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MATHEMATICAL NEEDS OF LAURA VICUÑA LEARNERS: BASELINE FOR PROJECT IMPLEMENTATION

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ABSTRACT

An inquiry on the training needs in Mathematics was conducted to Laura Vicuña Center - Palawan (LVC-P) learners. Specifically, this aimed to determine their level of performance in numbers, measurement, geometry, algebra and statistics; identify the difficulties they encountered in solving word problems; and enumerate topics where they needed coaching.

To identify specific training needs, the study employed a descriptive research design where 36 participants were sampled purposively. The data were gathered through a problem set test and focus group discussion. Findings revealed that LVC-P learners had an unsatisfactory performance in numbers, measurement, and statistics while alarmingly poor in geometry and algebra. They also faced difficulties in remembering, understanding, applying, and analyzing mathematical concepts when solving problems. Further, the learners were able to name certain topics subjected for tutorials.

The above facts and observations suggest that learners if LVC-P have urgent training needs in Mathematics. It is recommended that the Western Philippines University - College of Education RDE Unit continue its research, development, and extension services to LVC-P. More importantly, the results of this inquiry regarding the training needs of the learners will serve as bases for conducting an extension project and development program for LVC-P. Series of tutorial sessions is deemed necessary to address the needs and difficulties of the learners.

Keywords: extension; Laura Vicuña Center - Palawan; mathematics; mentoring and tutorial; training needs

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INTRODUCTION

Background

As a strong partner for sustainable development of West Philippines and beyond, the College of Education through its Research, Development and Extension Unit seeks to extend services for the development of schools and communities based from relevant research outputs. By means of training needs assessment (TNA), a pre-test was conducted to Laura Vicuña Center Palawan (LVC-P) learners. Brown (2002) highlighted that “conducting needs assessment is fundamental to the success of a training program”.

LVC-P is an adopted school of the Western Philippines University College of Education since 2018. Learners are composed of indigents from the province of Palawan and from the city of Puerto Princesa. Cagatin (2020) mentioned that “indigent students are not surprising in the Philippines”. Most of the learners came from far flunk areas and cannot afford to further their education. Currently, the institution does not have a resident and permanent math teacher. The learners study mathematics independently through modules provided to them with the guidance of resident Sisters. Indeed, these circumstances may not fully guarantee the learners a quality learning and significant mathematics education.

The abovementioned condition of LVC-P gives light to the Western Philippines University - College of Education to extend a hand by providing mathematics enhancement project and program for the learners. As emphasized, “mathematics is often promoted as endowing those who study it with transferable skills such as an ability to think logically and critically or to

have improved investigative skills, resourcefulness and creativity in problem solving” (Cresswell & Speelman, 2020). Hence, this inquiry through TNA was conducted to determine the specific mathematical needs of the learners and to identify the concerns of the institution that must be given immediate and appropriate solutions.

Objectives of the Study

Based from the current situation of the institution, the inquiry determined the training needs in Mathematics of LVC-P learners.

Specifically, it aimed to:

1. determine the learners’ level of performance in numbers, measurement, geometry, algebra and statistics (as a bases for the project to be designed);
2. identify difficulties encountered by the learners in solving word problems involving numbers, measurement, geometry, algebra and statistics (as a bases for the program to be implemented); and
3. enumerate specific topics that must be addressed (as a bases for planning of tutorial sessions and activities to be considered).

METHODOLOGY

Employing a descriptive research design, the study was conducted in Laura Vicuña Center - Palawan, Barangay Macarascas, Puerto Princesa City during the first quarter of year 2020. Thirty-six (36) LVC-P learners were chosen through purposive total population sampling. The LVC-P learners were chosen from this institution since these learners were reported to have training

needs in mathematics. Permission was granted by the LVC-P Sister-in-charge to conduct this inquiry. Purposive total population sampling was employed in the inquiry to gain greater insights and to capture a wide range of perspectives relating to the training needs and immediate concerns of LVC-P learners. Ethical considerations were made to ensure the learner's safety.

A problem set test modified from SEI-DOST and MATHTED (2011) containing elementary concepts in numbers (fundamental operations, fractions and percentage), measurement (perimeter, area and volume), geometry (Pythagorean Theorem, ratio and proportion), algebra (solving equations involving unknowns) and statistics (probability and measures of central tendency) was administered to determine the needs and difficulties faced by the LVC-P learners. Elementary mathematics was given importance to inquire if the LVC-P learners were able to gain, recall and apply learned concepts.

Through focused group discussion, the LVC-P learners were able to clarify their answers and solutions. This was the basis in crafting themes that described the difficulties the learners encountered while completing the pre-test. According to YS level, the LVC-P learners have named specific topics from their module where they needed assistance and tutoring.

Arithmetic Mean was used to determine the level of problem solving performance of the LVC-P learners along with descriptions such as excellent (0.81-1.00), very satisfactory (0.61-0.80), satisfactory (0.41-0.60), unsatisfactory (0.21-0.40) or poor performance (0.00-0.20). Observed difficulties encountered by the LVC-P learners were themed accordingly.

KEY FINDINGS

LVC-P Learners' Mathematical Performance

Table 1 details the level of performance in numbers, measurement, geometry, algebra and statistics of the LVC-P learners. In sum, the LVC-P learners achieved unsatisfactory problem-solving performance ($\bar{x} = 0.26$). As shown in the table, the overall mean obtained was far behind the expected 0.81 to 1.00 (excellent performance). This indicates that the LVC-P learners were not able to apply the fundamental knowledge specific to the content areas identified. This result relates with Geary (2011) who revealed that children “have deficits in understanding and representing numerical magnitude, difficulties retrieving basic arithmetic facts from long-term memory, and delays in learning mathematical procedures”. Results may imply that the LVC-P learners are challenged with their mathematical knowledge, skills and understanding particularly elementary topics in numbers, measurement, geometry, algebra and statistics.

The learners' unsatisfactory performance in numbers ($\bar{x} = 0.33$), measurement ($\bar{x} = 0.26$) and statistics ($\bar{x} = 0.34$) and poor performance in geometry ($\bar{x} = 0.17$) and algebra ($\bar{x} = 0.16$) is quite alarming. This observable fact may hinder their problem-solving performance and mathematics achievement as a whole. Accordingly, Doorman et al. (2020) recognized the importance of problem solving in mathematical thinking and in mathematics education. These observations are similar with Capate and Lapinid (2015) who determined the performance and the difficulties of Grade 8 students. It was indicated that the students struggle with their mathematical understanding or

possess only the minimum knowledge and skills and core understandings, and prerequisite and fundamental knowledge and/or skills have not been acquired or developed adequately to aid understanding.

Table 1. LVC-P Learners' Mathematical Performance.

CONTENT AREA (Elementary Topics¹)	MEAN	DESCRIPTION²
Numbers	0.33	Unsatisfactory
1. Addition, Subtraction	0.28	Unsatisfactory
2. Addition, Multiplication	0.44	Satisfactory
3. Fractions, Division	0.25	Unsatisfactory
4. Divisibility	0.44	Satisfactory
5. Percentage	0.25	Unsatisfactory
Measurement	0.26	Unsatisfactory
6. Perimeter of a square	0.36	Unsatisfactory
7. Area of a rectangle	0.53	Satisfactory
8. Area (estimation)	0.22	Unsatisfactory
9. Pythagorean Theorem (estimation)	0.06	Poor
10. Volume of a rectangular prism	0.11	Poor
Geometry	0.17	Poor
11. Hypotenuse of a right triangle	0.17	Poor
12. Area of a plane inscribed in a solid	0.11	Poor
13. Diagonal of a plane figure	0.17	Poor
14. Shapes and relationships	0.14	Poor
15. Diagonal of a solid figure	0.25	Unsatisfactory
Patterns and Algebra	0.16	Poor
16. Representing equations in one unknown	0.19	Poor
17. Analyzing situations in one unknown	0.17	Poor
18. Solving relationships in one unknown	0.28	Unsatisfactory
19. Analyzing situations in two unknowns	0.08	Poor
20. Solving relationships in two unknowns	0.06	Poor
Probability and Statistics	0.34	Unsatisfactory
21. Estimating probabilities	0.28	Unsatisfactory
22. Making predictions	0.58	Satisfactory
23. Mean	0.17	Poor
24. Median	0.19	Poor
25. Mode	0.47	Satisfactory
OVERALL PERFORMANCE	0.26	UNSATISFACTORY

¹ Items were adopted and modified from SEI-DOST and MATHTED (2011).

² 0.81 - 1.00 = Excellent

0.61 - 0.80 = Very Satisfactory

0.41 - 0.60 = Satisfactory

0.21 - 0.40 = Unsatisfactory

0.00 - 0.20 = Poor

Difficulties Encountered by the LVC-P learners

Table 1 reflects that the LVC-P learners encountered difficulties in solving simple worded problems involving numbers, measurement, geometry, algebra and statistics (with an overall unsatisfactory performance). These results indicate that the Laura Vicuña Center – Palawan learners struggled with both lower and higher order thinking skills themed as follows:

1. Remembering. It can be implied that most of the LVC-P learners were not able to recall learned concepts from their elementary and early junior high school mathematics. Even the application of the four fundamental operations and MDAS was not observed throughout the learners' choice of answer in the multiple-choice test. Additionally, the LVC-P learners struggled to recall the formulas in solving for perimeter and area, and volume of regular planes and solids respectively; and common properties such as the Pythagorean Theorem, ratio and proportion among others. This result may be due to poor mathematical communication. "Mathematical communication is an important tool that allows children to demonstrate their mathematical thinking and understanding of mathematics" (Lee, 2015).

2. Understanding. A few understand what is going on in the problem. The LVC-P learners faced difficulty in identifying or distinguishing the given versus the unknown. The responses showed that connections between or among information were not realized by the learners. The given statements were made simple and were designed for elementary pupils, still the LVC-P learners are challenged to grasp what must be done to solve the situation identified. Even in Lee (2015), "children frequently show difficulty in presenting their mathematical thoughts to others, or their mathematical

thinking is not reflected in words”. It can be indicated that without remembering skills, poor understanding follows. On the other hand, this could be attributed to poor proficiency in English, which is the language of teaching and learning mathematics (Makonye & Fakude, 2016).

3. Applying. Mathematical properties, definitions, formulas, even shortcuts and estimation strategies were not exhibited by the LVC-P learners. Practical, manual or mental computation strategies were not observed from the learners given that the problems provided does not require calculator and extra sheets of paper for solutions. Difficulty in applying math concepts to word problems may be attributed to the LVC-P learners’ difficulty in remembering and understanding relationships between what is given and what is asked.

4. Analyzing. Analytical thinking was not displayed especially by the LVC-P learners in the lower YS levels. Additionally, a small number from the upper YS levels tend to choose any letter from the choices without doing any computation. A sense of responsibility and confidence in doing analysis were recorded to define the unsatisfactory performance of the learners.

Concerns arising with the applying and analyzing skill may similar to Makonye and Fakude (2016), who found that learners have misconceptions, have procedural errors, have strategic errors, and have logical errors on addition and subtraction of directed numbers.

Certain Topics Requested by the LVC-P learners

In line with their learning modules, the LVC-P learners enumerated specific topics where they needed tutorials. Table 2 summarizes the topics identified according to YS Level.

Table 2. Topics to be Discussed as Enumerated and Requested by the LVC-P learners.

YS LEVEL	TOPICS
11 ^a	Sequence and Series Polynomial Function Circles Synthetic Division Power Theorems Combinations and Probability Statistical Measures
10 ^b	Quadratic Equations and Inequalities Triangle Similarity Parallelograms Trapezoids and Kites
9 ^c	Special Products and Factoring Parallel and Perpendicular Lines Reasoning and Proof
8 ^d	Special Products FOIL Method

^aYS 11 is equivalent to Grade 10

^bYS 10 is equivalent to Grade 9

^cYS 9 is equivalent to Grade 8

^dYS 8 is equivalent to Grade 7

CONCLUSION AND RECOMMENDATION

Conclusion

From the aforementioned findings, it can be derived that the learners of Laura Vicuña Center – Palawan badly needs mathematics enhancement program and simultaneous tutorial sessions to address the difficulties identified and training needs enumerated.

Recommendations

In light of the results and its implications to the learners and the institution as a whole, recommendations are as follows:

1. The Western Philippines University – College of Education (WPU-CED) is encouraged to strongly sustain its “Adopt a School: Learning Enhancement in Mathematics” project and MATH-EMATICS (**MATH** Enhanced **Mentoring, Assistance and Tutorial to In-need and Challenged Students**) program in LVC-P.

2. The WPU-CED Research Unit may as well consider other variables or factors by conducting series of inquiries to various factors or further studies to other variables that may contribute in defining the training needs and concerns of LVC-P learners in Mathematics. Extension and Development services are seemed effective only when it really addresses well-defined problems or challenges faced by the learners.

3. The WPU-CED Extension Unit may conduct regimented evaluation of its program and activities provided to LVC-P. Regular impact assessment is suggested to the training team to verify the progress of the learners and to consider other training strategies that may fully achieved the goals and objectives of the extension project. The training team is also encouraged to provide series of coaching and tutorials to the learners as well as to develop among them interdependent learning.

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