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Bridging the gap of Jose Magsaysay elementary school learners in numeracy: Makati localized numeracy assessment tool for stage 1 (Grades 1-3)

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Abstract

Numeracy is an essential skill needed in everyday life. The study aimed to assess the numeracy of Jose Magsaysay Elementary School learners using the Makati Localized Assessment Tool for Stage 1 (Grades 1-3). Specifically, the study determined the numeracy gaps encountered by the learners, the numeracy levels of the learners, and how the school can address the needs of the learners in numeracy. Utilizing a quantitative research design, the results of an eight-week intervention utilizing the Makati Localized Numeracy Assessment Tool indicated no statistically significant differences between pre-and post-tests for students in Grade 2 and Grade 3, although a relatively significant difference was seen for students in Grade 1. Furthermore, paired correlations showed no significant association between pre-and post-test results across all grade levels, suggesting the intervention for students' numeracy abilities did not succeed in closing numeracy gaps Findings also indicate that the majority of Grade 1, Grade 2, and Grade 3 students need major support for all eight numeracy skills examined and that the school must address the weakness of students in numeracy skills through better interventions such as exposing students to more drills and exercises, differentiated instruction, and using better instructional materials together with parent-student conferences for numeracy and one-on-one tutoring. It is also recommended that the school conduct new intervention strategies to determine what would assist in addressing the learners' numeracy gaps. In addition, as the intervention in the current research lasted just eight weeks, the school may potentially explore an extended numeracy intervention period that lasts longer than eight weeks for future interventions. Furthermore, future researchers might investigate interventions that incorporate parental participation, particularly for kids in Grades 1, 2, and 3, and examine the different factors that influence the eight dimensions of numeracy skills by the student to provide better numeracy gaps interventions for students.

Keywords: Assessment; Gaps; Interventions; Learners; Numeracy; Strategies

1. Introduction

Education plays a vital role in every learner. They are powerful agents of change when given a chance to succeed. However, due to the Covid-19 pandemic attack, most of the learners were shocked by the educational system. From face-to-face to blended learning. Students are struggling with adaptation to the system. But the government continuously provides a way to let the learners proceed with their studies. The quality of education provided for the new system is not likely the same quality as that provided by in person-learning. Because of this, when students return to face-to-face, there is a shred of new evidence that learners' achievement caused by the pandemic increases the gaps in the performance of the learners. Two years of struggle in distance learning that not all learners were able to learn well. Despite numerous challenges, education must continue to serve its stakeholders by providing excellence through various modalities and platforms; assessing learners' abilities to measure their learning through differentiated activities carried through intervention.

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Numeracy is an essential skill needed in everyday life. Literacy in mathematics involves understanding and synthesizing mathematical fundamentals, including concepts, terminology, facts, and skills, following the requirements of real-world situations; however, studies have shown that students struggle with math worldwide, making it essential to come up with ways to address mathematics and numeracy challenges and bridge the gaps in numeracy of learners (Stacy et al., 2017; Morrison and McLafferty, 2018). In the local context, students from the Philippines had been reported to perform among the worst of all participating nations in the 2018 Programme for International Student Assessment (PISA). In the PISA assessment, less than 20% of students exhibited the minimum competency level (Level 2) in mathematics, while over 50% displayed extremely poor proficiency (below Level 1) (Bernardo et al., 2022). With scores below the lowest level of competence on the PISA, these Filipino learners have been far behind in mathematics education, indicating that more than half of this age group of Filipino students have poor mathematical skills in comparison to their counterparts from other countries.

Hence, the Department of Education (DepEd) of the Philippines has implemented several initiatives to improve the mathematical literacy of Filipino students who have difficulty comprehending mathematical concepts. DepEd Order 55 s. 2016, also referred to as Policy Guidelines on the National Assessment of the Student Learning for the K-12 Basic Education Program, highlighted that every student must meet the early language, literacy, and numeracy standards (Elopre and Baggay, 2022). The School Division of Makati is committed to closing the numeracy gap by gaining a better understanding of the critical processes and identifying opportunities to improve the teaching-learning process.

The School Division of Makati Localized Numeracy Assessment Tool is a Division of Makati initiative in collaboration with the DepEd region V that aims to help every Makati learner develop and acquire basic numeracy skills. The assessment tool is intended to determine each learner's numeracy level. It is made up of five numeracy skills: knowing and understanding; computing and solving, estimating, visualizing, and modeling; representing and communicating, conjecturing and reasoning; proving and decision making; and applying and connecting with five components: numbers and number sense; geometry; statistical and probability; algebra; and measurement.

The information that will be gathered from the tests could be utilized to tailor an intervention to the learners' needs and abilities in numeracy. As part of the learning recovery plan, this can also be used to plan and design activities and interventions to improve numeracy skills performance. As such, the present study seeks to determine this information from Jose Magsaysay Elementary School learners using the Makati Localized Assessment Tool For stage 1 (Grades 1-3) to determine specific strategic actions and recommendations that the school can utilize to address the needs of learners in numeracy.

Objectives of the study

The study aimed to help the bridging gap in numeracy for Jose Magsaysay Elementary School learners using the Makati Localized Assessment Tool for Stage 1 (Grades 1-3) to determine each learner's numeracy level. Specifically, this study intends to address the following specific questions:

- What are the numeracy gaps encountered by the learners?
- What are the numeracy levels of the learners?
- How does the school address the needs of the learners in numeracy?

2. Material and methods

2.1. Method

The present study utilized a quantitative research design, specifically a pre-test and post-test experimental design for selected Grades 1, Grade 2, and Grade 3. Many research initiatives in the field of education focus on assessing the effectiveness of intervention programs. Methodologically, the pretest and posttest approach is all about collecting data at two different times (before and after intervention) to determine the strength of intervention effects after the treatment has ended (Alessandri et al., 2017). In the present study, numeracy skills of knowing and understanding; computing and solving, estimating, visualizing and modeling; representing and communicating, conjecturing and reasoning; proving and decision making; and applying and connecting students in pre-test and post-test experiments.

2.2. Instrument

The research instrument used for the study is the Makati Localized Assessment Tool for Stage 1 (Grades 1-3) to determine each learner's numeracy level. The goal of the assessment tool is to evaluate the students' numeracy skills.

2.3. Data Collection

The study was conducted in Jose Magsaysay Elementary School learners in Makati City. One hundred twenty-eight (128) Grade 1 students, one hundred forty-four (144) Grade 2 students, and one hundred forty-two (142) Grade 3 students participated in the study.

2.4. Data Analysis

Paired t-test was used for comparing pre-and post-test scores while P values were calculated using IBM SPSS software at a $P < 0.05$ significant level.

2.5. Ethical Considerations

In terms of ethical considerations, in the experiment that the researcher conducted in the process of collecting data, the researcher firmly ensures that conducting the study has social value and would provide benefits or contribute to the improvement of people's and the community's well-being. The researcher also ensured that all the data acquired in each survey was kept confidential and destroyed after the conduct of the study. Further, it is ensured that the study brings no harm to the respondents and that all information gathered during the experiments was only for the study and not for anything that might bring harm to the learners.

3. Results and discussion

3.1. Numeracy levels of the learners

Figure 1 – Figure 3 and Table 1 to Table 3 show the trend of the numeracy levels and statistical analysis of the numeracy skills assessment of Grade 1, Grade 2, and Grade 3 learners using the Makati Localized Numeracy Assessment Tool. A pre-test and post-test assessment were conducted for the three grade levels starting June 2022 (pre-test) followed by an eight-week numeracy skills intervention and the post-test assessment.

Table 1 Post-test and pre-test mean scores

	Mean	N	Std. Deviation
Grade 1 Pre-test	17.1700	8	18.81249
Grade 1 Post-test	34.8236	8	7.28078
Grade 2 Pre-test	28.0725	8	10.39534
Grade 2 Post-test	28.9063	8	7.03301
Grade 3 Pre-test	24.1013	8	7.93277
Grade 3 Post-test	26.9725	8	13.50435

Table 2 Paired correlations of post-test and pre-test scores

	N	Correlation	Sig.
Grade 1 Pre-test and Post-test	8	0.193	0.648
Grade 2 Pre-test and Post-test	8	0.632	0.093
Grade 3 Pre-test and Post-test	8	0.646	0.084

Using the Makati Localized Numeracy Assessment Tool, pre-test scores show that Grade 1 learners had a mean score of 25.89 in knowing and understanding, 38.14 mean scores in estimating, visualizing, and modeling; 40.00 mean scores in representing and communicating, and 33.33 mean scores in applying and connecting. However, in terms of numeracy levels in conjecturing and reasoning; proving and decision making; and computing and solving during the pre-test phase for Grade 1 learners, a score of zero was recorded. The overall score of Grade 1 learners during the pre-test assessment is 17.17 indicating that the learners need major support in their numeracy skills. After the 8 weeks of intervention for Grade 1 students, however, there has been an observed increase in their numeracy skills scores (Figure 1). The knowing

and understanding score of Grade 1 learners was 35.22 in the post-test showing an increase from 25.89. There was also an increase in the applying and connecting skills of the learners from 33.33 to 42.67. The dramatic increase was also seen in computing and solving skills increased from a score of zero to a mean score of 45.00 and estimating also increased from zero to a score of 25.00. The same trend is observed in conjecturing and reasoning and proving and decision-making with an increased score of 36.50 and 27.00, respectively.

Table 3 Paired T-test analysis of post-test and pre-test scores

	Mean	Std. Deviation	df	Sig. (2-tailed)
Grade 1 Pre-test and Post-test	-17.65361	18.81904	7	0.033
Grade 2 Pre-test and Post-test	-0.83375	8.06851	7	0.779
Grade 3 Pre-test and Post-test	-2.87125	10.34309	7	0.458

For the other skills assessed, however, such as visualizing and modeling and representing and communicating, post-test scores showed a decrease for Grade 1 learners from 38.14 to 29.00 and 40.00 and 38.20, respectively. However, overall, the post-test mean score of 34.8236 still indicates that Grade 1 learners need major support for their numeracy skills. Furthermore, results of the paired t-test analysis of post-test and pre-test scores showed that there was only a relatively significant effect of the intervention given for Grade 1 students at a 5% significance level (p-value = 0.033). On the other hand, based on the paired correlation of the pre-test and post-test scores, results showed that the association between the pre-test and post-test scores (r=0.193) is not statistically significant with p = 0.648.

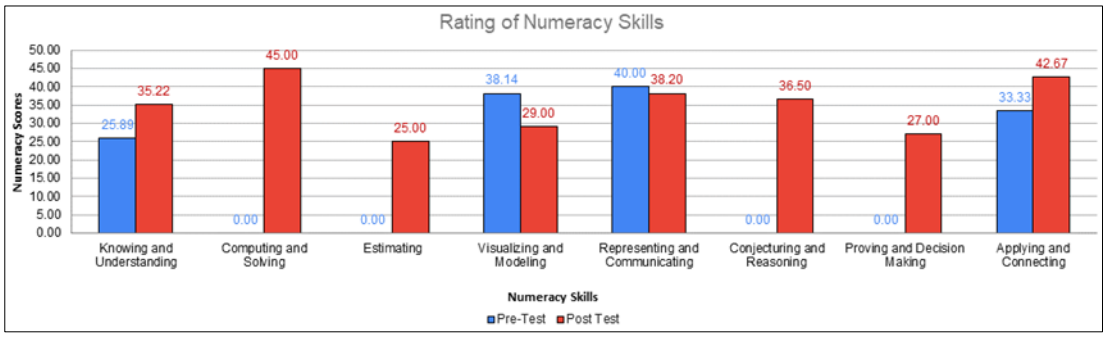

Figure 1 Numeracy Levels of Grade 1 Learners

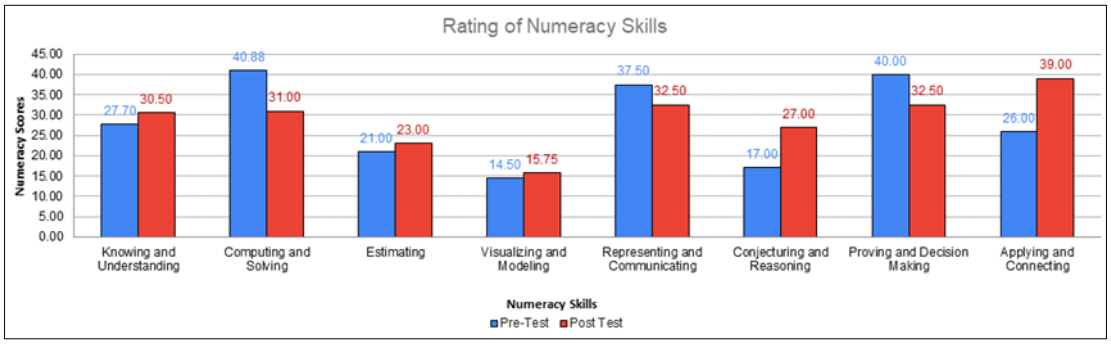

Figure 2 Numeracy Levels of Grade 2 Learners

For Grade 2 learners, the results of the study show that there are no significant differences in the pre-test and post-test scores of the students (p-value = 0.779). However, findings show that there is a very slight increase in the overall mean score of numeracy skills of Grade 2 learners from 28.0725 in the pre-test to 28.9063 in the post-test. During the pre-test assessment, Grade 2 students scored 27.70 in knowing and understanding while in computing and solving, learners scored 40.88. In terms of estimating, the pre-test means a score of Grade 2 students was 21.00. For visualizing and modeling, a mean score of 14.50 was recorded. In terms of representing and communication, conjecturing, reason, and proving and decision making, Grade 2 learners scored a mean score of 37.50, 17.00, and 40.00, respectively. Lastly, in applying and connecting, the mean score is 26.00 in the pre-test assessment. On the post-test phase, Grade 2 students

scored higher in knowing and understanding (x̄=30.50), estimating (x̄=23.00), visualizing and modeling (x̄=15.75), conjecturing and reasoning (x̄=27.00), and applying and connecting (x̄=39.00), however, the learners scored lower when it comes to computing and solving (x̄=31.00), representing and communicating (x̄=32.50), and proving and decision making (x̄=32.50). In addition, the paired correlation of the pre-test and post-test scores for Grade 2 showed that there is no significant relationship between the assessment scores (r=0.632, p=0.093).

For Grade 2 learners, the results of the study also show that there are no significant differences in the pre-test and post-test scores of the students (p-value = 0.458). Although, findings show that there is a relative increase in the overall mean score of numeracy skills of Grade 3 learners from pre-test scores of 24.1013 to 26.9725 in the post-test. However, both mean scores indicate that students need major support in their numeracy skills. Specifically, in the pre-test assessment, Grade 3 students scored 35.17 in knowing and understanding while in computing and solving, learners scored 31.89. In terms of estimating, the pre-test means score recorded for Grade 3 students was 12.00. For visualizing and modeling, the learners scored a mean score of 28.75. In terms of representing and communication, conjecturing, reason, and proving and decision making, Grade 3 learners scored a mean score of 18.00, 27.00, and 16.00, respectively. While, in applying and connecting, the mean score recorded was 23.00 in the pre-test assessment. During the post-test, Grade 3 students scored higher in knowing and understanding (x̄=44.83), visualizing and modeling (x̄=38.38), representing and communicating (x̄=26.00), proving and decision-making (x̄=29.00), and applying and connection (x̄=33.57). However, they scored lower in estimating where learners in the post-test had a score of zero, computing and solving where the mean score decreased to 23.00, and conjecturing and reasoning where the mean score decreased to 21.00. In addition, the paired correlation of the pre-test and post-test scores for Grade 2 showed that there is no significant relationship between the assessment scores (r=0.646, p=0.084).

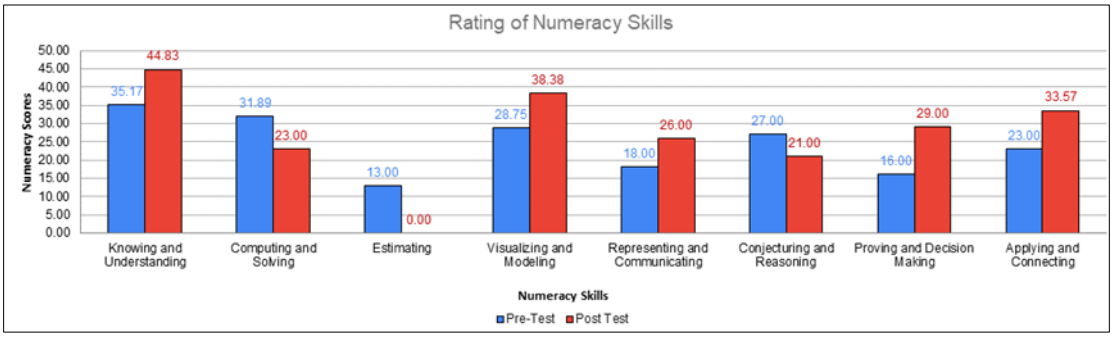

Figure 3 Numeracy Levels of Grade 3 Learners

3.2. Numeracy gaps

Based on the results of the pre-test and post-test scores of Grade 1, Grade 2, and Grade 3 students, students require significant assistance with their numeracy skills. In the post-test assessment for Grade 1 students, 128 learners were reported to require significant assistance, with 3 learners adjusting, 2 learners developing, 1 learner emerging, and 1 learner transforming. For Grade 2 students, 144 students require extensive assistance, and three students have been developing. Only one learner demonstrated developing numeracy skills and one learner demonstrated emerging numeracy skills among Grade 3 students.

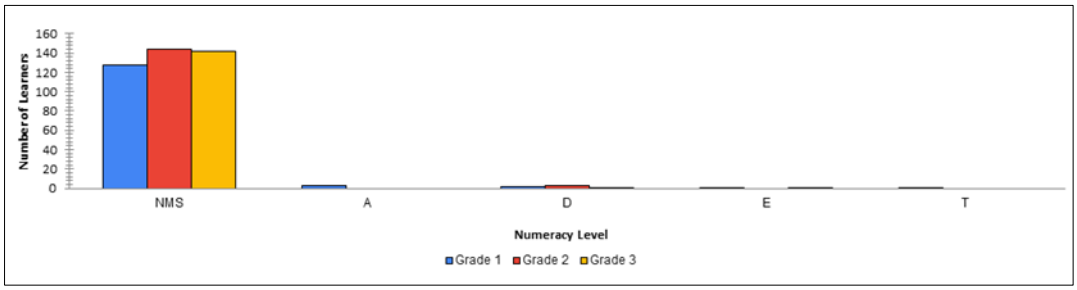

Figure 4 Number of Learners Per Level and their Numeracy Gaps

Figure 5 and Figure 6 show the comparison of numeracy skills per grade level and the level of numeracy skills per grade level. In terms of specific numeracy skills, the post-test scores show that Grade 3 learners scored the highest in knowing

and understanding, followed by Grade 1 students and Grade 2 students. In computing and solving, Grade 1 had the highest scores, followed by Grade 2 pupils and Grade 3 students. In estimating, only Grade 1 and Grade 2 students showed numeracy skills, with Grade 1 students scoring slightly higher than Grade 2 students. On the other hand, in visualizing and modeling, Grade 3 learners scored the highest, followed by Grade 1 students then Grade 2 learners. In terms of representing and communicating, Grade 1 students scored highest, followed by Grade 2 learners then Grade 3 students. For conjecturing and reasoning and applying and connecting the same trend is observed. Only in proving and decision-making did Grade 2 students scored the highest, followed by Grade 3 students and Grade 1 pupils.

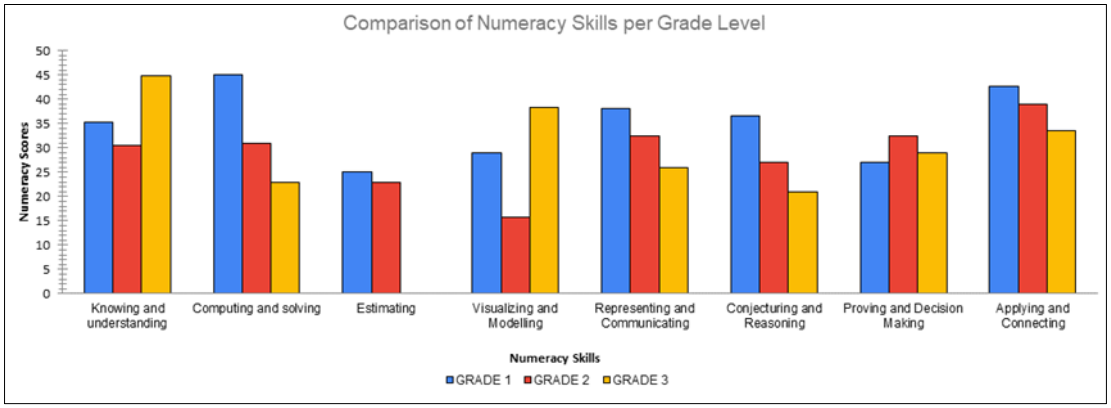

Figure 5 Comparison of Numeracy Skills per Grade Level

Although results showed that every area of numeracy skill examined needs major support in all Grade levels. Specific scores for the different grade levels indicate the specific numeracy gaps of Grade 1, Grade 2, and Grade 3 students (Figure 5). For Grade 1 learners, results show that their biggest numeracy gap is in estimating followed by applying and connecting. Visualizing and modeling ranked 3rd in their numeracy skill gap and knowing and understanding ranked 4th and conjecturing and reasoning ranked the 5th. The highest scores of Grades 1 however are in computing and solving, followed by applying and connecting and representing, and communicating.

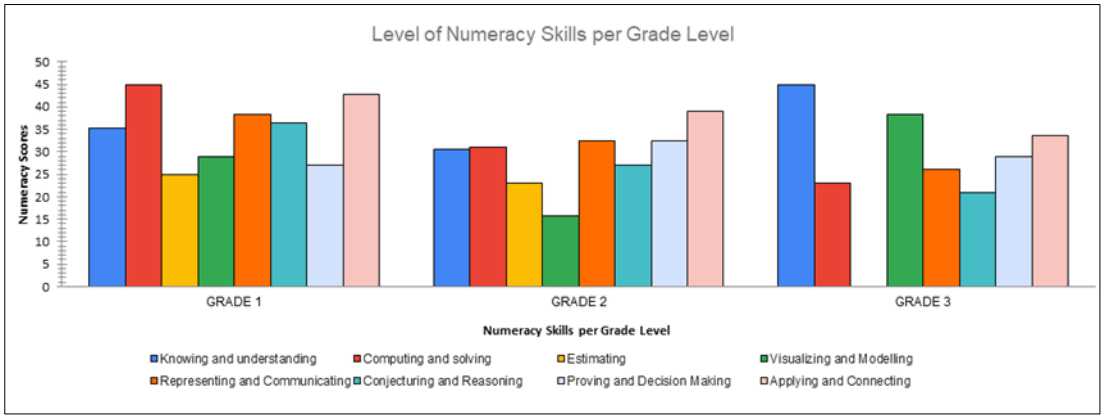

Figure 6 Level of Numeracy Skills per Grade Level

On the other hand, the biggest numeracy gap for Grade 2 students is in visualizing and modeling followed by estimating and conjecturing, and reasoning. The highest scores for numeracy for Grade 2 students, however, are on applying and connecting, representing and communicating, and proving and decision-making. Knowing and understanding and computing and solving rank in the middle. Lastly for Grade 3 learners, after the post-test assessment, the biggest numeracy gap is in their estimating skills, followed by conjecturing and reasoning, and computing and solving. The highest scores of Grade 3, students on the other hand, are in knowing and understanding, visualizing and modeling, and applying and connecting. Ranking in the middle for numeracy skills of Grade 3 students is proving and analyzing and representing and communicating.

Generally, however, results predominantly show that all eight numeracy skills examined need major support for the majority of Grade 1, Grade 2, and Grade 3 learners. In this regard, addressing the needs of the learners in numeracy is critical.

3.3. Addressing the needs of the learners in numeracy

The significance of identifying students' strengths and limitations from the outset is to assist them in achievable objectives are achievable and how to continue with a study plan for the students. Now that the learners' strengths and weaknesses are identified through the assessment of eight dimensions of their numeracy skills, teachers and the school need to make strategic actions to help achieve learning goals and strengthen the numeracy skills of students in all aspects. In the study of Layug et al. (2021), as an intervention for students who were performing poorly in mathematics, conference with parent and student and one-on-one tutorial was reported as the best intervention for teachers. Since an eight-week intervention that focused on teaching numeracy skills in a classroom set-up did not significantly address numeracy gaps, a more personal approach to students may be a better intervention. Including their parents may also have a positive significant effect as parent coaching intervention has been shown to help improve student's numeracy skills (Dulay et al., 2018)

In another study by Alfonso-Mendoza (2021), interventions for numeracy included pedagogy interventions including exposing pupils to more drills and exercises, differentiated instruction, and using a manipulative, real, and tangible objects as instructional materials.

Exposing students to additional drills and exercises is effective because this notion may be traced to the behaviorist-aligned approaches, in which students are presented with the same contents repeatedly until mastery is obtained. To build on previous lessons, teachers will often give students a series of questions or tasks that are very similar to those they have already completed. Each student comes to school with his or her own set of skills and talents, which the school's responsibility is to uncover and develop. This is the core idea behind differentiated instruction as a pedagogical approach. As a result, educators need to have a firm grasp on the wide range of student backgrounds that occupy today's classrooms. Interventions for Grade 1 students may be as diverse as the interventions for Grade 2 students. What works for increasing numeracy skills for Grade 3 students may be different from what works for other Grade levels. Furthermore, other research has demonstrated that learning via experience with manipulatives, and actual and physical objects as teaching resources, may be useful in developing numeracy abilities (Alfonso-Mendoza, 2021). Overall, however, the most essential aspect of incorporating these interventions is that the school addresses the numeracy gaps in learners as soon as possible and the study plans or curriculum development with interventions be initiated promptly to help learners without delay.

4. Conclusion

Based on the findings of the study, there is no significant difference in the pre-test and post-assessment after an eight-week intervention using the Using Makati Localized Numeracy Assessment Tool for learners Grade 2 and Grade 3 students but a relatively significant difference was observed for Grade 1. Additionally, based on paired correlations, there was no significant relationship between the pre-test and post-test scores for all grade levels also indicating that the intervention given for the numeracy skills of students was not effective in addressing numeracy gaps. Results also predominantly show that all eight numeracy skills examined need major support for the majority of Grade 1, Grade 2, and Grade 3 learners and the weakness of learners in numeracy skills in terms of knowing and understanding, computing and solving, estimating, visualizing and modeling, representation and communication, conjecturing and reasoning, proving and decision-making, and applying and connecting needs to be addressed by the school with better interventions such as exposing pupils to more drills and exercises, differentiated instruction, and using a manipulative, real and tangible object as instructional materials as well as conference with parent and student and one-on-one tutorial for the students. Further, it is very crucial to make better interventions for learners as soon as possible to help the students without delay.

Recommendation

Based on the findings, it is recommended that an assessment of new intervention methods may be done by the school to find what will genuinely help address the gaps of numeracy in the learners. Furthermore, since the intervention in the present study only lasted for eight weeks, a longer numeracy intervention period that lasts for more than eight weeks may also be considered by the school in new interventions. Moreover, to improve the current study, future researchers can also consider evaluating interventions that include parents' participation, especially for younger learners such as Grade 1, Grade 2, and Grade 3 students. Examining the different factors that affect the eight dimensions of numeracy skills by the student such that what specific parts and areas of conjecturing and reasoning is challenging

for students and what computing and solving factors are the weaknesses of students may also be examined by future researchers to specifically fine-tune interventions based on the needs of the learners and to provide better numeracy gaps interventions for students.

Compliance with ethical standards

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Disclosure of conflict of interest

The author declares that there are no conflicts of interest regarding the publication of this manuscript.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

References

[1] Alfonso-Mendoza, M. J. A . The Development of Numeracy Skills of Primary Grade Pupils Through Mother Tongue-Based Multilingual Education: A Phenomenological Study.

[2] Alessandri, G., Zuffianò, A., & Perinelli, E. (2017). Evaluating Intervention Programs with a Pretest-Posttest Design: A Structural Equation Modeling Approach. Frontiers in psychology, 8, 223. https://doi.org/10.3389/fpsyg.2017.00223

[3] Bernardo, A. B., Cordel, M. O., Lapinid, M. R. C., Teves, J. M. M., Yap, S. A., & Chua, U. C. (2022). Contrasting Profiles of Low-Performing Mathematics Students in Public and Private Schools in the Philippines: Insights from Machine Learning. Journal of Intelligence, 10(3), 61.

[4] Dulay, K. M., Cheung, S. K., Reyes, P., & McBride, C. (2019). Effects of parent coaching on Filipino children's numeracy, language, and literacy skills. Journal of Educational Psychology, 111(4), 641.

[5] Elopre, M. G., & Baggay, C. T. Numeracy through Literacy: Basis for an Enhancement Program for the Grade 7 Learners of Barasoain Memorial Integrated School.

[6] Layug GD,Velario J and Capones G. (2021). Teachers' Interventions in Improving Numeracy Skills of Grade 7 Students in Baguio City National High School. Retrieved from: https://www.dpublication.com/wp-content/uploads/2021/08/22-4022.pdf

[7] Morrison, S., & McLafferty, L. (2018). Bridging the Gaps in Mathematics and Numeracy: Supporting Schools in Practitioner Research. Educational & Child Psychology.

[8] Stacy, S. T., Cartwright, M., Arwood, Z., Canfield, J. P., & Kloos, H. (2017). Addressing the Math-Practice Gap in Elementary School: Are Tablets a Feasible Tool for Informal Math Practice?. Frontiers in psychology, 8, 179. https://doi.org/10.3389/fpsyg.2017.00179