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**LEARNERS' MATHEMATICAL SKILLS IN FOUR FUNDAMENTAL OPERATIONS OF INTEGERS THROUGH LITERACY ENHANCEMENT AND REINFORCING NUMERACY (LEARN) PROJECT**

**AILEEN JOY G. SARABIA**

**Teacher II**

Getulio National High School

aileenjoy.garque@deped.gov.ph

**ABSTRACT**

The study determined the learners' mathematical skills in four fundamental operations of integers through Literacy Enhancement and Reinforcing Numeracy (LEARN) project. Before the implementation of the project, the mathematical skills were found to be low proficient when taken as a whole and when grouped as to sex, and nearly proficient when grouped as to school. There was a significant difference in the level of learners' mathematical skills when grouped as to sex for addition and not significant in other operations and in four operations when grouped as to school. The mathematical skills in four fundamental operations after the implementation of the project when taken as a whole and when grouped as to sex and school was nearly proficient. There were no significant differences in addition and subtraction but there were significant differences in multiplication and division. There were no significant differences on the four fundamental operations when grouped as to school. On the other hand, there were significant differences in four fundamental operations before and after the implementation of LEARN project.

**Keywords:** *Mathematical Skills, Four Fundamental Operations of Integers, Literacy Enhancement and Reinforcing Numeracy (LEARN) Project*

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## INTRODUCTION

### Background of the Study

Mathematics, often seen as a supporting discipline for science, also serves as a creative expression that conveys beauty through a framework of definitions, axioms, and theorems. It stands as one of the key instruments humans have created in their endeavor to comprehend and manipulate their surroundings. Given that mathematics is a crucial tool in the technological era, it is the responsibility of mathematics educators to offer students the chance to engage with content that might be deemed contemporary or innovative (Adler, 2015). These concepts could be learned better and effectively if the learners are literate in mathematics.

Mathematics literacy includes a wide range of understanding, knowledge, and value for the potential of mathematics, rather than implying proficiency in various mathematical fields or complex equations (Layug et al. 2021).

The majority of mathematical failures result from merely memorizing facts without any comprehension. Learners are not applying the skills and approaches that enhance their critical thinking, reasoning, and creativity, which are essential for them to tackle any mathematical task independently (Wallit, 2016). The Department of Education seeks to cultivate students who are proficient in numeracy and capable of utilizing their numerical skills for different reasons (RM No. 280, s. 2021). To reach this goal, it is essential to highlight critical thinking and problem solving in mathematics instruction, as well as in the creation of assessment instruments.

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Since numeracy skills serve as the foundational components for developing mathematical competencies across different grade levels, assessing the learners' current understanding of these skills is critically important. To assist mathematics teachers and curriculum developers in gauging their students' numeracy abilities in the four basic operations of integers, the Project Literacy Enhancement and Reinforcing Numeracy (LEARN) initiative was launched by the Schools Division of Guimaras. This initiative is a crucial element of the Division Literacy and Numeracy Roadmap, designed to enhance the literacy and numeracy skills of students in both formal education and the Alternative Learning System (DM 09, s. 2023).

Most of the students who were learning using the modules while staying at home during the previous school year were likewise found to be non-numerates. Due to their lack of in-person encounters, the math teachers only provided them with a separate learning activity sheet that required students to complete numeracy assessments under the guidance of their parents or learning facilitators. The teacher promptly used learning activity sheets to deliver further remedial tasks after learning the outcome. The goal of giving such was not adequately achieved because it was not made clear in the activity results whether the students actually completed the test or only the learning facilitators.

With the reintroduction of face-to-face classes in all schools within the Schools Division of Guimaras, many non-numerate students remain enrolled. The LEARN project was launched to provide remedial activities and ongoing practice in completing numeracy tests focused on the four basic operations of integers. In light of this premise, the researcher undertook this

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study to assess how effective remedial activities are in teaching numeracy as a means to enhance the performance of identified non-numerate students in all high schools within the Municipality of Buenavista-1. Essentially, this study concentrated on the mathematical skills demonstrated by the learners after the implementation of the innovation.

## MATERIALS AND METHODS

### Research Methodology

This chapter presents the research methods, research design, respondents of the study, sampling design, data gathering procedure, research instrument, data analysis and statistical tools that were used in analyzing and interpreting data in the study.

### Research Method

Descriptive method was used in this study. Descriptive method according to Fraenkel and Wallen (2007), is used to describe a given situation as fully and carefully as possible. The gathered data could determine the mathematical skills of learners in four fundamental operations of integers.

### Research Design

The study utilized the descriptive-survey research design. This design is suitable when the goal of the research is to identify the connections that exist among particular variables or events and to ascertain the nature and degree of the relationship between various variables within the population being studied (Fraenkel & Wallen, 2007). According to the Best & Kahn (2007), "the term descriptive research has often been used incorrectly to describe three types

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of investigations that are different. Perhaps their superficial similarities have obscured their differences. Each of them employs the process of disciplined inquiry through the gathering and analysis of empirical data, and each shall attempt to develop knowledge. To be done competently, each requires the experience of a careful and systematic investigator. A brief explanation may serve to put each one in its proper perspective." The research method that focuses on current phenomena regarding conditions, practices, beliefs, processes, relationships, or trends is referred to as a "descriptive survey study."

### Participants of the Study

The respondents of the study were the 181 learners taken randomly from the total population of 331 identified as non-numerates coming from two high schools. These respondents were categorized according to their sex and school.

In Getulio National High School, 13 (7%) of the learners were taken randomly from the total of 23.

In Buenavista National High School, 168 (93%) of the learners were also taken from the total of 308 identified non-numerates of the school.

The data are shown in Table 1.

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**Table 1**

*Distribution of Respondents by School, Schools District of Buenavista 1*

Schools	N	n	%
1. Getulio National High School	23	13	7
2. Buenavista National High School	308	168	93
Total	331	181	100

### Sampling Design

Two stage-random sampling designs were used to obtain the desired number of respondents from the total population. After the sample size was computed using the Slovin’s formula, simple random sampling was also employed.

Simple random sampling involves choosing cases from a population where each unit has the same probability of being selected for the sample (David, 2005).

Stratified sampling was used to obtain the representative from each school. This was used as the second stage in the sampling design.

### Research Instrument

The Enhanced Regional Unified Numeracy Test (E-RUNT), a standardized tool from the Department of Education (DepEd) Region VI, was utilized to collect information regarding the

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mathematical skill levels of learners in the four basic operations of integers: addition, subtraction, multiplication, and division.

The same instrument was used during the pre-test and posttest.

### Data-Gathering Procedures

The researcher wrote the letter and sent them to the principal of the target schools to conduct the study to the respondents. Once permission was granted, the researcher personally conducted and started the distribution and administration of the questionnaires to the respondents. The researcher solicited the cooperation and understanding of the school heads and respondents to ensure easy retrieval and gathering of the questionnaires. Compliance with research ethics protocol was also done through the signed informed consent to insure the dignity of the respondents.

### Data Analyses

The data were organized, computed, and tabulated using the appropriate statistical tools.

The rating scale and description for learners' mathematical skills are:

Scale	Description
90% - 100%	Highly Proficient
75% - 89%	Proficient
50% - 74%	Nearly Proficient
25% - 49%	Low Proficient
0% - 24%	Not Proficient

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Computations, analysis, and interpretations were done using the computer with the Statistical Package for Social Sciences (SPSS) software.

### Statistical Tools

Both the descriptive and inferential statistics were used in the study. For descriptive statistics, the frequency count, percentage, and mean were utilized. The inferential statistics used in this study was the

t-test set at 0.05 level of significance.

**Frequency Count.** Frequency count outlines the characteristics of respondents based on the number distribution related to each selected personal attribute (Santos, 2006). This method was utilized to determine how respondents are distributed within a specific group, who will select, verify statements, or indicate which best represents their type of mathematical skill.

**Percentage.** A percentage represents the outcome obtained by dividing a specific value or measurement by the total amount and then multiplying the result by 100 (Ruiz, 2003). This method was utilized to determine the percentage of respondents within a certain group or grade level in the overall population.

**Mean.** The mean was calculated by dividing the total weighted scores of all items on the checklist by the overall number of items (Borro, 2002). These means were utilized to derive the average scores that illustrate the learners' mathematical abilities in the four basic operations with integers, categorized according to various variables.

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**t-test.** To determine the significant difference between the mean of two variables t-test was used. This tool was used to find out the significant difference in the learners' mathematical skills in four fundamental operations when classified according to sex, school, and the effect of the LEARN project to the mathematical skills of learners set at 0.05 significance level.

## RESULTS AND DISCUSSIONS

This study was conducted to determine the grade 7 learners' mathematical skills in four fundamental operations of integers through Literacy Enhancement and Reinforcing Numeracy (LEARN) project of Buenavista 1 for school year 2023 -2024.

A descriptive approach was employed in the research, employing a descriptive-survey design.

The respondents of the study were the 181 learners taken randomly from the total population of 331 identified as non-numerates coming from two high schools. These respondents were categorized according to their sex and school.

A two-stage random sampling designed was used to obtain the desired number of respondents from the total population.

A standardized tool known as the Enhanced Regional Unified Numeracy Test (E-RUNT) from the Department of Education (DepEd) Region VI was utilized to collect data regarding

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the proficiency of learners in mathematical skills, specifically focusing on the operations of addition, subtraction, multiplication, and division of integers.

The intervention being tested whether effective or not is the project LEARN of the schools Division of Guimaras.

The collected data was organized, examined, and understood through relevant statistical methods. The research employed both descriptive and inferential statistics. For descriptive statistics, frequency counts, percentages, and means were used. To perform inferential statistics, a t-test was conducted, with a significance level established at .05.

The statistical computations were processed through the Statistical Package for Social Science (SPSS) Software.

The following were the findings of the study:

Before the implementation of LEARN project, learners' mathematical skills were found to be "low proficient" when taken as a whole and when grouped according to sex. Male students demonstrated a "low proficient" level of numerical skills in both subtraction and division of integers and a "nearly proficient level" in addition and multiplication. Female students demonstrated a "low proficient level for both addition and subtraction and a "nearly proficient" level for multiplication and division.

The level of learners' mathematical skills in four fundamental operations before the implementation of LEARN project when taken as a whole and classified according to school were found to be "nearly proficient". Both addition and division, learners showed a "nearly proficient" level of mathematical skills in big school, while a "low proficient" level in subtraction

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and multiplication. In small school, learners demonstrated a “low proficient” level for both subtraction and division and a “nearly proficient” level for addition and multiplication.

There was a significant difference in the level of learners’ mathematical skills when grouped according to sex for addition and not significant in subtraction, multiplication, and division.

There were no significant differences on the numerical skills of learners before the implementation of the LEARN project when grouped as to school for addition, subtraction, multiplication, and division.

The level of learners’ mathematical skills in four fundamental operations after the implementation of LEARN project when taken as a whole and classified according to sex were found “nearly proficient”.

For male, they were proficient in multiplication, nearly proficient in addition and division while low proficient in subtraction.

For female, they were proficient in addition, multiplication, and division while nearly proficient in subtraction.

The level of learners’ mathematical skills in four fundamental operations after the implementation of LEARN project when taken as a whole and for small schools was found to be “nearly proficient” and proficient in big schools.

For big schools, they were proficient in addition and division, and nearly proficient in subtraction and multiplication.

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For small schools, they were proficient in multiplication and nearly proficient in addition, subtraction, and division.

There were no significant differences on the level of learners' mathematical skills after the implementation of LEARN project for addition and subtraction while significant differences in multiplication and division when classified according to sex.

When grouped as to school, results revealed that there were no significant differences on the level of learners' mathematical skills after the implementation of the project for addition, subtraction, multiplication, and division.

There were significant differences in the level of learners mathematical skills before and after the implementation of LEARN project in addition, subtraction, multiplication, and division.

## CONCLUSIONS

Based on the findings, the following conclusions were drawn:

The level of learners' mathematical skills in four fundamental operations of integers before the implementations of LEARN project was not good as expected regardless of their sex and school.

The male learners performed better than the female in addition before the implementation of LEARN project and comparable in other fundamental operations of integers when classified according to sex and comparable in four fundamental operations when classified according to school.

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There was an improvement in the level of learners' mathematical skills in four fundamental operations after the implementation of LEARN project regardless of sex and school.

The female respondents performed better in multiplication and division compared to male learners after the implementation of LEARN project and comparable to other fundamental operations and also comparable to all fundamental operations when classified according to school.

The learners performed better in their mathematical skills after the implementation of LEARN project in all fundamental operations.

Considering the findings and conclusions that have emerged in this study, the following recommendations are proposed:

Learners should do their share in cooperating with their mathematics teachers, school heads and parents in attending to the different activities under the LEARN project of their respective schools.

Mathematics teachers as implementers of the said project should be flexible enough to adopt the most appropriate strategies considering learners' differences in grasping new concepts or ideas in solving real – life problems.

Teachers as project implementers should give focus on male learners in enhancing their numeracy skills specifically, on the operations multiplication and division.

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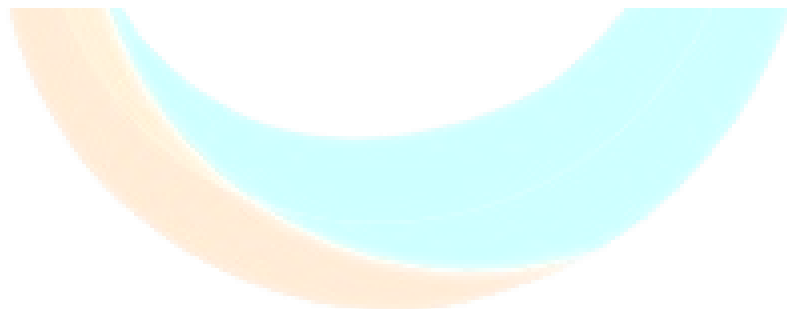
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The schools should sustain and continue the implementation of project LEARN as an intervention in improving learners' mathematical skills in four fundamental operations of integers.

School heads should support the implementation of project LEARN through fund allotments for the procurement of the instructional materials needed.

Parents should be involved in the implementation of the said project of school especially those with better educational attainment.

Future researchers may conduct similar or related studies using other variables and settings. Such studies may contribute knowledge on the impact of Project LEARN to learners' mathematical skills in various grade levels.



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