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Analyzing Proficiency: Grade VI Mastery Levels in Mathematics across Private and Public Elementary Schools

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Abstract

This study determined the mastery levels in Mathematics of randomly selected 515 Grade VI pupils of public and private elementary schools in Nueva Ecija. The mastery levels were classified as mastery (75% to 100%), near mastery (50% to 74%) and low mastery (below 50%). The main source of data is a researchers-made test called the Mathematics Achievement Test (MAT). The MAT was found reliable using the Kuder-Richardson formula 20, with a reliability coefficient of 0.97. The MAT was composed of 40 items and each problem was assigned one point.

The study revealed that the Grade VI pupils nearly mastered Graphs, Maps and Scale Drawings while they had poor mastery of whole numbers. They have low mastery of place value, scientific notations and different types of numbers. Furthermore, public school pupils have better mastery levels in the MAT than private school pupils. Lastly, this study offers pedagogical implications for supplementary research along this line.

Introduction

According to Bernardo *et al.*, (2022) [1], "Filipino students performed poorly in the 2018 Programme for International Student Assessment (PISA) mathematics assessment, with more than 50% obtaining scores below the lowest Mastery level. Students from public schools also performed worse compared to their private school counterparts".

They added that "In mathematics, less than 20% of students demonstrated the minimum Mastery level (Level 2), while more than 50% showed very low Mastery (below Level 1). Scoring below the lowest level of Mastery in the PISA, these Filipino students have been left behind in terms of mathematics education; more than half of this age group of Filipino students have inadequate mathematical skills compared to their peers in other parts of the world" (Bernanrdo, *et al.*, 2022) [1].

The disparity in mathematical proficiency among pupils in public and private schools was also evident, with their average scores of 343 and 395, respectively (Department of Education 2019) [2].

This was the scenario on the mathematics performance of the pupils in the Philippines before the pandemic. However, in 2019, "The COVID-19–19 pandemic has paralyzed face-to-face classroom sessions but it has not stopped the teaching and learning activities of schools in the province of Nueva Ecija. The institutions shifted to e-learning and use different technological platforms hoping to provide a quality education through online delivery of instruction to their respective students" (Mina, *et al.*, 2020) [4].

After two school years without face-to-face classes, public and private schools' empty rooms and corridors in the Philippines once again filled with students as the Department of Education (DepEd) formally opened the School Year 2022-2023(Mingoy, 2022) [5].

In this regard, the researchers assessed the Mastery levels in mathematics of the elementary students from selected public and private schools in Nueva Ecija, Philippines to see if the students who are affected by the pandemic have improved Mastery levels in mathematics. Their mastery will be assessed using the Mathematics Achievement Test (MAT) designed by the researchers.

Specifically, this study aimed to determine the Mastery levels of Grade VI pupils in the Mathematics Achievement Test (MAT) in whole numbers, rational numbers, basic concepts in geometry, measurement and graphs, maps and scale drawings and how their Mastery levels differ when grouped according to the type of school they attended.

Methodology

This study utilized a descriptive research design (Subia, Mangiduyos & Turgano, 2020) [8]. With the use of this design, the researchers were able to determine the Mastery levels in terms of Mean Percentage Score (MPS) of the respondents using a questionnaire in the form of a test, as the research instrument of this study.

The total number of respondents, who were randomly selected, were 515 Grade VI students from public and private elementary schools in Nueva Ecija.

The research instrument is a Mathematics Achievement Test (MAT). It is a one-hour test and it's composed of 40 items on whole numbers, rational numbers, basic concepts in geometry, measurement and graphs, maps and scale drawings. The test was checked by professors in Mathematics for content Validity then it was tried out on a group of randomly selected Grade VI pupils for item analysis and reliability. The test has a very high-reliability coefficient of 0.97.

Appropriate statistical tools were used to treat the gathered data. Weighted mean was used to describe the Mastery levels of the respondents while the t-test was used to look at the significant difference in the performance of the respondents in terms of the school they attended.

Results and Discussion

1. Mastery levels of Grade VI pupils in Different Topics/Areas of the Mathematics Achievement Test

Table 1: Shows the Mastery levels of the respondents in the different areas of the Mathematics Achievement Test (MAT)

Topics/Areas	Grade VI Pupils	
	MPS	Verbal Description
1. Whole Numbers	49.74%	Low Mastery
2. Rational Numbers	61.01%	Near Mastery
3. Basic Concepts in Geometry	50.99%	Near Mastery
4. Measurements	58.83%	Near Mastery
5. Graphs, Maps and Scale Drawings	64.17%	Near Mastery
OMPS	56.95%	Near Mastery

Legend: Mastery 75 to 100%; Near Mastery 50 to 74%; Low Mastery below 50% (MPS-Mean Percentage Score)

The table shows that the respondents performed poorly on the topics of whole numbers. The respondents' Mastery level is 49.74% described as "Low Mastery". This means that the respondents have low mastery of place value, scientific notations and different types of numbers.

On the topic of rational numbers, the respondents' performance was "Near Mastery", based on their Mean Percentage Score of 61.01%. This means that the respondents nearly mastered the topics on decimals, number theory, fractions, ratios and proportion and percent.

As to the basic concepts of Geometry, the mean percentage score of the respondents is computed at 50.99% verbally described as near mastery. This means that the respondents nearly mastered visualizing and describing spatial figures.

In terms of Measurement, the respondents nearly mastered the topics based on their MPS at 58.83%. This means that the respondents nearly mastered the concepts and problems on the perimeter, surface area, volume, reading and interpreting electric and water meters.

In Graphs, Maps and Scale Drawings, the respondents nearly mastered the concepts and problems of finding directions and interpreting maps and graphs. Their Mean Percentage Score is 64. 17%.

Overall, the respondents proved that their strongest performance is Topic 5 (graphs, maps and scale drawings) while their weakest performance is at whole numbers.

"The low mastery levels in whole numbers indicate a significant area of concern, highlighting the need for targeted interventions and remedial measures to strengthen foundational mathematical concepts and self-regulation strategies" (Salangsang & Subia, 2020) [7]. On a positive note, the near mastery demonstrated in rational numbers, geometry, measurement, and graphs suggests that focused efforts in these areas can contribute to an overall improvement in mathematical proficiency among Grade VI students (Retnawati & Wulandari, 2019) [6].

2. Performance of the Grade VI pupils when grouped according to School Attended

Table 2: Comparison of the Mastery Levels of the Respondents According to Type of School Attended

	Public	Private
MPS	58.20	54.82
Variance	206.1965	202.0306
n	324	191
t-test	1.96*	

*Difference is significant @ 0.05 level

The table presents the MPS of public elementary school respondents at 58.20, variance equal to 206.1965 and 324 Grade VI pupils. The table also shows the private elementary school respondents' MPS at 54.82, variance equal to 202.0306 and 191 number of Grade VI pupils. The value of the t-test is found to be significant @ 0.05 level which means that there is a significant difference in the MPS performance of the respondents, favoring the public elementary pupils.

The findings imply that public school Grade VI pupils performed better in the Mathematics Achievement Test than their private school counterparts. According to Lubienski (2016) [3], some factors contribute to public schools' performance in math. "Private school students are more likely than their public school counterparts to sit in rows, complete math worksheets and believe that mathematics is "mostly memorizing facts"-a narrow view that captures neither the breadth of the discipline nor the reasoning that is central to it. In contrast, public schools have moved beyond traditional, repetitive exercises, and more often ask students to solve complex, real-world problems and to learn geometry, data analysis, and early algebra ideas, in addition to basic arithmetic" Lubienski (2016) [3].

Conclusions

1. The Grade VI pupils nearly mastered Graphs, Maps and Scale Drawings while they have poor mastery in whole numbers.

2. The respondents have low mastery of place value, scientific notations and different types of numbers.
3. Public school pupils have better mastery levels in the Mathematics Achievement Test than private school pupils.

References
1. Bernardo Allan BI, Macario O, Cordel II, Minie Rose C, Lapinid Jude Michael M Teves, Sashmir A Yap, *et al*. Contrasting Profiles of Low-Performing Mathematics Students in Public and Private Schools in the Philippines: Insights from Machine Learning. Journal of Intelligence. 2022; 10:61. Doi: https://doi.org/10.3390/jintelligence10030061
2. Department of Education. PISA 2018 Philippine National Report; Pasig City: Department of Education, 2019. Available online: https://www.deped.gov.ph/wp-content/uploads/2019/12/PISA-2018-Philippine-National-Report.pdf (accessed on 3 January 2022).
3. Lubienski S. Why might public school students score better in math than their private school counterparts? University of Illinois, 2016.
4. Mina JC, Subia GS, Barlis PT, Tuliao RC, Pastorfide DM. Inclinations of Engineering and Marketing Management Students to Engage in Online Learning Technology Amidst the COVID-19 Pandemic. 2020; 62(9):24-35.
5. Mingoy G. Face-to-face classes resume in the Philippines for SY 2022-2023, 2022. https://onstarplus.com/archives/4034#:~:text=After%20two%20school%20years%20without,Monday%2C%20August%2022%2C%202022.
6. Retnawati H, Wulandari NF. The development of students' mathematical literacy proficiency. Problems of Education in the 21st Century. 2019; 77(4):502-514. Doi: https://doi.org/10.33225/pec/19.77.502
7. Salangsang L, Subia G. Mathematical thinking on problem-solving and self-regulation strategies of Filipino primary grade pupils. International Journal of Scientific & Technology Research. 2020; 9(2). ISSN 2277-8616
8. Subia GS, Mangiduyos GP, Turgano JBD. Emergency Preparedness of Novo Ecijanos. Open Journal of Social Sciences. 2020; 8:17-23. Doi: https://doi.org/10.4236/jss.2020.83003