

EFFECT OF THE MATH-INFUSED READING INTERVENTION (MRI) ON THE READING COMPREHENSION SKILLS OF GRADE 6 FRUSTRATION-LEVEL READERS AT BISLIG CENTRAL ELEMENTARY SCHOOL, BISLIG CITY DIVISION: A QUASI-EXPERIMENTAL STUDY

Dhaisy Ambi Abayan¹, Anrey G. Antiquina, PhD²

¹Teacher, Department of Education, Bislig City Division, Philippines

² Graduate School Faculty, Andres Soriano Colleges of Bislig, Philippines

ABSTRACT

Reading comprehension is foundational to learning across subject areas, yet many elementary learners remain at the frustration level and struggle to understand grade-level texts. This study examined the effect of a Math-Infused Reading Intervention (MRI) using DigiTales modules on the reading comprehension skills of Grade 6 frustration-level readers at Bislig Central Elementary School, Bislig City Division. A quantitative quasi-experimental one-group pretest-posttest design was used. Twenty-seven (27) Grade 6 learners identified as frustration-level readers served as respondents. Reading performance was measured using the Philippine Informal Reading Inventory (Phil-IRI) oral reading assessment, focusing on word recognition, sentence reading, reading fluency, and overall comprehension. The MRI was implemented for fifteen (15) weeks using contextualized texts and guided activities that integrated mathematical contexts and problem-solving situations. Descriptive statistics and a paired-samples t-test were used to compare pre- and post-test results. Findings showed that the mean pre-test score was 2.07 (29.63%), interpreted as frustration level, while the mean post-test score increased to 5.15 (70.90%), interpreted as instructional level. The gain was statistically significant ($t = 10.35$, $p = 1.03 \times 10^{-10}$), leading to the rejection of the null hypothesis. Results suggest that integrating mathematical contexts into reading instruction and delivering lessons through DigiTales can enhance engagement and support comprehension gains among struggling readers.

Keyword: Math-Infused Reading Intervention; DigiTales Modules; Reading Comprehension; Grade 6 Learners; Frustration-Level Readers; Quasi-Experimental Study; Phil-IRI

1. INTRODUCTION

Reading comprehension enables learners to construct meaning from texts, make inferences, and use information for learning tasks across subject areas. When learners experience persistent difficulty in decoding and comprehension, they often remain at the frustration level and cannot independently engage with grade-level materials, limiting participation and achievement in school tasks.

In mathematics, reading comprehension is essential because learners must understand directions, interpret word problems, and connect contextual information to mathematical operations. Learners who struggle in comprehension may therefore experience compounded difficulty in mathematics tasks that rely on understanding language and problem situations.

To address these challenges, the present study implemented a Math-Infused Reading Intervention (MRI) using DigiTales modules. The intervention integrates mathematical contexts into reading lessons through structured passages and guided activities designed to strengthen word recognition, sentence reading, fluency, and overall comprehension. Specifically, the study determined learners' reading comprehension levels before and after the intervention and tested whether the observed improvement was statistically significant.

2. METHODOLOGY

2.1 Research Design

A quantitative quasi-experimental design using a one-group pretest-posttest format was employed to measure learners' reading comprehension before and after the Math-Infused Reading Intervention (MRI).

2.2 Research Locale

The study was conducted at Bislig Central Elementary School, Schools Division of Bislig City, Surigao del Sur, Philippines.

2.3 Participants and Sampling

The respondents were twenty-seven (27) Grade 6 learners from the Matapat section who were identified as frustration-level readers based on the Phil-IRI oral reading assessment. Total enumeration was used to include all identified frustration-level readers in the section.

Table 1. Participants (Matrix)

Section	Male	Female	Total
MATAPAT	14	13	27
TOTAL	14	13	27

2.4 Research Instruments and Intervention

The Phil-IRI oral reading assessment served as the instrument for both the pre-test and post-test. The instructional intervention was the Math-Infused Reading Intervention (MRI) using DigiTales modules, which integrated mathematical contexts into reading passages and activities to improve comprehension through guided and contextualized practice.

2.5 Data Gathering Procedure

Permission to conduct the study was secured from the Schools Division and school administration. The Phil-IRI pre-test was administered to the identified learners, followed by a fifteen-week implementation of the MRI using DigiTales modules. After the intervention, the Phil-IRI post-test was administered to measure gains in reading comprehension.

2.6 Statistical Treatment

Mean and percentage scores were computed for pre- and post-test results. A paired-samples t-test at $\alpha = 0.05$ was used to determine whether the difference between pre-test and post-test scores was statistically significant.

3. RESULTS AND DISCUSSION

3.1 Reading Comprehension Level Before the Intervention

Table 2. Pre-Test Reading Comprehension Level of Grade 6 Learners (n = 27) (Matrix)

Variable	Raw Score Mean	Percentage (%)	Interpretation
Pre-Test Scores	2.07	29.63	Frustration Level

Legend: Frustration: 58% and below; Instructional: 59–79%; Independent: 80–100%

Pre-test results indicated very low reading performance, with learners classified at the frustration level. This suggests serious difficulties in decoding, fluency, and constructing meaning from grade-level texts.

3.2 Reading Comprehension Level After the Intervention

Table 3. Post-Test Reading Comprehension Level of Grade 6 Learners (n = 27) (Matrix)

Variable	Raw Score Mean	Percentage (%)	Interpretation
Post-Test Scores	5.15	70.90	Instructional Level

Legend: Frustration: 58% and below; Instructional: 59–79%; Independent: 80–100%

Post-test results showed substantial improvement. Learners shifted from frustration to instructional level, reflecting gains in word recognition, sentence processing, fluency, and overall comprehension after the MRI using DigiTales modules.

3.3 Significant Difference Between Pre-Test and Post-Test Scores

Table 4. Significant Difference Between Pre-Test and Post-Test Scores (Paired t-test)

Variable	t-Statistic	p-Value	Interpretation	Decision on Ho
ORPT Scores	10.35	1.03×10^{-10}	Significant	Reject Ho

The paired-samples t-test confirmed a statistically significant increase in reading comprehension scores after the intervention ($p < 0.05$). This indicates that the Math-Infused Reading Intervention using DigiTales was effective in enhancing reading comprehension among the respondents.

4. CONCLUSIONS

Grade 6 frustration-level readers demonstrated very low reading comprehension performance prior to the intervention.

After the fifteen-week MRI using DigiTales modules, learners' reading comprehension improved to the instructional level.

There was a statistically significant difference between pre-test and post-test scores, indicating that the intervention was effective.

5. RECOMMENDATIONS

Integrate MRI-based modules into school-based remedial reading programs for frustration-level learners.

Provide teacher capacity-building on contextualized literacy instruction, scaffolding strategies, and the effective use of DigiTales and similar tools.

Sustain fluency and comprehension strategy instruction through guided reading, repeated reading, and explicit strategy teaching.

Conduct replication studies using larger samples and comparison groups to further validate the effectiveness of MRI in other grade levels and contexts.

6. REFERENCES

Abella, J., Kilag, O. K., Andrin, G., Tañiza, F. N., Groenewald, E., & Cordova Jr, N. (2024). Benchmarking literacy and numeracy: The contributing elements. *Excellencia: International Multi-disciplinary Journal of Education* (2994-9521), 2(1), 90-99.

Alam, A., & Mohanty, A. (2023). Music and its effect on mathematical and reading abilities of students: Pedagogy for twenty-first century schools. In *Interdisciplinary perspectives on sustainable development* (pp. 342-346). CRC Press.

AR, M. M., Asmoni, A., Aini, K., & Wardi, M. (2024). The Relationship of the 5th Batch Campus Teaching Program to Literacy and Numeracy Skills in Elementary Schools. *Al-Ishlah: Jurnal Pendidikan*, 16(2), 1999-2011.

Beaudine, G. (2022). Mathematical reading: Investigating the reading comprehension strategies implemented by middle school students. *International Journal of Science and Mathematics Education*, 20(Suppl 1), 187-213.

Bernabini, L., Bonifacci, P., & De Jong, P. F. (2021). The relationship of reading abilities with the underlying cognitive skills of math: A dimensional approach. *Frontiers in Psychology*, 12, 577488. Balopiños, J., & Uchang, J. T. (2025). Students' reading comprehension and grit in mathematics. *Ignatian International Journal for Multidisciplinary Research*, 3(2), 196-205.

Bonifacci, P., Compiani, D., Affranti, A., & Peri, B. (2021). Home literacy and numeracy interact and mediate the relationship between socio-economic status and early linguistic and numeracy skills in preschoolers. *Frontiers in Psychology*, 12, 662265.

Bouknify, M. (2023). Importance of metacognitive strategies in enhancing reading comprehension skills. *Journal of Education in Black Sea Region*, 8(2), 41-51.

Burns, M. K., Duesenberg, M. D., & Romero, M. E. (2022). Skill-by-Treatment Interaction: Increasing the Likelihood for Success in Reading and Math. In *Mental Health Assessment, Prevention, and Intervention: Promoting Child and Youth Well-Being* (pp. 85-106). Cham: Springer International Publishing.

Cheung, S. K., Dulay, K. M., Yang, X., Mohseni, F., & McBride, C. (2021). Home literacy and numeracy environments in Asia. *Frontiers in Psychology*, 12, 578764.

Forné, S., López-Sala, A., Mateu-Estivill, R., Adan, A., Caldú, X., Rifà-Ros, X., & Serra-Grabulosa, J. M. (2022). Improving reading skills using a computerized phonological training program in early readers with reading difficulties. *International Journal of Environmental Research and Public Health*, 19(18), 11526.

Galang, R. T., Arrozal, J. Y., Regala, A., & Manlutac, A. C. (2023). Reading comprehension level and academic performance of college students in their mathematics course. *International Journal of Multidisciplinary: Applied Business and Education Research*, 4(10), 3516-3520.

Gallen, C. L., Schaerlaeken, S., Younger, J. W., Anguera, J. A., & Gazzaley, A. (2023). Contribution of sustained attention abilities to real-world academic skills in children. *Scientific reports*, 13(1), 2673.

Gloriani, Y., Setiyani, S., Firmasari, S., & Erawati, T. (2023). Relationship between literacy and numeracy for junior high school students. *AL-ISHLAH: Jurnal Pendidikan*, 15(4), 6048-6054.

Greisen, M., Georges, C., Hornung, C., Sonnleitner, P., & Schiltz, C. (2021). Learning mathematics with shackles: How lower reading comprehension in the language of mathematics instruction accounts for lower mathematics achievement in speakers of different home languages. *Acta Psychologica*, 221, 103456.

- GUIRO, J. E., & Stanso, R. V. (2024). Best Practices in the Implementation of the Remedial Reading Program. *International Journal of Advanced Multidisciplinary Studies*, 4(5).
- Hadianto, D., Damaianti, V. S., Mulyati, Y., & Sastromiharjo, A. (2021, March). Does reading comprehension competence determine level of solving mathematical word problems competence?. In *Journal of Physics: Conference Series* (Vol. 1806, No. 1, p. 012049). IOP Publishing.
- Hamidi, F., Soleymani, S., Dazy, S., & Meshkat, M. (2024). Teaching Mathematics Based on Integrating Reading Strategies and Working Memory in Elementary School. *Athens Journal of Education*, 11(1), 9-22.
- Iswara, H. S., Ahmadi, F., & Da Ary, D. (2022). Numeracy literacy skills of elementary school students through ethnomathematics-based problem solving. *Interdisciplinary Social Studies*, 2(2), 1604-1616.
- Karacaoğlu, Ö. C., & Kasap, Y. (2023). The effect of reading comprehension skills on mathematics and science according to PISA data. *International Journal of Educational Research Review*, 8(3), 623-637.
- Kim, J., Gilbert, J., Yu, Q., & Gale, C. (2021). Measures matter: A meta-analysis of the effects of educational apps on preschool to grade 3 children's literacy and math skills. *Aera Open*, 7, 23328584211004183.
- Krawitz, J., Chang, Y. P., Yang, K. L., & Schukajlow, S. (2022). The role of reading comprehension in mathematical modelling: Improving the construction of a real-world model and interest in Germany and Taiwan. *Educational Studies in Mathematics*, 109(2), 337-359.
- Lechner, C. M., Gauly, B., Miyamoto, A., & Wicht, A. (2021). Stability and change in adults' literacy and numeracy skills: Evidence from two large-scale panel studies. *Personality and Individual Differences*, 180, 110990.
- Little, C. W., Lonigan, C. J., & Phillips, B. M. (2021). Differential patterns of growth in reading and math skills during elementary school. *Journal of educational psychology*, 113(3), 462.
- Mariam, S., Kepirianto, C., Fadlilah, M. R., & Mardhiana, N. (2022). Utilizing quipper school for improving reading comprehension of recount text. *Indonesian EFL Journal*, 8(1), 127-136.
- Megawati, L. A., & Sutarto, H. (2021). Analysis numeracy literacy skills in terms of standardized math problem on a minimum competency assessment. *Unnes Journal of Mathematics Education*, 10(2), 155-165.
- Napoli, A. R., Korucu, I., Lin, J., Schmitt, S. A., & Purpura, D. J. (2021, March). Characteristics related to parent-child literacy and numeracy practices in preschool. In *Frontiers in Education* (Vol. 6, p. 535832). Frontiers Media SA.
- Rakhmawati, Y., & Mustadi, A. (2022). The circumstances of literacy numeracy skill: Between notion and fact from elementary school students. *Jurnal Prima Edukasia*, 10(1), 9-18.
- Riyadi, R., Syarifah, T. J., & Nikmaturohmah, P. (2021). Profile of students' problem-solving skills viewed from Polya's four-steps approach and elementary school students. *European Journal of Educational Research*, 10(4), 1625-1638.
- Terencio, L. A. T., Abuyen, J. M., Padrigano, M. L., Daga, J. A. S., & Celis, J. H. (2025). Exploring the Strategies Employed in the Reading Remedial Program. *East Asian Journal of Multidisciplinary Research*, 4(6), 2437-2450.
- Tjandra, C. (2023). Effectiveness of using manipulatives in mathematics teaching in inclusive education programs in an elementary school. *Dharmas Education Journal (DE_Journal)*, 4(1), 168-178.
- Torgesen, J. K., Wagner, R. K., & Rashotte, C. A. (2021). Prevention and remediation of severe reading disabilities: Keeping the end in mind. In *Components of Effective Reading Intervention* (pp. 217-234). Routledge.
- Uyen, B. P., Tong, D. H., & Tram, N. T. B. (2021). Developing Mathematical Communication Skills for Students in Grade 8 in Teaching Congruent Triangle Topics. *European Journal of Educational Research*, 10(3), 1287-1302.
- Villanueva, J. M. (2022). Language profile, metacognitive reading strategies, and reading comprehension performance among college students. *Cogent Education*, 9(1), 2061683.

Yurko, J., & Reboli, D. (2025, March). Using Mathematics and Technology to Integrate Reading to Learn in the Content Areas. In Society for Information Technology & Teacher Education International Conference (pp. 6128-6131). Association for the Advancement of Computing in Education (AACE).

