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Pedagogical Skills and Competencies of Grade Six Public Elementary School Math Teachers in Relation to Pupils' Performance: A Case of Public Elementary Schools in Tarlac Province

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Abstract

This study investigated the correlation between Grade Six Math teachers' pedagogical skills and the Mathematics performance of Grade Six pupils in public elementary schools in Cluster 1, Tarlac Province, which ranked last among 20 divisions in Region III's National Achievement Test. Conducted during the 2019–2020 school year, the study involved 37 Math teachers and their classes, employing survey questionnaires, documentary analysis, classroom observation tools, and performance ratings. Results revealed that teachers' pedagogical skills were at the Consolidating level, a stage indicating emerging mastery of instructional strategies that require further support to enhance learner engagement, with a weighted mean of 6.16. Teachers' competencies were rated Very Satisfactory (4.31 mean), and 78% of Grade Six pupils demonstrated a Very Satisfactory performance in Mathematics. The study concludes that continuous teacher training is essential to improving both pedagogical skills and student performance, highlighting its importance in achieving Sustainable Development Goal 4 (SDG 4) for quality education.

Introduction

Learning is an essential part of life; while it can sometimes become tiring, it does not need to be boring. With the right atmosphere, curriculum content, and exciting classroom activities, learning can be fun. The key is to incorporate fun into the lessons or activities and the utilization of various methods and strategies in teaching.

Genio (2009) observes that it has been a belief that Mathematics is a difficult subject. This negative impression influences the pupil's appreciation and desire to learn the subject. While it is true that Mathematical concepts and principles are not easily learned, much difficulty is expected in a learner who considers Mathematics a burden to his studies and feels disliked for it. Thus, the teacher's primary concern in teaching Mathematics is to develop the learner's appreciation of the subject.

Mathematics is not solely about memorizing rules, facts, or equations or rhyming off numerical operations, but instead is about finding patterns, coming up with inventive solutions, and putting forward suggestions that might match an evolving body of knowledge. (Feachem, 2014)

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"Students learn Mathematics through the experiences that teachers provide. Teachers must know and understand deeply the mathematics they are teaching, understand and be committed to their students as human beings," said Canonizado (2009). In many cases, students' perception of Mathematics as a difficult subject is directly linked to the effectiveness of their teachers' skills.

It is indeed a challenge for a teacher to make Mathematics applicable to life situations. Teachers may be skilled with the strategies but failure to utilize them in the classroom means losing the opportunity to find Mathematics a place in the hearts of every learner.

In the Philippines, where Mathematics education faces challenges, educational systems must embrace new insights, pedagogical approaches, and teaching innovations to support Math teachers in enhancing their professional skills. This is essential not only for new teachers but also for experienced ones who recognize the need to refine their teaching methods. According to Zvarych (2013), these improvements ultimately enhance students' learning outcomes, leading to meaningful and sustained gains in education quality.

The pedagogical skills and level of competencies of Mathematics teachers are indispensable to providing quality basic education in our country. Under the provision of Article IV of Section 2, of R. A. No. 7836, otherwise known as the Code of Ethics of Professional Teachers states that every teacher shall uphold the highest possible standards of quality education, shall make the best preparation for the career of teaching, and shall always be at his best in the practice of his profession".

Globally, the United Nations has established 17 (SDGs), each of which addresses important facets of development, as educators work to create a more sustainable future. Among these goals, SDG 4 stands out as it focuses on ensuring inclusive and quality education for all, promoting lifelong learning opportunities for everyone. Where is the Philippines on the SDGs? The Philippines, however, faces a learning crisis, with national assessments and international benchmarks revealing substantial skill gaps. Prior to the pandemic, the world was off track in meeting SDGs; even COVID-19 put SDGs further off track. Based on UNESCO, without additional measures to what we have, approximately 300 million students will lack the basic numeracy and literacy skills necessary for success in life by 2030. The Philippines ranked 7th in ASEAN in attaining SDGs. Based on the study by Albert (2018) of PIDS (Philippine Institute for Development Studies), he found out that in terms of Quality Education, there is still Learning Crisis, and there's nothing new about it. Learning Assessments suggest that learners don't have enough skills since on National Achievement Test, the MPS is below 50%, and on PISA, the Philippines ranked last in reading, Second to the last in Science and Math.

Data based on the institutional performance profile report of Region III for three past consecutive years, the Division of Tarlac Province ranked 20th among the twenty (20) divisions on National Achievement Test. Moreover, based on the latest conducted Metrobank MTAP Challenge, only a few among the Grade Six examiners in Cluster 1 qualified in the elimination round. With the presented data, it can be said that the Mathematics performance of Tarlac Province needs remediation to improve the result. One of the potential factors that may affect the performance of our learners is the pedagogical skills and competencies of teachers. Hence, improving and enhancing teachers' skills can be one of the keys to meeting the standards.

Therefore, this study will determine the pedagogical skills and level of competencies of public elementary school Mathematics teachers in Cluster 1, Division of Tarlac Province about the pupils' performance in Mathematics so that systematic and innovative programs/teaching strategies for Mathematics teachers should be implemented.

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Research Questions

This study investigated the relationship of the pedagogical skills and competencies of Grade Six Mathematics teachers to the pupils' performance in public Elementary Schools in Cluster I, Division of Tarlac Province.

Specifically, it sought to answer the following questions:

1. How are the public elementary Grade Six Mathematics teachers in Cluster I described along:
    - 1.1 content knowledge,
    - 1.2 teaching strategies,
        - 1.2.1 literacy and numeracy skills,
        - 1.2.2 critical and creative thinking skills, and
        - 1.2.3 differentiated and developmental learning,
    - 1.3 classroom management,
    - 1.4 learner's behavioral management,
    - 1.5 planning, managing, and implementing curriculum,
    - 1.6 utilizing appropriate teaching and learning resources, and
    - 1.7 assessment strategies?
2. How is the level of competencies of the Grade Six Mathematics teachers in public elementary schools in Cluster 1 described in terms of the following Key Result Areas (KRAs):
    - 2.1 content knowledge and pedagogy,
    - 2.2 learning environment and diversity of learners,
    - 2.3 curriculum and planning, and
    - 2.4 assessment and reporting?
3. How are Grade Six pupils in Cluster 1 described in terms of their Mathematics performance?
4. To what extent do the pedagogical skills and level of competencies of the Grade Six Mathematics teachers relate to the pupils' Mathematics performance?
5. What action plan can be proposed to improve the pedagogical skills and level of competencies of Mathematics teachers?

Literature Review

A Chinese adage says, "It is easy to be an elementary school teacher, but it is difficult to be a good elementary school teacher" (Anonymous). This highlights the complex, multidimensional nature of teaching that extends beyond basic instruction.

Teaching is considered the performance of systems and actions varied in form and content, and the interaction of the teacher with his students. Teaching is always done by the operation that reflects the very nature of the learning situation. Such logical operation involves the teacher's behavior, student's behavior, and instructional materials that serve as aids in transmitting ideas or substances of the concepts (Naron, 2009).

According to contemporary cognitive theories, learning is situated in a particular context and is an active constructive process that is heavily influenced by the individual's existing knowledge and beliefs (Borko and Putnam, 1996). The research on learning to teach shows that teachers' existing knowledge and beliefs are critical in shaping what and how they learn from teacher education experiences.

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According to Das (2015), the most significant part of the classroom session is the teacher's guidance on direction, supervision, and rhythm of classroom activities by deciding instantly what questions to put, how to present the issues, to relate to physical phenomena. From a pedagogical point of view, teachers in mathematics have a very critical role to play in facilitating students for effective learning. The teachers must introduce a topic in different manners by explaining reasons for its existence and applicability through some activities, like models, small group discussions, and asking questions that push students to examine, and articulate their ideas. It can be difficult to grasp a new concept or solve a problem when distracted by the views of others. That is why, teachers should ensure that all students are given opportunities to think and work quietly by themselves, where they are not required to process the varied, sometimes conflicting perspectives of others.

Mathematics is the most international of all curriculum subjects, and mathematical understanding influences decision-making in all areas of life—private, social, and civil (Anthony & Walshaw, 2009). In support of this, Das (2015) said, Mathematics education plays a key role in increasing the post-school opportunities of young minds, but today, many students are struggling with mathematics and being disaffected as they continually encounter various obstacles to engagement. Therefore, what effective mathematics teaching helps students come to understand, and be able to use mathematics is a great challenge for teachers.

By mathematical knowledge for teaching, we mean not only the mathematical knowledge common to individuals working in diverse professions, but also the subject matter knowledge that supports that teaching, for example, why and how specific mathematical procedures work, how best to define a mathematical term for a particular grade level, and the types of errors students are likely to make with content. By “mathematical quality of instruction” we mean a composite of several dimensions that characterize the rigor and richness of the mathematics of the lesson, including the presence or absence of mathematical errors, mathematical explanation and justification, mathematical representation, and related observables (Hurrell, 2013).

By teaching, we mean everything that teachers must do to support the learning of their students. We mean the interactive work of teaching lessons in classrooms and all the tasks that arise in the course of that work. But we also mean planning for those lessons, evaluating students’ work, writing and grading assessments, explaining the class work to parents, making and managing homework, attending to concerns for equity, and dealing with the building principal who has strong views about the math curriculum (Ball, 2000).

Mathematics methods courses traditionally focus on the tools of teaching: lesson plans, unit planning, classroom management, and assessment, and they are usually not designed to help teachers learn more mathematics or develop an understanding of its structure and logic (Morales, et. al., 2003).

In the program of Morales, et. al. (2003), methods specialists tend to view elementary school mathematics instruction from a constructivist classroom viewpoint, where teachers facilitate students’ investigations of topics and where student learning occurs in collaborative group discussions. Thus, content courses tend to be structured around a teacher-centered lecture followed by individual assessment through homework, quizzes, and tests. Methods course instruction is more discussion-oriented using collaborative groups and a variety of assessments, including portfolios, journals, and writing assignments. Given these different approaches to teaching content and methods, Morales et al. sought to develop a course in which teachers acquired a thorough conceptual understanding of mathematics in addition to the ability to explain its processes in a way that elementary students can understand and assimilate.

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We view teaching as a knowledge-rich profession with teachers as 'learning specialists.' As professionals in their field, teachers can be expected to process and evaluate new knowledge relevant to their core professional practice and to regularly update their knowledge base to improve their practice and meet new teaching demands (Guerriero, 2012).

Moreover, knowledge changes with time and context, so teachers must learn to adapt to change. Professional development plays a crucial role in successful education reform. Professional development serves as a bridge between where teachers are now and where they will need to be tomorrow to meet new challenges in guiding students to achieve higher standards of learning and development (Alcantara, 2014). For Loucks-Horsley et al. (1998), professional development means the opportunities offered to educators to develop new knowledge, skills, approaches, and dispositions to improve their effectiveness in classrooms and organizations. From those definitions, it can be said that teacher professional development involves all processes and designed activities that enable teachers to acquire knowledge, skills, attitudes, and behavior enhancing their ability to function effectively in their classrooms.

In the context of mathematics education, Alcantara (2014) emphasizes that proficient teachers understand students' evolving mathematical skills and can use appropriate representations to aid comprehension. Alcantara (2014) said teachers' learning constitutes a very important part of professional development and growth. Teachers should be given experience with teaching approaches that are like those being used in the classroom.

Teachers with strong pedagogical content knowledge can recognize students' developing mathematical understanding and use appropriate representations, examples, and illustrations in designing future instruction to help fully develop students' understanding (Alcantara, 2014).

In the context of teaching, proficiency requires a conceptual understanding of the core knowledge required in the practice of teaching; fluency in carrying out basic instructional routines; strategic competence in planning effective instruction and solving problems that arise during instruction; adaptive reasoning in justifying and explaining one's instructional practices and in reflecting on those practices to improve them; and a productive disposition toward mathematics, teaching, learning, and the improvement of practice (Alcantara, 2014).

It is not sufficient that teachers possess the kinds of core knowledge delineated in the previous section. One of the defining features of conceptual understanding is that knowledge must be connected so that it can be used intelligently. Teachers need to make connections within and among their knowledge of mathematics, students, and pedagogy (Alcantara, 2014).

Researchers defined and interpreted pedagogy in mathematics teaching in different ways to focus on how it is significantly important for quality learning outcomes. New research is defining pedagogy as ―a highly complex blend of theoretical understanding and practical skill (Das, 2015).

It is not enough, however, for mathematical knowledge and knowledge of students to be connected; both need to be connected to classroom practice. Teachers may know mathematics, and they may know their students and how they learn. But they also must know how to use both kinds of knowledge effectively in the context of their work if they are to help their students develop mathematical proficiency (Das, 2015).

The kinds of knowledge that make a difference in teaching practice and students' learning are elaborated, integrated knowledge of mathematics, a knowledge of how students' mathematical understanding develops, and a repertoire of pedagogical practices that consider the mathematics being taught and how students learn it. The implications for teacher

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preparation and professional development are that teachers need to acquire these forms of knowledge in ways that forge connections between them (Das, 2015).

Pedagogical knowledge refers to the specialized knowledge of teachers for creating effective teaching and learning environments for all students. The pedagogical 'knowledge base' of teachers includes all the required cognitive knowledge for creating effective teaching and learning environments (Guerriero, 2012).

Moreover, according to Ball (2000), pedagogical content knowledge also includes an understanding of what makes the learning of specific topics easy or difficult: the conceptions and preconceptions that students of different ages and backgrounds bring with them to the learning of those most frequently taught topics and lessons. When defined in these ways, pedagogical content knowledge begins to look as though it includes almost everything a teacher might know in teaching a particular topic, obscuring distinctions between teacher actions, reasoning, beliefs, and knowledge.

Pedagogical content knowledge includes knowing what topics are typically difficult for students and why, knowing different representations that are useful for teaching a specific idea, and knowing ways to develop students' understanding of a particular idea (Ball, 2000). According to Ball, a teacher with good mathematical pedagogical content knowledge can break down mathematical knowledge into less polished and abstract forms, thus making it accessible to students who are at different cognitive levels. A teacher with good pedagogical content knowledge can unpack mathematics into its discrete elements and can explain a concept or procedure at a level that includes the steps necessary for the students to make sense of the reasoning. Ball (2000) further indicates that elementary teachers with good mathematical pedagogical content knowledge understand where elementary students may have trouble learning mathematics and can represent the mathematics in a way that their students can comprehend its structure and avoid these difficulties. To prepare effective elementary mathematics teachers, a teacher training program must focus on all three types of knowledge: content knowledge, pedagogical skills, and pedagogical content knowledge. Along with developing prospective teachers' pedagogical content knowledge, the mathematical preparation of effective elementary school teachers must include experience using that pedagogical content knowledge.

An American politician, Jackson (1997), said, "You cannot teach what you don't know. And you can't lead where you don't go". This adage emphasizes that knowledge is necessary to be able to teach. Teaching entails more than knowledge, however. Teachers need to do as well as to know. For example, knowledge of what makes a good instructional task is one thing; being able to use a task effectively in class with a group of sixth graders is another.

Teachers need to know mathematics in ways that enable them to help students learn. The specialized knowledge of mathematics that they need is different from the mathematical content contained in most college mathematics courses, which are principally designed for those whose professional uses of mathematics will be in mathematics, science, and other technical fields. Conventional wisdom holds that a teacher's knowledge of mathematics is linked to how the teacher teaches. Teachers are unlikely to be able to provide an adequate explanation of concepts they do not understand, and they can hardly engage their students in productive conversations about multiple ways to solve a problem if they can only solve it in a single way.

Mathematical knowledge includes knowledge of mathematical facts, concepts, procedures, and the relationships among them; knowledge of the ways that mathematical ideas can be represented; and knowledge of mathematics as a discipline—in particular, how mathematical knowledge is produced, the nature of discourse in mathematics, and the norms and standards of evidence that guide argument and proof. In our use of the term, knowledge of mathematics includes consideration of the

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goals of mathematics instruction and provides a basis for discriminating and prioritizing those goals. Knowing mathematics for teaching also entails more than knowing mathematics for oneself. Teachers certainly need to be able to understand concepts correctly and perform procedures accurately, but they also must be able to understand the conceptual foundations of that knowledge. In the course of their work as teachers, they must understand mathematics in ways that allow them to explain and unpack ideas in ways not needed in ordinary adult life. Mathematical sensibilities hold the matter in guiding their decisions and interpretations of students' mathematical efforts (Kilpatrick et al., 2001).

Dweck (2013) suggests the use of effective pedagogical strategies such as appropriate pedagogy to support students' mathematical proficiency, proficiency in teaching mathematics, strategies for differentiation and student engagement in making instructional decisions based on student thinking, teaching literacy in math, promoting a culture of persistence, and purposeful use of technology. Teachers need to employ pedagogical strategies suited to the learners.

Effective programs of teacher preparation and professional development cannot stop at simply engaging teachers in acquiring knowledge; they must challenge teachers to develop, apply, and analyze that knowledge in the context of their classrooms so that knowledge and practice are integrated (Kilpatrick et al., 2001).

Dweck (2013) and Ball (2000) both emphasize that teachers should possess the content knowledge and pedagogical skills necessary to present complex ideas in accessible ways. Ball's assertion that effective Mathematics teachers "break down" content aligns with Dweck's emphasis on scaffolding to enhance student engagement. The synergy between content mastery and pedagogical technique underscores the importance of targeted training for Grade Six Mathematics teachers in Tarlac, where the current performance challenges underscore the need for teachers skilled in both theory and practical application.

Significance of the Study

The quality of basic education is reflected in how the pedagogical skills and level of competencies of teachers are utilized in transferring learning to the pupils. Thus, there is an urgent need to determine the strengths, and improvement needs of teachers to find ways how to address them.

Given the critical role of teachers in public elementary school today, this study proved beneficial for the following:
To the Department of Education (DepEd) authorities. The result of this study provides an avenue for the higher authorities to plan and allot a budget for training and workshops for teachers in improving and upgrading their pedagogical skills.

To the School Heads. This study serves as a basis for crafting a professional development program during their LAC (Learning Action Cell) Session where highly skilled teachers can present innovative suggestions and ways of teaching.

To the Teachers. The result of this study provides a way for the teachers to stimulate intellectual growth to improve their instruction. They can personally assess the quality of their performances. They can also reflect on what they are already doing and on what aspect they need to improve more.

To the Pupils. The result of this study helps the pupils get quality education and improves pupils' outcomes as their teachers' pedagogical skills improve. As they receive a quality education, they can be equipped with lifelong skills which can prepare them for the real world.

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To the Future Researchers. The results of this study serve as a valuable reference for those who would undertake studies of a similar nature.

Framework / Structure

This study was anchored on the Theory of Performance by Don Elger, of the University of Idaho, United States. The Theory of Performance (ToP) develops and relates six foundational concepts to form a framework that can be used to explain performance as well as performance improvements. To perform is to produce valued results. A performer can be an individual or a group of people engaging in a collaborative effort. Developing performance is a journey, and the level of performance describes the location of the journey. The current level of performance depends holistically on six components: context, level of knowledge, level of skills, level of identity, personal factors, and fixed factors. Three axioms are proposed for effective performance improvements. These involve a performer's mindset, immersion in an enriching environment, and engagement in reflective practice.

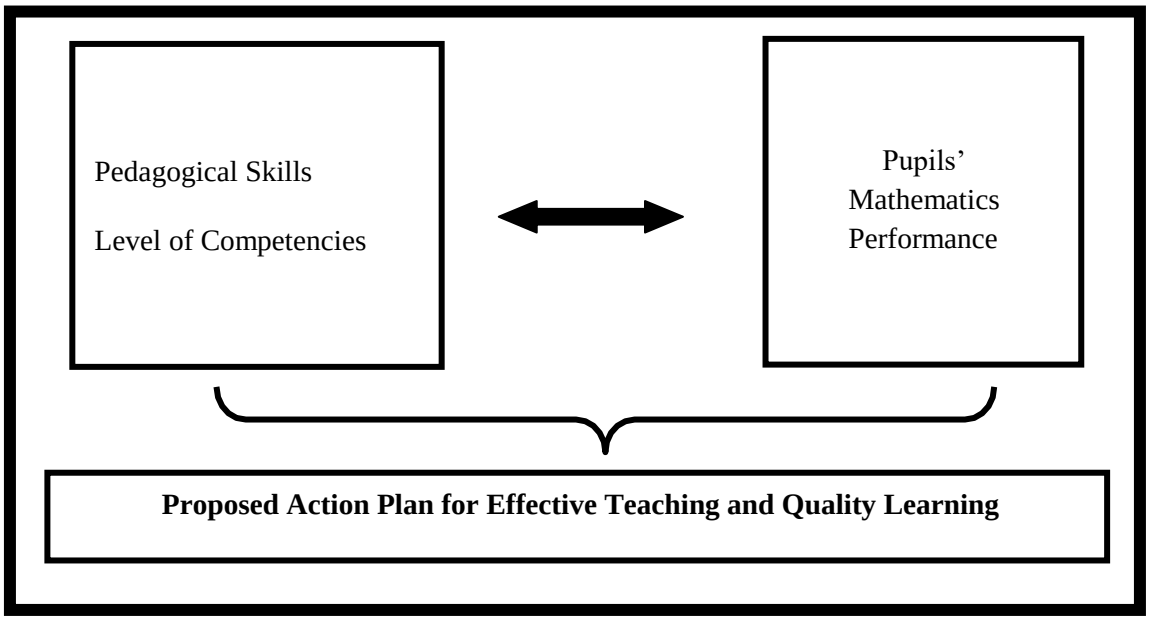
Some part of the concept of this study was adapted from the study of Guerriero (2012), better content knowledge of teachers will result in higher student achievement. Besides, better pedagogical content knowledge will also result in higher student achievement. However, pedagogical content knowledge has more impact on student achievement than content knowledge. Only pedagogical content knowledge seems to have an impact on the quality of instruction. Furthermore, higher general pedagogical/psychological knowledge produces a higher quality of instruction according to student perception (e.g., Higher cognitive activation, better instructional pacing, better student-teacher relationships).

In this study, the researcher conceptualized that the pupils' performance in Mathematics is related to the teacher's pedagogical skills, and level of competencies. Pedagogical skills and competencies appear to be very essential in the learning of the pupils. Hence, if the pedagogical content knowledge is high, then the pupils' performance will also be high. Effective teaching skills have a significant relationship to our learners' performance.

This concept was graphically illustrated by the paradigm in Figure 1.

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Figure 1
The paradigm of the Study



Methodology

This portion presents the methodology of the study. Specifically, this discusses the research design, participants, instruments, and procedure used in the study.

This study utilized a purely quantitative descriptive-correlational research design to meet its objectives of assessing the pedagogical skills and competencies of Grade Six Mathematics teachers and determining their relationship to pupil performance. The quantitative approach was chosen to provide measurable, objective data that aligns with the study's research questions.

Data collection involved the use of structured surveys and assessments adopted from validated Department of Education (DepEd) instruments such as the IPCRF and RPMS-COT designed to evaluate teacher competencies across multiple domains. These domains included content knowledge, teaching strategies, classroom management, and assessment strategies. The instruments' structured design and prior usage in educational assessments help establish both content and construct validity, as these tools were systematically developed to align with DepEd standards and competencies required for effective teaching.

To measure pupil outcomes, final Mathematics grades served as the performance metric. This approach provided an objective, quantifiable measure of student achievement, aligning with the study's focus on evaluating the impact of teaching

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competencies on student learning. To ensure reliability, data collection procedures followed consistent administration protocols across all participants, reducing potential variability due to procedural differences.

For data analysis, descriptive statistics and Pearson's correlation coefficient were employed to examine relationships between teaching competencies and pupil outcomes. Descriptive statistics, such as means, were used to summarize and provide an overview of the data, particularly in evaluating the teacher competencies and student performance metrics. Pearson's correlation coefficient was then utilized to measure the strength and direction of the linear relationship between the teachers' pedagogical skills and the student's performance in Mathematics. This combination of techniques was chosen to offer both a clear picture of individual data points (descriptive) and an understanding of how teaching competencies might influence student outcomes (correlational).

The chosen methods ensured that the data collection and analysis were aligned with the study's objectives and research questions, allowing for a clear, replicable framework that could be validated and applied in similar educational contexts.

Research Design

The descriptive-correlational and documentary analysis research designs were used in this study. It is descriptive because it describes the teachers in terms of their pedagogical skills and level of competencies. On the other hand, it is correlational because it establishes the relationship between the pedagogical skills and level of competency of the teachers and the pupils' Mathematics achievement. The documentary analysis method was used for the teacher's record and pupils' performance.

Participants

The participants of this study were the Grade Six Mathematics teachers and pupils in Cluster I, Division of Tarlac Province during the School Year 2019-2020. It involves 37 Grade Six Mathematics teachers and the pupils of the class under them.

Instruments

The survey questionnaire was the major data-gathering instrument used in the study.

Two sets of documents were secured from the participants for the needed data.

The RPMS - Classroom Observation Tool (COT) form for the pedagogical skills of the teachers. It assesses various aspects of teaching, including content knowledge, teaching strategies, classroom management, and assessment practices. The COT is based on the Philippine Professional Standards for Teachers (PPST), which ensures that the tool is aligned with national standards for teaching practice. The use of this instrument provides valid and reliable measures of teaching effectiveness, as it has been specifically designed to evaluate the competencies that directly affect learner learning outcomes.

The Individual Performance Commitment and Review Form (IPCRF) for the level of competencies found in the Philippine Professional Standards for Teachers (PPST). This document was used to assess the teachers' level of competencies across different Key Result Areas (KRAs), including content knowledge and pedagogy, learning environment, curriculum planning, and assessment. The IPCRF is a standardized performance evaluation tool used by DepEd, making it a reliable source for assessing teacher competencies.

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Procedure

In gathering the data, the following steps were undertaken:

First, the researcher prepared a questionnaire to elicit information on the teachers' attributes of Mathematics teachers of public elementary schools in Cluster I, Division of Tarlac Province.

Second, the researcher sought permission from the Schools Division Superintendent of Tarlac Province, the District Supervisors, and School Heads in Cluster I.

Third, the researcher sent a letter of request to the school heads of the different schools in Cluster I for the administration of questionnaires to the mathematics teachers to secure a copy of the documents such as COT and IPCRF.

The questionnaires were distributed personally by the researcher to the respondents. Retrieval of the questionnaire was done a week after to ensure sizeable feedback and to give ample time for the respondents to provide answers.

Results and Discussion

This chapter presents the findings of the study based on the analysis of data obtained using the gathering instruments. They were analyzed and interpreted considering their relevance.

Description of Mathematics Teachers' Pedagogical Skills

The ability to help pupils establish connections with the subject is a key skill in a competent Mathematics teacher. Teachers must ensure that pupils comprehend topics rather than simply memorize equations. Competent Mathematics teachers are those who can help their students build and develop mathematical capabilities effectively and efficiently.

The major goal of pedagogy is to build on pupils past knowledge and work on the development of skills and attitudes. Pedagogy allows students to have a complete comprehension of a subject and assists them in applying what they have learned outside of the classroom.

The pedagogical skills of the teachers were classified according to their rating on RPMS - Classroom Observation Tool (2019). The following are the priority indicators during the school year 2019-2020 with their corresponding levels and descriptions respectively, 7 – Integrating, where teachers use well-connected pedagogical aspects of the indicator to create an environment that addresses individuals and groups; 6 – Consolidating, where teachers use well-connected pedagogical aspects of the indicator that consistently are aligned with student development and support students to be successful; 5 – Applying, where teachers demonstrate a range of associated pedagogical aspects of the indicator that usually are aligned with the learners' developmental needs; 4- Developing, where teachers demonstrate a range of associated pedagogical aspects of the indicator that sometimes are aligned with the learners' developmental needs; and 3 – Organizing, where teachers demonstrate a limited range of loosely-associated pedagogical aspects of the indicator.

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Table 1.

Description of Mathematics Teachers' Pedagogical Skills

Pedagogical Skills	Weighted Mean	Standard Deviation	Description
1. Content Knowledge	6.19	0.925	Consolidating
2. Teaching Strategy	6.13	0.963	Consolidating
3. Classroom Management	6.22	0.990	Consolidating
4. Learner's Behavioral Management	6.03	1.000	Consolidating
5. Planning, Managing, and Implementing Curriculum	6.19	1.036	Consolidating
6. Utilizing Appropriate Teaching and Learning Resources	6.27	0.949	Consolidating
7. Assessment Strategies	6.11	1.133	Consolidating
Overall Mean	6.16	0.918	Consolidating

Legend: Range – 3.00 – 3.49 (Organizing); 3.50 – 4.49 (Developing);
4.50 – 5.49 (Applying); 5.50 – 6.49 (Consolidating);
6.50 – 7.00 (Integrating)

Table 1 presents the data on how the Mathematics teachers are described in their pedagogical skills. It can be gleaned from the table that the overall weighted mean is 6.16 which falls on consolidating level which means that teachers use well-connected pedagogical aspects of all the indicators that consistently are aligned with student development and support students to be successful learners.

Content Knowledge

To be effective, teachers must grasp a body of information that includes facts, theories, principles, ideas, and vocabulary. Teachers should have a thorough understanding of the subject they teach and the curriculum that goes with it (subject content knowledge). It could be gleaned from the table that teachers have a weighted mean of 6.19 which falls on consolidating level.

When it comes to the application of content knowledge within and across curriculum teaching areas, the teachers in Cluster 1 demonstrate accurate and in-depth knowledge of all concepts in presenting the lesson and in responding to learners' questions in a manner that is responsive to learners' developmental needs and promotes learning.

Moreover, the teachers make meaningful connections across curriculum teaching areas. When teachers fall on this level, they display extensive knowledge of content and address content accurately and its focus is congruent with the big ideas

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and/or structure of the teaching area (Department of Education - Bureau of Human Resource and Organizational Development, 2020).

Teaching Strategy

Dweck (2013) suggests the use of effective teaching strategies such as appropriate pedagogy to support students' mathematical proficiency, proficiency in teaching Mathematics, strategies for differentiation, and student engagement to make instructional decisions based on student thinking, teach literacy in Math, promote a culture of persistence, and purposeful use of technology. Teachers need to employ pedagogical strategies suited to the learners.

The table shows that the teachers have a weighted mean of 6.13 which falls on the consolidating level. This means that teachers employ a variety of strategies that are appropriate in addressing the special educational needs of learners in difficult circumstances. The teachers in Cluster 1 provide thoughtful and appropriate instructional adaptation for individual learner needs. The teachers' adaptation of instruction is realistic and effective. They provide diverse learners with opportunities to actively engage in various learning activities.

The teaching strategies include using a range of teaching strategies that enhance learner achievement in literacy and numeracy skills, applying a range of teaching strategies to develop critical and creative thinking, as well as other higher-order thinking skills.

All children must learn to read, write and compute, as well as apply and practice these abilities and skills across the curriculum and throughout their education. Teachers must make use of all available resources to motivate students to desire to learn and expand their reading abilities across a variety of courses.

Encouraging children to explore, be curious, ask questions, and study how things function helps them develop critical and creative thinking. Requesting that they consider various solutions to challenge a variety of actions that need preparation and decision-making. The goal of critical and creative thinking capabilities is for students to get a grasp of thought processes as well as the ability to manage and apply them consciously. Logical, strategic, adaptable, and adventurous thinking capabilities and learning dispositions.

When a teacher designs a lesson, he or she modifies the topic being discussed, the learning process, or the product expected from students to ensure that students at various beginning points receive the education they need to grow and succeed. It is found that students' learning outcomes significantly improve when teachers use differentiated content that responds to a student's learning preferences (How Differentiated Instruction Can Help You Reach Every Student in Class, 2020).

Classroom Management

In the teaching-learning process, classroom management is the lynchpin that makes teaching and learning possible. Planning, coordinating procedures and resources, structuring the environment to enhance efficiency, assessing pupils' progress, and anticipating future problems are all responsibilities of the teacher.

Table 1 revealed that Mathematics Six teachers in Cluster 1 are at consolidating level in their classroom management with a weighted mean of 6.22, the second to the highest weighted mean among pedagogical skills. This means that teachers manage classroom structure to engage learners, individually or in groups, in meaningful exploration, discovery, and hands-on activities within a range of physical learning environments.

According to Das (2015), the most significant part of the classroom session is the teacher's guidance on direction, supervision, and rhythm of Classroom activities by deciding instantly what questions to put, how to present the issues, to relate to physical phenomena.

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Learner's Behavioral Management

Teachers should assist pupils in learning how to manage and adjust their conduct before it becomes a bigger problem. To reinforce intervention strategies, teachers must collaborate. This will emphasize behavioral expectations and help achieve goals. Teachers must reprimand any pupils who disrupt the classroom and risk other students to guarantee that all students enjoy a safe and productive learning environment. Students should be able to carry out their maximum potential, which allows students to develop appropriate behavior patterns. Teachers must deal with unexpected events and have the ability to control student behavior, using effective classroom management strategies (Sieberer-Nagler, 2015).

It can be gleaned from the table that the teachers are at consolidating level in with a weighted mean of 6.03. This means that the teachers constructively manage learners' behavior by applying positive and non-violent discipline to ensure a learning-focused environment. The teachers apply a range of successful strategies that maintain learning environments that motivate learners to work productively by assuming responsibility for their learning.

In terms of their practice, they encourage the learners to take responsibility for their behavior. The teachers implement a well-established procedure for learners to monitor their classroom behavior. The teachers closely monitor the learners so that misbehavior is detected early before it involves more learners or becomes a serious disruption (Classroom Observation Tool, 2019).

Planning, Managing, and Implementing Curriculum

The curriculum is a pedagogical strategy that governs students' work as well as their teaching and learning methods. It's a proactive activity in which all school activities are planned. In addition, this agreement establishes instruments that lead to the expectations of the educational institution and all those participating in the process, both the faculty and the student body.

It can be seen from the table that the teachers are on the consolidating level with a weighted mean of 6.19. It shows that the teachers plan, manage and implement developmentally sequenced teaching and learning processes to meet curriculum requirements and varied teaching contexts. They manage well-structured lessons with an emphasis on explicit connections between previous learning and new concepts and skills. In terms of their practice, their progression from the warm-up to the main activity is thoughtfully planned. The review of basic concepts and the activities that follow are effective in taking the application of this knowledge to the next level of exploration (Classroom Observation Tool, 2019).

Utilizing Appropriate Teaching and Learning Resources

The goal and significance of teaching and learning materials are to make lessons engaging, learning simple, and allow teachers to convey concepts. Learning materials can help learners attain greater success by facilitating learning. It can be gleaned from the table that teachers are at consolidating level with a weighted mean of 6.27, the pedagogical skills with the highest mean. This means that the teachers integrate extensive and multidisciplinary learning resources, including ICT, which are appropriate and aligned with the learning goals.

The teachers select, develop, organize and use appropriate teaching and learning resources, including ICT, to address learning goals. The teachers model the positive use of ICT to learners in all ICT-based learning activities. The teachers practice demonstrating responsible use of online and multimedia platforms by applying digital etiquette and responsible social interaction.

In terms of practice, the teacher skillfully manages diverse instructional materials that encompass other disciplines and consistently supports the learning goals (Classroom Observation Tool, 2019).

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Assessment Strategies

Teachers design, select, organize, and use diagnostic, formative, and summative assessment strategies consistent with curriculum requirements. It can be gleaned from the table that the teachers are on Consolidating level with a weighted mean of 6.11 which means that teachers integrate assessment strategies that engage learners in self-and peer assessment.

In the program of Morales et al. (2003), methods specialists tend to view elementary school Mathematics instruction from a constructivist classroom viewpoint, where teachers facilitate students' investigations of topics and where student learning occurs in collaborative group discussions. Thus, content courses tend to be structured around a teacher-centered lecture followed by individual assessment through homework, quizzes, and tests. Methods course instruction is more discussion-oriented using collaborative groups and a variety of assessments, including portfolios, journals, and writing assignments.

The teachers in Cluster 1 practice using assessment strategies that engage learners in assessment criteria to self-monitor and reflect on their progress. The teachers prompt learners to frequently assess their work and the work of their peers using assessment criteria embedded in teacher- or learners-generated rubrics, peer reviews, and/or reflection logs (Classroom Observation Tool, 2019).

Description of Mathematics Teachers' Level of Competencies

Teachers' level of competencies is critical for the 'well-development' of pupils and providing quality learning. Teachers' competencies will benefit students' academic development and skills while also assisting teachers in improving their teaching ways. The level of competencies of a teacher can be strengthened through the means of continuing education, peer support, mentoring, and job guidance, and by developing the entire working community. Developing the competencies of the teaching staff and having them committed to the development are central issues to producing actual changes.

The teachers' level of competencies is described based on their Individual Performance Commitment Review Form (IPCRF) rating. It is composed of the Key Result Areas (KRAs) which dwell on content knowledge and pedagogy; learning environment and diversity of learners; curriculum and planning; and assessment and reporting with the following rating, 5-Outstanding; 4 – Very Satisfactory; 3 – Satisfactory; 2 – Unsatisfactory; and 1 – Poor Performance.

Table 2 shows the ratings of the Mathematics Teachers in terms of their level of competencies. It shows that the overall weighted mean is 4.49, which is Very Satisfactory. This means that teachers have very satisfactory performance in terms of their competencies as teachers.

Content Knowledge and Pedagogy

Teachers' pedagogical content knowledge is based on how they link their pedagogical knowledge (what they know about teaching) to their subject matter knowledge (what they know about what they teach). Pedagogical content knowledge is the integration or synthesis of instructors' pedagogical expertise with their subject matter knowledge (Cochran, 2018).

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Table 2.
Description of Mathematics Teachers' Level of Competencies

Level Of Competencies	Weighted Mean	Standard Deviation	Description
1. Content Knowledge and Pedagogy	4.30	0.609	Very Satisfactory
2. Learning Environment and Diversity of Learners	4.51	0.551	Outstanding
3. Curriculum and Planning	4.57	0.594	Outstanding
4. Assessment and Reporting	4.57	0.638	Outstanding
Overall Mean	4.49	0.454	Very Satisfactory

Legend: Range – 1.00 – 1.49 (Poor Performance); 1.50-2.49 (Unsatisfactory); 2.50 – 3.49 (Satisfactory); 3.50 – 4.49 (Very Satisfactory); 4.50 – 5.00 (Outstanding)

By mathematical knowledge for teaching, we mean not only the mathematical knowledge common to individuals working in diverse professions, but also the subject matter knowledge that supports that teaching, for example, why and how specific mathematical procedures work, how best to define a mathematical term for a particular grade level, and the types of errors students are likely to make with content (Hurrell, 2013)

The table shows that the teachers have a Very Satisfactory Rating with a mean of 4.30 when it comes to content knowledge and pedagogy. This means that they show knowledge of content and its integration within and across subject areas. They also facilitated using different teaching strategies that promote reading, writing, and/or numeracy skills. They used different teaching strategies that develop critical and/or creative thinking, as well as other higher-order thinking skills.

Learning Environment and Diversity of Learners

Learning environment refers to the diverse physical locations, contexts, and cultures in which pupils learn. According to Cobb (2013), students actively construct their mathematical ways of knowing and learning through social interactions and engagement with the subject.

It is argued that an effective learning environment is one where there is coherency between underlying philosophical beliefs about how students best learn, the types of knowledge required (technological, pedagogical, and content) to best facilitate student understanding, and the learning design and process needed to generate student learning (Bate et al., 2013).

In the study of Glonek (2013), he stated, that having teachers and students assess themselves regarding learning styles can potentially have multiple benefits. By understanding their dominant learning preference, teachers can avoid only teaching to their preferred style of learning. Through this, a proposal has been made which is a better solution for teachers to modify their methods of teaching to the learning styles of their students. This first requires teachers to understand the learning styles of both their students and themselves.

Based on the table, the teachers are Outstanding in terms of this competency with a weighted mean of 4.51. This means that the teachers used classroom management strategies that engage learners in activities and tasks. They manage classroom

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structure to engage learners, individually or in groups, in meaningful exploration, discovery, and hands-on activities within a range of physical learning environments. The teachers applied management strategies of learner behavior that promote positive and non-violent discipline. They also used differentiated teaching strategies and developmentally appropriate learning experiences to address learners' diversity in gender, needs, strengths, interests, and experiences.

Curriculum and Planning

In curriculum and planning, it addresses teachers' knowledge of and interaction with the national and local curriculum requirements. It encompasses their ability to translate curriculum content into learning activities that are relevant to learners and based on the principles of effective teaching and learning (Llego, 2017).

By teaching, we mean everything that teachers must do to support the learning of their students. We mean the interactive work of teaching lessons in classrooms and all the tasks that arise in the course of that work. But we also mean planning for those lessons, evaluating students' work, writing, and grading assessments, explaining the class work to parents, making and managing homework, attending to concerns for equity, and dealing with the building principal who has strong views about the math curriculum (Ball, 2000).

The table shows that the teachers in this category have an Outstanding rating with a weighted mean of 4.57 which means that teachers apply their professional knowledge to plan and design, individually or in collaboration with colleagues, well-structured and sequenced lessons. Teachers also communicate learning goals to support learner participation, understanding, and achievement. They consistently participate in LACs/ meetings to discuss teacher/learner feedback to enrich instruction. They developed and used varied teaching and learning resources, including ICT, to address learning goals.

Assessment and Reporting

This competence refers to processes associated with a variety of assessment tools and strategies used by teachers in monitoring, evaluating, documenting, and reporting learners' needs, progress, and achievement.

The table shows that the teachers are Outstanding in terms of their competence in assessment and reporting with a weighted mean of 4.57. This means that teachers use assessment data in a variety of ways to inform and enhance the teaching and learning process and programs. They design, select, organize, and use diagnostic, formative, and summative assessment strategies consistent with curriculum requirements. They monitor and evaluate learner progress and achievement using learner attainment data. They consistently showed prompt and clear communication of the learners' needs, progress, and achievement to key stakeholders, including parents/guardians.

Description of the Mathematics Performance of the Grade Six Pupils

Pupils' performance level is an indication of a student's current level of mathematics skills, often denoted by a score on a test or probe. It refers to how well students succeed in various academic subjects. Classroom performance, graduation rites, and standardized test results are commonly used by teachers and education administrators to assess achievement.

Table 3 shows the description of the Mathematics performance using the achievement rate of the Grade Six class each teacher-respondent handled during the school year 2019-2020. The performance level is classified according to their respective rating as follows, Outstanding (90-100); Very Satisfactory (85-89); Satisfactory (80-84); Fairly Satisfactory (75-79); and Did not meet expectations (Below 75).

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It revealed that 29 classes or 78% of them have a very satisfactory performance which means that these pupils who belong to these classes indicate a good grasp of Mathematics, and their works are accurate and highly acceptable. Five classes or 14% are outstanding performers which means these are the ones who are self-initiating., exceed expectations, and have an insightful grasp in Mathematics. The pupils' works are accurate and exceptional. Three classes or 8% have satisfactory performance and knowledge in Mathematics.

Most of them were rated very satisfactory, an indication that the Grade Six pupils are doing great in their Mathematics lessons, and some of them tried their best to get the highest performance.

Table 3.
Description of the Mathematics Performance of the Grade Six Class

Performance Level	Frequency	Percentage (%)
Very Satisfactory	29	78
Outstanding	5	14
Satisfactory	3	8
Total	37	100

Relationship of Mathematics Teachers' Pedagogical Skills and Level of Competencies to the Mathematics Performance of the Grade Six Class

A person may have a very strong content knowledge of Mathematics, but this is of little benefit if they have poor knowledge of how students learn. Similarly, a person may have an in-depth knowledge of how students learn but without a relational understanding of Mathematics, this knowledge is of little benefit to them. Mathematical knowledge for teaching encompasses both subject matter knowledge and pedagogical content knowledge as mutual requirements of teaching Mathematics (Shuilleabhain, 2015).

Table 4 presents the extent of the relationship between pedagogical skills and level of competencies of Math teachers and the Math performance of the Grade Six classes.

Table 4.
Relationship of Teachers' Pedagogical Skills and Level of Competencies to the Math Performance of the Grade Six Pupils

Variables	Coefficient Of Correlation	Probability
Pedagogical Skills	0.480**	.003
Level of Competencies	0.477**	.003

** Correlation is significant at the 0.01 level (2-Tailed)

Pedagogical Skills

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According to Ball (2000), a teacher with good mathematical pedagogical content knowledge can break down mathematical knowledge into less polished and abstract forms, thus making it accessible to students who are at different cognitive levels. A teacher with good pedagogical content knowledge can unpack Mathematics into its discrete elements and can explain a concept or procedure at a level that includes the steps necessary for the students to make sense of the reasoning.

The data reveal that teachers' pedagogical skills and pupils' Mathematics performance have a significant positive medium relationship. This implies that if the teacher is confident in teaching and is familiar and knowledgeable with Math as the subject matter, the better the performance of his/her pupils would be.

This supports the study of Alcantara (2014), teachers with strong pedagogical content knowledge can recognize students' developing mathematical understanding and use appropriate representations, examples, and illustrations in designing future instruction to help fully develop students' understanding.

The result of this study agrees with the research project of Guerriero (2012) which says teacher quality is an important factor in determining gains in student achievement, even after accounting for prior student learning and family background characteristics.

Level of Competencies

Shuilleabhain (2015) said that Mathematics education research has found that teachers' subject content knowledge can impact student learning but also that their pedagogical content knowledge plays a vital role in students' learning experiences. It combines knowledge of Mathematics, students, and pedagogy and was defined by having several important features: knowledge of mathematical tasks as instructional tools, knowledge of students' thinking and assessment of understanding, and knowledge of multiple representations and explanations of mathematical problems.

It reveals from Table 4 that teachers' level of competencies and pupils' Mathematics performance also have a significant positive medium relationship. This means that when the teachers are doing their job well, the pupils' performance also goes high.

According to Guerriero (2012), the imperative in recent years about improving student outcomes is also about improving the quality of the teaching workforce.

Moreover, she added, that by investigating the knowledge underlying effective teaching and learning, we are studying how to improve teacher quality. Teacher quality itself is an important factor in determining gains in students' achievement.

Both the pedagogical skills and level of competencies of the teachers have a significant positive relationship to the pupils' Mathematics performance. This implies that Math teachers tend to perform better in teaching if they further enhance their teaching skills. Continuous upgrading of teachers' teaching skills should be done to improve the teaching competence of the teachers to provide quality education to the pupils. Math teachers are required to attend seminars, training, and workshops to increase the level of their teaching competence. Teachers always look forward to the development of the pupils so therefore they should not stop improving their teaching skills and competence.

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Proposed Action Plan to Improve the Pedagogical Skills and Level of Competencies of Mathematics Teachers

Based on the result of the description of the Mathematics teachers' pedagogical skills, they are already at a Consolidating level, but they still have space to improve to the higher level which is the integrating level. In terms of the level of competencies of the Mathematics teachers, only the Content Knowledge and Pedagogy have a Very Satisfactory Rating while others are already in Outstanding Rating. This domain needs to improve. According to the developmental needs expressed by some of the Mathematics teachers during the interview by the researchers turned out that they need to enhance their pedagogical skills and competencies. They need to know the modern trends in teaching Mathematics such as integrating ICT in their classroom. They also expressed their need to learn about innovative ways of teaching Math.

Enhancing the pedagogical skills and level of competencies of Math teachers through training and professional development programs play a vital impact on the quality education of every learner. Thus, the following plan of action was proposed to serve as the basis for further enhancement of the pedagogical skills and competencies of Math teachers in the future with the identified pedagogical skills and competencies in this study. This would be a great help to Math teachers to have better teaching performance which will result in better learning for the pupils. The proposed action plan is shown in Table 5.

Table 5.
Proposed Action Plan

Pedagogical Skills	Objectives/ Targets	Strategies/ Activities	Time Frame	Persons Involved	Expected Output
Content Knowledge	Enhance the competencies in content knowledge and capabilities of teachers in teaching Mathematics	Conduct training on the identified least mastered skills of teachers in teaching Mathematics. Conduct training/workshop on the utilization of Mathematics digital tools such as Geogebra, Geometry Pad, PhotoMath, Khan Academy, Buzzmath, Cuethink, etc. Encourage teachers to enroll in post-graduate studies.	Semestral Break Semestral Break Year-Round	DepEd, Division HR personnel, School Heads, Teachers	Competencies in content knowledge and capabilities of teachers in teaching Mathematics are enhanced.
Utilizing Appropriate Teaching and	Reinforce teachers to develop and integrate ICT devices to	Conduct training on creating ICT-based resources in teaching Mathematics using readily available tools such as Filmora in making video	Semestral Break	DepEd, Division HR personnel, Division	Teachers are reinforced to develop and integrate ICT devices to be

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Learning Resources	enhance the teaching and learning process.	lessons, Canva or Microsoft Office for interactive PowerPoint, and Appsgeysers in creating mobile applications Propose and organize a contest showcasing the development of innovative ICT-based resources in Mathematics such as Video Lessons, Flipped Learning, Chatbot, and Interactive ppt and a presentation on how it is used in teaching and learning.	2nd Quarter	ICT Personnel, School Heads, School ICT Leaders, Teachers	used in teaching and learning.
Teaching Strategy	Improve teachers' teaching strategies in Mathematics.	Conduct training and demonstrations on strategies and methods in teaching Mathematics in the new normal. Conduct Action Research Writeshop focused on the improvement of teachers' teaching strategies. Supervise the implementation of the Action Research.	Semestral Break Year-Round Year-Round	DepEd, Division HR personnel, School Heads, Teachers	Teachers' teaching strategies in Mathematics are improved.

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Assessment Strategies	Enhance the skills of teachers in creating innovative ways to assess pupils' performance.	Conduct training on the conceptualization and development of innovative assessment tools such as Kahoot, Mentimeter, BookWidgets, Gooru, etc. Conduct a program for the schools to implement Project APAW (A Problem A Week)	Semestral Break Weekly	DepEd, Division HR personnel, School Heads, School ICT Leaders, Teachers, Pupils	The skills of teachers in creating innovative assessment tools are enhanced.

Conclusion

Based on the findings, it was concluded that Mathematics teachers are at a consolidating level in terms of their pedagogical skills, as evaluated by their immediate supervisors or school heads. Their level of competencies is generally rated as Very Satisfactory, with some indicators achieving an Outstanding rating. Grade Six students exhibit a Very Satisfactory performance level in Mathematics. Furthermore, a significant medium positive relationship was identified between teachers' pedagogical skills, their level of competencies, and pupils' Mathematics performance. To address these findings and enhance the quality of education, a professional and pupils' development plan has been proposed, focusing on improving teachers' professional competence.

Recommendations

Based on the results and conclusions, several recommendations are proposed. The Department of Education is encouraged to consider the findings of this study in future policymaking. In-depth training programs focusing on the development of ICT-integrated devices should be conducted to enhance the teaching-learning process. Additionally, School Learning Action Cell (SLAC) sessions should be organized to revisit the Philippine Professional Standards for Teachers (PPST) and the Results-Based Performance Management System (RPMS) for Mathematics teachers, enabling further planning and designing of professional development interventions and delivery modes. Finally, related studies are recommended to explore other variables, such as factors affecting the pedagogical skills and competencies of Mathematics teachers, to provide a more comprehensive understanding of the subject.

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