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DEVELOPMENT OF CONTEXTUALIZED NUMERACY MATERIALS FOR GRADE 1 LEARNERS OF SIOAN INTEGRATED SCHOOL

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ABSTRACT

The study focused on the development of contextualized numeracy materials for Grade 1 learners using the RMA results as the baseline of the study. The study employed a descriptive developmental research design. Mean Percentage was used to get results and the Paired T-Test tool was used to measure the significant relationship in using the contextualized numeracy materials among learners in the study.

This study used the Analysis, Design, Development, Implementation, and Evaluation (ADDIE) model as its research design under the careful quality assurance of the Evaluation of the Printed Materials Resources per DepEd Standards used in the study. It followed into the process of development using the ADDIE model of the contextualized numeracy materials during analysis, design, development, implementation, and evaluation.

The following were the crucial findings obtained in the study.

1. The least-learned competencies among Grade 1 learners in Mathematics remedial activities were distributed across various tasks. Specifically:

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Task A- Number Identification. 57.52% of learners struggled with this task, indicating a significant need for improvement in this area.

Task C-Addition. 57.14% of learners required support in addition skills, highlighting the importance of targeted interventions.

Task D-Subtraction. 64.29% of learners demonstrated difficulty with subtraction, emphasizing the need for contextualized materials that address this specific skill.

Task G-Time Management. 33.73% of learners struggled with time management, suggesting that this skill requires additional support and practice.

Task I-Mass Measurements. 73.33% of learners showed difficulty with mass measurements, indicating a significant need for contextualized materials that address this specific skill.

These findings served as the research basis for developing contextualized numeracy materials to enhance the numeracy skills of Grade 1 learners during their Mathematics remedial activities. The researcher's consideration was directed towards addressing all these least-learned competencies to ensure that learners' numeracy skills are improved. These areas require more focused instruction and targeted interventions to help students improve their understanding and abilities.

On the other hand, Fractions, Geometric Representation, Missing Shapes in Patterns, and Linear Measurements are considered mastered competencies, indicating that most students have a good grasp of these concepts.

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2. The data provided below shows the distribution of essential competencies in numeracy among Grade 1 learners. The competencies are categorized into nine tasks: Number Identification and Discrimination, Fractions, Addition, Subtraction, Geometric Representation, and Missing Shapes in Patterns. Time Measurements, Linear Measurements, and Mass Measurements are also included. The results indicate that:

Number Identification and Discrimination is the least learned competency, with only 57.52% of learners mastering it.

Fractions. Most learners (79.76%) have mastered fractions.

Addition and **Subtraction** are also among the least learned competencies, with 57.14% and 64.29% of learners mastering them, respectively.

Geometric Representation and **Missing Shapes in Patterns**. Most learners master these competencies, with 82.68% and 78.57% achieving mastery, respectively.

Time Measurements. This competency is the least learned, with only 33.73% of learners mastering it.

Linear Measurements. Most learners (92.86%) have mastered linear measurements.

Mass Measurements. This competency is also among the least learned, with 73.33% of learners mastering it.

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3. The five least learned competencies are from the RMA Competencies for Grade 1 Learners namely: number identification and discrimination, addition, subtraction, time measurement, and mass measurement.

The contextualized numeracy materials are developed using the Analysis, Design, Development, Implementation, and Evaluation (ADDIE) model. This work adopted a standardized tool for quality assurance of printed materials concerning the components of instructions and criteria. The study underwent the DepEd tool in quality assurance.

The developed contextualized numeracy materials for Grade 1 learners were evaluated based on several criteria. The findings indicate that the materials were designed to be contextualized, making them relevant and meaningful for learners. This approach is rooted in a constructivist approach to learning, where learners construct meaning through interacting with and interpreting their environment.

The materials underwent validation processes, including content validation and acceptability ratings from teachers and SLRC experts. The results showed that the materials were highly valid and highly acceptable for use in Grade 1 mathematics instruction. It is also designed to facilitate easier recognition of patterns and mastery of algebraic skills, promoting effective learning outcomes. The use of contextualized problems engages learners in exploring mathematical concepts as they communicate with real-world experiences.

Additionally, the materials were developed to be relevant to everyday life situations, aligning with the Realistic Mathematics Learning (RML) approach. This approach emphasizes that mathematics must be close to learners and appropriate to their direct experiences.

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Further, the materials were designed to be implemented in a variety of settings, including classroom instruction and home learning activities. This flexibility allows teachers to adapt the materials to suit different learning environments and needs.

4. The validity test results of the contextualized numeracy materials per DepEd Standards indicate that the materials have passed all the criteria:

Content. The materials scored 28 out of 28 points, indicating that they fully meet the content requirements.

Format. The materials scored 72 out of 72 points, indicating that they fully meet the format requirements.

Presentation and Organization: The materials scored 20 out of 20 points, indicating that they fully meet the presentation and organization requirements.

Accuracy and Up-to-dateness of Information: The materials scored 24 out of 24 points, indicating that they fully meet the accuracy and up-to-dateness of information requirements.

The level are validity and usability of the developed contextualized numeracy materials is high since it can be seen from the results and discussions when it comes to the scores of every indicator. The developed contextualized numeracy materials were measured using the standardized tool. They showed favorable responses from the Quality Assurance (QA) members. Through the process given by the DepEd, it will be maximized by the schools in the Division of Gingoog City.

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5. In institutionalizing the developed contextualized materials at the district level, researchers must first consider the district's needs and challenges regarding numeracy education. The researchers see to it that the materials design is contextualized, making them relevant and meaningful for learners.

The materials underwent validation processes, including content validation and acceptability ratings from teachers and LRMDS experts. The results showed that the materials were highly valid and highly acceptable for use in Grade 1 mathematics instruction. The materials were designed to facilitate easier recognition of patterns and mastery of algebraic skills, promoting effective learning outcomes. The use of contextualized problems engages learners in exploring mathematical concepts as they communicate with real-world experiences.

Parents should be involved in the learning process through activities and resources provided at home, reinforcing the contextualized learning approach. The materials should be integrated into the broader mathematics curriculum to ensure that learners receive a comprehensive education in numeracy and problem-solving skills.

Developing policies at the district level to support the integration of contextualized numeracy materials into the district's curriculum and teaching practices is very important to ensure sustainability. Training and professional development opportunities should be provided for teachers to use the materials in their classrooms effectively. Softcopy or layout of these contextualized numeracy materials would be given to teachers who wish to use the materials in their learning instruction for production. The development of contextualized numeracy

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materials should focus on the needs of the learners as it subjects to improve the performance of the students.

6. The frequency and percentage distribution of the grade 1 learners when grouped according to numeracy profile after the use of the developed contextualized numeracy materials improved. The majority, or 71% (30) of the pupils, are already enhanced after the use of the developed numeracy material. At the same time, only one (1) student remained for intervention. The other 26% (11) of the pupils are for consolidation, as evidenced by their scores that are between 75% and 84.99%. It empirically supports the improvement of the numeracy of the pupils when exposed to contextualized numeracy materials.

7. Relative to the mean scores, Table 5 shows that grade 1 learners obtained an average score of 43.83 in the pretest, which is lower than the post-test average score of 57.67. The mean gain in the post-test of around 13.84 is significant, as evidenced by the p-value of 0.001 (less than 0.05 level of significance). These results further support the improvement in the numeracy profile of the grade 1 learners after having been exposed to the numeracy materials.

These statistical figures indicate that most grade 1 learners performed well in the post-test after being exposed to the contextualized numeracy material.

8. The development of contextualized numeracy materials is a critical step in enhancing students' understanding and application of mathematical concepts. The importance of contextualization, teacher training, curriculum implementation, student engagement, academic performance, and relevance and effectiveness are all critical aspects of this process.

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The sources highlight the need for contextualized materials that are relevant and engaging for students. This can be achieved through teacher training programs that equip educators with the necessary skills to create effective materials. The involvement of teachers and students in the development process ensures that the materials are tailored to the needs of the learners. Using contextualized materials can significantly improve student engagement and motivation, leading to better academic performance in mathematics.

Keywords: *Development, Contextualized Numeracy, Materials, Improvement, Numeracy Skills*

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INTRODUCTION

Numeracy skills play a crucial role in a child's overall development and success in mathematics. By providing early exposure to numerical competencies through games, stories, and play, children can better understand the foundation of mathematics. This understanding of numeracy helps them in their daily lives. It lays the groundwork for more complex mathematical tasks in the future. Further, research shows that children's numerical competence in kindergarten is highly predictive of their acquisition of mathematics in Grade 1 and Grade 2 (Benavides-Varela et al., 2016).

To support Grade 1 learners in developing strong numeracy skills, it is essential to provide contextualized materials that are engaging and relevant to their everyday lives. According to Karakoç & Alacacı (2015), educators and parents can learn to create effective numeracy materials using different sources. These materials should focus on basic counting and number recognition and concepts such as quantity discrimination, addition, and subtraction. By incorporating activities such as board and card games, shopping, or cooking, children can have opportunities to practice and apply their numeracy skills in real-life contexts (Cheung & Mcbride, 2016).

Additionally, it is essential to consider the individual needs and abilities of Grade 1 learners. Teachers should use a variety of instructional approaches to cater to diverse learning styles and provide differentiated instruction. (Smale-Jacobse et al., 2019). To develop effective contextualized numeracy materials for Grade 1 learners, it is essential to consider the myriad ways in which children learn and engage with mathematical concepts. By

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incorporating a variety of sensory experiences and interactive activities, educators and parents can create a rich learning environment that caters to different learning styles.

To ensure the effectiveness of contextualized numeracy materials for Grade 1 learners, teachers should consider incorporating real-life contexts and experiences into their instruction. By doing so, students can see the relevance and applicability of numeracy skills in their everyday lives, making learning more engaging and meaningful (Sagirli et al., 2012). Using contextual teaching and learning strategies, teachers can connect mathematical concepts to real-world situations that students can relate to. This can foster a deeper understanding of numeracy concepts and their practical applications.

Teachers need to utilize contextual teaching and learning strategies to enhance students' mathematical literacy skills. This involves incorporating real-life examples and situations that students can relate to and providing hands-on activities and problem-solving tasks.

Teachers can create a supportive and inclusive learning environment that improves students' mathematical literacy skills and fosters their love for mathematics and their ability to apply mathematical concepts in real-life situations. In the study of Afni and Hartono (2020), using contextual learning strategies is essential for teachers and students to improve mathematical literacy skills. Therefore, contextual learning strategies are crucial for teachers and students in improving mathematical literacy skills.

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According to Yudha et al. (2019), through contextual learning strategies, teachers can create a meaningful and engaging learning environment for students, enhance their mathematical literacy skills, and bridge the gap between abstract mathematical concepts and real-world applications. Incorporating contextual teaching and learning strategies improves students' mathematical competence. It enhances their problem-solving skills, critical thinking abilities, and overall mathematical confidence. The study by Purba and Surya (2020) mentioned that teachers can connect mathematical concepts to real-life situations that students encounter daily using contextual teaching and learning strategies. This approach allows students to see the relevance of mathematics in their everyday lives. It helps them develop a deeper understanding and appreciation for the subject.

By doing so, teachers can effectively support their students in developing strong mathematical literacy skills and lay a solid foundation for their future mathematical learning and success. Therefore, (Owusu-Ansah et al., 2023) using contextual learning strategies is very important to teachers and students in improving mathematical literacy skills. Utilizing these strategies, teachers can create a meaningful and engaging learning environment for students that enhances their mathematical literacy skills and fosters their curiosity, motivation, and overall love for learning.

In conclusion, the development of contextualized numeracy materials for Grade 1 learners is crucial in improving students' mathematical literacy skills. These materials should be designed to connect mathematical concepts to real-life contexts and provide opportunities for hands-on learning, problem-solving, and critical thinking. Furthermore, the materials

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should cater to the diverse needs of learners and provide different levels of difficulty to ensure inclusivity and accessibility. By doing so, educators can create a learning environment that not only promotes mathematical proficiency but also encourages students to develop a lifelong love for mathematics.

Math is everywhere. Everybody uses Math to navigate daily decisions successfully. Children begin to experience and explore mathematical concepts from birth. Youngsters who understand, numerate, and apply mathematical concepts are equipped to explain and make sense of their surroundings. As such, it is an essential skill for living a fulfilling life.

From the standpoint of Hodaňová, J., & Nocar, D. (2016), Mathematics is not just a technical subject but a fundamental discipline that permeates various aspects of our daily lives, including natural phenomena and is essential for many professions. By providing quality education that emphasizes the relevance of mathematics to real-world situations, we can foster pupils' interest in the subject as they recognize its impact on their daily routines, personal lives, and future career paths. Mathematics education can significantly enhance students' ability to reason, problem-solve, and make informed decisions, improving their overall quality of life and professional orientation.

Furthermore, learners with math-related learning disabilities may experience issues such as number additions, substitutions, transpositions, omissions, and reversals, as well as difficulty with left and correct orientation and keeping score during games. This indicates that many learners have poor numeracy skills, which suggests that there is a need to adopt another

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methodology for teaching numeracy skills. Golafshani (2013) found a growing consensus on using numeracy materials in instructional practices.

Confucius once said, "I hear, and I forget, I see, and I remember, I do, and I understand." This adage suggests essential aspects of learning this area. Increasing learners' achievement and enhancing their attitude towards numeracy will signify that the method utilized is effective. This could not be impossible with the aid of numeracy materials or math manipulatives (Burns & Hamm, 2011; Bjorklund, 2014; Carbonneau et al., 2013), as cited by Salao (2021). Moreover, the effectiveness of the use of numeracy materials is evident in the lower grades and higher grades as well.

Unknowingly, individuals explored the knowledge and skill of numeracy in old times, starting from using stones to using modern technologies. According to Salao (2013), understanding numeracy concepts should be the focus. Relating techniques used in one given situation to an equally relevant situation will help learners integrate manipulatives. The fast-moving and modernized world offers analytical tools to utilize numeracy skills. This is because these skills are used practically in their daily lives. Thus, learners should give time to keep on their minds about the use of manipulatives.

Using contextualized manipulative materials in numeracy is not as easy as a piece of cake, and education professionals are nevertheless learning how to use them. They must make the most of their ability to handle manipulative materials in numeracy instructions, for it shall be focusing on helping the learners understand numeracy concepts and adopting them

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in localized situations. When the materials used by the learners are found in their localized context, they will gradually suit their interests.

Everything starts with real experiences for learners, especially in numerical/mathematical instruction. They function as symbols throughout their learning, and manipulative materials represent essential tools for making Mathematics realistic (Golafshani, 2013). However, when using any tool, carefulness should always be practiced to maximize the results. If misused, they may result in frustration or confusion and disrupt student motivation and overall learning opportunities.

Contextualized materials in teaching numeracy skills play a vital role in improving students' mathematical literacy. It provides students with a meaningful and practical understanding of mathematics, promotes critical thinking and problem-solving skills, prepares students for real-world challenges, and fosters inclusivity and equity in the classroom. According to Helma et al. (2018), using contextualized materials in teaching numeracy skills is essential for creating an engaging and meaningful learning experience. Using contextualized materials in teaching numeracy skills is vital because it allows students to see the real-world applications of mathematics, making the learning experience more relevant and applicable to their lives.

Connecting mathematics to real-world contexts, contextualized materials help students see the purpose and relevance of numeracy skills, increasing their motivation and engagement in learning mathematics. Overall, contextualized materials are essential in teaching numeracy

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skills because they enhance students' understanding of mathematical concepts, promote critical thinking and problem-solving skills, and make learning math more meaningful and enjoyable (Nufus & Zubainur, 2020). In summary, the use of contextualized materials in teaching numeracy skills is essential for creating an engaging and meaningful learning experience.

In summary, contextualized materials are essential in teaching numeracy skills because they enhance students' understanding of mathematical concepts, promote critical thinking and problem-solving skills, and help students see the practical applications of numeracy in everyday life. Moreover, Kul et al. (2018) mentioned that teaching numeracy skills is essential because it allows students to see the relevance and applicability of mathematics in their everyday lives. This helps students develop a deeper understanding of mathematical concepts and improve their problem-solving skills.

Further, using contextualized materials in teaching numeracy skills is essential because it helps students see the practical applications and relevance of mathematics in their everyday lives, which enhances their motivation and engagement in learning mathematics. In summary, the use of contextualized materials in teaching numeracy skills is essential because it helps students see the practical applications and relevance of mathematics in their everyday lives.

According to RA 9155, commonly known as the Governance of Basic Education Act of 2001, as stated in the Official Gazette 2019, enhancing the quality of primary education should be empowered by the local initiatives by the State. The State might guarantee that the

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learning environment's qualities, needs, and aspirations are reflected in the instruction program for the learners, out-of-school youth, and adult students. Therefore, schools and learning institutions should be able to decide what is best for the students they serve.

According to DepEd Order No. 32, s. 2015 entitled "Adopting the Indigenous Peoples Education Curriculum Framework," the school should perceive the privilege of Indigenous people groups to fundamental instruction that is culturally rooted and responsive; the IPEd Curriculum Framework looks to give guidance to schools and other training programs, both public and private, as they draw in with indigenous groups in localizing, indigenizing, and enhancing the K to 12 Curriculum in light of their respective educational and social settings. As cited by Salao (2021), numerical skills are crucial to functioning in today's world (Burns & Hamm, 2011; Carbonneau et al., 2013). A Filipino child needs to develop higher-order skills, critical-thinking skills, and functional numeracy skills. It is given that every Filipino child with sufficient numeracy skills would have greater chances of success in life.

Numerical skills are essential today as they enable us to perform various tasks, from basic calculations to complex mathematical problems. These skills are vital in everyday life, including managing personal finances, measuring ingredients for cooking, or understanding statistics and probabilities.

In the workplace, numerical literacy is critical for data analysis, decision-making, and problem-solving. Moreover, technology has become an integral part of our lives, and understanding numbers is essential for programming, coding, and interpreting data.

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Therefore, developing solid numerical skills is crucial for success in personal and professional life, as it empowers individuals to make informed decisions, solve problems, and communicate effectively. Skills are not just necessary in mathematical classes; they are essential in the lives of people.

Based on a published article by worldbank.org in 2018, the Philippines placed second to last in science and math out of 79 participating economies in the 2018 PISA (Programme for International Student Assessment). This shows that even when the COVID-19 Pandemic strikes, the Philippines faces a learning crisis. Further, according to the recently conducted 2022 PISA, for the second time, the Philippines is among the countries with the lowest performance in reading, mathematics, and science. To highlight this need, the Constitution under Section 1, Article XIV of 1987 mandates that the "State shall protect and promote the right of all citizens to quality education at all levels and shall take appropriate steps to make such education accessible to all."

In response to this mandate, the Department of Education, anchored in MATATAG Curriculum: Batang Makabansa, Bansang Makabata agenda, adopts the National Learning Recovery Program (NLRP) through DepEd Order No. 13, s. 2023. The aim is to strengthen the Department's learning recovery and continuity program, improve numeracy and literacy, and accelerate the achievement of education targets. The learning recovery plan starts with assessing fundamental skills such as literacy and numeracy in the early grades. Detecting learners who have not developed the full range of reading and numeracy skills is provided with appropriate programs.

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Under the NLRP, some subprograms shall help bridge the learning gaps among learners. One of the five subprograms is the National Mathematics Program (NMP). This subprogram aims to strategically support and accelerate learning progress on the mathematical fundamental skills and numeracy among crucial stage 1 learners. It also aims to provide intensive, explicit, and learner-centered instruction aligned with the curriculum and supported by assessment and learning resources. To cover the need to enhance the numeracy skills among crucial stage 1 learners, the NMP begins with a rapid assessment phase for all learners called Rapid Math Assessment (RMA) under memorandum DM-CT-2023-322, through the Curriculum Implementation Division (CID) to conduct a pretest for the Rapid Math Assessment (RMA) for Grades 1 to 3 learners using the Assessment Tools provided from October 16-27, 2023.

Consequently, the researcher, as a Grade I teacher at Sioan Integrated School, is experiencing a problem with how to improve the learners' numeracy skills. In the recent Grade 1 RMA (Rapid Math Assessment) results conducted at the beginning of the school year 2023-2024, 34 learners out of 42 falls in the intervention level with an equivalent of less than 75% of the total scores, 7 learners out of 42 fall in the consolidation level with an equivalent of 75%-84.99% of the total scores, and 1 learner out of 42 fall in enhancement level with an equivalent of equal to or above 85%. This is a big problem on the part of the researcher as their Grade I teacher to get this meager score. In the past three (3) years of handling Grade 1, she made use of different pictures as a strategy for teaching numeracy to the pupils.

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Because students are driven to participate in the learning process and have historically achieved excellent exam scores, she found it helpful.

Based on the preceding discussions, the researcher considers other methods and strategies and determines their impact on Grade I students' numeracy abilities.

MATERIALS AND METHODS

This study is anchored on the ADDIE Model as shown in Figure 1, the Analysis Phase, Design Phase, Implementation Phase, and Evaluation Phase, and other theories that the use of contextualized materials in teaching numeracy can help to promote pupil's academic performance like constructivist theories of Piaget (1970), Bruner (1966) as cited by Carbonneau, K. J., Marley, S. C., & Selig, J. P. (2013) and instructional theory of Bruner (2000) as cited by Alcala (2011). These child development experts contend that early learning success depends on giving young students a chance to interact with their surroundings physically.

Piaget (1970), as cited by Carbonneau et al. (2013), believed that children at an early age learn best through concrete objects since children's thinking is concrete. Concrete operational children have difficulty performing mental operations on abstract symbols. With this, making problems tangible makes them tractable for young children. From Piaget, she says that educators have adopted the notion that elementary school children's thinking is concrete. It has been assumed that children of this age learn best through concrete objects.

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Concrete operational children have difficulty performing mental operations on abstract symbols. By this view, making problems tangible also makes them tractable for young children.

Additionally, hands-on activities involving teaching aids foster active engagement, ensuring sustained interest and focus. Visual aids, such as charts and graphs, contribute to enhanced comprehension by allowing students to visualize mathematical relationships and patterns, which are often more memorable than abstract symbols. Moreover, the use of teaching aids accommodates varied learning styles, recognizing that students have diverse preferences for visual or hands-on approaches.

Furthermore, concrete materials serve as a bridge between abstract mathematical concepts and real-world applications, fostering a crucial connection that emphasizes the practical relevance of the learned content. In addition to the study of Boggan M. et al. (2010), when pupils reach higher levels, a lack of application of arithmetic principles frequently results in a bad attitude toward math. Students in grades one and two are at the concrete operational stage, according to Piaget. This means that kids frequently find mental math to be heavily burdensome, and problem-solving should be supported using concrete objects.

Bruner (2000), as cited by Alcala (2011), emphasizes the theory of discovery learning, which is that an individual learns from their discovery of the environment. According to Alcala (2011), learners are inherently curious about the things in the environment; thus, they can be self-motivated until they find answers to the problem. Therefore, every individual is capable of learning how to learn. Bruner's idea gives rise to the emerging theory of constructivism and

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self-learning. Bruner's contribution is that people make sense of their early surroundings via "enactive representations," such as manipulation. Later, they achieve complete competence through images and words. In contrast, Piaget is the first to advance the notion of cognitive development in young children (Marley, Carbonneau, 2014).

Bruner (1966), as cited by Carbonneau, K. J., Marley, S. C., & Selig, J. P. (2013), believed elementary school children's thinking focused on properties that could be actively manipulated. Bruner explicitly called for the use of concrete objects in instruction, suggesting that using many different natural objects could help move children beyond their focus on the perceptual properties of the individual objects.

In Bruner's words, this approach could "empty the concept of specific visual features and allow the student to grasp its intellectual properties. Research from both learning theory and classroom studies shows that using manipulatives to help teach math can positively affect student learning. This is true for students at all levels and of all abilities. Incorporating numeracy materials into mathematics lessons in meaningful ways helps students grasp concepts with greater ease, making teaching the most effective. In 2013, the National Council of Supervisors of Mathematics (NCSM) issued a position statement on the use of manipulatives in classroom instruction to improve student achievement. To develop every student's mathematical proficiency, leaders and teachers must systematically integrate the use of concrete materials and virtual manipulatives into classroom instruction at all grade levels.

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In like manner, this study will make use of the Pretest and Post-Test using the Rapid Math Assessment Tool for Grade 1 to determine the effectiveness of the developed contextualized numeracy materials. According to Kelly (2017), pretests help measure student learning over a period. The pretest serves to mark a student's level of understanding before instruction, while a final assessment of the post-test measures student learning. A comparison of pre-and post-tests can provide a teacher an opportunity to track student learning in one class or over several years.

Jerome Bruner's theory of instruction has been a seminal contribution to the field of education. It highlights the significance of discovery learning and the active engagement of learners in the educational process. Bruner's theory has inspired countless educators to adopt more student-centered teaching methods, fostering the development of creativity, critical thinking, and problem-solving skills in the classroom (Chambers et al., 2013).

The impact of Bruner's theory has been particularly evident in the teaching of literacy and numeracy, according to Chambers et al. (2013). Discovery learning, as advocated by Bruner, has been instrumental in helping educators develop more effective strategies for teaching these foundational subjects. Bruner's theory of instruction emphasized the importance of discovery learning and active engagement of learners in the educational process. This approach to teaching inspired countless educators to adopt more student-centered methods, fostering creativity, critical thinking, and problem-solving skills in the classrooms. This insight has been instrumental in helping educators develop more effective strategies for teaching literacy and numeracy.

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One of these is the ADDIE instructional design model. The ADDIE model was created for the military at Florida State University in the 1970s. The name of the model is an acronym for the five stages of design: Analysis, Design, Development, Implementation, and Evaluation, and was meant as a guideline to create practical training and instructional materials. The model was intended to lead the faculty to complete each phase before moving to the next. Over the years, the steps have been revised with the model becoming more dynamic and interactive than the original, Molenda, M. (2015).

The ADDIE model is an instructional design tool that can help educators and training professionals create, organize, and streamline effective learning and development programs in their organization in line with the concept of Bruner's instructional theory, where educators will be able to design, develop, and create more effective strategies for teaching instructions like numeracy. Although developed in the 1970s, the ADDIE training model remains the most used model for instructional design because it is simple yet highly effective.

In this cyber era, some studies show the effectiveness of using the ADDIE model design. The ADDIE model, which stands for Analysis, Design, Development, Implementation, and Evaluation, is a widely recognized and utilized instructional design framework (Designers, 2019). This model was initially developed by Florida State University for the military in the 1970s and has since been adapted and revised to meet the needs of various industries and educational settings. Several studies have examined the effectiveness and practicality of using the ADDIE model in instructional design.

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Furthermore, in a study mentioned by Constancio et al. (2018), Sweigart and Mehlinger explored the application of the ADDIE model in developing an online course for library instruction. The researchers found that following the ADDIE model allowed for a thorough analysis of learner needs, effective design of instructional materials, systematic development of content, seamless implementation, and comprehensive evaluation of the learning experience. These steps ensured that the course was effectively tailored to the student's specific learning objectives and the goals of the library program.

The use of instructional materials that are culturally relevant and localized is essential in education (Usman et al., (2020). It not only helps students connect with the content but also promotes a deeper understanding and appreciation of their own culture and heritage. Several studies have utilized the ADDIE model to develop localized instructional materials that align with the specific needs and goals of the learners.

One study, for example, implemented the ADDIE model to closely monitor and engage with learning activities in an open online environment (Mohd & Shahbodin, 2013). The researcher took on the role of a learner to actively participate in various activities of the courses, interact with participants, and explore the learning process. Another study by Puspitasari et al. (2020) focused on developing cross-cultural study teaching materials using the ADDIE method. The researchers followed the Analysis, Design, Development, Implementation, and Evaluation model to create teaching materials that aimed to improve students' nationalist character.

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Another research project used the ADDIE model to develop a 2013 curriculum-oriented lesson plan for the 21st century (Dewi & Winangun, 2021). They sought to create a contextual and teaching learning model based on Tri Kaya Parisudha and determine the validity of the development through expert input and data analysis. Additionally, a research study was conducted aimed to provide valid character education for grade schools using the ADDIE model.

The research followed the five phases of the ADDIE model: analysis of needs, product design, product development, implementation, and evaluation. These studies demonstrate the effectiveness and applicability of the ADDIE model in developing localized instructional materials. These localized instructional materials are crucial in promoting student engagement, understanding, and retention of the content (Soesilo & Munthe, 2020).

Through the utilization of the ADDIE model, researchers can systematically analyze the needs of learners, design and develop instructional materials that are culturally relevant and aligned with specific learning goals, implement these materials in the classroom, and evaluate their effectiveness. These studies serve as valuable examples of how the ADDIE model can be used in educational settings to create localized instructional materials that cater to the unique needs and contexts of learners, ultimately enhancing the quality of the learning experience (Song & You, 2016). These studies highlight the importance of considering students' opinions and viewpoints in the development and adaptation of instructional materials. One survey by Onyia (2013) emphasized the importance of engaging users with Personal Learning Environments while utilizing the ADDIE model. This study recognized the

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significance of involving students in the process of developing personalized learning environments by adapting the ADDIE model. The researcher actively participated in various activities of the courses, interacted with participants, and explored the process of learning and interaction. Through this engagement, the researcher gained valuable insights into the learning phenomena in an open online environment and was able to create a more personalized and practical learning experience for students (Personal et al., based on Web 2.0 Services in Higher Education, 2019). For example, one study developed cross-cultural study teaching materials to improve the national character of students using the ADDIE model.

The researchers followed the ADDIE model's phases of analysis, design, development, implementation, and evaluation to create teaching materials that incorporated cross-cultural perspectives. The use of the ADDIE model allowed for a systematic and comprehensive approach to developing these materials, ensuring that they were aligned with the specific needs and goals of the students. By utilizing the ADDIE model, these studies were able to effectively address the challenges and gaps in character education, curriculum design, and learning models in elementary school settings (Williams et al., 2014). These studies demonstrate the applicability and effectiveness of the ADDIE model in creating localized instructional materials that cater to specific learning needs and goals.

In conclusion, the ADDIE model has been utilized in various studies to develop localized instructional materials that enhance the learning experience for students. These studies highlight the importance of involving students in the development process, considering their opinions and viewpoints, and creating personalized learning environments. These studies also

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emphasize the significance of a systematic approach, such as the ADDIE model, in designing and implementing instructional materials (Adalikwu & Iorkpilgh, 2013).

Overall, these studies provide evidence of the ADDIE model's effectiveness and applicability in developing localized instructional materials for elementary school settings. Additionally, Hidayanto et al. (2017) mentioned that the ADDIE model allowed for a systematic and comprehensive approach to developing these materials, ensuring that they were aligned with the student's specific needs and goals.

The ADDIE model has been proven effective in the development of localized instructional materials for various subjects and goals, including character education, 21st-century learning, cross-cultural studies, and curriculum design (Sahaat et al., 2020). Furthermore, the utilization of data collection methods such as interviews, questionnaires, and observations allowed for a thorough analysis of the current state of education and the effectiveness of the developed materials (Sun, 2018). These studies demonstrate the benefits of using the ADDIE model in creating localized instructional materials that are tailored to the specific needs and goals of students.

Gawlik-Kobyli\u0144ska (2018) studies discussed above provide evidence that using the ADDIE model in developing localized instructional materials has resulted in improved learning outcomes and a more engaging learning experience for students. In conclusion, the ADDIE model has been utilized in various studies to develop localized instructional materials that enhance the learning experience for students. The utilization of the ADDIE model in these

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studies allowed for a systematic and comprehensive approach to designing and implementing instructional materials that address specific learning needs and goals in elementary schools. The studies discussed above provide evidence that using the ADDIE model in developing localized instructional materials has resulted in improved learning outcomes and a more engaging learning experience for students in elementary schools (Palupi, 2017). These studies demonstrate the effectiveness of using the ADDIE model to develop localized instructional materials that address specific learning needs and goals in elementary schools.

Several studies have proven the effectiveness and applicability of the ADDIE model in developing localized instructional materials for elementary school settings. By adopting the ADDIE model, researchers were able to conduct thorough analyses, design materials aligned with specific goals, develop the materials based on those analyses, implement the materials in the classroom, and evaluate their effectiveness.

Drljača et al. (2017) in their studies demonstrate the benefits of using the ADDIE model in developing localized instructional materials for elementary schools. The studies discussed above provide evidence that using the ADDIE model in developing localized instructional materials has resulted in improved learning outcomes and a more engaging learning experience for students in elementary schools. These studies highlight the importance of using a systematic approach like the ADDIE model to ensure that instructional materials are effectively designed, implemented, and evaluated to meet the specific learning needs and goals of students in elementary schools.

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In addition, Sukmaningthias (2020) mentioned that by creating materials that cater to specific requirements, the studies demonstrated the thoroughness with which the ADDIE model allows for evaluation and refinement. By continually assessing the effectiveness of the developed materials, researchers were able to make iterative improvements, ensuring that the instructional resources were constantly evolving to meet the evolving needs of the students.

Moreover, the utilization of the ADDIE model emphasized the collaborative efforts of educators, administrators, and curriculum developers to create a cohesive approach to instructional material design. This inclusivity and shared decision-making process contributed to a more holistic and integrated approach to student learning, nurturing a supportive and enriched educational environment Wilcox et al. (2021).

As a result, studies not only provided evidence of improved learning outcomes and a more engaging learning experience for elementary school students but also highlighted the transformative impact of implementing a robust and structured model like ADDIE in the development of localized instructional materials. The comprehensive and detailed approach offered by the ADDIE model has the potential to continue shaping and enhancing the landscape of elementary education, instilling a culture of dynamic and tailored learning experiences for students.

Bruner's instructional design approach aligns well with the ADDIE model. In the study of Frew & Klein (1982), as cited by Kurt (2017), Bruner's instructional design approach and

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the ADDIE model emphasize a systematic and learner-centered process for designing and developing instruction. Bruner's emphasis on leading the learner through a sequence of statements and restatements aligns with the Analysis stage of the ADDIE model, where the instructional designer analyzes the needs of the learners and the goals of the instruction—(ADDIE – Instructional Designer's Handbook 2019), (Bajracharya, 2019).

In the Design stage, both Bruner's approach and the ADDIE model focus on organizing and transforming information to be taught, ensuring that it is structured in a way that promotes comprehension and retention. In the Development stage, Bruner's approach and the ADDIE model both involve creating instructional materials or resources that support the learning process (Frew & Klein, 1982), as cited by Kurt (2017). For example, Bruner's approach emphasizes the importance of creating materials that engage learners and promote active learning,

Meanwhile, the Development stage of the ADDIE model involves creating the actual instructional materials, such as lesson plans, presentations, and learning activities. In the Implementation stage, both Bruner's approach and the ADDIE model involve putting the instruction into action and delivering it to learners. Finally, in the Evaluation stage, both Bruner's approach and the ADDIE model emphasize the importance of assessing the effectiveness of the instruction and making necessary adjustments or improvements. Overall, Bruner's instructional design aligns with the ADDIE model as both approaches prioritize a systematic and learner-centered approach to designing and developing instruction.

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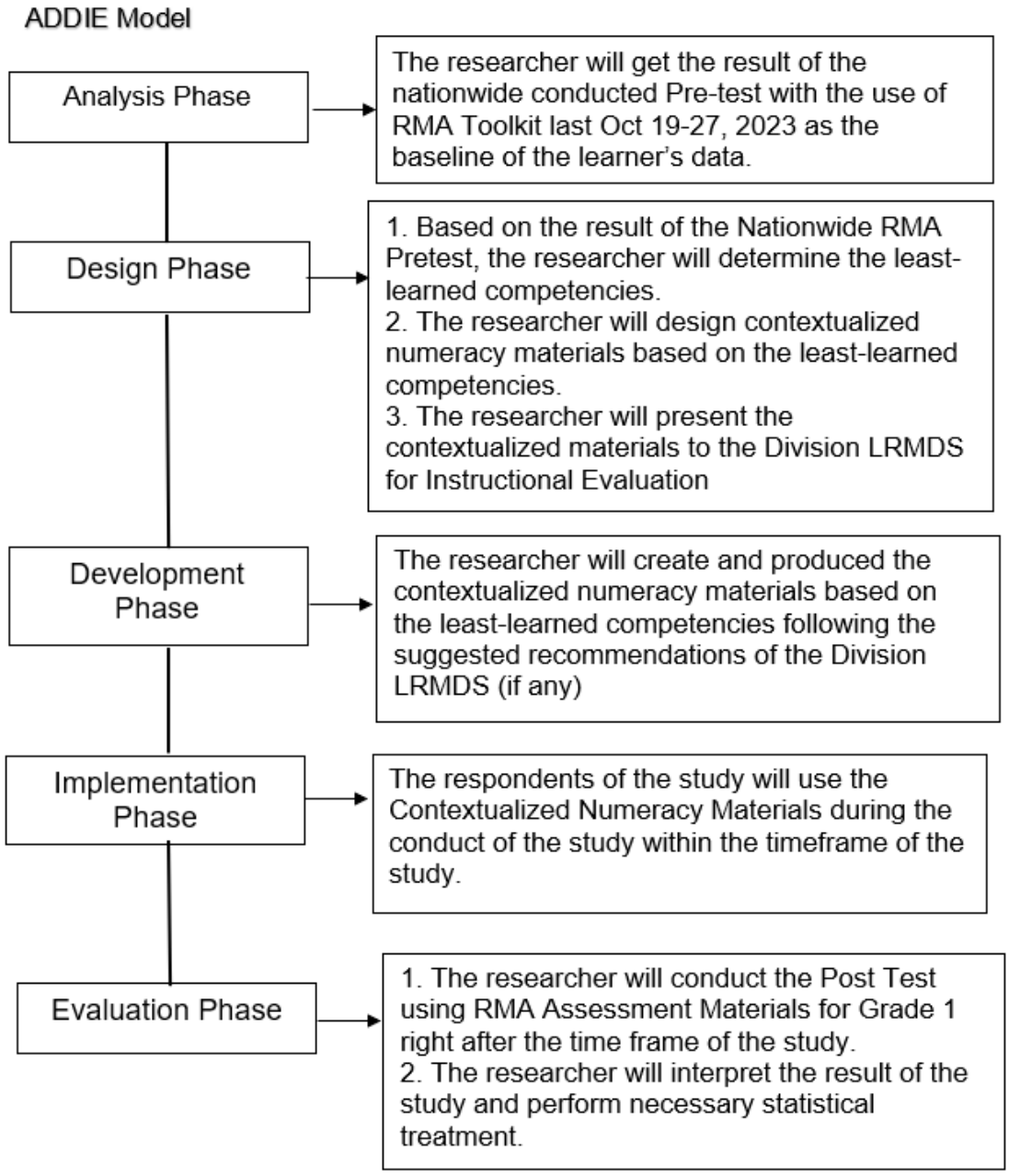

Figure 1. The ADDIE Model

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RESULTS AND DISCUSSION

The following were the important findings obtained in the study.

1. The least-learned competencies among Grade 1 learners in Mathematics remedial activities were distributed across various tasks. Specifically:

Task A- Number Identification. 57.52% of learners struggled with this task, indicating a significant need for improvement in this area.

Task C-Addition. 57.14% of learners required support in addition to skills, highlighting the importance of targeted interventions.

Task D-Subtraction. 64.29% of learners demonstrated difficulty with subtraction, emphasizing the need for contextualized materials that address this specific skill.

Task G-Time Management. 33.73% of learners struggled with time management, suggesting that this skill requires additional support and practice.

Task I-Mass Measurements. 73.33% of learners showed difficulty with mass measurements, indicating a significant need for contextualized materials that address this specific skill.

These findings served as the research basis for developing contextualized numeracy materials to enhance the numeracy skills of Grade 1 learners during their Mathematics remedial activities. The researcher's consideration was directed towards addressing all these least-learned competencies to ensure that learners' numeracy skills are improved. These areas

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require more focused instruction and targeted interventions to help students improve their understanding and abilities.

On the other hand, Fractions, Geometric Representation, Missing Shapes in Patterns, and Linear Measurements are considered mastered competencies, indicating that most students have a good grasp of these concepts.

2. The data provided below shows the distribution of essential competencies in numeracy among Grade 1 learners. The competencies are categorized into nine tasks: Number Identification and Discrimination, Fractions, Addition, Subtraction, Geometric Representation, and Missing Shapes in Patterns. Time Measurements, Linear Measurements, and Mass Measurements are also included. The results indicate that:

Number Identification and Discrimination is the least learned competency, with only 57.52% of learners mastering it.

Fractions. Most learners (79.76%) have mastered fractions.

Addition and **Subtraction** are also among the least learned competencies, with 57.14% and 64.29% of learners mastering them, respectively.

Geometric Representation and **Missing Shapes in Patterns**. Most learners master these competencies, with 82.68% and 78.57% achieving mastery, respectively.

Time Measurements. This competency is the least learned, with only 33.73% of learners mastering it.

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Linear Measurements. Most learners (92.86%) have mastered linear measurements.

Mass Measurements. This competency is also among the least learned, with 73.33% of learners mastering it.

3. The five least learned competencies are from the RMA Competencies for Grade 1 Learners, namely number identification and discrimination, addition, subtraction, time measurement, and mass measurement.

The contextualized numeracy materials are developed using the Analysis, Design, Development, Implementation, and Evaluation (ADDIE) model. This work adopted a standardized tool for quality assurance of printed materials concerning the components of instructions and criteria. The study underwent the DepEd tool in quality assurance.

The developed contextualized numeracy materials for Grade 1 learners were evaluated based on several criteria. The findings indicate that the materials were designed to be contextualized, making them relevant and meaningful for learners. This approach is rooted in a constructivist approach to learning, where learners construct meaning through interacting with and interpreting their environment.

The materials underwent validation processes, including content validation and acceptability ratings from teachers and SLRC experts. The results showed that the materials were highly valid and highly acceptable for use in Grade 1 mathematics instruction. It is also

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designed to facilitate easier recognition of patterns and mastery of algebraic skills, promoting effective learning outcomes. The use of contextualized problems engages learners in exploring mathematical concepts as they communicate with real-world experiences.

Additionally, the materials were developed to be relevant to everyday life situations, aligning with the Realistic Mathematics Learning (RML) approach. This approach emphasizes that mathematics must be close to learners and appropriate to their direct experiences. Further, the materials were designed to be implemented in a variety of settings, including classroom instruction and home learning activities. This flexibility allows teachers to adapt the materials to suit different learning environments and needs.

4. The validity test results of the contextualized numeracy materials per DepEd Standards indicate that the materials have passed all the criteria:

Content. The materials scored 28 out of 28 points, indicating that they fully meet the content requirements.

Format. The materials scored 72 out of 72 points, indicating that they fully meet the format requirements.

Presentation and Organization: The materials scored 20 out of 20 points, indicating that they fully meet the presentation and organization requirements.

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Accuracy and Up-to-dateness of Information: The materials scored 24 out of 24 points, indicating that they fully meet the accuracy and up-to-dateness of information requirements.

The level of validity and usability of the developed contextualized numeracy materials is high since it can be seen from the results and discussions when it comes to the scores of every indicator. The developed contextualized numeracy materials were measured using the standardized tool. They showed favorable responses from the Quality Assurance (QA) members. Through the process given by the DepEd, it will be maximized by the schools in the Division of Gingoog City.

5. In institutionalizing the developed contextualized materials at the district level, researchers must first consider the district's needs and challenges regarding numeracy education. The researchers see to it that the materials design is contextualized, making them relevant and meaningful for learners.

The materials underwent validation processes, including content validation and acceptability ratings from teachers and LRMDS experts. The results showed that the materials were highly valid and highly acceptable for use in Grade 1 mathematics instruction. The materials were designed to facilitate easier recognition of patterns and mastery of algebraic skills, promoting effective learning outcomes. The use of contextualized problems engages learners in exploring mathematical concepts as they communicate with real-world experiences.

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Parents should be involved in the learning process through activities and resources provided at home, reinforcing the contextualized learning approach. The materials should be integrated into the broader mathematics curriculum to ensure that learners receive a comprehensive education in numeracy and problem-solving skills.

Developing policies at the district level to support the integration of contextualized numeracy materials into the district's curriculum and teaching practices is very important to ensure sustainability. Training and professional development opportunities should be provided for teachers to use the materials in their classrooms effectively. Softcopy or layout of these contextualized numeracy materials would be given to teachers who wish to use the materials in their learning instruction for production. The development of contextualized numeracy materials should focus on the needs of the learners as it subjects to improve the performance of the students.

6. The frequency and percentage distribution of the grade 1 learners, when grouped according to numeracy profile after the use of the developed contextualized numeracy materials, improved the majority, or 71% (30) of the pupils are already enhanced after the use of the developed numeracy material. At the same time, only one (1) student remained for Intervention. The other 26% (11) of the pupils are for consolidation, as evidenced by their scores that are between 75% and 84.99%. It empirically supports the improvement of the numeracy of the pupils when exposed to contextualized numeracy materials.

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7. Relative to the mean scores, Table 5 shows that grade 1 learners obtained an average score of 43.83 in the pre-test, which is lower than the post-test average score of 57.67. The mean gain in the post-test of around 13.84 is significant, as evidenced by the p-value of 0.001 (less than 0.05 level of significance). These results further support the improvement in the numeracy profile of the grade 1 learners after having been exposed to the numeracy materials.

These statistical figures indicate that most grade 1 learners performed well in the post-test after being exposed to the contextualized numeracy material.

8. The development of contextualized numeracy materials is a critical step in enhancing students' understanding and application of mathematical concepts. The importance of contextualization, teacher training, curriculum implementation, student engagement, academic performance, and relevance and effectiveness are all critical aspects of this process. The sources highlight the need for contextualized materials that are relevant and engaging for students. This can be achieved through teacher training programs that equip educators with the necessary skills to create effective materials. The involvement of teachers and students in the development process ensures that the materials are tailored to the needs of the learners. Using contextualized materials can significantly improve student engagement and motivation, leading to better academic performance in mathematics.

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Furthermore, the development of these materials is crucial for the effective implementation of the curriculum and the enhancement of educational leaders' and teacher's competencies.

CONCLUSION

Based on the findings of the study, the following conclusions are drawn.

1. The numeracy profile highlights the need for targeted support and interventions to improve the numeracy skills of most learners. The exceptional performers (for enhancement) can focus on refining their skills. At the same time, those who require more support (for intervention) need more extensive interventions to address their knowledge gaps.

RMA results are low, so contextualized numeracy materials for teachers are needed to aid learners' performance. This highlights the need for targeted interventions that cater to the specific needs of these learners.

2. The least-learned competencies in Grade 1 Mathematics based on RMA pre-test scores are Number Identification and Discrimination, Addition, Subtraction, Time Measurements, and Mass Measurements. These areas require more focused instruction and targeted interventions to help students improve their understanding and skills. On the other hand, Fractions, Geometric Representation, Missing Shapes in Patterns, and Linear

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Measurements are considered mastered competencies, indicating that most students have a good grasp of these concepts.

3. All indicators in the tool showed high responses, which means that when the validity and usability are high, the quality assurance of the developed contextualized numeracy materials is desirable. The developed contextualized numeracy materials for Grade 1 learners demonstrate a comprehensive approach to learning mathematics. The materials are contextualized, validated, and effective in promoting learning outcomes. They are relevant to everyday life situations and can be implemented in various settings.

4. Quality assurance is essential when developing contextualized numeracy materials to ensure they are aligned with standards, relevant to the local context, effective for learning, user-friendly, and continuously improved based on feedback and evaluation. The contextualized numeracy materials have been validated to meet all the DepEd Standards criteria. This suggests that the materials are comprehensive, well-structured, and accurate, providing a solid foundation for teaching numeracy skills to Grade 1 learners.

5. Institutionalizing contextualized numeracy materials in schools at the district and division levels is essential for ensuring consistency, accessibility, teacher support, student engagement, continuous improvement, integration with curriculum, community involvement, and long-term impact. The developed contextualized numeracy materials for Grade 1 learners demonstrate a comprehensive approach to learning mathematics. The materials are contextualized, validated, and effective in promoting learning outcomes. They are relevant to

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everyday life situations and can be implemented in various settings. The materials should be institutionalized to ensure that learners have access to high-quality, contextualized learning resources.

6. The data concludes that numeracy skills are developing, but there are areas where they need improvement. It highlights the importance of considering students' attitudes and organizational skills when planning interventions or adjustments to support their learning. It emphasizes the need to differentiate and build on students' existing knowledge and skills. It encourages them to develop more sophisticated procedures for counting and other numeracy skills.

Overall, a comprehensive approach to numeracy education should focus on both the cognitive and affective aspects of learning and take into account each student's individual needs and strengths.

7. The utilization of contextualized numeracy materials has significantly improved the numeracy skills of Grade 1 learners. The Percentage of learners in the enhancement category increased dramatically, while the Percentage in the intervention category decreased substantially. The mean score gain of 13.84 points is statistically significant, indicating the effectiveness of the materials in enhancing learners' numeracy skills.

The contextualized numeracy materials were effective in improving students' numeracy skills. The significant improvement in numeracy skills and the decrease in the number of students requiring additional support suggest that the materials were effective in

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addressing students' needs. This has implications for the development of future numeracy materials and the implementation of numeracy education in schools.

8. Training programs play a vital role in the development of contextualized numeracy materials. These programs enhance the competencies of educational leaders and teachers, ensuring that the materials are relevant, engaging, and effective in improving students' numeracy skills. If successfully implemented, Project GOLDEN Sioan will be effective in enhancing the numeracy skills of Grade 1 learners. The significant improvement in learners' numeracy profiles and mean scores demonstrates the success of the program in achieving its objectives.

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