of Grade 7 learners at Maujao National High School. The study was anchored on Vygotsky's Sociocultural Theory, Bruner's Constructivist Theory, Sweller's Cognitive Load Theory, and the Input-Process-Output-Feedback (IPOF) framework. A quantitative quasi-experimental one-group pretest-posttest design was employed involving 69 Grade 7 learners identified with literacy and numeracy difficulties through the Philippine Informal Reading Inventory (PHIL-IRI) and Rapid Mathematics Assessment (RMA). Data were collected using standardized assessment tools and an integrated remediation program that incorporated explicit instruction, guided practice, contextualized learning activities, and formative assessment. Results showed that learners initially exhibited substantial literacy and numeracy deficiencies, with most participants classified at the frustration level in literacy and at the emerging or non-proficient level in numeracy. Session-based monitoring demonstrated consistent improvements in reading fluency, comprehension, and numeracy skills throughout the intervention period. Post-test findings revealed notable gains in both literacy and numeracy performance, with learners progressing from lower proficiency levels to instructional, independent, developing, and transitioning categories. The Wilcoxon Signed-Rank Test further indicated statistically significant differences between pre-test and post-test scores in word reading, comprehension, and numeracy, confirming the effectiveness of the intervention. The study concluded that the Integrated Literacy-Numeracy Remediation Program effectively reduced foundational learning gaps and supported learner achievement through structured and contextualized instruction. It recommends the continued implementation and institutionalization of integrated remediation programs supported by ongoing assessment, teacher capacity-building, and evidence-based instructional practices. The study aligns with Sustainable Development Goal (SDG) 4 on Quality Education and SDG 8 on Decent Work and Economic Growth by strengthening foundational learning and promoting educational equity. It contributes to educational, institutional, and socio-economic sustainability through improved learning recovery initiatives and enhanced opportunities for learner development.

Keywords: Educational Sustainability, Grade 7 Learners, Integrated Literacy-Numeracy Remediation Program, Learning Recovery, Literacy Performance, Numeracy Performance, PHIL-IRI, Rapid Mathematics Assessment, Remediation Intervention

1. Introduction

Literacy and numeracy are fundamental skills that enable individuals to learn, communicate, solve problems, and participate effectively in society. Despite improvements in access to education, many learners continue to experience difficulties in reading and mathematics, limiting their academic achievement and lifelong learning opportunities. Globally, millions of learners lack basic literacy and numeracy skills, emphasizing the need for targeted educational interventions (UNESCO, 2023). In the Philippines, national assessments have revealed persistent challenges in reading and mathematics proficiency, particularly among junior high school learners (Department of Education, 2020; Department of Education, 2022). These concerns became more pronounced following the COVID-19 pandemic, which widened learning gaps and intensified the need for learning recovery programs (World Bank, 2021). This study examined the potential effects of an Integrated Literacy-Numeracy Remediation Program designed to improve the literacy and numeracy performance of Grade 7 learners at Maujao National High School.

1.1 Background of the Integrated Literacy-Numeracy Remediation Program for Grade 7 Learners

Literacy and numeracy are essential foundations for academic success, personal empowerment, and lifelong learning. UNESCO reported that millions of learners worldwide continue to lack basic competencies in reading, writing, and mathematics, highlighting the importance of strengthening foundational learning to achieve Sustainable Development Goal 4 (UNESCO, 2023). In the Philippines, results from the Philippine Informal Reading Inventory (PHIL-IRI) and Rapid Mathematics Assessment (RMA) showed that many learners perform below grade-level expectations in reading and mathematics (Department of Education, 2020; Department of Education, 2022). The learning disruptions caused by the COVID-19 pandemic further aggravated these deficiencies (World Bank, 2021). National and local literacy data also

indicate persistent challenges in applying literacy and numeracy skills in everyday life, particularly in Oriental Mindoro and the MIMAROPA Region (Philippine Statistics Authority, 2024; Mendoza, 2023). At Maujao National High School, assessment results revealed that a substantial proportion of Grade 7 learners were classified at the instructional or frustration levels in reading and at emerging or low-proficient levels in numeracy. Such conditions may negatively affect academic achievement, confidence, motivation, and readiness for higher-level learning (Bautista, 2019). These findings underscore the need for targeted and contextualized interventions that address both literacy and numeracy simultaneously.

1.2 Themes and Insights on Literacy, Numeracy, and Remediation Interventions

Literature consistently identifies literacy and numeracy as interconnected competencies that support higher-order learning and problem-solving. Reading comprehension, vocabulary development, number sense, computational fluency, and logical reasoning collectively contribute to learners' academic success (UNICEF & Hempel Foundation, 2023; Craig & Guzmán, 2018; UNESCO, 2025). Research has shown that weaknesses in literacy and numeracy create barriers to learning, particularly at the secondary level where academic tasks become increasingly complex (UNESCO, 2025; OECD, 2019). Learners with inadequate foundational skills often experience reduced motivation, lower self-esteem, and persistent academic difficulties (Villanueva, 2021; Slavin et al., 2020). Studies further indicate that remediation programs can generate both immediate and long-term improvements in learner performance. Gains in reading fluency, comprehension, and computational skills have been associated with increased learner confidence and engagement (Hattie, 2009; Slavin et al., 2020; UNESCO, 2025). However, literacy gains often emerge more rapidly than numeracy gains, which typically require sustained intervention (Birgin et al., 2022; Spaul and Pretorius, 2019). Another major theme in the literature is the effectiveness of integrated literacy-numeracy approaches. Scholars argue that reading and mathematics reinforce one another because mathematical problem-solving frequently requires language comprehension, while literacy tasks often involve quantitative reasoning (Craig & Guzmán, 2018; Fuchs & Fuchs, 2019; OECD, 2019; Spaul & Pretorius, 2019; UNESCO, 2025). Integrated and contextualized interventions have been associated with deeper learning and improved academic outcomes.

1.3 Local, National, and Global Context of Literacy and Numeracy Challenges Among Grade 7 Learners

Globally, literacy and numeracy remain priorities in educational reform because they are critical foundations for equity, lifelong learning, and social development (UNESCO, 2025; UNICEF & Hempel Foundation, 2023). International organizations have emphasized learning recovery efforts to address learning losses caused by educational disruptions, particularly during and after the COVID-19 pandemic (UNESCO, 2021; OECD, 2020). Nationally, the Department of Education has responded through the National Learning Recovery Program (NLRP), the MATATAG Curriculum Framework, and the implementation of literacy remediation initiatives that prioritize foundational skills and contextualized learning interventions (Department of Education, 2023; Department of Education, 2025). These reforms encourage schools to utilize assessment data and implement localized strategies to support learners experiencing difficulties in literacy and numeracy. At the local level, assessment results from Maujao National High School demonstrated significant literacy and numeracy gaps among Grade 7 learners, highlighting the need for a school-based intervention tailored to learner needs and contextual realities (Mendoza, 2023).

1.4 Theoretical and Conceptual Foundations of the Integrated Literacy-Numeracy Remediation Program

This study was anchored on Vygotsky's Sociocultural Theory (1978), Bruner's Constructivist Theory (1966), and Sweller's Cognitive Load Theory (1988). Vygotsky's Sociocultural Theory emphasizes learning through social interaction and scaffolding within the Zone of Proximal Development (ZPD), enabling learners to perform tasks beyond their independent capabilities with appropriate support (Vygotsky, 1978). Bruner's Constructivist Theory views learning as an active process in which learners build knowledge from prior experiences. His spiral curriculum supports repeated exposure to foundational concepts at increasing levels of complexity, reinforcing literacy and numeracy development (Bruner, 1966; Bruner, 2018). Sweller's Cognitive Load Theory highlights the importance of managing cognitive demands through structured instruction, task sequencing, and scaffolding to facilitate effective learning among struggling learners (Sweller, 1988). These principles are consistent with research from the science of learning and development, which emphasizes supportive learning environments, learner engagement, and instructional practices that foster cognitive and academic growth (Darling-Hammond et al., 2020). The study was further guided by an Input-Process-Output-Feedback (IPOF) framework. Inputs consisted of Grade 7 learners with literacy and numeracy difficulties, assessment tools, and instructional resources. The process involved implementing the Integrated Literacy-Numeracy Remediation Program through structured interventions and formative assessments. Outputs were reflected in improvements in literacy and numeracy performance, while feedback mechanisms supported continuous monitoring and program refinement.

1.5 Research Gaps and Rationale for an Integrated Literacy-Numeracy Remediation Program

Although substantial literature exists on literacy and numeracy development, several gaps remain. Most studies have examined literacy and numeracy separately rather than as integrated competencies (Villanueva, 2021). Existing interventions largely focus on elementary learners, leaving limited evidence regarding integrated remediation for Grade 7 students transitioning into secondary education (UNESCO, 2021; OECD, 2019). Furthermore, many studies emphasize

overall program outcomes without systematically documenting immediate learner progress across remediation sessions (Hattie, 2009; Spaull and Pretorius, 2019). There is also limited empirical evidence on how schools implement and evaluate localized learning recovery initiatives using assessment tools such as PHIL-IRI and RMA, despite evidence that data-based remediation programs can improve instructional decision-making and learner outcomes (Cruz & Balagtas, 2022). To address these gaps, this study developed and evaluated an Integrated Literacy-Numeracy Remediation Program that simultaneously targets reading and mathematics skills among Grade 7 learners. The study contributes evidence on both immediate and delayed learning outcomes within a Philippine secondary school context.

1.6 Alignment of the Integrated Literacy-Numeracy Remediation Program with Relevant Sustainable Development Goals (SDGs)

This study aligns primarily with SDG 4 – Quality Education, which promotes inclusive and equitable quality education and lifelong learning opportunities for all (UNESCO, 2023). By addressing literacy and numeracy deficiencies among junior high school learners, the study supports efforts to improve foundational learning outcomes and reduce educational inequalities. The study also relates to SDG 8 – Decent Work and Economic Growth, as improved literacy and numeracy skills contribute to future employability, productivity, and workforce readiness. Furthermore, the intervention supports educational recovery initiatives that strengthen human capital development and long-term socio-economic advancement.

1.7 Importance of the Integrated Literacy-Numeracy Remediation Program to Multidisciplinary Sustainability

The study contributes to educational sustainability by strengthening foundational competencies necessary for lifelong learning and academic success. It supports socio-economic sustainability by helping learners develop skills that enhance future educational and employment opportunities. The research also promotes community sustainability through stronger home-school collaboration, learner empowerment, and localized educational interventions that engage stakeholders in addressing literacy and numeracy challenges (Echavez, Gonzaga, & Magallanes, 2024). In addition, it contributes to institutional sustainability by providing evidence-based practices that schools, administrators, and policymakers can use to improve learning recovery programs and resource allocation. Through its integrated and contextualized approach, the study supports sustainable educational development by addressing persistent learning gaps, promoting equity, and strengthening the capacity of schools to respond effectively to learner needs.

2. Material and methods

2.1 Research Design

The study utilized a quantitative research design using a quasi-experimental one-group pretest-posttest approach. This design examined the immediate and delayed effects of the Integrated Literacy-Numeracy Remediation Program on learners' literacy and numeracy performance. Baseline assessments were administered before the intervention, followed by the implementation of the remediation program and continuous monitoring of learner progress after each session. A posttest was subsequently administered to determine changes in performance. The quantitative approach allowed systematic analysis of measurable variables and assessment of program outcomes (Creswell, 2018). The design was appropriate because it enabled evaluation of intervention effects in a natural school setting where random assignment to experimental and control groups was not feasible (Campbell and Stanley, 1963).

2.2 Locale of the Study

The study was conducted at Maujao National High School (MNHS), a public secondary school located in Barangay Maujao, Bulalacao, Oriental Mindoro, under the Schools Division Office of Oriental Mindoro. The school serves learners from Maujao and neighboring communities, including San Francisco, San Isidro, and Milagrosa. Although the school implements literacy and numeracy programs aligned with the MATATAG Curriculum and Learning Recovery initiatives, assessment results from PHIL-IRI and RMA indicated that many Grade 7 learners remained at instructional or frustration levels in reading and below proficient levels in numeracy, highlighting the need for an integrated remediation program.

2.3 Respondents of the Study

The respondents were Grade 7 learners of Maujao National High School during the School Year 2025–2026 who demonstrated literacy and numeracy difficulties based on PHIL-IRI and RMA results. A total of 69 learners from four Grade 7 classes participated in the study and completed the integrated literacy-numeracy remediation program. Participation was voluntary, and informed consent was secured from parents or guardians before implementation.

2.4 Sample and Sampling Procedure

A two-stage sampling procedure was employed. Initially, purposive sampling was used to identify 84 Grade 7 learners who were classified at the instructional or frustration levels in reading and exhibited low proficiency in numeracy. From this group, 69 learners were randomly selected to participate in the study. Randomization minimized selection bias while ensuring that participants represented learners requiring remedial support. The selected learners were grouped according to their class sections. Stratified random sampling procedures and random number generation were utilized to ensure

objectivity in participant selection. Replacement procedures were applied whenever selected participants declined participation or became unavailable. This sampling strategy ensured proportional representation of learners requiring remediation and supported equitable participation among students with varying learning needs.

2.5 Research Instrument

Three instruments were utilized in the study: the Philippine Informal Reading Inventory (PHIL-IRI), the Rapid Mathematics Assessment (RMA), and the Integrated Literacy-Numeracy Remediation Program. The PHIL-IRI served as the primary reading assessment tool and measured oral reading, comprehension, and reading proficiency before and after the intervention. Developed and validated by the Department of Education, it classified learners according to reading proficiency levels and provided a standardized measure of literacy performance (Department of Education, 2018). The RMA was used to assess numeracy skills, including number sense, operations, measurement, and problem-solving abilities. It was administered as both a pretest and posttest to determine changes in mathematical proficiency resulting from the intervention. The Integrated Literacy-Numeracy Remediation Program served as the main intervention. It was developed using pre-assessment results and incorporated explicit instruction, guided practice, contextualized learning activities, formative assessments, and scaffolded instruction to improve both literacy and numeracy skills simultaneously. To ensure validity, PHIL-IRI and RMA were utilized as standardized instruments officially developed and validated by the Department of Education. The remediation program underwent content validation by a panel composed of language and mathematics teachers, a master teacher, and a school head. Reliability of the intervention materials was established through pilot testing with learners who possessed similar characteristics to the target participants but were not included in the actual study.

2.6 Data Gathering Procedure

Permission to conduct the study was secured from the appropriate school authorities prior to implementation. Pretests using PHIL-IRI and RMA were administered to identify learners requiring intervention and to establish baseline literacy and numeracy performance. Following the assessments, the Integrated Literacy-Numeracy Remediation Program was implemented. The intervention utilized contextualized learning materials, guided instruction, collaborative learning activities, and formative assessments designed to strengthen reading comprehension, vocabulary development, number sense, computation, and problem-solving skills. Learner performance was monitored continuously after each remediation session to document immediate learning gains, consistent with data-based remediation approaches that emphasize ongoing assessment and instructional adjustment (Cruz & Balagtas, 2022). Upon completion of the intervention period, posttests were administered using the same assessment instruments. The resulting data were collected, organized, and prepared for statistical analysis to determine changes in literacy and numeracy performance.

2.7 Data Analysis Techniques

Data analysis focused on determining both immediate and delayed effects of the intervention. PHIL-IRI results were analyzed using established proficiency classifications that categorized learners as independent, instructional, or frustration readers. RMA scores were used to classify learners according to levels of numeracy proficiency ranging from emerging to highly proficient. Session-based scaling procedures were employed to monitor immediate learner progress throughout the remediation program. Literacy performance was evaluated according to reading proficiency classifications, while numeracy performance was assessed using session-based proficiency indicators. Changes in learner performance from pretest to posttest were analyzed to determine improvement in literacy and numeracy skills. To validate the effectiveness of the intervention, statistical analysis was conducted to determine significant differences between pretest and posttest results. The Wilcoxon Signed-Rank Test was used to establish whether observed changes in literacy and numeracy performance were statistically significant.

3. Results and Discussion

3.1 Literacy and Numeracy Performance of Learners

3.1.1 Pre-test Literacy Performance

The PHIL-IRI pre-test results revealed that most learners were at the Frustration level in both word reading and comprehension. In word reading, 66.67% were classified as Frustration readers and 33.33% as Instructional readers, with no learner reaching the independent level. The mean word reading score was 86.14 (SD = 5.07). In comprehension, 69.57% were at the Frustration level and 30.43% at the Instructional level, with a mean score of 42.32 (SD = 18.95). These findings indicate substantial literacy deficits among the learners prior to the intervention. The absence of independent readers reflects the purposive selection of participants requiring remediation. The results support the observations of Bautista (2019) regarding persistent reading difficulties among Filipino learners and Mendoza (2023), who reported continuing literacy challenges in Oriental Mindoro. The findings emphasize the need for targeted and contextualized literacy interventions.

3.1.2 Pre-test Numeracy Performance

The RMA pre-test results showed that 97.10% of learners were classified as Emerging (Not Proficient), while only 2.90% were Emerging (Low Proficient). No learner reached the Developing, Transitioning, or Highly Proficient levels. The mean numeracy score was 2.23 (SD = 3.32). The results confirm that learners possessed very limited computational and problem-solving skills at the beginning of the study. Since participants were intentionally selected from the lowest proficiency categories, the findings validate the need for intensive numeracy intervention. These results are consistent with Blanca (2023), who highlighted the necessity of structured remediation for learners with severe numeracy deficiencies.

3.2 Immediate Effects of the Integrated Literacy-Numeracy Remediation Program

3.2.1 Session-Based Literacy Improvement

Literacy performance improved steadily across the six remediation sessions. Word reading scores increased from a mean of 89.65 in Session 1 to 96.58 in Session 6, while variability declined from an SD of 6.10 to 1.87. Learners progressed from the Frustration level to the Instructional level. Comprehension scores likewise increased from 60.43 to 74.35, with reduced variability across sessions. Frustration-level readers were eliminated by Session 3, while the proportion of independent readers increased in both word reading and comprehension. The findings demonstrate that continuous remediation contributed to measurable gains in literacy skills. The reduction in score variability suggests that learners improved more uniformly over time, helping reduce performance gaps. These outcomes support the findings of Bautista (2019) and Mendoza (2023), who emphasized the effectiveness of structured and contextualized reading interventions. The results further indicate that word recognition developed more rapidly than comprehension, highlighting the greater complexity of higher-order reading skills.

3.2.2 Session-Based Numeracy Improvement

Numeracy performance also showed continuous improvement throughout the remediation sessions. Mean scores increased from 1.91 during Session 1 to 2.64 during Session 6. Learners progressed from the Emerging category toward the Transitioning category. The proportion of Transitioning learners increased over time, while Emerging learners gradually decreased. Although some learners achieved Proficient status during certain sessions, proficiency gains were less stable than literacy gains. These results indicate that the intervention successfully strengthened learners' foundational numeracy skills. The transition from Emerging to Transitioning levels demonstrates progress in computational fluency and problem-solving ability. The findings support Blanca (2023), who noted that structured numeracy interventions are effective for learners with significant mathematical learning gaps. However, the slower rate of advancement suggests that numeracy development requires sustained and extended intervention.

3.3 Post-test Literacy and Numeracy Performance

3.3.1 Post-test Literacy Performance

Post-test literacy results showed substantial improvement. In word reading, 37.68% of learners reached the independent level, 52.17% attained the Instructional level, and only 10.15% remained at the Frustration level. The mean score increased to 94.42 (SD = 4.11). In comprehension, 21.74% reached the independent level, 56.52% were Instructional, and 21.74% remained at the Frustration level. The mean comprehension score increased to 65.94 (SD = 17.60). These results demonstrate that the remediation program effectively improved learners' literacy performance. The emergence of independent readers confirms that many participants moved beyond their initial proficiency levels. The findings align with Bautista (2019) and Mendoza (2023), who reported that structured and contextualized reading interventions can significantly improve literacy outcomes among struggling learners.

3.3.2 Post-test Numeracy Performance

Post-test numeracy results revealed substantial gains. No learner remained at the Emerging (Not Proficient) level. Instead, 21.74% were classified as Emerging (Low Proficient), 43.48% reached the Developing level, and 34.78% attained the Transitioning level. The mean numeracy score increased to 18.58 (SD = 5.64). The results indicate that learners successfully advanced from the lowest levels of numeracy proficiency to higher performance categories. Although no learner reached the Highly Proficient level, the overall improvement demonstrates the effectiveness of integrating literacy scaffolding with numeracy instruction. These findings support Blanca (2023), who emphasized the value of structured numeracy enhancement programs for learners with foundational skill deficits.

3.4 Significant Difference Between Pre-test and Post-test Performance

3.4.1 Statistical Significance of Literacy and Numeracy Gains

The Wilcoxon Signed-Rank Test revealed statistically significant improvements across all assessment areas. Word reading produced $W = 0.000$, $Z = -7.220$, $p < 0.001$, with a Hodges-Lehmann estimate of -8.500. Comprehension yielded $W = 69.000$, $Z = -6.746$, $p < 0.001$, with a Hodges-Lehmann estimate of -20.000. Numeracy likewise showed $W = 0.000$, $Z = -7.220$, $p < 0.001$, with a Hodges-Lehmann estimate of -16.000. The results confirm that improvements in literacy and numeracy were not due to chance and can be attributed to the Integrated Literacy-Numeracy Remediation Program. The substantial Hodges-Lehmann estimates indicate meaningful gains in learner performance. The findings support Slavin et

al. (2020), who emphasized the effectiveness of structured remediation programs, Villanueva (2021), who highlighted the benefits of integrating numeracy within literacy instruction, and Banerjee et al. (2019), who demonstrated the effectiveness of data-driven remedial interventions.

3.4.2 Educational Implications of the Significant Findings

The statistically significant gains suggest that contextualized and scaffolded instruction can effectively improve foundational literacy and numeracy skills. The reduction in score variability, particularly in word reading, indicates that the intervention helped reduce disparities among learners. Improvements in numeracy further demonstrate the value of combining literacy support with mathematical problem-solving activities. These findings have important implications for teachers, administrators, and policymakers. The results support the institutionalization of integrated remediation programs within school learning recovery initiatives. They also provide evidence for strengthening monitoring systems, teacher capacity-building programs, and policy frameworks focused on literacy and numeracy recovery. Although learners have not yet achieved full grade-level mastery, the results demonstrate that meaningful progress can be achieved through structured and sustained intervention.

3.5 Proposed Enhancements to the Integrated Literacy-Numeracy Remediation Program

3.5.1 Strengthening Literacy Components

The findings indicate that while comprehension improved significantly, considerable variability remained among learners. The program may therefore be enhanced through explicit instruction in inference-making, summarization, critical questioning, guided reading, and reciprocal teaching strategies. These enhancements are supported by Villanueva (2021), who emphasized that comprehension development requires deliberate scaffolding beyond basic decoding skills.

3.5.2 Strengthening Numeracy Components

Although numeracy performance improved substantially, no learner reached the Highly Proficient category. Extending remediation cycles, incorporating problem-based learning, and utilizing contextualized mathematical tasks may further strengthen numeracy outcomes. These recommendations align with Banerjee et al. (2019), who highlighted the importance of sustained and iterative practice in developing numeracy proficiency.

3.5.3 Enhancing Assessment and Monitoring Systems

The significant gains observed in the study highlight the importance of continuous formative assessment and systematic learner monitoring. Similar findings have been reported in data-based remediation programs where assessment results were used to guide instructional interventions and improve learner performance (Cruz & Balagtas, 2022). The integration of checklists, rubrics, learner progress tracking, and peer feedback mechanisms may improve instructional responsiveness and learner monitoring. This recommendation is consistent with Evans & Popova (2022), who found that continuous feedback systems accelerate learner improvement.

3.5.4 Strengthening Teacher Capacity and Program Sustainability

The effectiveness of the remediation program depends on teachers' ability to implement integrated interventions successfully. Continuous professional development in literacy-numeracy integration, differentiated instruction, and data-driven decision-making may improve implementation quality and sustainability. This recommendation supports the findings of Slavin et al. (2020), who emphasized that teacher preparedness is a critical factor in successful remediation programs.

3.5.5 Scaling the Program for Wider Implementation

Given the statistically significant improvements observed, the Integrated Literacy-Numeracy Remediation Program may be expanded beyond pilot implementation and incorporated into school-based and national learning recovery initiatives. Strengthening policy support, resource allocation, and monitoring systems may facilitate broader implementation and long-term sustainability. These enhancements may enable the program to evolve into a comprehensive and equity-driven intervention that supports both immediate learning recovery and long-term academic success.

4. Conclusion & Recommendations

The findings demonstrated that the Integrated Literacy-Numeracy Remediation Program effectively addressed the foundational literacy and numeracy deficits of Grade 7 learners. Learners progressed from frustration and non-proficient levels to instructional, independent, developing, and transitioning levels, indicating significant improvement in both domains. The integrated approach showed that literacy and numeracy development reinforced one another, contributing to overall learner growth. While substantial gains were observed in decoding, fluency, comprehension, and numeracy, comprehension and higher-level numeracy skills continued to require sustained support. The statistically significant differences between pre-test and post-test results further confirmed the effectiveness, reliability, and equity of the program,

highlighting its potential as a learning recovery intervention for learners with foundational skill gaps.

Based on the findings, teachers are encouraged to continue implementing integrated and contextualized literacy-numeracy strategies supported by continuous assessment and differentiated remediation. School administrators may institutionalize the Integrated Literacy-Numeracy Remediation Program as part of learning recovery initiatives while strengthening professional development, monitoring, and evaluation systems. Policymakers may consider supporting the integration of literacy-numeracy remediation into broader educational programs and allocating resources for wider implementation, particularly in underserved areas. Future researchers may examine the long-term effects of the program, explore technology-supported remediation approaches, and investigate its applicability across different grade levels and subject areas.

The study was limited to Grade 7 learners of Maujao National High School and focused primarily on the short-term effects of the Integrated Literacy-Numeracy Remediation Program. Although significant improvements were observed, comprehension and higher-level numeracy skills were not fully mastered, indicating the need for extended remediation cycles and continued reinforcement. The study also did not examine the long-term retention of learning gains, the use of digital intervention tools, or the applicability of the program across other grade levels and educational contexts.

Compliance with ethical standards

The study adhered to established research procedures throughout its implementation. Permission to conduct the study was obtained from the appropriate school authorities, and participation was voluntary. Informed consent was secured from the parents or guardians of the participating learners prior to data collection and program implementation. The conduct of the study ensured respect for participants and compliance with institutional requirements for educational research.

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