THE EFFECTIVENESS OF DIFFERENTIATED INSTRUCTION IN IMPROVING NUMERACY SKILLS OF GRADE 1 PUPILS

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ABSTRACT

One of the biggest difficulties that elementary pupils encounter is numeracy skills. This quasi-experimental research aimed to determine the effectiveness of differentiated instruction in improving the numeracy skills of Grade 1 pupils. The data were gathered through the use of researcher-made pre-test and post-test questionnaires. The pre-test results revealed that most respondents (94.40%) scored between 11 and 15, indicating satisfactory performance. Only one respondent (5.60%) scored 10 or below. No respondents achieved a score of 16 or higher. Overall, the average pre-test score was 12.89, suggesting that the students' numeracy skills were at a satisfactory level. The findings indicated that the respondents significantly improved their numeracy skills after the intervention, as evident in their post-test scores. Notably, there was a significant difference in the pre-test and post-test scores of the respondents, indicating clear improvement in numeracy skills during and after the intervention. Moreover, this study's vital findings benefit administrators, teachers, pupils, and future researchers.

Keyword : *differentiated instruction, numeracy skills, multiple intelligences, learning style, quasi-experiment, readiness, students' interest*

1. INTRODUCTION

Numeracy skills are essential for using and understanding math in everyday life. They involve working with numbers, using formulas like multiplication and division, and applying math concepts to solve real-world problems (Ritz & Fan, 2015; Gonzalez & Kuenzi, 2012). However, many students worldwide, including in the Philippines, struggle with numeracy, affecting their learning and math progress (Olson & Riordan, 2012). Many children encounter challenges in acquiring numeracy skills, especially during their early years. Difficulties in fundamental numeracy abilities, such as counting and comparing numbers, often persist throughout elementary school and hinder their overall mathematical progress (Nelson & McMaster, 2019). Children who struggle with numeracy skills in kindergarten tend to experience ongoing difficulties in mathematics and display slower learning rates compared to their peers who possess stronger numeracy foundations (Nelson & McMaster, 2019). These challenges can have long-lasting consequences, as numeracy skills are crucial for academic achievement and real-life applications. On account of this, researchers are interested in finding effective teaching methods to help improve students' numeracy abilities (Blömeke et al., 2015).

One promising teaching approach is differentiated instruction, tailoring lessons to meet each student's unique needs, interests, and skills (Tomlinson, 2014). Differentiated instruction can help students develop their numeracy skills by giving them more choices and control over their learning. Teachers need to meet their students' diverse needs for effective learning (Sharma et al., 2012).

This action research aimed to test the effectiveness of differentiated instruction in improving numeracy skills. The study focused on identifying challenges related to numeracy skills, specifically in addition and subtraction among Grade 1 pupils in Cateel Central Elementary School, where this problem has not been studied thoroughly. Understanding the factors behind low numeracy skills is crucial for implementing effective solutions without disrupting the learning process. Understanding these problems enabled the researchers to propose appropriate strategies to address them. The findings provided valuable recommendations to teachers and administrators. Therefore, this study aimed to discover methods to help students improve their numeracy skills that are beneficial in navigating the real world.

1.1 Statement of the Problem

The researchers opted for this action research because of the observable problem with pupils' numeracy skills that is continuously growing and affecting their capacity to become productive and competent in mathematics. Pupils with this kind of difficulty must be taken seriously through an intervention to lessen or completely solve the problem (Martin et al., 2017).

Hence, this study aimed to improve the numeracy skills of Grade 1 pupils in Cateel Central Elementary School. Furthermore, this study sought answers to the following questions:

1.What is the level of pre-test scores in terms of numeracy skills of Grade 1 Pupils in Cateel Elementary School?

2.What is the level of post-test score in terms of numeracy skills of Grade 1 Pupils in Cateel Elementary School?

3.Is there any significant difference in pre-test and post-test score scores in terms of numeracy skills of Grade 1 Pupils in Cateel Elementary School?

1.2 Scope and Limitation

The main focus of this study was to improve the numeracy skills of Grade 1 pupils through differentiated instruction. This action research employed a true experimental research design. It was conducted at Cateel Central Elementary School at Castro Avenue, Poblacion, Cateel, Davao Oriental. The selection of respondents was made through complete enumeration. The respondents are the Grade 1 pupils of the Joy section in the School Year 2022-2023. In this study, numeracy skills are delimited to addition and subtraction. Particularly, the learning competencies were “Illustrate Addition as putting together or combining or joining sets and “Illustrate Subtraction as “taking away” or “comparing” elements of sets.
Furthermore, the researchers conducted the treatment for one (1) week, which consisted of 3 sessions. The data gathered in this study was focused on the objectives mentioned above and was limited to the timeframe of the intervention. This limitation is essential since it would help the researcher focus on the research objectives and make this thesis accurate and valid.

2. REVIEW OF RELATED LITERATURE

This chapter presents the literature related to the study. It is to position this study correctly amidst many studies conducted in this field.

2.1 Numeracy Skills Defined

Numeracy skills were among the most significant predictors of later school success in mathematics (Anders et al., 2012). Similarly, numeracy skills were a concept used to identify the knowledge and capabilities required to accommodate the mathematical demands of private and public life and to participate in society as informed, reflective, and contributing citizens (Geiger et al., 2015). Guhl (2019) affirmed that numeracy skills are already used by most young children daily through play and everyday interactions. Additionally, numeracy skills are the ability to manage data and numbers to solve problems in various contexts of everyday life (Via et al., 2021). Also, numeracy skills are managing data and numbers to evaluate statements based on certain contexts (Cassen et al., 2018). Other than that, numeracy skills could train the ability to reason, interpret data and identify information (Sellars, 2018). Libertus et al. (2016) claimed that numeracy skills involved understanding numbers, counting, solving number problems, measuring, estimating, sorting, noticing patterns, and adding and subtracting numbers.

Further, Browder et al. (2012) believe these skills begin in early childhood and are the foundation for the rest of elementary and upper-level math classes. These skills must be introduced at a young age. Hence, students can continue to build on those skills as they progress through the vertical math curriculum because higher-level math classes, such as algebra and geometry, depend on a strong foundation of number sense and number skills (Mulligan et al., 2020). In line with that, numeracy skills are a person's ability to effectively use appropriate mathematical competencies for successful participation in everyday life, including personal life, at school, at work, and in the wider community (Darriet et al., 2021). It involves understanding real-life contexts, applying appropriate

mathematical competencies, communicating these results to others, and critically evaluating mathematically based statements and results.

Hence, numeracy skills are the building blocks of all future math classes (Jimenez & Staples, 2015). These skills are necessary for students to succeed with higher math concepts. Students need to learn to solve problems, one of the basic early math skills, for all areas of academics and life outside of school. In line with this, Steen (2012) attested that numeracy skills are related to the ability to interpret numbers, in which numbers play an important role in solving problems in everyday life, such as shopping or using public transportation.

2.2 Development of Numeracy Skills

Numeracy skills are essential for individuals to comprehend and apply mathematical concepts effectively (Jain & Rogers, 2019). Various factors influence the development of these skills. One significant factor is students' prior knowledge and experiences. A solid foundation in basic number concepts, counting, and operations is a starting point for further numeracy development. Real-world applications of mathematics, such as measuring and estimating, also contribute to acquiring numeracy skills (La Fevre et al., 2011).

The use of instructional strategies can also contribute to the development of numeracy skills. Effective instructional approaches play a vital role in promoting numeracy development. Singh et al. (2021) revealed that hands-on and experiential learning activities positively impact numeracy skills, where students actively engage in mathematical tasks and problem-solving. Scaffolded instruction, which offers support and guidance as students progress in their learning, is also beneficial for numeracy skill enhancement (Parker & Thomsen, 2019).

Another crucial factor in developing numeracy skills is promoting a deep conceptual understanding of mathematical concepts. Going beyond procedural knowledge and focusing on mathematical ideas' underlying principles and connections fosters numeracy skills (Crooks & Alibali, 2014). Approaches emphasizing conceptual understanding, such as using manipulatives and visual representations, are effective (Hunt, 2011). Proficiency in mathematical language and communication is essential for numeracy development. Students must understand and effectively use mathematical vocabulary, symbols, and notation to express their mathematical thinking. Encouraging mathematical discourse, individually and in collaborative settings, promotes critical thinking and problem-solving abilities, contributing to developing numeracy skills (Rounds et al., 2020).

Motivation and confidence also play a significant role in numeracy skill development. Students with a positive attitude towards mathematics and who believe in their ability to succeed are likelier to engage in learning activities, persist in problem-solving, and seek opportunities to apply numeracy skills in real-life contexts. Therefore, nurturing students' motivation and confidence is crucial for fostering numeracy development (Brophy, 2013). Furthermore, factors beyond the classroom, such as home and environmental influences, contribute to numeracy skill development. The home environment, parental involvement, and exposure to mathematical experiences in daily life shape students' numeracy abilities (Ball et al., 2014). Encouraging parental support and providing resources that promote mathematical engagement at home can positively impact numeracy development (Van Voorhis, 2013).

Furthermore, children start to learn numeracy skills as soon as they are born. This was learned by seeing and doing things with numbers, especially in everyday activities (Hachey, 2013). Also, when a child hears you count their fingers and toes, they start to recognize numbers and shapes on things like clocks, phones, or books and decide how many apple slices they want. (Fuson, 2012). As children got older, they learned more numeracy skills and liked how to measure and figure out sizes (Anders et al., 2013).

Consequently, when a child compares things of different sizes, like big, small, and medium, and groups things together and talks about the same and different, or when a child uses words to describe where things are over, under, and next to, he or she helps set the table with the right number of plates, forks, spoons, and cups; fills a water bottle; helps with the shopping and uses money to buy things; and divides food into equal portions (Pitchford, 2015). Moreover, talking to a child about math as you go about your daily life helps a child see how and why math is important (Reys et al., 2014). You refer to size and weight when you say big and small, high and low, heavy and light, fast and slow, close and far, first, second, and last (order). Besides that, learners can increasingly use mathematical terms and symbols to describe computations, measurements, and characteristics of objects in context (Winter, 2022). Numeracy skills are not just an important part of the curriculum; they are a vital life skill that enables us to carry out everyday tasks (Tabor et al., 2020). Introducing children to numeracy concepts is never too

early; early childhood is a crucial time for brain development, so it is important to consider how to support the children in your nursery to acquire numeracy skills (Casey et al., 2018).

Further, as children had more chances to interact with their environment, they started to understand other types of informal mathematics knowledge, such as the verbal count sequence, counting objects with one-to-one correspondence, and cardinality (Purpura & Lonigan, 2013). Knowledge of the verbal counting sequence typically developed throughout the preschool years, and by approximately 4 years of age, most students can accurately count a small set of objects (e.g., blocks) and determine how many objects are in the set (Nelson & McMaster, 2019). As students' numeracy skills progress, they establish cardinality, which confirms that they understand that the last number in a count sequence represents the total quantity of objects in a set (Mix et al., 2012). Merkley & Ansari (2016) highlighted that when students understand formal mathematics knowledge, they can demonstrate numeracy skills such as writing numerals and numerical notation (e.g., using the addition symbol). They also begin to display written and verbal fluency with basic facts. By kindergarten and first grade, students are expected to understand the relative position of cardinal numbers (Hutchison et al., 2022).

The development of numeracy skills, such as understanding the relative position of a number or how two or more numbers are connected, is needed to develop more complex mathematics skills, such as problem-solving (Mayer & Hegarty, 2012). Although some children may develop numeracy skills such as simple addition and subtraction without formal instruction, these skills typically emerge with formal instruction in kindergarten and the first grade. Proficiency in basic arithmetic facts is essential to solving word problems and complex computation problems (Björn et al., 2016). Nguyen et al. (2016) found that skills such as counting and number comparison measured in kindergarten were significant predictors of overall mathematics achievement at the end of third grade.

Everyday activities like counting, sorting, recognizing patterns, recognizing shapes, measuring and comparing numeracy skills, and talking about sizes help children develop numeracy skills. In another study, Harris and Petersen (2019) found that children with more parent interactions related to math in early childhood are likelier to succeed in school overall. Adults must introduce the words and connect the meaning to physical interaction. Soon after, they could enter the shortened counting stage, identify numerals, and count from any given number (Aunio et al., 2015). Ofsted (2018) emphasized the need to focus on numeracy skill development in young children, given the impact of early mathematical attainment on future achievement in school. More specifically, most of the mathematics skills that develop early are categorized as numeracy skills (Nelson & McMaster, 2019).

Generally, numeracy skills play a vital role in developing the self-capacity of elementary school students in understanding mathematics's role related to numbers to solve everyday problems (Ghazali, 2020). In line with that, numeracy development is important because it provides pupils with the platform to learn and apply the skills to real-life situations (Ward et al., 2017). Additionally, researchers have focused on strategies for teaching numeracy skills (Browder et al., 2012) because these skills are important for mathematics development (Clements & Sarama, 2014). With numeracy skills, students can thrive throughout elementary school (Aunio et al., 2015). Thus, developing numeracy skills in the early years of formal schooling is critical to children's success in mathematics (Claessens & Engel, 2013).

2.3 Importance of Numeracy Skills

The importance of numeracy has been widely acknowledged as the foundation for lifelong learning, which must be harnessed early to support young people's success in the wider curriculum and other activities beyond the classroom (Ofsted, 2018). Similarly, numeracy skills are important for individuals to develop logical thinking and reasoning strategies in their everyday activities (Maloney & Beilock, 2012). We need numeracy to solve problems and make sense of numbers, time, patterns, and shapes for activities like cooking, reading receipts, reading instructions, and even playing sports (Septiadi, 2022). Also, numeracy skills were an important learning area for young people, as a fundamental element of mathematics and a life skill that gave students a foundation to succeed in learning and access the wider curriculum (Education Scotland, 2019). Thus, numeracy skills are essential to make informed decisions daily (Garcia et al., 2019).

The prominence of numeracy is extremely evident in daily life. As teachers, it is important to provide quality assistance to students concerning developing a child's numeracy skills (Niklas et al., 2016). Numeracy skills build on children's natural curiosity, inquiry, and exploration of the world around them (Chesloff, 2013). Numeracy skills equip pupils with a uniquely powerful tool, and it understands how mathematics is used in the real world and be able

to apply it to make the best possible decisions (Szabo, 2020). It is as much about thinking and reasoning as about actual calculations. Numeracy skills that support mathematical development are harnessed in young children, especially in their early years, when they have shown the fastest rate of mathematics development. This would support their numeracy skills in the future (Kermani & Aldemir, 2015).

Encompassing key education bodies and current research highlights the need to develop a strong foundation in math as early as possible to support children in reaching their full potential as they progress through their education (Martin, 2018). Numerical skills measured prior to school entry are predictive of mathematics achievement longitudinally. Therefore, young children must start school with strong mathematical foundations (Merkley & Ansari, 2016). Additionally, numeracy skills contribute to many subjects, and it is equally important that children are given opportunities to apply and use their skills in real contexts (Geiger et al., 2015). Teaching numeracy skills in early childhood is important because it is during that time that children are the most open to learning (Claessens & Engel, 2013).

2.4 Differentiated Instruction in Teaching Math

Nicolae (2014) defines differentiation as an approach to teaching in which teachers proactively modify curricula, teaching methods, resources, learning activities, and student products to address the diverse needs of individual and small groups of students to maximize the learning opportunity for each student in a classroom. Scott, B. (2012) affirmed that it stems from a teacher‘s solid and growing understanding of how teaching and learning occur, and it responds to varied learners‘ needs for more structure or independence, more practice or greater challenge, and more active or less active approaches to learning. Additionally, Hapsari & Dahlan (2018) explain that differentiated instruction is a method to adjust the learning to the needs of students to maximize the potential of each student in the stipulated scope. Also, Tomlinson (2017) states that differentiation is not just a learning strategy. It is not a recipe for teaching but an innovative way of thinking about learning and teaching. Differentiated learning sees the learning experience as social and collaborative Tomlinson (2014). Building on this definition, Konstantinou-Katzi et al. (2013) also add that differentiated instruction occurs in the context of an increasingly diverse population of students. Each student is appreciated for his/her unique power. They are offered the opportunity to show their skill through various assessment techniques. Munro (2012) states that teachers can differentiate their instruction effectively when they understand how their students learn and think, understand the various options for learning differentiation, may implement learning differentiation to the topics in their classrooms, have the correct motivational orientation, and may interpret the culture and climate of the school and the classroom in terms of this differentiation.

In line with this, instruction can be differentiated in three ways: content, process, and product (Tomlinson, 2014):

Content is the input of learning and teaching, what the teacher teaches or wants students to learn (Tomlinson, 2017). Differentiation content strategies can be done with concept-based teaching, compacting the curriculum, learning contract, small-group learning, and mentoring (Hapsari & Dahlan, 2018)

Process means an opportunity for students to process content or ideas and skill. In scholastic language, the process is frequently called activities (Dixon et al., 2014). Differentiation process strategies can be done through interest groups, complex learning, independent learning, and concept achievement (Gregory & Chapman (2012).

Products must help students, individually or in groups, to rethink, use, and expand on what they have learned for a specific period, sub-part, semester, or even a year (Hapsari & Dahlan, 2018). Therefore, teachers can replace some tests with rich task products in differentiated classrooms or combine tests and options to widen the students' scope (Tomlinson, 2014). They must have the maximum opportunity to think, implement, and show what they have learned.

Similarly, National Research Council. (2012) emphasizes the importance of understanding students and of varied instruction that considers the characteristics and needs of students who are learning. National Research Council (2013) states that there are 3 fundamental types of knowledge in teaching mathematics in school: knowledge of mathematics, knowledge of students, and knowledge of learning practice. Lawrence-Brown (2020) reported that differentiated instruction is important for students who struggle the mastery of the grade-level curriculum. Two goals are achieved as a result of differentiated instruction Tomlinson (2014). These are: to maximize the capacity of each learner by teaching in ways that help all learners bridge gaps in understanding and skill and help each learner grow as quickly as he or she can.

Differentiated mathematic instruction provides individualized math instruction to students. This instruction is based on math exit tickets, math benchmark assessments, other formative assessments, and teacher observations during whole-group and small-group instruction (Benders & Craft, 2016). Nurasiah et al. (2020) claimed that students expect mathematical instruction to be easy to understand, fun, not rushed, and not too serious. The teacher must master various knowledge, assess students continuously, and plan instruction properly, although time-consuming. Students respond positively to differentiated instruction. They become more motivated and involved in learning.

2.5 Benefits of Differentiated Instruction in Teaching Numeracy Skills

Numeracy skills are crucial for academic success, and different teaching approaches have been explored to improve these skills. One popular method is differentiated instruction, tailoring lessons to student's unique learning needs (Tomlinson, 2014). Differentiated instruction provides many benefits in enhancing numeracy skills. One is personalized instruction. Personalized instruction is a key aspect of differentiated instruction. When considering students' multiple intelligences and learning styles, teachers can engage pupils through various strategies like visuals, hands-on activities, and technology. This individualized approach helps them better understand numeracy concepts (Gentry, 2013).

Another benefit of differentiated instruction is that it promotes an inclusive and supportive learning environment. When students feel safe and supported, they are more likely to participate actively and take risks in their learning. This positive atmosphere boosts their self-confidence and encourages them to improve their numeracy skills (Mazana et al., 2019). Access to suitable resources is also crucial in differentiated instruction. Using diverse materials like manipulatives and technology tools supports students' understanding of numeracy concepts. Having a range of resources ensures that students can engage with materials that suit their learning preferences (Gentry, 2013).

Furthermore, strong teacher-student relationships also play a vital role. Teachers who build positive connections and understand their students' needs can adjust instruction accordingly. Recognizing students' prior knowledge and experiences helps teachers create meaningful connections and scaffold instruction effectively (Vanner et al., 2022). Moreover, continuous professional development for teachers is essential in implementing differentiated instruction. Ongoing training allows teachers to deepen their understanding of instructional strategies, assessments, and differentiation methods. It empowers them to plan and deliver effective differentiated instruction (Kim et al., 2019).

3. METHODOLOGY

3.1 Research Locale and Duration

The study was conducted in Cateel Central Elementary School, particularly the Grade 1 pupils of the School Year 2022-2023. The Grade 1 classrooms were in Building 15 in front of Building 17 and next to Building 16. Also, the intervention or data collection from the respondents was done in one (1) week and only on days and times that the grade 1 advisers agreed. Further, this study was conducted from April to May 2023.

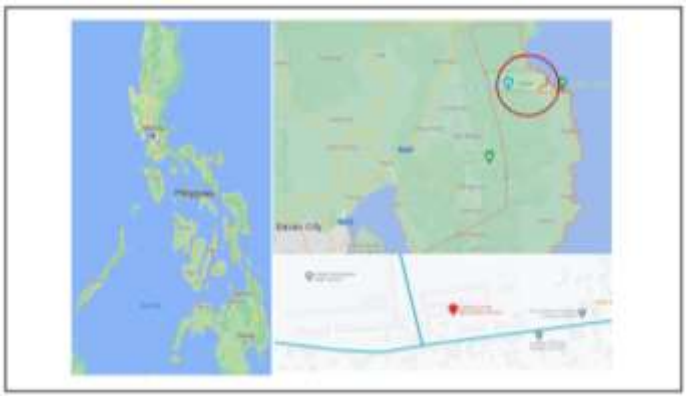

Figure 1. Research Locale Map of Cateel Central Elementary School

3.2 Research Design

This study employed a true experimental design to demonstrate the effectiveness of the intervention. A research design was used to determine a cause-and-effect relationship between various variables. Studies with at least one dependent or outcome variable that is experimentally modified are called true experiments (Dawes, 2010).

3.3 Research Instrument

The data collection for this study was solely based on the researcher-made quantitative instrument, mainly the pre-test and post-test questionnaires. The questionnaires used underwent validity from the Math 1 Master Teacher of Cateel Central Elementary School and reliability testing through a pilot test in San Rafael Integrated School before being administered to the actual respondents of the research study in Cateel Central Elementary School. The content of the questionnaires was based on a specific numerical lesson covered by the K–12 curriculum guide. It is a multiple-choice and problem-solving test comprising twenty (20) items.

3.4 Respondents of the Study

The respondents to this study were the Joy section Grade - 1 pupils at Cateel Central Elementary School. The respondents were chosen through complete enumeration. There were a total of 18 respondents under study.

4. RESULTS AND DISCUSSION

This chapter presents the results and discussion of this study. The study utilized multiple intelligences and learning styles as the basis for implementing differentiated instruction. The chapter compares the pre-and post-intervention performance of the Grade 1 pupils in Cateel Central Elementary School and analyzes the findings.

4.1 Pre-test Scores of the Grade 1 Pupils

Table 1 shows the baseline measures of numeracy skills of the Grade 1 pupils before implementing differentiated instruction. Results show that most respondents (94.40%) scored between 11 and 15, indicating satisfactory performance. Only one respondent (5.60%) scored 10 or below. No respondents achieved a score of 16 or higher. Overall, the average pre-test score was 12.89, suggesting that the students' numeracy skills were at a satisfactory level.

Table 1. Level of pre-test scores of respondents

Interval	Frequency	Percentage	Standard Deviation	Mean	Grade Percentage	Interpretation
10 and below	1	5.60	1.49	12.89	83.92	Satisfactory
11 to 15	17	94.40				
16 and above	0	0.00				

The results suggest that before the intervention, the respondents had a satisfactory level of performance in numeracy. This is because the participants received prior instruction and exposure to basic numeracy concepts. Their prior educational experiences laid a solid foundation for their numeracy, contributing to their satisfactory performance. Summer (2019) stated that early educational experiences, such as preschool or early childhood programs, are vital in building a foundation for numeracy skills. These experiences expose children to basic numeracy concepts and help them develop a solid understanding of numbers and counting (Salminen et al., 2021).

The alignment of the curriculum with Grade 1 standards also ensured that the essential numeracy concepts were thoroughly covered (Leirnward, 2014), given that the target competency was already covered during the school year's first quarter. Coburn et al. (2018) suggest that a well-aligned curriculum, specifically designed to meet the learning needs of Grade 1 students, is crucial for effective numeracy instruction. It ensures that students are taught the necessary numeracy concepts and skills at the appropriate level of complexity.

In addition, the classroom environment, including the availability of resources and teaching materials, supported their satisfactory performance. Access to relevant learning materials, manipulatives, and visual aids can enhance their understanding of numeracy concepts and provide opportunities for hands-on learning experiences (Adendorff et al., 2018). The effective teaching strategies employed by the teacher played a role in fostering their numeracy

skills. Effective teaching strategies, such as hands-on activities and clear explanations, have been shown to enhance students' numeracy skills (Boaler, 2022; Ball et al., 2014). These strategies engage students actively in the learning process and help them develop a deeper understanding of mathematical concepts. The support and involvement of parents or guardians also play a crucial role in students' numeracy development. Bernabini et al. (2020) revealed that parental involvement and support play a significant role in students' numeracy development. Students ' numeracy skills will likely improve when parents engage in their child's learning, provide additional opportunities for mathematical exploration at home, and reinforce classroom concepts. (Van Voorhis, 2013).

4.2 Post-test Scores of the Respondents

Table 2 presents the level of post-test scores in numeracy of the Grade 1 pupils. The post-test scores of the participants showed a significant improvement in their numeracy skills after implementing differentiated instruction. All 18 respondents scored 16 and above, indicating an outstanding performance.

Table 2. Level of post-test scores of respondents

Interval	Frequency	Percentage	Standard Deviation	Mean	Grade Percentage	Interpretation
10 and below	0	0.00	0.72	18.06	97.52	Outstanding
11 to 15	0	0.00				
16 and above	18	100.00				

The outstanding post-test performance observed by the respondents suggests that differentiated instruction effectively improved the numeracy skills of the Grade 1 pupils. First, using various teaching methods like visual aids, hands-on activities, and objects helped students understand addition and subtraction better (Jone & Tiller, 2017). These practical approaches helped them connect abstract ideas to real-life situations. The intervention offered various instructional strategies catering to students' individual preferences (Gentry, 2013).

In addition, personalizing instruction based on student strengths and learning styles also made learning more individualized (Bray & McClassey, 2016). For instance, students who learn by moving benefit from hands-on activities, while those who learn visually find visual aids and graphics helpful (Shabiralyani et al., 2015). Tong et al. (2022) found that students who received personalized instruction showed significantly greater academic achievement than those who received traditional instruction.

Moreover, differentiated instruction's positive and inclusive classroom environment contributed to students' success. Students felt valued and supported, which made them more comfortable taking risks, asking questions, and sharing their ideas (Celik, 2019). The strong teacher-student relationship built through differentiated instruction boosted students' confidence and encouraged them to seek help when needed (Vanner et al., 2022).

4.3 Difference in the Results Between Pre-test and Post-test Scores of Respondents

Table 3 compares pre-test and post-test scores in terms of numeracy skills. The mean pre-test score was 12.89, with a standard deviation of 1.49, while the mean post-test score was 18.06, with a standard deviation of 0.72. The paired t-test value was 11.254, and the p-value was 0.000, indicating a significant difference between the pre-test and post-test scores. This suggests that the students' numeracy skills improved significantly after the intervention. The post-test scores were higher than the pre-test scores, demonstrating the effectiveness of the intervention in enhancing the student's numeracy abilities.

Table 3. Comparison between pre-test and post-test scores

Score Category	Mean	Standard Deviation	Paired t-test value	p-value	Interpretation
Pre-test	12.89	1.49	11.254	0.000	Pre-test and post-test scores differ significantly.
Post-test	18.06	0.72			

The significant improvement in post-test scores compared to pre-test scores highlights the effectiveness of differentiated instruction in enhancing students' numeracy skills. Before the intervention, the participants' pre-test

scores indicated a satisfactory level of performance, with most students scoring between 11 and 15. This suggests that the students already possess a foundational understanding of numeracy concepts.

However, after implementing differentiated instruction, the post-test scores showed a remarkable improvement. All 19 participants scored 16 and above, indicating an outstanding performance. This significant score increase can be attributed to differentiated instruction's tailored and personalized approach.

Differentiated instruction incorporated various instructional strategies during the intervention, such as hands-on activities, visual aids, and real-life examples (Jone & Tiller, 2017). These strategies allowed students to engage with numeracy concepts concretely and meaningfully. Differentiated instruction facilitated a deeper understanding of addition and subtraction and promoted higher-order thinking skills by providing multiple entry points and accommodating different learning styles (Gentry, 2013).

Moreover, the positive classroom environment created through differentiated instruction played a crucial role in students' success. The inclusive and supportive atmosphere encouraged active participation, collaboration, and a sense of belonging among students (Celik, 2019). This positive learning environment fostered student confidence, motivation, and a willingness to take risks in their learning, ultimately contributing to their outstanding post-test performances.

The significant difference between the pre-test and post-test scores demonstrates the effectiveness of differentiated instruction in enhancing students' numeracy skills as it promotes tailored instruction, personalized learning experiences, and a supportive classroom environment. Implementing differentiated instruction improved post-test scores significantly, indicating enhanced numeracy skills among the Grade 1 students in Cateel Central Elementary School.

4.4 The Implication to Mathematics Education

The findings of this study have important implications for mathematics education:

1. It is beneficial to use different approaches to teaching that consider students' individual strengths and learning styles. This can improve numeracy skills by tailoring instruction to meet students' needs.
2. Instead of just memorizing procedures, it is important to focus on understanding the underlying concepts in math. Using hands-on activities and real-life examples can make math more meaningful and help students grasp the concepts better.
3. A positive and supportive classroom environment is crucial for learning math. Teachers should make sure students have access to appropriate resources and materials and foster positive relationships with their students to encourage active participation and engagement.
4. Engaging students in math can enhance their learning. Teachers may use interactive teaching strategies, such as group activities, problem-solving tasks, and practical applications, to make math more interesting and relevant to students' lives.

5. CONCLUSION

Based on the data findings from this study, the following conclusions can be drawn:

1. The Grade 1 pupils in Cateel Central Elementary School had satisfactory pre-test scores indicating that prior to the intervention, they already had a basic understanding of numeracy concepts.

2. The Grade 1 pupils in Cateel Central Elementary School had outstanding post-test scores indicating that they have improved after implementing differentiated instruction as an intervention.

3. There was a significant difference in pre-test and post-test scores, indicating that differentiated instruction effectively enhanced the numeracy skills of the Grade 1 pupils in Cateel Central Elementary School.

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