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Research Article

Utilization of Teacher-Made Learning Activity Sheets as a Tool in Improving Learners' Numeracy Skills: An Action Research

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ABSTRACT

Developing learners' numeracy skills has been a pressing issue in the field of education, as it is one of the battlecries of the agency along with literacy. Studies revealed that addressing these learning gaps varies widely across schools, classrooms, and learners. Moreover, students learn better through the activities that their teachers provide to them. Thus, under the Mathematics Foundation Fluency Program, a numeracy intervention program of Langkaan II National High School, teacher-made learning activity sheets were used as learning materials of the learners under numeracy intervention. The objective of this study is to determine the effectiveness of utilizing teacher-made learning activity sheets in improving the numeracy skills of the learners particularly in Langkaan II National High School. The findings of the study will serve as a help in improving the numeracy intervention program of the school.

The results revealed that there was a marked improvement in the numeracy skills of the learners as manifested in the improved scores of the learners during the post-test. Moreover, no non-numerates were reported during the end-of-the-school year numeracy assessment. Thus, using the teacher-made learning activity sheets were found to be an effective tool in improving the numeracy skills of the learners including number sense, number operations, measurement, geometry, patterns and algebra, and statistics and probability. It helped the students to cope up certain topic/lessons in basic mathematics that develops their numeracy skills. These materials can contribute to a more comprehensive program to improve the numeracy skills of the learners. Further studies may also be conducted as to other aspects relevant to the implementation of the whole program. Validation or modification of these learning materials may also be conducted for further enhancement.

Keywords: *Intervention, Numeracy, Teacher-made learning activity sheets*

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Introduction

In the Philippines, the nation's message about Mathematics, as measured by national and international assessments, has highlighted poor performance of the learners in numeracy. From the results of these standardized tests, there are still learners who got promoted to Junior High School with weak Mathematical foundations. When the Philippines participated in Programme for International Student Assessment (PISA) for the first time in 2018, the country came in last place among 79 participating countries in reading, and second to last place in science and mathematics (Philippines - Country Note, 2019). National Achievement Test Results also indicates low proficiency in Mathematics. These are some of the reasons why in the past few years, the government was eager and focused more on developing reading and numeracy skills of the learners. In her speech last February 2023, DepEd Sec. Duterte highlighted the improvement of literacy and numeracy programs as one of their priorities in the agency. It was fully mandated in DepEd Order no. 13 s. 2023 or the Adoption of the National Learning Recovery Plan in the Department of Education where one of the goals is to improve the literacy and numeracy of the learners (Department of Education, 2023). Langkaan II National High School is not exempted in this learning gap. In school year 2022-2023, there were 27 reported non-numerate learners comprising of learners in all grade levels.

In the City Schools Division of Dasmariñas, schools were encouraged to contextualize its methods of addressing these problems in their level. As there is no one size fits all strategies in learning, schools are encouraged to implement programs that suit their respective learners.

The role of teacher-made activity sheets stands as essential learning materials in developing the learning experiences of students. Studies show that learners still learn better through the activities that their teachers provide to them. These worksheets serve as support and help teachers facilitate teaching and learning activities (Widodo et al., 2023). Designing worksheets and supplementary materials to be used by the learners can help also improve their problem solving and higher-order

thinking skills (Cruz, 2019; Gustiningsi et al., 2022). These instructional materials serve as dynamic tools for teachers to engage learners in meaningful mathematical exploration, promoting a hands-on and participatory approach in understanding mathematics, including numeracy.

Unlike generic worksheets, teacher-made activity sheets are tailored to align with specific curriculum objectives and cater to the diverse learning styles within a group of learners, classroom, or school. Dumigsi and Cabrella (2019) developed learning materials which were used as remediation materials for their Math 9 learners which were then found to be effective in improving the mathematics achievement of their learners (Dumigsi & Cabrella, 2019). The same result was also found out by Dugan and Ricafort (2023) using the Division Developed Learning Activity Sheets in Chemistry. These studies proved that developing learning materials provide teachers with the flexibility to address the unique needs and abilities of their students, offering a modified or personalized learning journey that goes beyond standardized approaches (Dugan & Ricafort, 2023).

Under the Mathematics Foundation Fluency Program of Langkaan II National High School which aimed to address the numeracy issues of its learners, the teachers developed learning activity sheets that focused on the competencies under numeracy which includes: number sense, number operations, measurement, geometry, patterns and algebra, and probability and statistics. With the goal of developing the numeracy skills of the learners in Langkaan II National High School, the researchers determined the effectiveness of the teacher-made learning activity sheets as a tool in the school-based numeracy intervention program.

The research is made to find out the effects of utilizing teacher-made learning activity sheets in developing the numeracy skills of the non-numerate learners in Langkaan II National High School SY 2022-2023. The study focused on determining the effectiveness of the teacher-made learning activity sheets in numeracy which focused on the following topics: number sense, number operations, measurement, geometry, patterns and algebra, and probability and statistics. The materials were

developed after conducting a LAC session on developing numeracy intervention materials. These materials were checked by the department key teacher and was utilized during the intervention phase through peer-assisted, teacher-facilitated, and home-based remediations which were done weekly.

Specifically, it aimed to answer the following questions:

1. What is the general performance of the participants before and after the utilization of learning materials in the program and in the following dimensions:
 - a. number sense
 - b. number operations
 - c. measurement
 - d. geometry
 - e. patterns and algebra
 - f. probability and statistics
2. Is there a significant difference in the pre and post numeracy results of the participants?
3. What are the numeracy levels of the participants after utilizing the materials?

Methods

Research Design

The study used quantitative quasi-experimental research design particularly one-group pretest and posttest design. The purpose of using the one-group pretest and posttest design is to see the result of the intervention of a single group of participants, in this research are the non-numerate learners of LNHS.

Research Instrument

The study utilized the Division-made Numeracy Level Test which was used by all schools in the Division of Dasmariñas as basis to determine the numeracy levels of Key Stage 2 and 3 learners. The exam was conducted

quarterly to all enrolled learners. The same exam was also used during the post assessment measures at the end of the school year.

Respondents

The intervention was done to identified non-numerate learners of Langkaan II National High School in SY 2022-2023 based on the numeracy preassessment test conducted to all at the start of the school year using the Division-made Numeracy Level Test. From the preassessment test results, 27 learners were identified as non-numerates, however one 910 learners transferred to other school in the early months of the school year, leading to twenty-six (26) learner-participants. Parent consent to participate in the intervention program was sought prior to its implementation. Learners were also interviewed to further assess their profile and plan on strategies to assist them.

Data Gathering Procedures and Data Analysis

During the intervention period, the participants used the teacher-made learning materials which were validated by the department's immediate supervisor, through peer-assisted, teacher-facilitated, and home-based remediations which were done weekly from February to May 2023. The same exam was also used at the end of the intervention.

All the data were consolidated, tabulated, and analysed using mean, standard deviation, frequency, and percentage. Paired t-test was also used to determine whether there is a significant difference in the scores of the participants before and after the intervention.

Result and Discussion

After the post assessment, all data were gathered, tabulated, and analysed.

Table 1. Performance of the identified learner-participants before and after the intervention

Assessment	n	Mean Score	SD	Interpretation
Pretest	26	5.27	1.15	Non-Numerate
Posttest	26	16.46	5.76	Emergent

Table 1 presents the performance of the identified learner-participants in the pre and post numeracy assessment. It was revealed

that prior to the intervention, the learners got an average of 5.38 out of 30 item test which fell on the category of non-numerate. All 26

participants were identified as non-numerates and undergone several intervention strategies utilizing the teacher-made learning activity sheets. During the post assessment, the learners scored an average of 16.35 which fell on the category of emergent numerate learners. The improvement is evident as all learners moved categories from being non-numerates.

Table 2. Performance of the identified learner-participants before and after the intervention per domain (n=26)

Domains	Pre Assessment		Post Assessment	
	Mean Score	SD	Mean Score	SD
Number Sense	1.00	0.57	3.27	1.04
Number Operation	1.08	0.98	3.42	1.53
Measurement	0.77	0.65	2.35	1.35
Geometry	0.96	0.77	2.31	1.26
Patterns and Algebra	0.85	0.73	3.12	1.51
Probability and Statistics	0.62	0.70	2.00	1.41

Table 2 presents the performance of the learners in the numeracy pre and post assessment per domain. The table reveals that during the pre-assessment, the learners have the most prior knowledge on number operations which involves the four basic operations in numbers while the has the least knowledge on the

concepts of probability and statistics. The learners generally improve in all domains as reflected in the increase in their post assessment results. The learners still have increased most number operations while the least learned in on probability and statistics.

Table 3. Test of difference between numeracy pre and post assessment scores (n=26)

Group	Test Scores		t-cal.	t-crit.	df	p-value
	Pre	Post				
Identified non-numerate learners	5.27	16.46	9.31	2.06	25	0.00*

*p<0.05

Table 3 presents the test of difference between the numeracy pre and post assessment scores of the non-numerate learners. As the mean score increased from 5.38 in the pretest to 16.35 in the posttest, it was revealed that the calculated t-value of 9.31 is greater than the critical value of 2.06 and with a p-value 0.00

which is lower that the 0.05 level of significance, null hypothesis is rejected. There is a significant difference between the pre and post assessment result of the learners in numeracy. This implies that utilizing the teacher-made learning activity sheets help the learners improve their numeracy skills.

Table 4. Test of difference between numeracy pre and post assessment scores per domain (n=26)

Group	Test Scores		t-cal.	t-crit.	df	p-value
	Pre	Post				
Number Sense	1.00	3.27	11.11	2.06	25	0.00*
Number Operation	1.08	3.42	6.05	2.06	25	0.00*
Measurement	0.77	2.35	5.78	2.06	25	0.00*
Geometry	0.96	2.31	4.59	2.06	25	0.00*
Patterns and Algebra	0.85	3.12	6.50	2.06	25	0.00*
Probability and Statistics	0.62	2.00	4.55	2.06	25	0.00*

*p<0.05

Table 5. Numeracy level of the participants after the implementation of the program

Numeracy Level	n	%
Highly Numerate	1	4%
Numerate	13	50%
Emergent	12	46%
Non-Numerate	0	0%
Total	26	100%

Table 5 shows that from being non-numerates at the start of the intervention, there are no reported non-numerates at the end of the school year. 46% of these reported non-numerate learners moved to being emergent numerate learners, while 50% or half of them became numerate learners. One (1) learner has a huge step from being non-numerate to highly numerate learner. This also implies that the use of teacher-made learning activity sheets helps students to improve their numeracy skills.

Conclusion

The result of the study shows that the performance of the learner-participants improved after the intervention. The results revealed that there was a marked improvement in the numeracy skills of the learners as manifested in the improved scores of the learners during the post-test. The null hypothesis, "There is no significant difference in the pre and post numeracy results of the participants," was rejected. Moreover, no non-numerates were reported during the end-of-the-school year numeracy assessment.

Thus, using the teacher-made learning activity sheets were found to be an effective tool in improving the numeracy skills of the learners, according to the findings of the study. It helped the students to cope up certain topic/lessons in basic mathematics that develops their numeracy skills. These materials can contribute to a more comprehensive school program to improve the numeracy skills of the learners.

In light of the findings and conclusions drawn from the study, the following recommendations are made: Teachers in other learning areas may also develop learning materials to further improve the performance of their learners, thus LAC sessions with other teachers may be organized. Further studies may also be

conducted as to other aspects relevant to the implementation of the whole program. Perceptions of the learners on utilizing these teacher-made learning activity sheets may also be sought along with conducting its validation or modification for further enhancement of these learning materials. As the materials helped the non-numerate learners, the school, as part of its numeracy program, may also craft materials that may help improve those of the emergent learners for continuous improvement of their numeracy skills.

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