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Numeracy Level of Grade 4 Pupils: Basis for A Proposed Numeracy Intervention Module

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Abstract

This study aimed to determine the numeracy level of Grade 4 pupils in Guadalupe Elementary School and develop a Numeracy Intervention Module using indigenized materials to address identified learning gaps. Anchored on the principle that contextualized instruction enhances meaningful learning, the study employed a descriptive action research design. The respondents consisted of 115 Grade 4 pupils, with 32 identified as non-numerate based on a validated teacher-made 30-item numeracy assessment test. Data were gathered through document review and analyzed using mean and percentage. Findings revealed that 27.83% of pupils were non-numerate, 53.91% were classified as low average, and 18.26% were average, with no pupils reaching the fast level. These results indicate that a significant proportion of learners struggle with foundational numeracy skills, particularly in basic operations and problem-solving. In response, a Numeracy Intervention Module was developed to provide structured and contextualized learning activities aimed at improving pupils' mathematical competencies. The study concludes that targeted intervention using indigenized materials can help address numeracy gaps and enhance learning outcomes. It is recommended that the module be implemented, supported by teacher training and institutional resources, and further evaluated through future studies. This study aligns with SDG 4 (Quality Education) by strengthening foundational learning and SDG 8 (Decent Work and Economic Growth) by supporting skills development essential for future productivity. The study contributes to educational, socio-economic, cultural, and institutional sustainability by promoting inclusive learning, contextualized instruction, and scalable intervention strategies

Keywords: Action Research, Indigenized Materials, Numeracy Intervention Module, Numeracy Skills, Grade 4 Pupils, Purposive Sampling

1. Introduction

Education centers on the learner, whose diverse physical, intellectual, social, and emotional characteristics necessitate responsive and inclusive teaching approaches. Effective instruction integrates teaching, learning, and instructional strategies to promote meaningful experiences and holistic development. Within this framework, numeracy emerges as a foundational skill essential for problem-solving, reasoning, and real-life application. However, persistent challenges in mathematical proficiency among primary learners highlight the need for targeted instructional interventions. In Guadalupe Elementary School, pre-test results revealed a significant number of non-numerate Grade 4 pupils, underscoring the need for a contextualized intervention. This study, therefore, aims to assess pupils' numeracy levels and develop a Numeracy Intervention Module using indigenized materials to improve learning outcomes.

1.1 Background of the Study on Numeracy Skills of Grade 4 Pupils in Guadalupe Elementary School

Learners possess unique characteristics that influence how they acquire knowledge and skills, making differentiated and responsive instruction essential. Teaching, learning, and instruction function as interconnected components that shape meaningful educational experiences. Learning involves equipping learners with knowledge and skills applicable in real-life contexts (Merriam et al., 2007). Numeracy is a fundamental competency developed during early schooling, involving the ability to interpret, apply, and reason with mathematical concepts in everyday situations. Despite its importance in developing logical thinking and problem-solving skills, Mathematics is often perceived as difficult by learners. Under the K to 12 Basic Education Curriculum, Grade 4 pupils are expected to achieve competencies across learning areas, including Mathematics. However, results from a pre-test conducted in August 2023 in Guadalupe Elementary School showed that 32 out of 115 pupils were classified as non-numerate, with difficulties in conceptual understanding, word problems, and basic operations. These findings highlight the need for targeted intervention.

1.2 Themes and Insights from Related Literature on Numeracy and Intervention Strategies

Numeracy is recognized as a critical skill enabling learners to apply mathematical reasoning in various contexts. UNESCO defines numeracy as the ability to use numbers and mathematical reasoning to solve problems in daily life. Research

indicates that learners' difficulties in numeracy often stem from weak foundational skills. Effective mathematics learning requires conceptual understanding, procedural fluency, and strategic competence (Kilpatrick, Swafford, and Findell, 2001). Intervention strategies have been shown to significantly improve learners' mathematical performance. Structured and explicit instruction enhances skill acquisition and understanding (Gersten and Chard, 1999). Additionally, contextualized and indigenized instructional materials support comprehension by linking lessons to learners' real-life experiences, making learning more meaningful and engaging.

1.3 Local, National, and Global Context of Numeracy Challenges in Primary Education

Globally, numeracy is considered a foundational skill alongside literacy, essential for lifelong learning and societal participation. However, many learners worldwide fail to achieve minimum proficiency in mathematics during primary education, indicating a widespread educational challenge. At the national level, the K to 12 curriculum emphasizes numeracy as a core competency for developing analytical and problem-solving skills. Locally, the results from Guadalupe Elementary School reflect similar challenges, where a significant proportion of Grade 4 pupils struggle with basic numeracy skills. These parallels across global, national, and local contexts emphasize the urgency of implementing effective interventions.

1.4 Conceptual Basis of Numeracy Intervention Using Indigenized Materials

The study is anchored on the principle that learning becomes more effective when instructional strategies are contextualized and aligned with learners' experiences. The conceptual framework highlights the relationship between identified numeracy gaps (based on pre-test results) and the implementation of intervention activities using indigenized materials. Through the development and application of a Numeracy Intervention Module, the study aims to improve numeracy skills and reduce the number of non-numerate learners. This approach aligns with the idea that meaningful learning occurs when instruction is relevant, engaging, and responsive to learners' needs.

1.5 Research Gaps and Rationale for Developing a Numeracy Intervention Module

Despite existing instructional strategies, a significant number of learners continue to struggle with numeracy, indicating gaps in effective implementation and contextualization of teaching approaches. While studies support the effectiveness of intervention programs and contextualized materials, there remains a need for localized, school-based solutions tailored to specific learner needs. The identification of 32 non-numerate pupils in Guadalupe Elementary School highlights a gap between expected competencies and actual performance. This study addresses this gap by developing a Numeracy Intervention Module using indigenized materials to directly respond to learners' difficulties and improve their numeracy skills

1.6 Alignment with Relevant Sustainable Development Goals (SDGs)

This study aligns with SDG 4 – Quality Education by addressing gaps in foundational numeracy skills and promoting inclusive and equitable learning opportunities for Grade 4 pupils through the development of a targeted intervention module. By improving learners' mathematical competencies, the study also supports SDG 8 – Decent Work and Economic Growth, as numeracy is essential for future employability, productivity, and informed decision-making. Through the use of contextualized and indigenized materials, the study contributes to strengthening learners' capacity for lifelong learning and meaningful participation in society

1.7 Importance of the Study to Multidisciplinary Sustainability

This study contributes to educational sustainability by enhancing foundational learning outcomes and supporting effective teaching practices. It promotes socio-economic sustainability by equipping learners with essential numeracy skills necessary for future workforce participation and decision-making. Additionally, the use of indigenized materials supports cultural sustainability by integrating local contexts into instruction, making learning more relevant and meaningful. The development of a structured intervention module also contributes to institutional sustainability, as it provides a replicable approach for improving numeracy instruction in similar educational settings

2. Material and methods

2.1 Research Design

This study employed a descriptive action research design to assess the numeracy level of Grade 4 pupils and develop a Numeracy Intervention Module for non-numerate learners. The research process followed a systematic flow beginning with identifying the problem, determining the study locale, selecting the participants, utilizing a numeracy assessment tool, conducting data gathering through document review, and applying statistical analysis. The results then served as the basis for designing an intervention program aimed at improving pupils' numeracy skills.

2.2 Locale of the Study
The study was conducted at Guadalupe Elementary School located in Barangay Carpenter Hill, City of Koronadal. The school served as the setting where the numeracy levels of Grade 4 pupils were assessed and where the intervention module was developed and intended to be implemented.

2.3 Respondents of the Study
The respondents consisted of 115 Grade 4 pupils enrolled in Guadalupe Elementary School. Based on the Mathematics pre-test conducted in August 2023, 32 pupils were identified as non-numerate and became the primary focus of the intervention development.

2.4 Sample and Sampling Procedure
The study utilized purposive sampling by selecting pupils identified as non-numerate based on pre-test results. From the total population of 115 Grade 4 pupils, 32 who fell under the non-numerate category were chosen as participants for the intervention module development. This approach ensured that the study directly addressed learners with the greatest need for numeracy support.

2.5 Research Instrument
A teacher-made numeracy assessment test consisting of 30 items was used to determine pupils' numeracy levels. The instrument was validated by a Mathematics specialist to ensure its reliability and appropriateness. The scoring interpretation classified pupils into four levels: scores ranging from 0 to 7 were categorized as non-numerate, 8 to 16 as low average, 17 to 23 as average, and 24 to 30 as fast. This classification system provided a basis for identifying learners who required intervention and guided the development of the Numeracy Intervention Module.

2.6 Data Gathering Procedure
Permission to conduct the study was obtained from the school principal prior to data collection. The researcher reviewed the numeracy pre-test results of Grade 4 pupils to identify those who belonged to the non-numerate level. Following this, a Numeracy Intervention Module was developed to address the identified learning gaps. The module consisted of structured activities aimed at enhancing pupils' ability to read numbers, perform basic mathematical operations, and solve word problems. The use of document review as the primary data collection method ensured that the intervention was grounded on actual pupil performance data.

2.7 Data Analysis Techniques
The collected data were analyzed using mean and percentage. These statistical measures were used to determine the numeracy levels of pupils and quantify the proportion of learners within each classification, particularly those identified as non-numerate, thereby providing a basis for evaluating the need for intervention.

3. Results and Discussion
3.1 Numeracy Levels of Grade 4 Pupils
3.1.1 Distribution of Pupils Across Numeracy Levels
The findings revealed that out of 115 Grade 4 pupils, 32 or 27.83% were classified as non-numerate, 62 or 53.91% were categorized as low average, and 21 or 18.26% were identified as average, while no pupils reached the fast level. The data further showed that the majority of pupils were concentrated in the low average category, with a considerable proportion falling under the non-numerate level. These results indicate that a large number of learners have not yet achieved the expected level of numeracy proficiency. The absence of pupils in the fast category suggests limited mastery of mathematical skills among Grade 4 learners. This situation highlights the need for targeted instructional support and reinforces the importance of implementing intervention strategies to improve learners' numeracy performance.

3.1.2 Prevalence of Non-Numerate and Low-Average Learners
The results further showed that more than half of the pupils belonged to the low average group, while over one-fourth were identified as non-numerate. This indicates that a significant portion of the learners struggled with basic mathematical concepts and skills necessary for their grade level. The high proportion of pupils in the low average and non-numerate categories suggests gaps in foundational numeracy skills, which may hinder learners' ability to progress in more advanced mathematical tasks. These findings emphasize the urgency of providing structured and focused intervention to address these learning deficiencies and support pupils in achieving the required competencies.

3.2 Development of Numeracy Intervention Module
The study resulted in the development of a Numeracy Intervention Module designed to address the learning needs of identified non-numerate pupils. The module was structured to improve pupils' skills in basic mathematical operations, number recognition, and problem-solving. The development of this intervention module serves as a direct response to the

identified gaps in numeracy skills. By providing targeted and structured learning activities, the module aims to enhance pupils' understanding and performance in mathematics. This approach supports the goal of reducing the number of non-numerate learners and improving overall numeracy levels among Grade 4 pupils.

4. Conclusion & Recommendations

The findings indicate that a considerable number of Grade 4 pupils in Guadalupe Elementary School experience difficulties in numeracy skills, particularly in basic mathematical concepts and operations. The results further show that a large proportion of learners fall under the non-numerate and low average levels, highlighting gaps in foundational competencies. The development of a Numeracy Intervention Module using indigenized materials provides a targeted approach to address these learning gaps and support the improvement of pupils' mathematical understanding.

The developed Numeracy Intervention Module should be implemented to support pupils identified as non-numerate and improve their numeracy skills. Mathematics teachers are encouraged to utilize contextualized and engaging instructional materials to enhance learning, while also participating in seminars and training programs to strengthen their teaching strategies. School administrators should provide adequate support and resources to ensure the effective implementation of numeracy intervention programs, and future researchers are encouraged to conduct further studies to assess the effectiveness of the developed module.

The study is limited to the assessment of numeracy levels among Grade 4 pupils in Guadalupe Elementary School and the development of an intervention module based on the identified needs of non-numerate learners. It focuses only on the results of a pre-test and does not include the evaluation of the effectiveness of the intervention module after implementation.

Compliance with ethical standards

The authors declare no conflict of interest and confirm that this study received no external funding. The study was conducted at Guadalupe Elementary School with the voluntary participation of Grade 4 pupils, and informed consent was obtained prior to data collection. Data were gathered through non-invasive methods, specifically document review and assessment of existing test results, and all information was treated with strict confidentiality, ensuring that no identifying details of participants were disclosed. The researchers also acknowledge the support of the school and the participants who contributed to the completion of the study.

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