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TEACHING STRATEGIES FOR THE DEVELOPMENT OF MATHEMATICAL FUNDAMENTALS IN KS1 THROUGH THE MATATAG CURRICULUM: BASIS FOR CREATING INSTRUCTIONAL MATERIAL IN MATHEMATICS

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ABSTRACT

This study investigated effective teaching strategies for enhancing mathematical fundamentals in Key Stage 1, specifically in Kindergarten and Grade 1, under the newly implemented MATATAG Curriculum. Anchored on the principle that early numeracy forms the foundation for future academic success. The research addressed the gap in instructional practices within the context of this new curriculum. The significance of the study evaluating how current approaches and pedagogical innovations can enhance young learners' mathematical fundamental skills. This study employed a descriptive-survey research design; quantitative data were collected from Kindergarten and Grade 1 teachers in the districts of Catanauan, Mulanay, and San Narciso, Quezon. It focused on evaluating teaching strategies such as differentiated instruction, technology integration, experiential learning, and collaborative learning, assessing the effectiveness in developing numeracy skills of the pupils. The findings of the study indicated that these strategies positively influenced pupils' engagement and learning outcomes, highlighting the importance of an interactive and hands-on teaching-learning process. Based on these findings, the study developed instructional materials, such as a workbook, to support children in developing mathematical fundamentals. It contains a variety of exercises and activities focused on building skills and mathematical concepts. This study intended to support educators in enhancing teaching methods and improving learning outcomes aligned with the MATATAG Curriculum.

KEYWORDS: *Teaching Strategies, Mathematical Fundamentals, Instructional Materials*

INTRODUCTION

The early childhood mathematics program is a vital stepping stone for future math instruction. The start of a child's mathematics education is extremely important. Youngster must explore and learn the mathematical ideas and concepts present in their environment during the formative years of their life. It promotes young children in developing their critical thinking, reasoning, and worldwide, both inside and outside the classroom, which eventually helps them establish a solid basis for their academic success (Onoshakpokaiye, 2020). Mathematics is one of the most meaningful learning because we use it in our daily lives. It is very important, as early as kindergarten, to develop fundamental skills in mathematics. We need to identify the various strategies for effective teaching to enhance learning outcomes.

Cardino et al. (2020) stated that determining students' learning styles will be a great help to teachers in designing and implementing a particular strategy that suits them. Teachers will be guided in developing diverse tactics by an understanding of the diversity of pupils and their various learning styles. Knowing students' learning styles is crucial for designing effective educational strategies that accommodate learning needs. By identifying their personal preferences and implementing strategies that suit their learning styles and preferences, teachers can create more engaging and effective instructional materials that enhance the learning experiences of all students.

Based on Department Order No. 010, s. 2024 – Policy Guidelines on the Implementation of the MATATAG Curriculum, under the Kindergarten Curriculum Guide, there are six developmental domains, and one of these is cognitive development. This implies that learners are expected to develop thinking skills, and insights into patterns of mathematics, concept of numbers, length, capacity, mass, and time using concrete objects or materials, and apply this meaningfully in their daily experiences through the provision of varied manipulative activities to help them see relationships and interconnections in math and enable them to deal flexibility with mathematical ideas and concept (MATATAG Curriculum Guide). In addition, the main goal of the curriculum is for Filipino learners to become

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mathematically proficient and critical problem solvers. The curriculum intends to develop among the learners the proficiency in solving mathematical problems critically, grounded on a strong conceptual knowledge, strategic use of mathematical skills and processes, desirable values, and a proper disposition in mathematics, thus enabling them to become productive and successful 21st-century citizens.

Despite the positive outcomes of the MATATAG Curriculum, challenges such as disparities in resource allocation and the transition process for educators and students were identified. Addressing these challenges will require ongoing support, investment, and collaboration among education stakeholders. In light of these findings, it is evident that the MATATAG Curriculum has the potential to significantly improve educational quality and promote equity in the Philippine education system (Kilag et al, 2024). For the success of the MATATAG Curriculum implementation, various supports are needed, such as instructional materials that are suitable for the learners.

Although different teaching strategies are being used by the teachers, there is still a significant research gap concerning the use of these strategies. Based on the study of Cardino and Ortega-Dela Cruz (2020), one of the challenges in the teaching-learning process is knowing the most effective approach and strategies that are also in line with the learning styles of the pupils. Since the MATATAG Curriculum is just being implemented this school year, it might not fully explore the teaching strategies that are effective in enhancing mathematical skills. With that, the researcher decided to explore and study to identify the best practices and teaching strategies for the development of mathematical fundamentals of the pupils in Key Stage 1, specifically in Kindergarten and Grade 1. Since a lot of students are struggling in mathematics because of numerous factors that affect their learning, there is a need for further studies to solve this matter. In early childhood, many pupils have difficulty learning basic math skills that hinder to more complex ideas. This study aims to help students who are struggling in mathematics by highlighting teaching strategies for the development of mathematical fundamentals as early as kindergarten and Grade 1. If the mathematical fundamental skills are developed in early childhood, this will help the pupils in learning more complex ideas and skills in mathematics.

Through evaluating instructional approaches, we can determine which of these are effective in the teaching and learning process that will help the students develop their fundamental skills in mathematics. In the same way, one can innovate the strategies to improve teaching practices that cater to the needs of learners for better learning outcomes. In addition, with the advancement in educational practices and technology, exploring innovative methods, improving the learning guide, and various instructional materials that enhance teaching the mathematics subject, making learning more engaging and effective.

PURPOSE OF THE RESEARCH

This study aimed to assess the strategies of teaching mathematics through the MATATAG Curriculum to develop and improve fundamental skills of kindergarten and grade 1 pupils. As early childhood education plays a crucial role in shaping their mathematical understanding, it is essential to explore both current approaches and innovative strategies, improve the learning guide, and create various instructional materials to enhance the numeracy of the pupils.
The following objectives served as guide in this study:

1. Determine the teacher's demographic profile in terms of the following:
   1.1. Sex;
   1.2. Age;
   1.3. Highest Educational Attainment;
   1.4. Length of Service; and
   1.5. School size.
2. Analyze the level of utilization of the teaching strategy based on the Matatag curriculum in terms of:
   2.1. Differentiated Instruction;
   2.2. Technology Integration;
   2.3. Experiential Learning; and
   2.4. Collaborative Learning.
3. Assess challenges experienced by teachers in the utilization of the teaching strategy in terms of:
   3.1. Lack of Resources;
   3.2. Insufficient Training;
   3.3. Struggling Learners; and
   3.4. Classroom Management Issues.

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4. Evaluate the performance of the pupils in terms of:
   4.1. Number, color, and shape recognition;
   4.2. Understanding of Quantity;
   4.3. Patterns and Sorting;
   4.4. Measurement Concepts; and
   4.5. Basic Operations.
5. Evaluate the significant difference in teaching strategy when grouping according to teaching profile.
6. Assess the significant relation between teaching strategies and student performance.
7. Assess the significant relation between teaching strategies and challenges experienced by teachers.

METHODOLOGY

Research Design/Research Instrument/Data Gathering Procedure

This study employed a descriptive-survey type of research method to collect data that describes characteristics of a population. This method is used for collecting data to describe the characteristics and practices of the teachers regarding current teaching strategies. Since the goal of the study is to gain a clear understanding of existing practices and their effectiveness, the descriptive-survey method allows for a comprehensive assessment of the current teaching approaches in early mathematics education. It involved gathering information through questionnaires, interviews, or observations to capture a snapshot of opinions, behaviors, and demographic details. The main goal was to provide information about the subject to study, without manipulating variables. It involved the collection of quantitative information. This method was used to identify teaching strategies for the development of mathematical fundamentals in Key Stage 1, specifically in kindergarten and grade 1, through the MATATAG curriculum for better learning outcomes.

The researcher used questionnaires to gather information relevant to the study. It consists of sets of questions for gathering information from kindergarten and grade 1 teachers as respondents. This questionnaire served as a written interview to get important information used in this study. The questionnaires began with the demographic profile of the teachers and focused on the level of utilization of teaching strategies, assessed the challenges experienced by the teachers, and evaluated the performance of the pupils with the approaches used in teaching kindergarten and grade 1 pupils. This aimed to develop their mathematical fundamentals for them to become ready for more complex learning in mathematics.

The research employed a structured data-gathering procedure in collecting data on teaching strategies for developing mathematical fundamentals in kindergarten. After setting the goal and objectives, the researcher developed research questions, then, after the adviser's approval, presented them to the validators for further checking. The validators are Master Teachers of Kindergarten and Grade 1 who are knowledgeable in this field. After validating the questionnaire, pilot testing was conducted among 10 Kindergarten and Grade 1 teachers from another district to check the validity of the instrument. Before conducting an interview, the researcher sought permission from the authorities to gather data. The data gathered were stored confidentially, organized, and analyzed using quantitative methods. The results were summarized then conclusions and recommendations were made based on the findings from the collected data.

The research aimed to develop instructional materials, such as a workbook, to support kindergarten and grade 1 pupils in developing mathematical fundamentals. This contained a variety of exercises and activities focused on building skills that children would need for future academic success. The researcher used English and Filipino (Tagalog) instructions in developing these instructional materials to make them user-friendly and easier to understand. This will help bridge the gap between their home language and formal education, since they are only in the beginning stage of formal education. The process of developing this workbook began with an understanding of the guidelines in Matatag Curriculum, identifying the core mathematical concepts, such as color, shapes, and number recognition, patterns and sorting, measurement, and basic operations that are essential for early childhood education. The workbook was formulated to provide clear instructions, engaging visuals, and interactive activities to support development and build a solid mathematical foundation.

Respondents/Units of analysis/Subjects of the Study

The selection of respondents for this study was carefully considered to ensure a comprehensive understanding of the teaching strategies used in the development of mathematical fundamentals for Kindergarten and Grade 1 pupils. The target population of this study is composed of 104 kindergarten teachers and 130 grade 1 teacher from the Districts of

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Catanauan, Mulanay, and San Narciso, Quezon, with a total of 73 elementary schools. The respondents consisted of both experienced and newly hired teachers who brought different perspectives on teaching strategies and approaches, specifically under the newly implemented Matatag Curriculum. Their collective insights provided a comprehensive view about the demographic profile of the teachers and the level of utilization of teaching strategies, assessed the challenges experienced by the teachers, and evaluated the performance of the pupils with the approaches used in teaching kindergarten and grade 1 pupils that aim to develop the mathematical fundamentals of the pupils. This study covered the School Year 2024-2025. By engaging teachers, the study aimed to contribute to the ongoing process of improving teaching and learning in mathematics, addressing both challenges and opportunities that arise in the development of mathematical foundations for young learners. Therefore, the selection of the respondents was essential to gain a balanced understanding about current practices, challenges, and areas for improvement in Kindergarten and Grade 1 levels within the context of the Matatag Curriculum.

Sampling Design and Procedures

The respondents of this study were the kindergarten and grade 1 teachers from the Districts of Catanauan, Mulanay, and San Narciso. The researcher used a cluster sampling technique where the population was divided into separate groups, also known as clusters, and a random sample of these clusters was selected. Then, a random sample of members within the chosen clusters answered the questionnaires. Simkus (2023) defines cluster random sampling as a probability sampling method where researchers divide a large population into smaller groups known as clusters, and then select randomly among the clusters to form a sample.

The researcher identified the schools, then the total number of kindergarten and grade 1 teachers to determine the entire population of public schools in the district of Catanauan, Mulanay, and San Narciso, Quezon. After that, 30% of the population, along with a 5% buffer, was selected to be the respondents for gathering information through questionnaires. This 5% buffer was included to complete the response, as some of the initial 30% were unwilling to participate in the study. After gathering information, the researcher analyzed the data collected about the demographic profile of the teachers and the level of utilization of teaching strategies, assessed the challenges experienced by the teachers, and evaluate the performances of the pupils with the approaches used in teaching kindergarten and grade 1 pupils that aim to develop mathematical fundamental skills.

Research Locale/Study Site

This research was conducted in the School Division of Quezon Province, specifically in the Districts of Catanauan, Mulanay, and San Narciso. The selection of schools and teachers as respondents of the study involved implicit stratification, taking into account various considerations such as accessibility of the schools or having an internet connection, and the willingness of teachers to participate in the study. This provided a comprehensive understanding of the demographic profile of the teachers and the level of utilization of teaching strategies, assessed the challenges experienced by the teachers, and evaluated the performance of the pupils. The findings helped to create instructional materials in mathematics.

Research Paradigm/Conceptual Framework

This conceptual framework serves as a guide in this study on what teaching strategies will help the kindergarten and grade 1 pupils in developing their fundamental skills in mathematics by evaluating current approaches and innovations. This study will investigate the impact of various teaching strategies and explore the challenges encountered by the teachers. This will provide a visual representation of the variables, process, and what will be the desired output of the study.

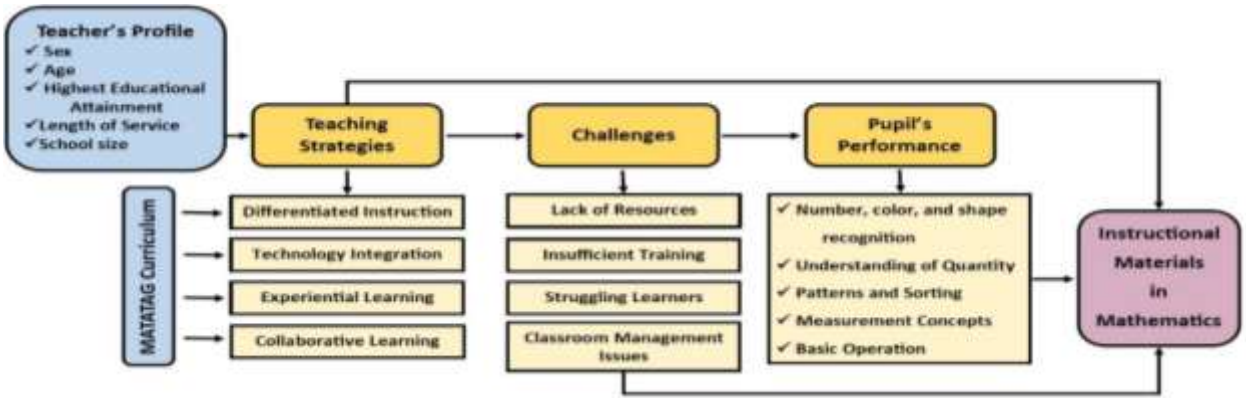
Figure 1 shows the flow of the study starting with the teacher's demographic profile, which provides insights into the characteristics of the study population. The researcher will gather information from other studies about early childhood mathematics, mathematical fundamentals, the MATATAG Curriculum, teaching strategies, challenges in the teaching-learning process, and students' performance. Then, develop a questionnaire that will be used as a tool in gathering information from the respondents. The questionnaire will be validated by the expert. The researcher will ask permission from the authority before gathering the data. Respondents are kindergarten and grade 1 teachers from the districts of Catanauan, Mulanay, and San Narciso, Quezon, under the school year 2024-2025. They will answer the questionnaires about teaching strategies under the MATATAG curriculum, such as differentiated instruction, technology integration, experiential learning, and collaborative learning. The challenges experienced by the teachers in the utilization of different teaching approaches like a lack of resources, insufficient training, struggling learners,

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and classroom management issues. Another objective of this study is to determine the performance of the pupils in terms of number, color, and shape recognition, understanding of quantity, patterns, and sorting, measurement concepts, and basic operations. After gathering data, the researcher will create instructional materials in Mathematics based on the findings from the data collected. Instructional materials like workbooks will help the pupils develop mathematical skills. It provides structured exercises and activities that will help them practice math concepts. This aims to develop the mathematical fundamentals of kindergarten and grade 1 pupils.

Figure 1

Research Paradigm of Teaching Strategies for the Development of Mathematical Fundamentals in KS1 through MATATAG Curriculum



RESULTS AND DISCUSSION

This section presents the data through tables about the results of data gathered, along with analysis and interpretation to identify different teaching strategies that will help pupils develop their mathematical fundamentals, and explains the outcome of the study from the following objectives. (1) Determine the teacher's demographic profile; (2) Analyze level of utilization of the teaching strategy based on the Matatag curriculum; (3) Assess challenges experienced by teachers in the utilization of the teaching strategy; (4) Evaluate the performance of the pupils; (5) Evaluate significant difference in teaching strategy when group according to teaching profile; (6) Assess the significant relation between teaching strategies and student performance; (7) Assess the significant relation between teaching strategies and challenges experienced by teachers.

The demographic profile of the teacher-respondents serves as a foundational aspect of understanding the context and diversity within the educational environment under study. Demographic characteristics such as gender, age, educational attainment, length of service, and school size are critical in examining patterns and drawing meaningful conclusions in educational research. These variables often influence teaching practices, professional development needs, and overall educational outcomes. Analyzing these characteristics provides valuable insight into the composition and potential perspectives of the participating teachers.

The data reveal that all respondents (100%) are female, indicating a gender-homogeneous sample, which reflects the typical makeup of early education staff but may limit the scope of perspectives in instructional strategy design. In terms of age distribution, most respondents fall within the 30–50 years old bracket (46%), followed by those below 30 years old (37%), and the smallest group being those 51 years old and above (17%). This suggests the findings are shaped by those in their professional prime, combining practical classroom experience with openness to innovation in teaching methods under the Matatag Curriculum. Regarding educational attainment, a greater portion of the teachers (63%) hold a bachelor's degree, while 37% have obtained a Master's degree. In terms of professional experience, 37% of the respondents have more than 10 years of service, 34% have between 4 to 10 years, and 29% have less than 4 years. This implies a knowledgeable group capable of contributing both practical and research-based insights to develop instructional materials and strategies. When categorized by school size, most teachers are from medium-sized schools (54%), with the rest coming from small (30%) and large schools (16%), suggesting that the instructional materials developed may be most applicable to similarly resource settings.

The predominance of female respondents highlights a potential gender imbalance in the teaching workforce within the study area, which may influence pedagogical dynamics and staff development initiatives. According to the study of Alfayez (2022), female teachers of the first three grades had a moderate level of mathematical proficiency, a good

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level of mathematical thinking skills. In addition, the study found a significant statistical positive correlation between mathematical proficiency and mathematical thinking skills among female teachers. The diverse age and service length distribution suggests a mix of novice and experienced educators, offering opportunities for mentorship and collaborative learning within schools. The relatively high proportion of teachers with a bachelor's degree signals a potential area for further professional advancement and graduate education support. Finally, the concentration of respondents from medium-sized schools might reflect regional school distribution or accessibility.

Table 1
Teacher-Respondent Demographic Profile

Profile	Group	Frequency	Percent
Gender	Female	70	100
Age	Below 30 years old	26	37
	30 – 50 years old	32	46
	51 years old and above	12	17
Highest Educational Attainment	Bachelor's Degree	44	63
	Master's Degree	26	37
	Total	70	100
Length of Service	0-3 years	20	29
	4-10 years	24	34
	more than 10 years	26	37
School Size	Small	21	30
	Medium	38	54
	Large	11	16
Total		**70**	**100**

The implementation of the Matatag Curriculum highlights the importance of adopting inclusive and adaptive teaching strategies, such as differentiated instruction, to meet the diverse learning needs of students. Differentiated instruction is particularly essential in mathematics education, where learners often demonstrate varying levels of readiness, interests, and learning profiles. This section presents the self-reported level of utilization of differentiated instruction among teacher-respondents, as measured by their agreement with key instructional practices aligned with the Matatag Curriculum. Understanding the extent of teachers' engagement with differentiated instruction provides insights into how well educational reforms are being integrated at the classroom level.

The overall average mean score of 4.55 indicates that teachers "Always" employ differentiated instruction strategies in their teaching practices. Among the individual statements, the highest-rated item was the necessity to adjust teaching methods based on pupils' abilities (M=4.76), reflecting a strong commitment to addressing individual learning needs. This is closely followed by the belief that differentiated instruction aids in developing pupils' fundamental mathematical skills (M=4.66) and the practice of assessing students' readiness for appropriate instruction (M=4.63). Other high-ranking behaviors include actively seeking new strategies (M=4.57), motivating pupils through diverse instructional methods (M=4.54), and incorporating self-directed learning opportunities (M=4.46). The lowest-rated statement, albeit still within the "Always" category, pertains to the use of differentiated instruction via technology (M=4.33), indicating a comparatively lower integration of digital tools in differentiated practices.

Students often show improvement in their performance through diversified instructions. Tailored approaches address individual learning styles, allowing students to engage in the teaching-learning process. Varied instructional methods keep students interested and motivated, making it easier to grasp and retain information. By tailoring lessons, it will help children to engage more deeply and meet individual needs, interests, and learning styles. It will boost their interest to participate actively and stay motivated. Differentiation allows children to work at their learning style, which leads for better understanding and improved performances. Differentiated instruction is a strategy that can effectively meet the diverse needs of all students, leading to improved student achievement (Parsons et al., 2018).

Based on the study of Aguhayon & Pentang (2023), the results show that even in a short amount of time, differentiated instruction successfully addressed pupils' mathematical performance. Additionally, it gave a participant more self-assurance while responding to essential issues. The benefits of ongoing diversified instruction activities, especially

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for pupils who are struggling in mathematics. Differentiated mathematics instruction can increase student engagement and performance in the classroom, set them up for success in the future, and create a classroom environment that recognizes each student's unique learning style.

The consistent "Always" rating across all indicators suggests a high level of awareness and application of differentiated instruction among the teacher-respondents, signaling strong alignment with the goals of the Matatag Curriculum. The emphasis on adapting teaching to student ability and readiness underscores a learner-centered pedagogical approach. However, the relatively lower rating on technology integration suggests a potential area for professional development, particularly in leveraging digital tools to enhance differentiated instruction. Strengthening teachers' capacity in this area could lead to more innovative and accessible learning experiences, especially in increasingly digital learning environments. Future training programs and curriculum support should thus consider embedding technology use in differentiated instructional strategies to ensure holistic and modern teaching practices.

DepEd's Matatag represents a remarkable step forward in improving the quality of education in the Philippines. With a multifaceted approach, the program paves the way for a more competent, empathetic, and qualified generation of learners. By prioritizing foundational, inclusive, and empowering skills for teachers, this education reform has the potential to reshape the country's education landscape and help learners thrive in a world always changing (Cummins, 2021). The Matatag curriculum has significant advancements in enhancing the quality of education, particularly in mathematics. This curriculum aims to address the previous issues of rote learning by emphasizing critical thinking, problem-solving, and real-world application of mathematical concepts. It focuses on deep comprehension rather than memorization, integrating learning into real-life scenarios. By promoting a more holistic and integrated approach to math education, the Matatag curriculum aims to produce students who are not only proficient in math but also capable of using it critically and creatively in various aspects.

Table 2

Teachers' Overall Level of Utilization of the Teaching Strategy based on the Matatag Curriculum

Dimension	Mean	Verbal Interpretation	Rank
Differentiated Instruction	4.55	Always	1
Technology Integration	4.35	Always	4
Experiential Learning	4.42	Always	3
Collaborative Learning	4.45	Always	2
General Average	**4.44**	**Always**	

Legend: *4.21 – 5.00 = Always* *3.41 – 4.20 = Often* *2.61 – 3.40 = Sometimes*
1.81 – 2.60 = Rarely *1.00 – 1.80 = Never*

The successful implementation of teaching strategies under the Matatag Curriculum is influenced not only by pedagogical competence but also by the availability of adequate instructional resources. A lack of materials, technological tools, and funding can hinder teachers' ability to deliver effective, engaging, and inclusive instruction. This table presents the self-assessed challenges faced by teachers, specifically about resource constraints, shedding light on how these limitations impact their ability to fully utilize the prescribed teaching strategies.

The overall average mean score of 3.66, interpreted as "Often", indicates that teachers regularly experience challenges related to the lack of resources. The highest-rated concern was the belief that inadequate resources negatively affect pupil learning outcomes (M=4.20), followed by the perception that such shortages reduce student engagement and participation (M=3.96). Teachers also often rely on personal funds for classroom supplies (M=3.69) and face difficulties in acquiring materials for experiential learning (M=3.69). Concerns about outdated or insufficient teaching resources (M=3.59), and the need to modify lesson exemplars (M=3.56) or change planned activities (M=3.53) due to resource limitations were also prominent. Lower mean scores, though still notable, were observed in statements regarding the general lack of materials (M=3.49), instructional supplies (M=3.51), and issues in accessing technology (M=3.37), the latter of which fell into the "Sometimes" category.

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The findings reveal that while teachers are committed to implementing the strategies of the Matatag Curriculum, resource-related challenges pose significant barriers to full execution. Frequent modifications to lesson plans, reliance on personal financial contributions, and insufficient or outdated materials limit instructional flexibility and innovation. These challenges are particularly detrimental to resource-intensive approaches like experiential and technology-integrated learning. Addressing these issues requires stronger institutional support, including adequate budget allocation, updated instructional materials, and improved access to classroom technology. In addition, most of the problems in the textbooks require low-level cognitive skills. In this context, it is a remarkable result that the use of materials is stated as an ongoing problem despite its benefits in primary school (Usta & Ipek, 2019). Textbooks play a central role in early childhood mathematics education, but there are several challenges associated that affect the learners to develop their fundamental skills and learn concepts in mathematics. Textbooks are sometimes too advanced for young learners, lack diverse examples, and do not cater wide variety of learning needs. Some children may require additional challenges, while others need more foundational support. Without differentiated activities, some students may struggle while others may become disengaged because the materials are not challenging enough.

Table 3

Teachers' Overall Self-Assessment on the Challenges Experienced in the Utilization of Teaching Strategies

Dimension	Mean	Verbal Interpretation	Rank
Lack of Resources	3.66	Often	1
Insufficient Training	3.08	Sometimes	4
Struggling Learners	3.65	Often	2
Classroom Management Issues	3.31	Sometimes	3
General Average	**3.42**	**Often**	

Legend: *4.21 – 5.00 = Always* *3.41 – 4.20 = Often* *2.61 – 3.40 = Sometimes* *1.81 – 2.60 = Rarely* *1.00 – 1.80 = Never*

The ability to recognize numbers, colors, and shapes is fundamental to early childhood education and is crucial for laying the groundwork for future learning in mathematics and visual literacy. Teachers' perceptions of their pupils' performance in these areas provide valuable insights into the effectiveness of instructional strategies and interventions used in the classroom. Woods et al. (2018), the research shows that using a concrete representation of numbers with explicit instruction will benefit students in building their number sense. Incorporating concrete representations with explicit instruction significantly increases number sense, reinforcing the need for effective, hands-on learning teaching strategies in early childhood education. This table summarizes teachers' viewpoints on their pupils' abilities regarding number, color, and shape recognition, highlighting areas of strength and potential improvement.

The overall average mean score of 4.17 indicates that pupils are performing at a "Good" level in terms of number, color, and shape recognition. The highest-rated statement was that pupils can accurately count objects using concrete materials (M=4.40), reflecting strong foundational number skills. Following closely, pupils were rated highly for successfully identifying colors during activities (M=4.39) and performing hands-on activities to enhance color and shape recognition (M=4.36), both of which emphasize the importance of interactive and tactile learning experiences. The ability to identify and name shapes in various contexts (M=4.20) and apply number recognition skills in everyday scenarios (M=4.19) were also rated as "Good" performances. Additionally, pupils demonstrated competence in applying number recognition in real-life situations (M=4.04), participating in group activities (M=4.03), and showing proficiency in number recognition (M=4.00). The lowest rating, yet still within the "Good" category, was that pupils learn effectively through interventions and feedback (M=3.97).

The findings indicate that pupils generally exhibit strong skills in number, color, and shape recognition, suggesting that current teaching strategies and interventions are effective in promoting foundational skills. The high ratings for hands-on and interactive learning activities underscore the importance of engaging instructional methods that cater to diverse learning styles. However, the slightly lower rating regarding learning through interventions and feedback suggests that there may be opportunities to enhance the effectiveness of feedback mechanisms and targeted support strategies. Teachers might benefit from further professional development focused on formative assessment techniques and strategies for providing timely and constructive feedback. By refining these aspects, educators can better support pupil learning and foster a more conducive environment for skill development in early childhood education.

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Table 4

Teachers' Viewpoint on the Overall Performances of their Pupils

Dimension	Mean	Verbal Interpretation	Rank
Number, Color, and Shape Recognition	4.17	Good	1
Understanding of Quantity	4.00	Good	3
Patterns and Sorting	4.06	Good	2
Measurement Concepts	3.80	Good	4
Basic Operation	3.62	Good	5
General Average	**3.93**	**Good**	

Legend: *4.21 – 5.00 = Excellent 3.41 – 4.20 = Good 2.61 – 3.40 = Average*
1.81 – 2.60 = Below Average 1.00 – 1.80 = Poor

Understanding the differences in the utilization of teaching strategies based on teachers' age is crucial for tailoring professional development and support to meet diverse instructional needs. The Matatag Curriculum emphasizes various pedagogical approaches, including differentiated instruction, technology integration, experiential learning, and collaborative learning. This table presents the results of a Kruskal-Wallis H test examining whether there are significant differences in the levels of utilization of these teaching strategies among teachers grouped by age.

The analysis indicates varying results based on the teaching strategies examined. For Differentiated Instruction, the mean scores across age groups were as follows: below 30 years old (M=4.62), 30–50 years old (M=4.54), and 51 years old and above (M=4.43), with a Kruskal-Wallis H value of 1.99 and a p-value of 0.371, leading to the conclusion of no significant difference. In the case of Technology Integration, younger teachers (below 30 years old) scored higher (M=4.57) compared to older groups (30–50 years old: M=4.31; 51 years old and above: M=3.98), yielding a significant difference (H=8.30, p=0.016), indicating that age influences the level of technology integration utilized in teaching. For Experiential Learning, no difference was noted between the two younger groups (both M=4.50), while the oldest group had a lower mean (M=4.03). This resulted in a significant difference (H=9.36, p=0.009), suggesting that younger teachers may be more inclined to implement experiential learning strategies. Lastly, for Collaborative Learning, the mean scores indicated no significant differences among age groups (below 30 years: M=4.62; 30–50 years: M=4.39; 51 years and above: M=4.26; H=4.62, p=0.099).

The findings highlight that age influences the utilization of specific teaching strategies among teachers, particularly in technology integration and experiential learning. Younger teachers appear to embrace technology more readily and may engage in more experiential learning practices, while older teachers show consistent utilization across various strategies without significant differences. These insights suggest a need for targeted professional development that accommodates these generational differences in teaching practice. For instance, workshops focusing on technology integration could be beneficial for older teachers, while younger educators could be encouraged to share their innovative practices with their peers. By fostering an environment that promotes collaboration and shared learning across age groups, educational institutions can enhance the overall effectiveness of the Matatag Curriculum and ensure that all teachers are well-equipped to meet the diverse needs of their students.

Integrating technology into education provides students with an engaging learning experience, allowing them to remain more interested in the subject without being distracted. The utilization of projectors, computers, and other cutting-edge technical gear in the classroom may make studying fascinating and entertaining for students. Student learning can become more dynamic ang engaging by establishing tasks in class that incorporate technology resources, oral presentations, and group participation. Participation can extend beyond verbal communication as well (Haleem et al., 2022).

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Volume: 12 | Issue:7 |July 2025

Table 5

Significant Difference on Teachers' Level of Utilization of the Teaching Strategy based on the Matatag Curriculum when Grouped According to their Age

Variable	Group	Mean	Kruskal-Wallis H	p-value	Decision	Conclusion
Differentiated Instruction	Below 30 years old	4.62	1.99	0.371	Fail to Reject Ho	No Significant Difference Exists
	30 – 50 years old	4.54				
	51 years old and above	4.43				
Technology Integration	Below 30 years old	4.57	8.30*	0.016	Reject Ho	Significant Difference Exists
	30 – 50 years old	4.31				
	51 years old and above	3.98				
Experiential Learning	Below 30 years old	4.50	9.36*	0.009	Reject Ho	Significant Difference Exists
	30 – 50 years old	4.50				
	51 years old and above	4.03				
Collaborative Learning	Below 30 years old	4.62	4.62	0.099	Fail to Reject Ho	No Significant Difference Exists
	30 – 50 years old	4.39				
	51 years old and above	4.26				

**Significant at* $\alpha = 0.05$

The educational attainment of teachers is an important factor that may influence their teaching practices and the level of utilization of various pedagogical strategies outlined in the Matatag Curriculum. Understanding whether there are significant differences in teaching strategy utilization based on teachers' highest educational qualifications can help inform professional development initiatives and instructional support. This table presents the results of a Mann-Whitney U test examining the differences in the level of utilization of differentiated instruction, technology integration, experiential learning, and collaborative learning among teachers with Bachelor's and Master's degrees.

The analysis reveals that there are no significant differences in the level of utilization of teaching strategies between teachers with Bachelor's and Master's degrees across all examined variables. For Differentiated Instruction, the mean for teachers with a Bachelor's degree was 4.51, while for those with a Master's degree it was 4.60, yielding a Mann-Whitney U value of 504.00 and a p-value of 0.405. For Technology Integration, the mean scores were 4.30 (Bachelor's) and 4.42 (Master's), resulting in a U value of 505.50 and a p-value of 0.416. Similarly, for Experiential Learning, Bachelor's degree holders scored 4.36 while Master's degree holders scored 4.52, with a U value of 485.50 and a p-value of 0.288. Lastly, for Collaborative Learning, the means were 4.43 (Bachelor's) and 4.48 (Master's), resulting in a U value of 511.50 and a p-value of 0.456. In all cases, the p-values exceeded the significance level of 0.05, leading to the conclusion that there are no significantly different levels of strategy utilization based on educational attainment.

The findings suggest that teachers' highest educational attainment does not significantly impact their level of utilization of the teaching strategies associated with the Matatag Curriculum. This indicates that both Bachelor's and Master's degree holders may share similar practices in implementing differentiated instruction, technology integration, experiential learning, and collaborative learning. Given that educational attainment does not appear to influence strategy utilization, professional development initiatives may benefit from focusing on enhancing specific teaching practices rather than tailoring programs based solely on the level of educational qualifications. By fostering an inclusive and collaborative professional learning environment, all teachers can be supported in their continuous growth and effectiveness in the classroom.

In-service teacher training can be an effective way of imparting knowledge, skills, and motivation to teachers. It is a way to provide continuous education to the teachers who have already taken any certification in teaching and have chosen teaching as a profession. In-service teacher training can be defined as a series of activities arranged to engage teachers to enhance their knowledge, raise their skills, and broaden their professional approaches (Koellner & Greenblatt, 2018). According to Boudersa (2016), teacher training is very important to meet the advancements in education, not only in teaching but in assessment as well. In line with such requirements of training programs for teacher education, the Punjab government and private school chains have set up different training programs. In

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Volume: 12 | Issue:7 |July 2025

addition, teacher training plays a vital role in students' learning achievement; moreover, the context also plays an important role in teachers' professional development (Ikeda et al., 2019).

Table 6

Significant Difference on Teachers' Level of Utilization of the Teaching Strategy based on the Matatag Curriculum when grouped according to their Highest Educational Attainment

Variable	Group		Mann-Whitney U	p-value	Decision	Conclusion
Differentiated Instruction	Bachelor's Degree	4.51	504.00	0.405	Fail to Reject Ho	Not Significantly Different
	Master's Degree	4.60				
Technology Integration	Bachelor's Degree	4.30	505.50	0.416	Fail to Reject Ho	Not Significantly Different
	Master's Degree	4.42				
Experiential Learning	Bachelor's Degree	4.36	485.50	0.288	Fail to Reject Ho	Not Significantly Different
	Master's Degree	4.52				
Collaborative Learning	Bachelor's Degree	4.43	511.50	0.456	Fail to Reject Ho	Not Significantly Different
	Master's Degree	4.48				

**Significant at* $\alpha = 0.05$

The length of service of teachers is often believed to influence their pedagogical practices and the effectiveness of teaching strategies employed in the classroom. Understanding whether there are significant differences in the level of utilization of various teaching strategies based on teachers' years of experience can provide insights into how professional development and support should be tailored. This table presents the results of a Kruskal-Wallis H test examining the differences in the level of utilization of differentiated instruction, technology integration, experiential learning, and collaborative learning among teachers with varying lengths of service.

The analysis indicates that there are no significant differences in the level of utilization of teaching strategies based on the length of service among teachers. For Differentiated Instruction, teachers with 0–3 years of experience reported a mean of 4.57, while those with 4–10 years and more than 10 years had means of 4.55 and 4.52, respectively. The Kruskal-Wallis H value was 0.50, with a p-value of 0.780, leading to the conclusion of no significant difference. Similarly, for Technology Integration, the mean scores were 4.53 (0–3 years), 4.34 (4–10 years), and 4.21 (more than 10 years), with an H value of 2.60 and a p-value of 0.272, failing to reject the null hypothesis. The same pattern was observed for Experiential Learning, with means of 4.43 (0–3 years), 4.51 (4–10 years), and 4.34 (more than 10 years), yielding an H value of 1.89 and a p-value of 0.389, indicating no significant differences. Finally, for Collaborative Learning, the means were 4.54 (0–3 years), 4.46 (4–10 years), and 4.38 (more than 10 years), resulting in an H value of 1.12 and a p-value of 0.571, which also indicated no significant difference.

The findings suggest that the length of service does not significantly impact the level of utilization of teaching strategies among teachers in the context of the Matatag Curriculum. This indicates that both novice and more experienced teachers employ similar practices in differentiated instruction, technology integration, experiential learning, and collaborative learning. Given that length of service does not appear to influence strategy utilization, professional development initiatives may need to focus more on specific instructional strategies rather than being based solely on years of experience. Future research could explore other variables that might affect teaching practice, such as ongoing training opportunities, teacher collaboration, or the support provided by school administration. By fostering an environment that encourages professional growth for all teachers, irrespective of their length of service, educational institutions can enhance teaching quality and effectiveness in the classroom. Professional development consists of all natural learning experiences and those conscious and planned activities which are intended to be of direct or indirect benefit to the individual, group, or school, which contribute through these to the quality of education in the classroom. It is the process by which, alone and with others, teachers review, renew and extend their commitment as change agents to the moral purposes of teaching; and by which they acquire and develop critically the knowledge, skills and emotional intelligence essential to good professional thinking, planning, and practice with children, young people and colleagues throughout each phase of their teaching lives (Karlberg & Bezzina, 2020).

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Volume: 12 | Issue:7 |July 2025

Table 7

Significant Difference on Teachers' Level of Utilization of the Teaching Strategy based on the Matatag Curriculum when grouped according to their Length of Service

Variable	Group		Kruskal-Wallis H	p-value	Decision	Conclusion
Differentiated Instruction	0-3 years	4.57	0.50	0.780	Fail to Reject Ho	No Significant Difference Exists
	4-10 years	4.55				
	more than 10 years	4.52				
Technology Integration	0-3 years	4.53	2.60	0.272	Fail to Reject Ho	No Significant Difference Exists
	4-10 years	4.34				
	more than 10 years	4.21				
Experiential Learning	0-3 years	4.43	1.89	0.389	Fail to Reject Ho	No Significant Difference Exists
	4-10 years	4.51				
	more than 10 years	4.34				
Collaborative Learning	0-3 years	4.54	1.12	0.571	Fail to Reject Ho	No Significant Difference Exists
	4-10 years	4.46				
	more than 10 years	4.38				

**Significant at* $\alpha = 0.05$

The size of a school may impact various aspects of the educational environment, including the resources available for teaching, the professional support teachers receive, and the overall school culture. Understanding whether there are significant differences in the utilization of teaching strategies among teachers in small, medium, and large schools is crucial for tailoring support and professional development initiatives. This table presents the results of a Kruskal-Wallis H test that examines differences in the levels of utilization of differentiated instruction, technology integration, experiential learning, and collaborative learning based on school size.

The analysis reveals that there are no significant differences in the level of utilization of teaching strategies based on school size. For Differentiated Instruction, teachers in small schools had a mean score of 4.63, while those in medium and large schools scored 4.49 and 4.58, respectively. The Kruskal-Wallis H value was 1.17, with a p-value of 0.556, leading to the conclusion of no significant difference. In terms of Technology Integration, small schoolteachers reported a mean of 4.50, compared to 4.31 for medium schools and 4.19 for large schools. The resulting H value was 3.51, with a p-value of 0.173, which also failed to reject the null hypothesis. For Experiential Learning, the mean scores were 4.58 (small), 4.36 (medium), and 4.32 (large), yielding an H value of 4.03 and a p-value of 0.134, indicating no significant differences. Lastly, for Collaborative Learning, the means were 4.56 (small), 4.40 (medium), and 4.43 (large), resulting in an H value of 1.36 and a p-value of 0.505, further confirming no significant difference.

The findings suggest that school size does not significantly influence the level of utilization of teaching strategies among teachers in the context of the Matatag Curriculum. This indicates that regardless of school size, teachers are similarly engaging with differentiated instruction, technology integration, experiential learning, and collaborative learning strategies. Given that school size does not appear to impact teaching strategy utilization, professional development initiatives should focus on enhancing specific teaching practices rather than being tailored based on school size. Further research could explore other factors, such as school leadership, teacher collaboration, or the availability of resources, that may more directly correlate with effective teaching practices. By fostering a supportive and resource-rich environment across all school sizes, educational institutions can enhance the overall effectiveness of teaching strategies and improve student learning outcomes.

EPRA International Journal of Environmental Economics, Commerce and Educational Management
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Volume: 12 | Issue:7 |July 2025

Table 8

Significant Difference on Teachers' Level of Utilization of the Teaching Strategy based on the Matatag Curriculum when grouped according to their School Size

Variable	Group		Kruskal-Wallis H	p-value	Decision	Conclusion
Differentiated Instruction	Small	4.63	1.17	0.556	Fail to Reject Ho	No Significant Difference Exists
	Medium	4.49				
	Large	4.58				
Technology Integration	Small	4.50	3.51	0.173	Fail to Reject Ho	No Significant Difference Exists
	Medium	4.31				
	Large	4.19				
Experiential Learning	Small	4.58	4.03	0.134	Fail to Reject Ho	No Significant Difference Exists
	Medium	4.36				
	Large	4.32				
Collaborative Learning	Small	4.56	1.36	0.505	Fail to Reject Ho	No Significant Difference Exists
	Medium	4.40				
	Large	4.43				

**Significant at* $\alpha = 0.05$

The relationship between teachers' instructional practices and pupil performance is a crucial area of study in educational research. Specifically, differentiated instruction—a strategy aimed at meeting diverse student needs—has the potential to enhance learning outcomes across various subject areas. This table presents the correlation coefficients and p-values assessing the relationship between teachers' level of utilization of differentiated instruction and the performance of their pupils in key mathematical areas: number, color, and shape recognition; understanding of quantity; patterns and sorting; measurement concepts; and basic operations.

The analysis indicates that all correlation coefficients reflect a positive but weak relationship between the utilization of differentiated instruction and pupil performance across the various dimensions. For Number, Color, and Shape Recognition, the correlation coefficient is 0.177 (p=0.142), indicating not significantly correlated. In the area of Understanding of Quantity, the coefficient is 0.099 (p=0.414), which is also not significantly correlated. For Patterns and Sorting, the coefficient is 0.144 (p=0.234), demonstrating not significantly correlated results. The Measurement Concepts dimension shows a slightly higher correlation coefficient of 0.211 (p=0.079), nearing significance but still classified as not significantly correlated. Finally, for Basic Operations, the correlation coefficient is 0.197 (p=0.102), also indicating not significantly correlated.

The findings suggest that while there is a positive relationship between the level of utilization of differentiated instruction and pupil performance across various mathematical domains, the correlations are weak and not statistically significant. This indicates that factors other than differentiated instruction may play a more critical role in influencing pupil performance. It may be beneficial for educators to explore additional instructional strategies, classroom management techniques, and resource availability that could enhance student learning outcomes. Furthermore, ongoing professional development focusing on effective differentiation techniques, as well as collaborative practices among teachers, could help strengthen the impact of instructional methods on student achievement. Future research could examine other variables, such as student engagement, teacher collaboration, and the socio-economic context of schools, to provide a more comprehensive understanding of the factors that contribute to pupil performance.

Teachers need to have a wealth of knowledge in various teaching strategies and a bucket of these strategies to choose from. This helps educators engage their learners and keep their classroom actively participating in the learning process. Strategies help learners participate, connect, and add excitement to the content being delivered (Bouslog, 2022). Additionally, students often show improvement in their performance through diversified instructions. Tailored approaches address individual learning styles, allowing students to engage in the teaching-learning process. Varied instructional methods keep students interested and motivated, making it easier to grasp and retain information. By tailoring lessons, it will help children to engage more deeply and meet individual needs, interests, and learning styles.

EPRA International Journal of Environmental Economics, Commerce and Educational Management
Journal DOI: 10.36713/epra0414 |ISI I.F Value: 0.815|SJIF Impact Factor (2025): 8.57 ISSN: 2348 – 814X
Volume: 12 | Issue:7 |July 2025

It will boost their interest to participate actively and stay motivated. Differentiation allows children to work at their learning style, which leads to better understanding and improved performance.
Differentiated instruction is a strategy that can effectively meet the diverse needs of all students, leading to improved student achievement (Parsons et al., 2018).

Table 9

Significant Relationship of Teachers' Level of Utilization of Differentiated Instruction to the Performance of their Pupils

Variable	Correlation Coefficient	Degree of Relation	p-value	Conclusion
Number, Color, and Shape Recognition	0.177	Positive/Weak	0.142	Not Significantly Correlated
Understanding of Quantity	0.099	Positive/Weak	0.414	Not Significantly Correlated
Patterns and Sorting	0.144	Positive/Weak	0.234	Not Significantly Correlated
Measurement Concepts	0.211	Positive/Weak	0.079	Not Significantly Correlated
Basic Operation	0.197	Positive/Weak	0.102	Not Significantly Correlated

**Significant at $\alpha = 0.05$*

The integration of technology in the classroom is increasingly recognized as a vital component of modern education, potentially enhancing student engagement, and learning outcomes. Understanding the relationship between teachers' utilization of technology integration and pupils' performance across various mathematical domains is crucial for informing instructional practices and curriculum development. This table presents the correlation coefficients and p-values assessing the relationship between teachers' level of technology integration and their pupils' performance in key areas: number, color, and shape recognition; understanding of quantity; patterns and sorting; measurement concepts; and basic operations.

The analysis reveals that all correlation coefficients indicate a positive but weak relationship between the level of technology integration and pupil performance across the assessed dimensions. For Number, Color, and Shape Recognition, the correlation coefficient is 0.188 (p=0.120), which suggests not significantly correlated. In the area of Understanding of Quantity, the coefficient is 0.178 (p=0.139), indicating not significantly correlated results as well. For Patterns and Sorting, the coefficient is 0.172 (p=0.155), also demonstrating not significantly correlated. The Measurement Concepts dimension shows a higher correlation coefficient of 0.212 (p=0.078), nearing significance but still classified as not significantly correlated. Finally, for Basic Operations, the correlation coefficient is 0.141 (p=0.245), also indicating not significantly correlated.

The findings suggest that while there is a positive relationship between the level of utilization of technology integration and pupil performance across various mathematical domains, the correlations are weak and not statistically significant. This implies that other factors may be influencing pupil performance more significantly than technology integration alone. It may be beneficial for educators to investigate additional instructional strategies, engagement techniques, and resources that could enhance student learning outcomes. Furthermore, professional development focused on effective technology integration methods and pedagogical strategies may help teachers maximize the impact of technology in their classrooms. Future research could explore additional variables such as student motivation, classroom dynamics, and teacher training on technology usage to provide a more nuanced understanding of how technology affects pupil performance.

The effect of technology on students' mathematics performance is a subject of significant debate and research. While some studies have shown that technology can improve student mathematics performance, others have found no significant difference. One study found that technology-based learning interventions, such as gamification and interactive software, resulted in improved mathematics performance for students (Hillmayr et al, 2020). Furthermore, technology can provide students with immediate feedback on their work, allowing them to self-correct and adjust more quickly. However, technology is not a panacea for improving mathematics performance (Gomez-Garcia et al.,

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Journal DOI: 10.36713/epra0414 |ISI I.F Value: 0.815|SJIF Impact Factor (2025): 8.57 ISSN: 2348 – 814X
Volume: 12 | Issue:7 |July 2025

2020). Additionally, the use of technology in teaching and learning mathematics can have a positive effect on students' mathematics interest (Kelley et al, 2020).

Table 10

Significant Relationship of Teachers' Level of Utilization of Technology Integration to the Performance of their Pupils

Variable	Correlation Coefficient	Degree of Relation	p-value	Conclusion
Number, Color, and Shape Recognition	0.188	Positive/Weak	0.120	Not Significantly Correlated
Understanding of Quantity	0.178	Positive/Weak	0.139	Not Significantly Correlated
Patterns and Sorting	0.172	Positive/Weak	0.155	Not Significantly Correlated
Measurement Concepts	0.212	Positive/Weak	0.078	Not Significantly Correlated
Basic Operation	0.141	Positive/Weak	0.245	Not Significantly Correlated

**Significant at $\alpha = 0.05$*

Experiential learning is an educational approach that emphasizes learning through experience and reflection, enabling students to engage actively with the material and apply their knowledge in real-world contexts. Understanding the relationship between teachers' utilization of experiential learning and pupils' performance across various mathematical domains is essential for assessing the effectiveness of this pedagogical approach. This table presents the correlation coefficients and p-values that evaluate the relationship between the level of utilization of experiential learning and pupils' performance in key areas: number, color, and shape recognition; understanding of quantity; patterns and sorting; measurement concepts; and basic operations.

The analysis reveals that all correlation coefficients indicate a positive but weak relationship between the level of utilization of experiential learning and pupil performance across the assessed dimensions. For Number, Color, and Shape Recognition, the correlation coefficient is 0.129 (p=0.287), which suggests not significantly correlated. In the area of Understanding of Quantity, the coefficient is 0.082 (p=0.501), indicating not significantly correlated results as well. For Patterns and Sorting, the coefficient is 0.062 (p=0.612), also demonstrating not significantly correlated. The Measurement Concepts dimension shows a correlation coefficient of 0.124 (p=0.307), indicating not significantly correlated results. Lastly, for Basic Operations, the correlation coefficient is 0.116 (p=0.341), also indicating not significantly correlated.

The findings suggest that while there is a positive relationship between the level of utilization of experiential learning and pupil performance across various mathematical domains, the correlations are weak and not statistically significant. This indicates that other factors may be influencing pupil performance more significantly than experiential learning alone. Educators might explore additional instructional strategies, engagement techniques, and supportive resources to further enhance student learning outcomes. Additionally, professional development focused on implementing experiential learning effectively may empower teachers to create more engaging and impactful learning experiences for their pupils. Future research could investigate other variables, such as student engagement, teaching style, or classroom environment, to gain a deeper understanding of how experiential learning impacts pupil performance.

Based on the study of Charles-Ogan and Onyeka (2023), the experiential teaching method is based on the principle of learning by doing, as students acquire knowledge after having experienced or done somewhat innovative. Thus, the experiential teaching method focuses on students' own life experiences and comprises a high degree of involvement. According to McCrann (2016), in the experiential teaching method, learners are dynamically engaging in activities or experiences. The students acquire knowledge by doing. This means that the experiential teaching method helps learners in the acquisition of skills and the construction of knowledge from the direct outcome of the experience. The learner is said to have the capability to select and partake in practices that will improve performance and retention. The experiential teaching method raises students' cognition levels, upsurges the use of critical thinking skills, and therefore enhances students' ability to obtain, retain, and retrieve knowledge, hence augmenting performance.

EPRA International Journal of Environmental Economics, Commerce and Educational Management
Journal DOI: 10.36713/epra0414 |ISI I.F Value: 0.815|SJIF Impact Factor (2025): 8.57 ISSN: 2348 – 814X
Volume: 12 | Issue:7 |July 2025

Moreover, students using experiential learning-based teaching material in mathematics in their schools had higher cognitive ability than students who did not use experiential learning-based teaching material in mathematics in their school (Fitri, 2017).

Table 11

Significant Relationship of Teachers' Level of Utilization of Experiential Learning to the Performance of their Pupils

Variable	Correlation Coefficient	Degree of Relation	p-value	Conclusion
Number, Color, and Shape Recognition	0.129	Positive/Weak	0.287	Not Significantly Correlated
Understanding of Quantity	0.082	Positive/Weak	0.501	Not Significantly Correlated
Patterns and Sorting	0.062	Positive/Weak	0.612	Not Significantly Correlated
Measurement Concepts	0.124	Positive/Weak	0.307	Not Significantly Correlated
Basic Operation	0.116	Positive/Weak	0.341	Not Significantly Correlated

**Significant at $\alpha = 0.05$*

Collaborative learning is an instructional approach that emphasizes group work and peer interaction to enhance student learning outcomes. This method encourages communication, critical thinking, and problem-solving skills among pupils. Understanding the relationship between teachers' utilization of collaborative learning and pupils' performance in various mathematical domains is crucial for assessing the effectiveness of this strategy. This table presents the correlation coefficients and p-values that evaluate the relationship between the level of utilization of collaborative learning and pupils' performance in key areas: number, color, and shape recognition; understanding of quantity; patterns and sorting; measurement concepts; and basic operations.

The analysis shows that most correlation coefficients indicate a positive but weak relationship between the level of utilization of collaborative learning and pupil performance, with one exception. For Number, Color, and Shape Recognition, the correlation coefficient is 0.080 (p=0.509), indicating not significantly correlated. In the area of Understanding of Quantity, the coefficient is 0.134 (p=0.267), which also suggests not significantly correlated results. For Patterns and Sorting, the correlation coefficient is 0.191 (p=0.113), demonstrating a not significantly correlated outcome. The Measurement Concepts dimension shows a correlation coefficient of 0.216 (p=0.072), indicating a not significantly correlated result, albeit close to significance. However, for Basic Operations, the correlation coefficient is 0.264 (p=0.027), which is categorized as a positive/moderately weak correlation and is significantly correlated.

The findings suggest that while there is a generally positive relationship between the level of utilization of collaborative learning and pupil performance across various mathematical domains, most correlations are weak and not statistically significant. Notably, the significant correlation with Basic Operations indicates that collaborative learning may have a more pronounced effect in this area, suggesting its potential as an effective instructional strategy for enhancing pupils' understanding and skills in basic operations. Educators may benefit from incorporating more collaborative learning opportunities, particularly in teaching basic operations, to foster greater student engagement and understanding. Additionally, further research could explore other variables that might enhance the effectiveness of collaborative learning, such as group dynamics, peer influence, or specific instructional techniques. By leveraging collaborative learning effectively, teachers can create a more interactive and supportive learning environment that promotes better educational outcomes.

When it comes to the teaching and learning process, collaborative learning refers to a collection of teaching and learning techniques that encourage learners to work together in small groups (Le et al., 2018). In addition, the very essence of collaborative learning is working together toward a shared goal. This implies that in addition to their learning, learners are accountable for one another's academic progress (Ismail et al., 2018).

EPRA International Journal of Environmental Economics, Commerce and Educational Management
Journal DOI: 10.36713/epra0414 |ISI I.F Value: 0.815|SJIF Impact Factor (2025): 8.57 ISSN: 2348 – 814X
Volume: 12 | Issue:7 |July 2025

Following the DepEd memo No. 8, s. 2023 Multi-Year Guidelines on the Results-Based Performance Management System – Philippine Professional Standards for Teachers (RPMS-PPST), Classroom Observation Tool (COT) – RPMS for Proficient teacher under it. As mentioned in the said memorandum, under KRA 1 on Content Knowledge and Pedagogy, teachers who use the proficient tools are expected to apply a variety of teaching and learning strategies that are well aligned with the needs of both individual and group learning. It also encourages learners to participate, cooperate, and collaborate to improve learners' academic performance. Additionally, empirical studies on learners' engagement and collaborative learning have shown a favorable relationship between these two areas (Vega-Abarzua et al., 2022). Collaborative learning has proven to be effective in developing relationships with peers and, most especially, creating better work (Pahomov, 2018).

Table 12

Significant Relationship of Teachers' Level of Utilization of Collaborative Learning to the Performance of their Pupils

Variable	Correlation Coefficient	Degree of Relation	p-value	Conclusion
Number, Color, and Shape Recognition	0.080	Positive/Weak	0.509	Not Significantly Correlated
Understanding of Quantity	0.134	Positive/Weak	0.267	Not Significantly Correlated
Patterns and Sorting	0.191	Positive/Weak	0.113	Not Significantly Correlated
Measurement Concepts	0.216	Positive/Weak	0.072	Not Significantly Correlated
Basic Operation	0.264*	Positive/Moderately Weak	0.027	Significantly Correlated

**Significant at* $\alpha = 0.05$

Understanding the challenges teachers face in utilizing differentiated instruction is crucial for improving teaching practices and enhancing student learning outcomes. The relationship between the level of utilization of differentiated instruction and self-assessment of challenges such as lack of resources, insufficient training, struggling learners, and classroom management issues provides insight into the factors that may hinder effective instruction. This table presents the correlation coefficients and p-values assessing the relationship between teachers' utilization of differentiated instruction and their self-reported challenges in its implementation.

The analysis reveals that all correlation coefficients indicate a positive but weak relationship between the level of utilization of differentiated instruction and the self-assessment of various challenges, though none of the correlations are statistically significant. For Lack of Resources, the correlation coefficient is 0.152 (p=0.208), indicating not significantly correlated. In the case of Insufficient Training, the coefficient is 0.204 (p=0.091), also suggesting not significantly correlated results. The correlation for Struggling Learners is 0.213 (p=0.077), demonstrating a not significantly correlated outcome that is close to significance. Lastly, for Classroom Management Issues, the correlation coefficient is 0.218 (p=0.069), again indicating not significantly correlated, but also nearing significance.

The findings suggest that while there is a positive relationship between the level of utilization of differentiated instruction and teachers' self-assessment of challenges, these relationships are weak and not statistically significant. This indicates that factors such as lack of resources, insufficient training, and classroom management issues may not directly impede the utilization of differentiated instruction as perceived by teachers. However, the near-significant correlations with struggling learners and classroom management issues suggest areas where teachers may perceive these challenges as influencing their instructional practices. Professional development focused on addressing these challenges, particularly through resource allocation, training programs, and effective classroom management strategies, could enhance teachers' ability to implement differentiated instruction effectively. Future research may explore additional contextual factors, such as school culture or administrative support, to provide a deeper understanding of how these challenges impact differentiated instruction utilization.

Research has shown that students learn in several ways, which also affects student engagement and motivation. Instruction should differentiate to benefit each student. Adjusting teaching methods to accommodate student learning preferences helps to increase student motivation and performance (Malacapay, 2019). There are a few ways to

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Volume: 12 | Issue:7 |July 2025

differentiate instruction. One is by considering Howard Gardner's Multiple Intelligences Theory. Gardner's theory currently states that there are nine intelligences to consider when creating curriculum. It is important to provide students with ways to learn that are geared toward their preferred method of learning. (Sener & Cokcaliskan, 2018).

Aside from students' preferred methods of learning, teachers need instruction and need to have tools available to them to implement differentiated instruction into their classroom. Many teachers intend to differentiate, but struggle with how to incorporate these ideas and learning preferences into their classrooms. Other teachers feel they do not have enough time available to them, so they use it to a low extent (Onyishi & Sefotho, 2020). By providing teachers with training and time, teachers may become more comfortable with implementing differentiated instruction, which would have a positive impact on student learning (Bogen et al., 2019).

Table 13

Significant Relationship of Teachers' Level of Utilization of Differentiated Instruction to Their Self-Assessment on the Challenges Experienced in Its Utilization

Variable	Correlation Coefficient	Degree of Relation	p-value	Conclusion
Lack of Resources	0.152	Positive/Weak	0.208	Not Significantly Correlated
Insufficient Training	0.204	Positive/Weak	0.091	Not Significantly Correlated
Struggling Learners	0.213	Positive/Weak	0.077	Not Significantly Correlated
Classroom Management Issues	0.218	Positive/Weak	0.069	Not Significantly Correlated

**Significant at* $\alpha = 0.05$

The integration of technology in educational settings has become essential for enhancing teaching and learning processes. However, teachers often encounter various challenges that can impede effective technology utilization, such as a lack of resources, insufficient training, and classroom management issues. Understanding the relationship between the level of technology integration and teachers' self-assessment of these challenges provides valuable insights for improving instructional practices. This table presents the correlation coefficients and p-values assessing the relationship between teachers' utilization of technology integration and their self-reported challenges. Based on the study of Shahbodin & Pee (2018), technology is a major booster in increasing innovation in teaching-learning activities, providing different learning experiences, and providing broader learning opportunities for students. Additionally, the use of technology in learning mathematics creates opportunities for students to access mathematics more deeply and connect mathematics with real life. Along with the increasing problems and complexity of mathematics material, the digital learning ecosystem becomes an alternative for students, because mathematics learning becomes interactive, dynamic, investigative, and process-oriented due to technological involvement. In the end, it becomes a capital that can direct students towards discovery-oriented mathematics and strengthen deeper understanding through reflection and critical thinking. Learning mathematics using technology becomes more interesting, motivating, provides opportunities for learning while playing, encourages students to explore problems, produce guesses, and seek explanations while sharing their findings with their peers and teachers, and increases opportunities for collaboration (Freiman & Tassell, 2018).

The analysis shows that while most correlation coefficients indicate a positive but weak relationship, there is one significant correlation. For Lack of Resources, the correlation coefficient is 0.166 (p=0.170), suggesting not significantly correlated. In the case of Insufficient Training, the coefficient is 0.271 (p=0.023), indicating a positive/moderately weak relationship that is significantly correlated. For Struggling Learners, the correlation coefficient is 0.103 (p=0.395), which indicates not significantly correlated results. Finally, for Classroom Management Issues, the correlation coefficient is 0.164 (p=0.175), also demonstrating a not significantly correlated outcome.

The findings suggest that there is a significant relationship between the level of utilization of technology integration and teachers' self-assessment of insufficient training. This implies that as teachers integrate technology more effectively, their perception of the challenges associated with insufficient training becomes more pronounced. The positive correlation highlights the need for targeted professional development focused on enhancing teachers' technological competencies and providing adequate training to address the challenges they face. Although the relationships with lack of resources, struggling learners, and classroom management issues are positive but weak, they

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Volume: 12 | Issue:7 |July 2025

still indicate areas where teachers may feel these challenges affect their technology utilization. Addressing these challenges through resource allocation and training can further support teachers in effectively integrating technology into their instruction. Future research could explore additional factors that may influence these relationships, such as the specific types of technology used, teacher attitudes toward technology, and the support provided by school administration.

Technology-incorporated instructional practices not only enhance the quality of teaching (Akram et al., 2021) but also enable students to develop their skills, boost their motivation, and enhance their knowledge and information efficiently (Chen et al., 2018). However, teachers faced difficulties in making the best use of ICT in their instructional practices due to inadequate technological competencies, yet the transitory phase improved their digital skills. Furthermore, the utilization of ICT in education for enhancing instructional practices' effectiveness has been considered crucial for the last few decades worldwide (U.S. Department of Education, 2017).

Table 14

Significant Relationship of Teachers' Level of Utilization of Technology Integration to their Self-Assessment on the Challenges Experienced in its Utilization

Variable	Correlation Coefficient	Degree of Relation	p-value	Conclusion
Lack of Resources	0.166	Positive/Weak	0.170	Not Significantly Correlated
Insufficient Training	0.271*	Positive/Moderately Weak	0.023	Significantly Correlated
Struggling Learners	0.103	Positive/Weak	0.395	Not Significantly Correlated
Classroom Management Issues	0.164	Positive/Weak	0.175	Not Significantly Correlated

**Significant at* $\alpha = 0.05$

Experiential learning is a pedagogical approach that emphasizes active participation and real-world application in the learning process. However, teachers may encounter various challenges that can affect the effective utilization of experiential learning strategies, such as a lack of resources, insufficient training, struggling learners, and classroom management issues. Understanding the relationship between the level of utilization of experiential learning and teachers' self-assessment of these challenges is essential for improving instructional practices. This table presents the correlation coefficients and p-values that assess the relationship between teachers' utilization of experiential learning and their self-reported challenges.

National Education Policy (NEP) 2020 highlighted that experiential learning will be adopted as standard pedagogy for every subject at all stages, with an exploration of relations among different subjects. Today, experiential learning has become an essential method in all new innovative pedagogical practices as it holistically strives to shift the learning of the students from rote learning to learning by doing and by self-experience. However, many initiatives have been taken by Indian's state and central governments to incorporate experiential learning in school education to emphasize learning by doing and reflecting on experiences (Kumar & Kumari, 2019).

The analysis reveals that all correlation coefficients indicate a positive but weak relationship between the level of utilization of experiential learning and teachers' self-assessment of challenges, with none reaching statistical significance. For Lack of Resources, the correlation coefficient is 0.070 (p=0.563), indicating not significantly correlated. In the area of Insufficient Training, the coefficient is 0.122 (p=0.315), suggesting not significantly correlated results as well. The correlation for Struggling Learners is 0.049 (p=0.687), demonstrating a not significantly correlated outcome. Lastly, for Classroom Management Issues, the correlation coefficient is 0.010 (p=0.932), which also indicates not significantly correlated.

The findings suggest that there is no significant relationship between the level of utilization of experiential learning and teachers' self-assessment of challenges experienced in its implementation. This indicates that the challenges related to resources, training, struggling learners, and classroom management do not appear to significantly affect how

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Volume: 12 | Issue:7 |July 2025

teachers employ experiential learning strategies. However, the weak positive correlations may reflect a general awareness among teachers of the potential impact of these challenges on their instructional practices. To enhance the effectiveness of experiential learning, professional development initiatives may need to focus on addressing the specific challenges teachers face. For example, providing adequate resources, improving training opportunities, and offering strategies for managing diverse learners in the classroom can empower teachers to implement experiential learning more effectively. Future research could investigate additional factors that may influence these relationships, such as school culture, administrative support, or teacher collaboration.

Table 15

Significant Relationship of Teachers' Level of Utilization of Experiential Learning to their Self-Assessment on the Challenges Experienced in its Utilization

Variable	Correlation Coefficient	Degree of Relation	p-value	Conclusion
Lack of Resources	0.070	Positive/Weak	0.563	Not Significantly Correlated
Insufficient Training	0.122	Positive/Weak	0.315	Not Significantly Correlated
Struggling Learners	0.049	Positive/Weak	0.687	Not Significantly Correlated
Classroom Management Issues	0.010	Positive/Weak	0.932	Not Significantly Correlated

**Significant at $\alpha = 0.05$*

Collaborative learning is an instructional strategy that promotes student interaction and teamwork to enhance learning outcomes. However, teachers may face various challenges when implementing collaborative learning, such as a lack of resources, insufficient training, struggling learners, and classroom management issues. Understanding the relationship between the level of utilization of collaborative learning and teachers' self-assessment of these challenges is essential for optimizing instructional practices. This table presents the correlation coefficients and p-values that assess the relationship between teachers' utilization of collaborative learning and their self-reported challenges. According to Meijer et al. (2020), one of the main challenges for teachers and students is the assessment of collaborative learning activities.

The analysis indicates that all correlation coefficients show a positive but weak relationship between the level of utilization of collaborative learning and teachers' self-assessment of challenges, with none achieving statistical significance. For Lack of Resources, the correlation coefficient is 0.097 (p=0.423), suggesting not significantly correlated. In the area of Insufficient Training, the coefficient is 0.105 (p=0.388), indicating not significantly correlated results. The correlation for Struggling Learners is 0.098 (p=0.420), also demonstrating a not significantly correlated outcome. Lastly, for Classroom Management Issues, the correlation coefficient is 0.030 (p=0.805), indicating not significantly correlated.

The findings suggest that there is no significant relationship between the level of utilization of collaborative learning and teachers' self-assessment of the challenges they experience in its implementation. This indicates that the challenges related to resources, training, struggling learners, and classroom management do not significantly impact how teachers engage in collaborative learning practices. However, the weak positive correlations may suggest a general acknowledgment among teachers of the potential influences these challenges could have on their instructional methods. To enhance the effectiveness of collaborative learning, professional development initiatives could focus on addressing specific barriers teachers face. For instance, providing training on effective collaboration strategies, resource management, and techniques for managing diverse learners may empower teachers to implement collaborative learning more successfully. Future research could explore additional factors, such as institutional support, peer collaboration, and teacher attitudes toward collaboration, that may influence the effectiveness of collaborative learning practices.

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Volume: 12 | Issue:7 |July 2025

Table 16

Significant Relationship of Teachers' Level of Utilization of Collaborative Learning to their Self-Assessment on the Challenges Experienced in its Utilization

Variable	Correlation Coefficient	Degree of Relation	p-value	Conclusion
Lack of Resources	0.097	Positive/Weak	0.423	Not Significantly Correlated
Insufficient Training	0.105	Positive/Weak	0.388	Not Significantly Correlated
Struggling Learners	0.098	Positive/Weak	0.420	Not Significantly Correlated
Classroom Management Issues	0.030	Positive/Weak	0.805	Not Significantly Correlated

**Significant at $\alpha = 0.05$*

CONCLUSIONS

Based on the analysis and interpretation of the data, the following conclusions were drawn. These conclusions highlight the teaching strategies utilized by Kindergarten and Grade 1 teachers under the MATATAG Curriculum, the challenges encountered in utilization of these strategies and the performance of the pupils.

The respondents of the study are all females, which aligns with the common trend of Kindergarten and Grade 1 being commonly handled by female teachers. The majority of respondents fall into the 30-50 years old, suggesting that these teachers have accumulated significant experience in the field. Greater portions hold at least a bachelor's degree, indicating a strong educational foundation within this group. Additionally, in terms of professional experience, several respondents have worked for more than 10 years, which further suggests that highly experienced educators. Furthermore, the fact that more teachers work in medium-sized schools implies that the sample represents a specific type of educational environment. Overall, this group of respondents is both highly experienced and well-educated, making their perspectives and insights invaluable for understanding the challenges and strategies in early mathematics education. Their knowledge and expertise contribute significantly to the study's ability to provide informed recommendations for improving teaching and learning.

Teachers consistently implemented the four key teaching strategies advocated by the MATATAG Curriculum—differentiated instruction, technology integration, experiential learning, and collaborative learning—demonstrating a strong commitment to enhancing the educational experience of their pupils. The frequent use of these strategies, as reflected by the average response of "Always," highlights their importance in promoting essential skills for Kindergarten and Grade 1 pupils. This consistent implementation suggests that teachers are effectively creating a dynamic and supportive environment conducive to developing fundamental skills among young learners.

The teachers frequently encounter challenges in utilizing the teaching strategies, as reflected by the "Often" response of the majority of respondents. These challenges include a lack of resources, insufficient training, struggling learners, and classroom management issues. The common nature of these challenges signifies that addressing these issues is crucial for improving the effectiveness of instructional practices and supporting teachers in implementing the strategies successfully. By providing additional resources, comprehensive professional development, and a support system, this will empower teachers to deliver high-quality instruction and successful implementation of the Matatag Curriculum.

Pupils are performing at a "Good" level across the key areas of early mathematics education. This indicates strong performance across various dimensions of early mathematics education. Their competencies in number, color, and shape recognition, as well as understanding of quantity, patterns and sorting, measurement concepts, and basic operations, highlight the strengths of the pupils. These insights are valuable for guiding instructional practices and informing curriculum development for further support of pupils' learning and development in early mathematics.

There is a significant generational difference in the use of specific teaching strategies, particularly in the areas of technology integration and experiential learning. Younger teachers are more inclined to incorporate modern technological tools and engage pupils through hands-on, experience-based methods. In contrast, older teachers tend to employ a more balanced and consistent use of various instructional strategies, without a marked preference for these

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Volume: 12 | Issue:7 |July 2025

innovative approaches. This suggests that age may play a role in shaping pedagogical choices, particularly in the adoption of contemporary teaching methods.

There is a positive relationship between teaching strategies and student performance, but the correlations are generally weak and statistically insignificant. However, an exception has been found in the collaborative learning strategy, which demonstrated a positive yet moderately weak and statistically significant correlation with pupils' performance in basic operations. This indicates that collaborative learning may have a more meaningful impact on pupils' understanding and skills in this area. Although the overall relationship between teaching strategies and performance is weak, the positive effect of collaborative learning on basic operations highlights its potential as an effective strategy in early mathematics education. The findings point to the value of fostering collaborative learning environments, which could lead to enhanced mathematical skills, particularly in areas like basic operations.

There is a positive but weak relationship between the level of utilization of the following teaching strategies (differentiated instruction, experiential learning, and collaborative learning) and the challenges experienced by the teachers; none of these correlations is statistically significant. However, a significant correlation was found between technology integration and teachers' self-assessment of insufficient training. This signifies that as teachers incorporate more technology, their awareness of the training gap increases, emphasizing the need for specific professional development to improve technological skills. Additionally, while the relationship with challenges like lack of resources, struggling learners, and classroom management issues is weak, they still suggest that these factors may impact how effectively teachers use teaching strategies in delivering the lessons.

RECOMMENDATIONS

Based on the conclusion, the following recommendations are proposed to enhance the teaching and learning of mathematical fundamentals among Kindergarten and Grade 1 pupils under the MATATAG Curriculum. These recommendations aim to support teachers in addressing instructional challenges, improving pedagogical practice, and promoting better learning outcomes of the pupils.

Develop and improve teaching practices and provide professional development to enhance teaching methods for the development of mathematical fundamentals of the pupils. Tailored training programs could address emerging trends in education, such as technology integration and differentiated instruction. Additionally, as the majority have over 10 years of experience, mentorship and leadership development opportunities could be offered to support career growth and share the best practices across schools.

Enhance teachers' training for professional development opportunities that focus on advancing strategies, particularly in areas where they may be underutilized and less effective. Fostering a collaborative community of practice among teachers can allow for the sharing of successful approaches, challenges, and insights, ensuring continuous improvement and alignment with the evolving needs of the pupils.

Provide adequate resources, such as teaching materials and technological tools, to support teachers in delivering the lessons effectively. The frequent challenges faced by diverse learners highlight the need for targeted interventions and professional development focused on differentiated instruction and inclusive practices. Supporting teachers on professional development, like seminars and training addressing these interconnected challenges holistically, will be essential for fostering an environment where teachers can effectively implement the curriculum and enhance student learning experiences.

Continuously evaluate instructional practices through regular and comprehensive assessment to guide the effective teaching and learning process. Provide teachers with targeted professional development opportunities that focus on enhancing their expertise in key areas, like number sense, understanding of quantity, patterns and sorting, measurement concepts, and especially basic operations. This professional growth should be supported by evidence-based strategies and resources that address the specific needs of young learners. Additionally, by prioritizing these areas, teachers can significantly elevate the quality of instruction and improve student outcomes.

Provide professional development opportunities that focus on technology integration and experiential teaching strategies. Novice teacher could benefit from mentorship programs where experienced educators share insights on a broader range of teaching strategies, while older teacher may benefit from training that emphasizes the effectiveness of using technology and hands-on learning approaches. Encourage collaboration and knowledge sharing between teachers of varying experience levels to promote balanced and innovative teaching-and-learning environment.

Focus on strengthening the implementation of current approaches to increase impact. Specifically, the significant correlation with basic operations suggests that collaborative learning may be particularly effective in this area. To

maximize its potential, further integration to collaborative learning method in teaching basic operations should be explored and developed. Additionally, ongoing professional development and research on the effectiveness of these strategies can help identify best practices for enhancing mathematical fundamentals of the pupils.

Prioritize targeted professional development focused on enhancing teachers' skills in technology. Providing comprehensive training that addresses both the effective use of technology and the challenges teachers face in utilizing it will help bridge this gap. Equip teachers with the strategies to better manage challenges such as lack of resources, struggling learners, and classroom management issues, thus enhancing their overall teaching effectiveness, especially when integrating technology in the classroom.

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