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Bridging Numeracy Gap Using Project NUMEROS (Numeracy Monitoring, Enhancement and Revisiting of Skills) in Mathematics

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Abstract

Aim: This action research was conducted to determine the numeracy level of grade 8- learners of Ilongbukid National High School using Project NUMEROS handled by Project BERT (Batang Edukado, may Respeto at Talino) volunteers for the School Year 2023-2024.

Methodology: The study used a combination of quantitative and qualitative research since it utilized both descriptive statistics and thematic analysis. For quantitative research, it used and utilized one-group pretest-post test experimental research design. It was analyzed using Statistical Packages for Social Sciences (SPSS) version 25. For qualitative research, it utilized face-to-face interviews, journal makings and observations. It was analyzed through thematic analysis.

Result: The findings revealed that the numeracy level of grade 8 learners before the intervention was "low proficient" ($M=11.8333$ & $SD= 3.2258$) while after using project NUMEROS was nearly proficient ($M=24.8750$ & $SD=4.6468$). Findings in qualitative approach led to "positive perception" of the grade 8 learners towards project NUMEROS. It developed their foundation and basic skills to understand mathematical concepts.

Conclusion: The researchers concluded that project NUMEROS benefited the non- numerate learners to learn the basic concepts of Mathematics to the fullest. These finding developed plans and programs such as integrative program instruction, community plan partnership with the stakeholders in teaching Mathematics, and capability building in crafting contextualized instructional worksheets and materials used for non- numerate Learners.

Keywords: Numeracy Gap, Project NUMEROS, Project BERT

INTRODUCTION

Regional Memorandum No. 587 s. 2022 states that the Department of Education aims to develop learners who are numerates and who can apply numeracy skills for various purposes. To achieve this, critical thinking and problem solving need to be emphasized in the teaching of Mathematics as well in the design of assessment tool. Numeracy is one of the most important skills in Mathematics. It is the foundation towards learning of all mathematical competencies across grade levels, that's why the need to assess students' numeracy skills how far they have gone in Mathematics subject is vital on their journey towards learning mathematical concepts and ideas.

Research has shown that non-numerate learners are at a heightened risk of disengagement from the learning process. A study by Miller et al. (2022) found that students with low numeracy skills are more likely to experience feelings of frustration and anxiety, leading to reduced motivation and poorer academic outcomes. This cycle of disengagement can extend beyond formal education, impacting learners' ability to manage everyday tasks that require numeracy, such as budgeting, understanding interest rates, or interpreting statistical data.

Wardhaugh (2023) delved into the historical and cultural significance of counting and numbers in his book, "Counting: Humans History and Infinite Lives of Numbers." He explores how numeracy has shaped human civilization from ancient counting tools to modern digital applications highlighting its intrinsic role in societal development.



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In response to this challenge, the Technical Working Group (TWG) Region Office (RO) VI created the Enhanced Regional Unified Numeracy Test (ERUNT) as a tool to assess students' numeracy skills. It is comprised of a 10- item test per operation, namely, addition, subtraction, division, and multiplication answerable for 10-12 minute for Junior High School (JHS) learners and 50- minute for Senior High School (SHS) learners with a passing score of 32 and above which is 80% and above passing rate.

In this essence, Ilongbukid National High School conducted the Enhanced Regional Unified Numeracy Test (ERUNT) pretest last November 12, 2022. The result shows that 221 out of 271 takers or 82% were non-numerates. Forty- nine (49) of which are from Senior High School learners and 172 of them are from Junior High School learners. This result is very alarming in the teaching and learning process which is one of the Basic Education Research Agenda (BERA) of the Department of Education. Junior High School and Senior High School learners must have a solid skill at this stage to learn further mathematical concepts and ideas in accordance with their grade level.

In this context, Project NUMEROS (Numeracy Monitoring, Enhancement and Revisiting of skills) in Mathematics of Ilongbukid National High School was launched and pushed through in partnership with project BERT (Batang Edukado, my Respeto at Talino).

Project BERT is a Local Government Unit (LGU) program in response to the increasing number of non-readers and non- numerates learners in the schools district of San Rafael. It consists of a group of professionals and bachelor's degree holders who are hired and funded by the LGU to volunteer in teaching literacy and numeracy skills to the learners. Many of them are LET passers who are aspiring for regular positions in the Department of Education (DepEd). However, Project BERT currently lacks instructional materials for teaching non- reader and non-numerate learners. Therefore, the school needs to create and initiate something to help Project BERT in fulfilling its mission and vision aligning with the core values of the LGU- based program.

On the other hand, Project NUMEROS is a school-based numeracy program of the school to monitor, enhance and revisit the skills of non- numerate learners using series of activity and supplemental worksheets. Using Project NuMEROS, non- numerate learners can be able to practice and intensify their four fundamental skills in mathematics. This could also enhance the quality of teaching and learning process as one of DepEd's Intermediate Outcomes.

With this, Project NUMEROS' researchers and Project BERT volunteers worked hand in hand to monitor, enhance and revisit the learners' basic mathematical skills. Last May 25, 2023, the school has conducted the ERUNT post-test. The result showed that 83 out of 207 learners were non- numerates. Twenty-four (24) of these were from grade 7, 24 from grade 8, 6 from grade 9, 23 from grade 10 and 7 from grade 11.

Hullana (2019) emphasized the necessity of DEPED- LGU partnerships in improving basic quality education. The study found that such collaborations are vital for the effective implementation of educational programs and projects, significantly enhancing educational outcomes in municipalities. On the other hand, Briones (2019) underscored the critical role of strong partnerships between DEPED and LGUs in providing quality education. The study noted that establishing learning facilities and other educational initiatives are products of LGU's political will and collaboration with DEPED.

In this research, the participants were the 24 grade 8 learners of Ilongbukid National High School for school Year 2023- 2024. Thirteen (13) of them were Male and 11 were Female. The researchers created and drafted series of basic skills worksheets composed of four fundamental operations in real numbers specifically, integers, non- integers, and fractions. These worksheets collectively known as Project NUMEROS were designed to be taught by Project BERT volunteers. The worksheets were checked and validated by a group of experts in the field of research to verify the authenticity and validity. In this project partnership, the project BERT volunteers were trained by the researchers to deliver the competencies of the worksheets and pulled- out the non- numerates learners on their Mathematics class following the class schedules created by the school. The project BERT taught the non- numerates through the basic skills worksheet created and drafted by the researchers. The researchers monitored the Project BERT volunteers' implementation of the Project NUMEROS through pretest-posttest results.

Local Government Unit (LGU) and Ilongbukid National High School are one of the pillars of education. Their roles and duties are invaluable in developing and enhancing better Filipino citizens. Sending remedial teacher to develop and enhance non- numerates learners in school is one of the LGU's most significant initiatives. Surely, this



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partnership will leave an impact on the heart of every Filipino Learner especially to Ilongbukid National High School teachers, students, and parents. A partnership that will produce quality education and result the soonest. In addition to this, the Department of Education issued DepEd Order (DO) 40 s. 2015 showing the guidelines on k to 12 partnerships to achieve the goals of the K to 12 Program.

Objectives

This study aimed to determine the effect of Project NUMEROS to the performance of the grade 8 non-numerate learners of Ilongbukid National High School for S.Y. 2023-2024.

Specifically, this sought to answer the following questions:

1. What is the level of numeracy skills of Grade 8 non-numerate learners before and after the interventions?
2. What are the learning experiences of Grade 8 non-numerate learners using Project NUMEROS to address numeracy gap?
3. How can Project NUMEROS in Mathematics be used in developing and enhancing the numeracy skills of grade 8 learners?
4. What are the experiences of the researchers and the Project BERT in implementing Project NUMEROS?
5. What action will be taken after the study?

Methods

Research Design

The study used a combination of quantitative and qualitative research since it utilized both descriptive statistics and cluster analysis. According to Babbie (2020), quantitative research involves the numerical representation and manipulation of observations for the purpose of describing and explaining the phenomena that those observations reflect. Furthermore, Williams et al. (2022) added that quantitative research involves investigations where the collected and coded data can be expressed as numbers. While qualitative research focuses on depth, context and the subjective meanings of participants. It emphasizes understanding phenomena from the participants' perspectives, often through inductive designs that build theories grounded in the data (Leavy, 2022).

Population and Sampling

Purposively, the 24 combined Grade 8 non-numerate learners of Eagle and Dove of Ilongbukid National High School for S.Y. 2023-2024 were chosen to be the participants of this study based on the following criteria; the pretest result of the Enhanced Regional Numeracy Test (ERUNT), the grade 8 learners and their willingness to participate on the said study. ERUNT is based on the competency in Mathematics. Thirteen (13) of them was male and 11 of them was female. According to Crossman (2020), purposive sampling involves selecting participants based on specific characteristics relevant to the study. Ahmad et al. (2024) define it as a deliberate process of selecting context, materials or participants who share specific qualities that are relevant and have the potential to answer the inquiry about phenomenon of interest. The participants are heterogeneous in learning capacity based on the result of their Enhanced Regional Unified Numeracy Test (ERUNT). They are our learners coming from Barangay San Florentino, Barangay Ilongbukid, Barangay Poscolon, Barangay Poblacion and Barangay Aripdip, San Rafael, Iloilo.

The researchers as part of this study believed that for almost 10-year of their teaching experiences in mathematics, strongly affirm that non-numerate learners needed an effective intervention to develop and enhance their numeracy skills to the fullest. Thus, project NUMEROS in mathematics were created.

Instrument

The study used researcher-made questionnaire for quantitative and qualitative research. The instruments were validated by the research district coordinator, English and mathematics teachers. For quantitative, it was conducted to San Rafael National high School for reliability testing. Then it was conducted to the non-numerate learners of Ilongbukid National High School.



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Data Collection

Before the research was conducted, the researchers asked permission from the office of the district supervisor and school head of Ilongbukid National High School to administer and conduct the research instrument to the grade 8 non- numerate learners. And then, after the collection of the data, it was analyzed, treated, tabulated and interpreted using Statistical Packages for Social Sciences (SPSS) Software.

For qualitative data, the researchers conducted a face-to-face interview to the respondents and project BERT volunteers, interviews, journal making and observations were used to learn their personal experiences using project NUMEROS. It was analyzed using thematic analysis. And lastly, the researchers conducted reflective analysis of what the research was all about.

Data Analyses

After the collection of the data, it was analyzed, treated and interpreted accordingly. The mean was used to determine the level of numeracy skills of grade 8 non- numerate learners. The data was collated, encoded, tabulated and interpreted with the used of the Statistical Package for Social Sciences (SPSS) software version 25. Interviews, journal makings and observations were utilized to generate themes for qualitative data. Reflective analyses were used to get the experiences of the researchers.

Ethical Considerations

For the ethical consideration, the researchers sent permission letter via hand-carry mail to the schools district supervisor and school head of Ilongbukid National high School. Second, the researcher maintained the privacy of participants during and after the collection of data. Codes were used to hide their identity. Third, the study observed anti-plagiarism act by recognizing other researchers who contributed to this study. Lastly, the researcher considered the data and the people involved in the study with a high level of confidentiality.

RESULTS and DISCUSSION

This part of the study presented the findings which focused on the results of the seven (7) week remediation taught by the Project BERT (Batang Edukado, may Respeto at Talino) using Project NuMEROS to the grade 8 non- numerate learners of Ilongbukid National high School. The result as shown below:

Table 1

The level of Numeracy Skills of Grade 8 under Project NUMEROS Before and After the intervention integration

	N	Mean	SD	Description
Pre- test	24	11.8333	3.2258	Low Proficient
Post- test	24	24.8750	4.6468	Nearly Proficient
Highly Proficient (36-40) Proficient (30-35) Nearly Proficient (20-29) Low Proficient (10-19) Not Proficient (0-9)				

The table shown that the numeracy level of Grade 8- learners before the intervention, without using Project NUMEROS is Low Proficient with mean percentage of $m = 11.8333$ and with standard deviation of $SD = 3.2258$. After the intervention, their level of numeracy skills in Mathematics was enhanced and improved vastly with the mean percentage of $m = 24.8750$ and standard deviation of $SD = 4.6468$. It simply shown that Project NUMEROS or using worksheets can be able to enhance, develop and improve the numeracy level of non- numerate learners in a span of time.

It is supported by the study of Acosta (2023) in her study entitled "Supplementary Worksheets in Mathematics 1 of Bangar District", she stated that Activity worksheets is an appropriate and effective way of upgrading the performance of Grade 1 learners. Furthermore, activity worksheets is a very useful instructional aid and materials used by Mathematics teachers. On the other hand, Capuyan (2021) emphasized the effectiveness of contextualized learning activity sheets (LAS) in mathematics, particularly in Science and Math subjects. By aligning



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activity worksheets with local contexts, students were able to better connect theoretical knowledge with real-world applications, increasing engagement and understanding. Similarly, a study of Santos (2021) evaluated the use of digital activity worksheets in elementary mathematics classrooms. The research found that digital worksheets which incorporated interactive elements, significantly improved students engagement and academic performance in areas such as arithmetic and geometry.

To teach and to deliver Project NUMEROS in Grade 8 learners is not an easy task to do. It needs patience and understanding of the concepts. Project NUMEROS was delivered and taught by the Project BERT for almost 2-month. As a remedial teachers in literacy and numeracy as they said, it is a whole new thing for them but the experiences that they earned was impeccable and awesome. The grade 8- learners developed positive perception towards Project NUMEROS. It developed their basic skills in Mathematics. They acquired new skills how to perform four fundamental operations, knew how to solve numbers, learned proper rules on how to add, subtract, multiply, divide numbers and solve mathematical problems. Thus, Project NUMEROS has impacted their lives in a simple way.

According to Bearneza et al. (2023), in their study entitled, "Reconstructed Learning Activity Sheets (LAS): Its effect on Students' Performance in Mathematics", the learning activity sheets (LAS) have positive impact on the Mathematics performance of students in Grade 7. According to their study, reconstructed worksheets can help students perform much better in Mathematics. Additionally, Aquino (2021) focused on the use of downloadable activity worksheets to remediate low performing students in elementary mathematics. The findings indicated that students who participated in remedial sessions using worksheets showed noticeable improvements in geometry problem solving skills. The study highlighted the role of worksheets as effective interventions in addressing learning gaps. Santos and Domingo (2022) examined the design elements of activity worksheets for Grade 7 students, specifically focusing on worksheets used in teaching probability and statistics. They concluded that worksheets that provided clear instructions, visual aids and real-world applications were more effective in enhancing students' understanding of abstract mathematical concepts.

Project NUMEROS is created by the researchers to enhance and develop the basic numeracy skills of students of Ilongbukid NHS based on the result of the ERUNT. It is in cooperation and partnership with the Project BERT. Project BERT is a Local Government Unit program funded by the LGU- San Rafael to help the district of San Rafael develop and enhance the literacy and numeracy skills of the learners. On the other hand, Project NUMEROS is a series of worksheets answered by the learners. It is composed of Lesson Plan (LP) to be delivered by the Project BERT. After which, project BERT used activity worksheets answered by the learners. It is composed of 40- item activity to measure students understanding of the subject matter discussed by the Project BERT. Then, it was checked and recorded. After the discussion and activity, Project BERT gave another worksheet called supplemental worksheets where it served as an extension work of the students at home. It was done for 7 weeks to assess students numeracy skills. Through these initiatives and efforts exerted by Local Government Unit and the school, project NUMEROS turned successful and effective.

It is proven by Cayabas et al. (2023), on their study entitled, "Contributions and Partnership Strategies of External Stakeholders in the Implementation of the Alternative Learning System in Bontoc District: Insights from Teachers", they stated that the successful implementation of the ALS program can be attributed to the effective partnership strategies employed by the stakeholders, who serve as significant and in valuable partners in the programs execution. Their active involvement and collaborative efforts greatly contributed to the achievement and positive outcomes of the ALS programs.

The experiences have been the most unforgettable part of this endeavour. According to teacher A, teaching project NUMEROS to students who may not be comfortable with numbers was very rewarding challenge. Providing them an encouraging environment and offering them personalized things are very important strategy that can boost their confidence and interest in learning Mathematics. Indeed, the experiences in implementing project NUMEROS in Grade 8 learners were very productive, fun and enjoyable because learners learned by doing through worksheets. All of them was very cooperative and inquisitive.

According to teacher B, project NUMEROS definitely benefited non-numerate learners of Ilongbukid NHS. By providing them additional support, personalized guidance and tailored strategies, it addressed their individual learning needs. This project helped them built strong foundation in understanding basic concept in Mathematics. Creating a supportive learning environment where students feel encouraged to ask questions, make mistakes and learn at their own pace is the key to their success.

Indeed, through the objectives and aims of the said implemented Project, Project NUMEROS helped non-numerate learners of Ilongbukid NHS. It helped students knew, described and discovered the world of numbers and make meaning on it.



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As cited by Cayabas et al. (2023) again in their research study entitled, “ Contributions and Partnership Strategies of External Stakeholders in the Implementation of the Alternative Learning System in Bontoc District: Insights from Teachers”, the involvement of external stakeholders in the implementation of the Alternative Learning System (ALS) program in Bontoc has been identified and recognized in this study. The contributions made by these external stakeholders are seen as valuable assets that can contribute to the over all improvement of the program in the district. They also acknowledge the need to strengthen partnerships with these stakeholders to full capitalize on their potential . By establishing networks and linkages with government, non- government organizations and HEIs, the curricular and instructional efficiency and effectiveness can be greatly enhanced. Capuyan (2021) on the other hand emphasizes the significance of LGU support addressing gaps in educational infrastructure and resources. The study highlighted how local governments, through (SEF), have been instrumental in funding educational projects, improving school facilities, and supporting the training of teachers. This support has been vital in rural and undeserved areas where resources are limited.

In addition to the result, to help bridge and to continuously implement the research intervention and strategic processes as well as the recommendations, the following action plan was implemented

Activities	Purpose	Persons Involved	Time Frame
School Learning Action Cell School Reorientation	To develop a habit of partaking personalized and innovative worksheets used by the learners and parents at home for personal references.	Teachers, Parents and Learners	August 2024
Parents Involvement	To train and develop parents involvement in teaching their children using personalized worksheets.	Parents, Learners	August 2024
Stakeholders Linkages	To promote partnership between the internal and external stakeholders to work together in teaching and in developing future generations.	LGU, NGO and Faculty and staff	August 2024
	To recommend the continual existence and support of the LGU program in every school within the district of San Rafael through Project BERT to improve the numeracy and literacy level of every learner.	Project BERT, Teacher and LGU	August 2024
District Learning Action Cell	To present the planning, implementation of intervention and result of the study to the District.	PSDS, School Head, Teachers	September 2024
	To encourage the use of Project NUMEROS as an intervention tool for numeracy.	PSDS, School Head, Teachers	September 2024
	To encourage teacher- researchers to conduct action research similar in nature with this study.	Teachers	September 2024
District Write Shop	To organize different working groups by grade levels to create and draft personalized worksheets per subject to be used as intervention tool for subject improvements.	Teachers	October 2024

Conclusion

In view of the result of the study, the conclusions were inferred. There was a greater increase on the percentage of mean before and after the intervention. There was also a leaped on the numeracy level of grade 8 learners exposed under project NUMEROS. Therefore, it can be concluded that using project NUMEROS in partnership with LGU- Based program, project BERT can be able to develop, enhance and improve students’ mathematical skills.



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Based on thematic analysis, the grade 8- learners was very positive towards Project NUMEROS. It has been effective and efficient in developing and improving their mathematical skills especially their foundation skills or their four fundamental skills.

As the researchers walked through the journey towards implementing project NUMEROS, they have concluded that Partnership between the community and the school have impacted the teaching- learning process. It made teachers' life focused on the competency of the curriculum without further focusing on the foundation skills of the learners. The experiences of the implementer to do the said initiative benefited the grade 8 non- numerate learners of Ilongbukid National high School. It helped them to intensify and strengthen the foundation skills of the learners in Mathematics.

Recommendation

The results and conclusions of the study rationalize the following recommendations to the school head, mathematics teachers and district mathematics coordinator. The school head or the head of office must release school memorandum calling the attention of all mathematics teachers to adopt and use Project NUMEROS as an intervention tool to develop and improve learners mathematical skills. At the same time, will encourage all the teachers to create activity worksheets to be used as instructional materials to enhance students foundation skills not just in mathematics but to all subjects.

Mathematics teachers must target intervention that has positive impact on the learners' personal perception to develop their numeracy skills in Mathematics. It must be utilized and implemented to motivate them enhance their foundation skills. The District Mathematics Coordinator and Administrator and the Public District Supervisor is advised to acknowledge and endorse the utilization of Project NUMEROS to be integrated in Mathematics program of different schools in the District of San Rafael. To lessen and eradicate the problem in numeracy, teachers are recommended to conduct other action researches similar in nature as well as replicates of this study to test and validate further the results.

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