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Instructional Competence of Mathematics Teachers: Basis for a Training Program

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Abstract:

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Despite extensive research on mathematics instruction, gaps persisted in understanding the interplay between teaching strategies and teacher characteristics such as age, experience, gender, and technological integration. Limited studies also explored the impact of specific mathematical applications on student learning, the effect of multiple teaching preparations on instructional competence, and the competence differences between mathematics and non-mathematics teachers. Given these gaps, this study aimed to assess the pedagogical competence of secondary mathematics teachers in the Schools Division of Candon City, serving as a foundation for a targeted training program. Employing a descriptive-developmental quantitative design, the study involved secondary mathematics teachers and a representative sample of students. A structured questionnaire checklist, adapted from the DepEd Class Observation Tool (DepEd Memorandum No. 004, s. 2022) and Ragma's (2017) pedagogical competence instrument, was used to assess instructional competence across teaching, management, guidance, and evaluation skills. Data analysis included frequency counts and percentages for respondent profiles, and weighted means for instructional competence levels, t-tests for group perception differences, and Pearson's correlation and chi-square tests for relationships between teacher profiles and instructional competence. Findings identified strengths and weaknesses, which served as the basis for developing an evidence-based training program to enhance mathematics instruction. The results indicate that mathematics teachers are highly competent, with overall ratings of Excellent in Guidance, Management, and Evaluation Skills, and Teaching/Facilitating Skills. Teachers consistently rated themselves slightly higher than students did, but both groups acknowledged strong instructional abilities. The findings suggest that while teachers excel in classroom management, student guidance, and assessment, there is room to enhance teaching strategies for better student engagement. Moreover, it signifies that there is no significant relationship between mathematics teachers' profiles and their instructional competence across teaching/facilitating, guidance, management, and evaluation skills. The study highlights that mathematics teachers demonstrate a high level of instructional competence, with strong subject mastery, effective teaching skills, and the ability to integrate technology into their teaching. However, there is a need for continuous improvement in diversifying teaching methods, refining assessment strategies, and enhancing adaptability to different learning styles to further optimize student learning outcomes. To enhance Mathematics instruction, intensify teacher training programs, integrate technology through educational applications like Kahoot and Geogebra, and develop interactive slides catering to diverse learning styles. Additionally, invest in

Continuous Professional Development (CPD) through regular workshops, mentorship programs, and collaborative learning communities to foster innovation and knowledge sharing among educators.

Chapter I
Introduction
Background of the Study

In the modern era, education faces the immense challenge of adapting to rapid technological advancements and innovations. The primary goal remains to nurture students into well-rounded individuals capable of understanding the complexities of both themselves and the intricate society they inhabit. The monumental task lies in the hands of the teachers, who must confront the unique challenges of today's world.

To be effective educators, teachers must be equipped with essential resources that engage and sustain students' interests, facilitate seamless learning experiences, and evaluate learning outcomes. Mastery of their craft is vital, and a deep commitment to the holistic growth and development of their students is paramount (Flores, 2019).

Central to quality education is the art of instruction. For education to truly excel, it must be complemented by the comprehensive preparation for excellent teaching. As exceptional teachers, individuals must possess a thorough command of their subject matter, as well as a profound understanding of the dynamics of the teaching-learning process. This entails not only subject expertise but also a keen insight into the diverse mindsets and standards of their students within the classroom (Cotinsky, 2021).

The Philippines' vision for quality education with focus on Mathematics Proficiency is undoubted. In fact, the new program has put much emphasis on the teaching and learning of Mathematics. However, despite the importance and applications of Mathematics in many aspects of life, it remains to be one of the most difficult learning areas across all curriculum levels. It is always associated with complex calculations and complicated analyses because of its abstract nature. In fact, it is in this area where the majority of Filipino learners are failing. Villegas (2021) blatantly affirmed that the Philippines is experiencing an education crisis, particularly in terms of mathematics, science, and reading. Highlighting this, he mentioned the dismal performance of the Philippines in international assessment based on the report of the Program for International Student Assessment (PISA) of the Organization for Economic Co-operation and Development (OECD) in 2018 which showed that Filipino students ranked the lowest among 79 countries in mathematics, science, and reading.

Based on the findings from the 2019 Trends in International Mathematics and Science Study (TIMMS), Filipino Grade 4 students scored the lowest in mathematics and science when compared to 58 other countries that participated in the assessment. These results clearly indicated a significant lag in the Philippines' performance compared to other nations (Magsambol, 2020).

At the national level, Education Secretary Leonor Briones pointed out that Filipino students' performance in the National Achievement Test (NAT) is increasingly gravitating towards lower proficiency levels, particularly in Science, Math, and English subjects (Hernando-Malipot, 2019).

Given the inherent abstract nature of Mathematics, teachers are tasked with instilling a love and passion for learning the subject among students. Hence, it becomes the responsibility of educators to employ effective and efficient methods to concretize the teaching of Mathematics. Additionally, Mathematics teachers must foster learners who can appreciate the beauty and practicality of Mathematics in all facets of life.

When educators demonstrate a profound mastery of their subject matter and instructional techniques, they

imbue their students with a sense of confidence and trust. This, in turn, fosters greater student engagement and motivation, as learners are more inclined to be receptive to learning from a teacher they perceive as competent. A skilled teacher adeptly conveys intricate concepts, provides insightful feedback, and establishes a positive and inclusive learning environment that encourages active student participation.

Hence, the teaching of mathematics necessitates educators possessing an in-depth comprehension of the subject's concepts and procedures. A robust foundational knowledge of mathematical content, encompassing both its breadth and depth, is imperative. Similarly, educators must possess a strong grasp of pedagogical principles and practices. This encompasses understanding diverse learning styles, employing a variety of instructional strategies, implementing effective classroom management techniques, employing appropriate assessment methods, and utilizing differentiation strategies to cater to the unique needs of individual learners.

Dr. Milagros Ibe, a distinguished academic from the University of the Philippines, conducted a survey examining the competency of Science and Mathematics teachers. The findings revealed a disconcerting trend, indicating that a majority of these educators lacked the necessary qualifications to effectively teach these subjects. This deficiency was evident in the passing rates of secondary teachers, which stood at a mere 23.32% in April 2010 and marginally improved to 25.86% in September of the same year. These distressing statistics signify that while teachers may possess the requisite degrees, they are not yet deemed qualified or competent to impart knowledge effectively (Ragma, 2014).

Regrettably, this reality has had tangible repercussions on students' performance in the Mathematics Achievement Test. As emphasized by Roldan (2004), the poor academic performance of students in mathematics can be attributed to the inadequate influence of mathematics teachers. Research revealed that secondary teachers in Region I demonstrated proficiency solely in fundamental concepts and computations while displaying deficiencies in problem-solving skills and effective teaching strategies. Consequently, mathematics educators often resort to merely imparting mechanical procedures for obtaining answers, neglecting the essential essence of mathematics—its historical origins, laborious development, the evolution of ideals, and the transformation of abstract concepts into practical theories with profound social and human relevance (Cayabyab, 2010).

The subpar passing rates indicate a pressing concern in teacher preparation and professional development, particularly in equipping educators with the pedagogical expertise necessary to foster a deeper understanding and appreciation of these critical subjects among students. Consequently, addressing these deficiencies becomes paramount in enhancing the quality of mathematics education and ultimately elevating students' academic achievements in the discipline.

In the context of the instructional competence of mathematics teachers, the gaps in the literature could include but are not limited to the following: (1) the effectiveness of specific mathematical teaching strategies concerning teachers' age, and experiences; (2) the impact of gender on the integration of technological gadgets in mathematics instruction; (3) the under- explored the use of specific mathematical applications and their impact on student learning outcomes; (4) the relationship between the number of preparations and the instructional competence of mathematics teachers; (5) the differences in instructional competence between teachers handling math and non-math subjects. Given the aforementioned valuable insights, the researcher decided to initiate an investigation with the principal objective of assessing the pedagogical competence of mathematics teachers within the Schools Division of Candon City. The study aimed to ascertain the current state of competence among these Mathematics teachers served as the foundation for the formulation of a comprehensive and targeted training plan.

Framework

The tasks of mathematics teaching encompass problem selection, assessment, technology integration, and materials development. Teachers should know how to select appropriate problems and exercises that allow students to explore various methods and approaches to problem-solving and the application of mathematical concepts. Effective assessment strategies help teachers support students' continuous development and improve their teaching practices based on assessment results. Integrating technology in mathematics teaching requires understanding when and how to use different technological tools effectively. As such, teachers should have the capability to create teaching aids and materials tailored to their students' needs and contexts. The social constructivism, as the anchoring theory, highlights the roles of social interaction in knowledge construction. Mathematics teachers use discourse as a tool to support students' collaborative construction of mathematical knowledge, encouraging them to articulate their mathematical ideas and reasoning.

Moreover, instructional competent teachers are skilled in managing various aspects of the teaching and learning processes, including the classroom environment, learning resources, and student interactions. Understanding students' development stages, cognitive backgrounds, and cultural context enables teachers to plan appropriate methodologies for teaching mathematics and fostering students' overall development. Furthermore, a solid knowledge of general teaching techniques and classroom processes, such as differentiated instruction, allows teachers to address diverse student abilities and preferences, ensuring an engaging and effective learning environment (Philippines Council of Mathematics Teacher Education, 2011). This is supported by the theory of Zone of Proximal Development and the theory of Differentiated Instruction. The Zone of Proximal Development (ZPD), introduced by Lev Vygotsky, emphasizes the importance of providing appropriate support to bridge the gap between what a learner can do independently and with assistance. Pedagogically competent teachers use this concept to scaffold students' learning, providing guidance and support to help them progress in their mathematical understanding (Shulman, 1986). Moreover, the theory of Differentiated Instruction advocates adapting teaching methods to meet individual students' needs and learning styles. Pedagogically competent mathematics teachers employ differentiated instruction to address diverse student abilities and preferences, creating an inclusive and engaging learning environment (Capraro et al., 2017).

On the other hand, incorporating theories of assessment in their practice, such as assessment for learning, empowers teachers to design effective assessments aligned with learning objectives and provide valuable feedback to students and parents. This knowledge enables teachers to adapt their teaching strategies to enhance learning outcomes effectively (Science Education Institute, Department of Science and Technology, 2011). Additionally, being aware of their professional responsibilities, such as adhering to educational standards and communicating effectively with parents, emphasizes teachers' commitment to nurturing students' mathematical understanding and progress.

The anchoring theory of Assessment for Learning focuses on using assessment to inform and improve instruction. Pedagogically competent teachers use assessment data to identify students' strengths and areas for improvement, guiding their teaching practices accordingly and enhancing overall learning outcomes (Black & Wiliam, 2009).

Lastly, the concept of Reflective Practice encourages teachers to engage in self-awareness and continuous improvement through thoughtful reflection on teaching practices. Pedagogically competent teachers use reflective practice to enhance their effectiveness as educators and make data-driven decisions to improve their pedagogical approaches (Van der Stel et al., 2019).

Based on the theories and concepts reviewed the following diagrams served as the foundation of this study which uses the Input-Process-Output Model. The inputs are the profile of the mathematics teachers along highest educational qualification; the number of years in teaching mathematics; the number of mathematics trainings and seminars attended; and the level of competence of along content and instruction. The process encompasses the analysis and interpretation of the teacher's profile, and level of instructional competence along with Teaching facilitating skills, Guidance skills, Management skills, and Evaluation Skills as perceived by students, school heads, and teachers themselves; analysis of the strengths and weaknesses of mathematics teachers along instruction; and the development and validation of a training design. The output is a training design that will be crafted based on the salient findings of the study.

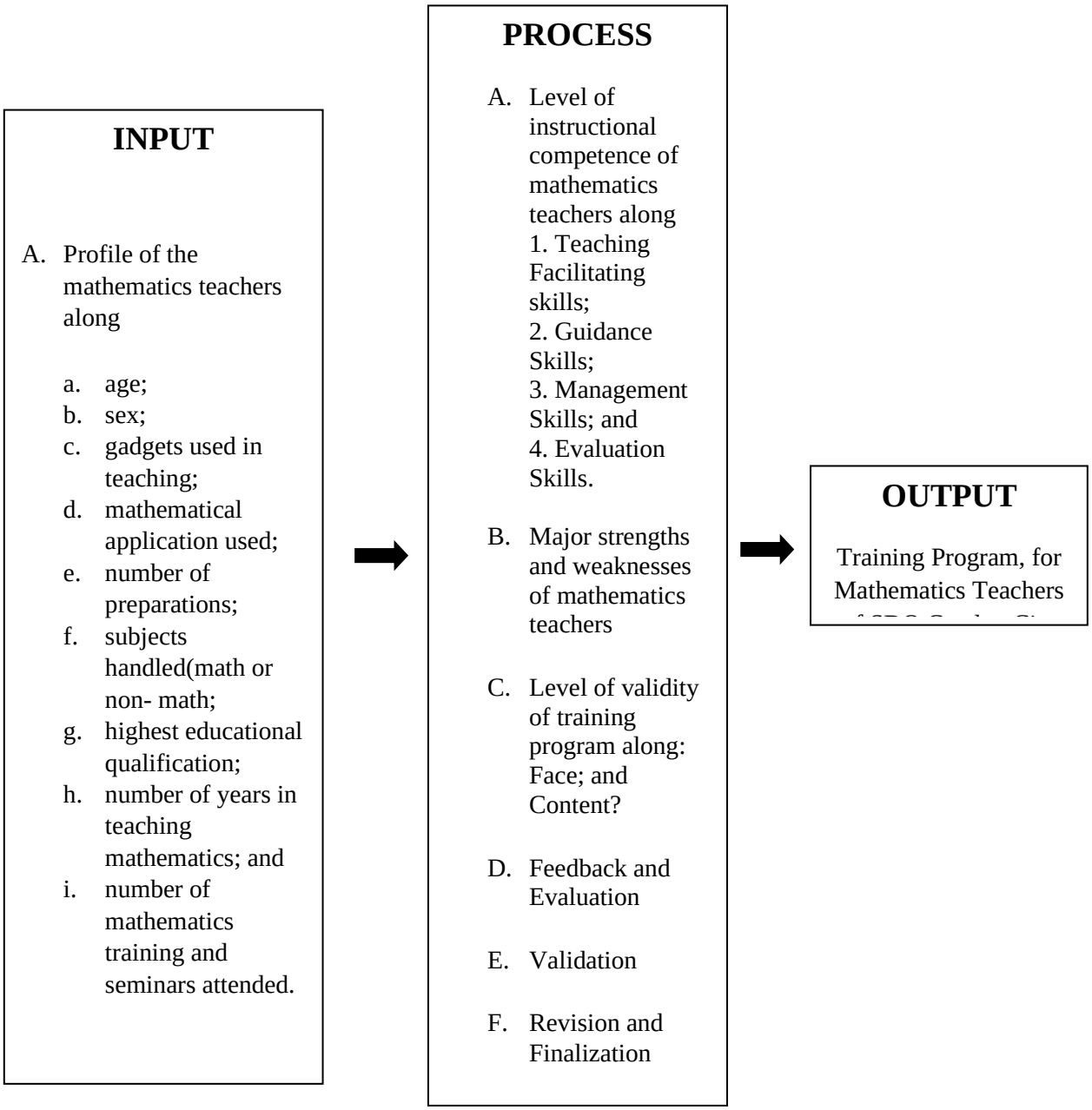

Figure 1. Conceptual Framework

Statement of the Problem

Generally, this study aims to determine the Instructional Competence of Mathematics Teachers in the School Division of Candon City.

Specifically, this study sought to answer the following:

1. What is the profile of the mathematics teachers along
a. age;
b. sex;
c. gadgets used in teaching;
d. mathematical applications used;
e. number of preparations;
f. subjects handled(math or non-math);
g. highest educational qualification;
h. number of years in teaching mathematics; and
i. number of mathematics training and seminars attended?
2. What is the level of instructional competence of mathematics teachers along
a. Teaching Facilitating skills;
b. Guidance Skills;
c. Management Skills; and
d. Evaluation Skills?
3. Is there a significant difference in the instructional competence of the teachers as perceived by students and teachers?
4. Is there a significant relationship between the profile of the mathematics teachers and the level of instructional competence of mathematics teachers along the different identified skills?
5. What are the major strengths and weaknesses of mathematics teachers?
6. Based on the results, what training program may be proposed to enhance the content and instructional competence of the mathematics teachers?
6.1. What is the level of validity of the training program along:
a. Face; and
b. Content?

Hypotheses

There is no significant difference on the instructional competence of Mathematics teachers along teaching facilitating skills, guidance skills, management skills and evaluating skills as perceived by students, and teachers, themselves.

Scope and Delimitation

The descriptive-developmental investigation design used in this study to determine the level of instructional competence of mathematics teachers during the 4-day in person classes in the city Division of Candon City for school year 2023-2024. The information gleaned from this study used to create a training program for the division's Mathematics teachers. Teachers who do not work full-time in the classroom will not be included in the study.

Importance of the Study

This piece of work greatly benefited the administrators, heads, teachers, students, the researcher, and future researchers. To school administrators of the Public Secondary Schools in the City Division of Candon, this study provides them with data that can help them formulate in-service training programs. Further, they will also be guided in structuring the Faculty Development Program that is aimed at intensifying and sustaining the skills of the teaching workforce;

To the Mathematics head of the City Division of Candon, this study will give them insights into the instructional competence of their teachers and the factors affecting their competencies. This will also provide them data for designing the Human Resources Development Plan;

To Mathematics teachers, this study will give them baseline data on their strengths and weaknesses in instruction. The output of the study, on the other hand, will make them more competent, prepared, directed and helped in carrying out their noble tasks;

To students, this study will lead them to a thoughtful understanding of Mathematics for they are handled by more competent teachers;

To the researcher, this study will help him improve his instructional competence; and

To future researchers, who will be interested in conducting similar studies, this study will motivate them to pursue their research since this study can be used as a basis.

Definition of Terms

To better understand this research, the following items are operationally defined:

Profile. This comprises the variables on highest educational attainment, number of years in teaching, and number of trainings and seminars attended.

Age. This pertains to the number of the existence of students and teachers from birth.

Sex. This refers to the gender of the students and teachers as male or female.

Highest educational attainment. This pertains to the highest academic qualification of the high school mathematics teachers for the Academic Year 2023-2024.

Number of years in teaching. This refers to the length of service a grade 10 mathematics teacher has in the academe.

Number of Seminars Attended. This refers to how frequent training a math teacher has been undergoing for the past three years.

Instructional Competence. This is divided into four elements: Teaching/facilitating skills, management skills, guidance skills, and evaluation skills.

Teaching Facilitating Skills. This refers to the process of providing instruction and guidance to students in a way that helps them acquire and develop the abilities necessary to facilitate various activities, classroom discussions, or tasks effectively.

Guidance skills. This section includes the quality of interaction and quality of tasks.

Management skills. This section focuses on teaching. proficiency, which encompasses the environment in the classroom, behavior, and material for evaluations.

Evaluation skills. This section focuses on teaching. competency, including the caliber of the assessment questions, assignment/enrichment activity quality, as well as evaluating the performance of students or an answer.

Strength. This pertains to an instructional competence rating of 3.41 and above.

Weakness. This pertains to an instructional competence rating of below 3.40.

Training Program. This refers to an action plan design in the study to enhance or sustain the content and instructional competence of mathematics teachers of the Public schools in the City Division of Candon.
Heads. This pertains to the principals, department heads, and head teachers.
Level of Competence. This pertains to the extent of attainment along content and instruction of Mathematics teachers.
Mathematics Teachers. These are the teachers handling Mathematics in the Public Secondary schools in Candon City for Academic Year 2023-2024.
Public Secondary Schools in Candon City. These are the government schools in Candon City where three groups of respondents emanate from.

Review of Related Literature and Studies

This chapter presents a synthesis of relevant professional literature and studies on the instructional competence of math teachers, serving as the foundation for the current investigation and supporting its conclusion.

Profile of the Math Teachers

The significance of teacher quality in determining student success cannot be overstated (Lee, 2018). Highly qualified math teachers are more likely to inspire students' motivation to learn and achieve academic excellence. Thus, teacher qualification holds considerable implications for education policy.
The elements on the teacher profile are developed in this context as a common vision for the qualities, traits, and skills that all educators in an organization should possess. This category comprises the following information: highest educational level attained, number of years teaching mathematics, and number of technology-based and modular writing seminars attended.

Age

The variable age and instructional competence of mathematics teachers and existing literature on teachers' professional competence and its impact on instructional quality provides a valuable foundation for understanding the broader factors influencing mathematics teaching. However, the impact of mathematics teachers' professional competence on instructional quality has been the focus of several studies. While specific literature directly linking age to instructional competence of mathematics teachers was not found, the professional competence of mathematics teachers has been studied in various contexts. For instance, a study on the COACTIV model of teachers' professional competence and cognitive activation in the mathematics classroom highlighted the importance of teachers' professional competence in dealing with cognitive activation in the mathematics classroom (Hammer & Ufer, 2023).
Older teachers often possess a wealth of experience accumulated over years of teaching. This experience can provide them with deep insights into effective instructional strategies, classroom management techniques, and understanding student learning needs in mathematics. They may have encountered a wide range of student misconceptions and developed strategies to address them. This experience can contribute to their overall mathematical competence and effectiveness as teachers.
Research by Smith (2018) highlighted that younger teachers often demonstrate strong proficiency with the latest teaching technologies, but may lack the depth of experience that older teachers bring to the classroom. On the other hand, Jones and Brown (2019) found that older teachers tend to have a wealth of

pedagogical knowledge and experience, but there could be potential challenges in adapting to newer instructional methods and technologies.

In the study conducted by Garcia et al. (2020), it was noted that the relationship between age and mathematical competence is not linear. They found that mid-career teachers, combining experience with adaptability, demonstrated a unique advantage in fostering mathematical understanding among students.

It's essential to consider not only chronological age but also factors like professional development and ongoing learning opportunities. The work of Robinson and White (2017) emphasized the importance of continuous training for teachers of all ages to enhance their mathematical competence.

Sex

The professional competence of mathematics teachers, including gender-specific beliefs, has been the subject of research. A study on K-8 teachers' overall and gender-specific beliefs about mathematics found that teachers viewed boys as more logical thinkers and perceived mathematics as less difficult for boys than for girls (Copur-Gencturk, Thacker, & Quinn, 2020). This study provides insights into how gender-specific beliefs may influence the instructional competence of mathematics teachers.

Sex or gender plays a significant role in shaping perceptions of mathematical competence among teachers and influencing students' experiences and outcomes in mathematics education. Addressing gender biases, promoting representation and diversity in the teaching workforce, and providing targeted support and professional development opportunities are essential steps toward promoting equitable and effective mathematics education for all students.

Several studies have explored gender differences in mathematical competence among teachers. In the study of Smith (2017) found that male teachers tend to have higher self-efficacy in teaching mathematics compared to female teachers. This could be attributed to societal stereotypes and biases regarding gender roles in STEM fields.

In addition, Jones and Brown (2018) revealed that male teachers are often perceived as more competent in mathematics by students, parents, and colleagues, regardless of their actual proficiency. This perception can influence students' confidence and engagement in mathematics, potentially perpetuating gender disparities in the subject.

Despite efforts to promote gender equity in STEM education, women remain underrepresented in mathematics teaching at various levels. Studies by Garcia et al. (2019) highlighted the importance of recruiting and retaining female teachers in mathematics to serve as role models and mentors for female students, thereby challenging gender stereotypes and encouraging greater participation and achievement in the subject.

Robinson and White (2020) emphasized the need for targeted professional development and support programs to address gender disparities in mathematical competence among teachers. Such programs could focus on building confidence, fostering inclusive classroom environments, and providing resources and strategies to enhance teaching effectiveness in mathematics, particularly for female educators.

Gadgets Used in Teaching

The use of technology and gadgets in teaching mathematics has been a subject of research. A study on the utilization of technologies in teaching mathematics in a flexible learning environment found that mathematics teachers mostly use laptops and smartphones in teaching, while utilizing messenger rooms and Microsoft Teams as digital platforms. The Microsoft Office and Google Workspace are the popular

digital teaching tools while GeoGebra is the most widely used free math software (De Vera & Balgua, 2023). Another study highlighted the importance of technology in fostering deep mathematical thinking when used appropriately, both content-specific and content-neutral technology can be effective in the math classroom (Picha, 2018). The study also emphasized the importance of being a critical consumer of technology and using it to support healthy learning practices. Additionally, Geogebra is a free and easily accessible tool that math teachers can use in their classroom as well as in virtual classes to make math interactive and fun for students (UpEducators, 2022). While the use of technology and gadgets in teaching mathematics has been studied, more research is needed to explore the impact of specific gadgets on the instructional competence of mathematics teachers.

Interactive and Mathematical Applications Used

The use of mathematical applications and tools in teaching mathematics has been studied in various contexts. Some of the commonly used mathematical applications and tools include GeoGebra, Microsoft Office, Google Workspace, Mathalicious, Mathspace, MathBoard, and Math Vocabulary Cards (UpEducators, 2022). A study on the utilization of technologies in teaching mathematics in a flexible learning environment found that mathematics teachers mostly use laptops and smartphones in teaching, while utilizing messenger rooms and Microsoft Teams as digital platforms (Jansen, 2023). The Microsoft Office and Google Workspace are the popular digital teaching tools while GeoGebra is the most widely used free math software (De Vera & Balgua, 2023). On the same vein with gadgets used in teaching, more research is needed to explore the impact of specific applications and tools on the instructional competence of mathematics teachers.

Number of Preparations

The review of related literatures did not yield specific studies related to the number of preparations for mathematics teachers. However, the National Council on Teacher Quality (NCTQ) has conducted a review of teacher preparation programs, including those for elementary mathematics to determine how well they prepare teachers for the classroom. Further, the relationship between the number of preparations and instructional competence of mathematics teachers, the existing literature on teacher preparation and professional competence provides a valuable foundation for understanding the broader factors influencing mathematics teaching.

Subject handled (Math or Non-Math)

Similarly, this review did not yield specific literature, or studies related to the subjects handled (math or non-math) by mathematics teachers. However, the professional competence of mathematics teachers has been studied in various contexts. For example, a study on teachers' ability to apply their subject-specific knowledge in instructional settings highlighted the importance of teachers' subject-specific knowledge, such as content knowledge and pedagogical content knowledge, in effective teaching (Jeschce, et al., 2021).

Highest Educational Attainment

No one shall participate in teaching or operate as a professional teacher in the preschool, primary, or secondary levels unless legally registered, according to Republic operate 9293, an act modifying section 26 of RA 7836.

Fianza (2009) revealed that most of the respondents possessed the necessary qualifications to teach secondary mathematics, with many teachers being LET/PBET passers and degree holders in mathematics. Notably, 40 out of 56 respondents held bachelor's degrees, 15 had master's degrees, and 1 had a doctorate degree.

Ragma (2017) highlighted that teacher, in general, meet the educational requirements as stipulated in the Magna Carta for Public School Teachers. He emphasized that educators have a strong desire not to remain stagnant in their field.

Guzman (2020) conducted a study involving 32 math teacher-respondents in the secondary schools in Candon City and found out that 40.63% were bachelor's degree holder, 30.50% are master's degree holder and 3.13% are doctorate degree holder. The study pointed out that mathematics teachers highly value continuous education to better equip themselves with the knowledge and skills needed for effective teaching.

Naz (2016) expressed that teachers are proactive in enhancing their competencies by seeking updates and advancements through formal educational processes. This drive to elevate their professional outlook is vital to their effectiveness and recognition as esteemed members of the teaching profession.

Many studies have examined the educational background and certification of math teachers. It is generally found that highly qualified math teachers, those with a strong background in mathematics and formal certification, tend to have a positive impact on student learning outcomes.

Call (2018) determined whether there is a difference in mean scores and/or pass rates of fourth-grade students on the Georgia Milestones End of Grade (EOG) Assessment in Mathematics for teachers with various levels of degree attainment (bachelor's, master's, educational specialist, and doctoral degrees). The results of the analyses indicated significant differences existed in student average math scores and passing rates between degree attainment groups. Due to the fact that teacher degree levels have an impact on student scores.

Numbers of Years in Teaching Mathematics

In the field of education, it is commonly accepted that having more experienced teachers is essential for raising student accomplishment levels. Teaching is a lifelong learning process for both teachers and students. Approximately 9% of public-school math teachers had less than three years' experience, 28% had between three- and nine-years' experience, 40% had between ten and twenty years' experience, and 23% had more than twenty years' experience (National Center for Education Statistics, 2017)

Various studies have consistently demonstrated that teachers with more experience tend to be more effective in fostering student progress. Ladd (2008) found that math teachers with over 20 years of experience are more effective than those with no experience, but their effectiveness does not significantly surpass that of teachers with 5 years of experience. Tara Kini (2016) supported this notion, indicating that teaching experience positively correlates with student achievement gains throughout a teacher's career. The study also revealed that teachers tend to improve at a higher rate during their initial years, with gradual improvement continuing at a somewhat lesser rate over the course of their careers.

Furthermore, additional research conducted in schools across the United States by Ladd (2017), along with a Dutch twin study by Gerritsen (2014), has highlighted the cumulative effect of teacher experience on student outcomes. As teachers gain more experience, their students are more likely to perform better on various indicators of success beyond just test scores, such as school attendance.

While early years in a teacher's career show significant gains in effectiveness, there appears to be diminishing returns in terms of additional gains in later years. However, other studies, including those by Blomeke (2016) and Hanushek (2013), have failed to consistently identify statistically significant associations between student achievement and teacher experience. This suggests that while experience matters significantly in the early stages of a teacher's career, its impact may vary in later years.

Similarly, a study was conducted to analyze the influence of faculty members' educational attainment on the performance in the licensure examination for teachers (LET) among 112 state universities and colleges (SUCs) in the Philippines. Results showed that almost half of the faculty members are bachelor's degree holders, about two-fifths of them have master's degree, and more than one-tenth are doctoral degree holders, the SUCs had an overall passing percentage higher as well as majority of the SUCs performed higher than the national passing rate (Balanquit, Ladia, & Nool, 2023). Further, there is a significant inverse relationship between the educational attainment of faculty with bachelor's degree and LET performance, in which higher proportion of faculty members with bachelor's degree tends to result to a lower passing percentage. In contrast, the educational attainment of faculty with doctoral degree has significant direct relationship to LET performance, in which higher proportion of doctoral degree holders likely results to higher passing rate in the LET. However, the educational attainment of teaching staff with master's degree does not significantly correlate with LET performance, hence it does not significantly influence LET performance. When the three categories of educational attainment are taken as independent variables, only doctoral degree significantly influences LET performance.

These reviewed literatures showed that educational attainment of teachers has an impact of students' performances in the classroom and examinations.

Number of mathematics seminars/trainings attended

Great teachers are distinguished by their dedication to ongoing beyond the call of duty and surpassing the limitations of the textbooks. The Department of Education's goal is to cultivate efficient and effective teachers. To achieve this mission, numerous training sessions and seminars are conducted to enhance the skills of every teacher in the schools.

The Department recognizes that the success of education hinges on the teacher's ability to instill a love for learning in every student. As such, they organize training and seminars on various subjects, including ICT, innovative teaching methods, orientations of K-12 Curriculum, Values Formation Seminars, and more to equip teachers for the challenges of a global world (Department of Education, 2023).

Continuing professional development is crucial for in-service teachers to ensure they are competent in their field throughout their careers (Akiba & Liang, 2016). Their study emphasizes the importance of in-service training for public teachers, exposing them to modern techniques and knowledge for improved performance,

In the study of Guzman (2020), she found out that 32% of the mathematics teachers in the City division of Candon City had attended national seminars related to their line of specialization. Similarly, 90% of mathematics teachers had already attended regional mathematics-related seminar and 100% of the mathematics teachers had already attended math-related training workshops conducted in the division and in the school level. She also pointed out that at least 3 seminars had already been attended by these teachers at all levels.

Apparently, only 2% of the total number of mathematics teachers were able to attend international seminars and it is only attended once by school heads and master teachers. Neither key teachers nor

teachers had experienced participating in workshops in the international landscape. This finding parallels the study of Ragma (2017), when he unveiled that the attendance of his teacher-respondents to seminars and trainings was mostly local and regional.

Level of Instructional Competence

Over and above the profile of the teacher, the instructional competence of math teachers is widely recognized as the significant factor in achieving quality Secondary Mathematics Education. It emphasizes that to be a successful mathematics teacher, one must not only possess a deep understanding of mathematics but also demonstrate expertise in mathematics instruction (Flores, 2019). Hence, the level of instructional competence exhibited by the teachers reveals strengths and weaknesses, providing valuable insights to develop and implement activities aimed at improving and enhancing their instructional skill. By having a profound grasp of their subject area and sound instructional techniques, mathematics teachers can effectively enhance the learning abilities of their students and foster a conducive learning environment for success.

Numerous challenges confront mathematics education. These obstacles can arise from multiple factors, including the dynamic nature of mathematical concepts and limited opportunities for continuous professional development. Extensive research conducted by Smith, Hodges, and Castro Superfine (2019) indicates that mathematics teachers often encounter challenges in acquiring and maintaining strong content knowledge in mathematics. Such difficulties can be attributed to various factors, such as the evolving landscape of mathematical research, inadequate pre-service training, and limited access to ongoing professional development opportunities.

Teaching/Facilitating Skills

The evolving role of teachers from being knowledge providers to facilitators of learning and navigator of knowledge necessitates the proper application of teaching methods to make learning experiences vital and relevant. In the context of mathematics education, the effectiveness of teaching is heavily reliant not only on the teachers' educational attainment or skills but also on their competence in the subject and in instruction environment (Philippines Council of Mathematics Teacher Education, 2011).

Pedagogical competence and skills are deemed crucial for facilitating the mathematics teaching and learning process. Chapman (2015) emphasizes that teachers' experience and knowledge of mathematics are vital prerequisites to engaging students in meaningful and effective mathematical practices in the classroom. This underscores the significance of teachers' expertise and experience in cultivating students' deep understanding and appreciation of mathematics.

Boyd et. at, (2011) revealed that teachers predominantly relied in textbooks to facilitate the teaching-learning process and encountered pressing problems such inadequate facilities and equipment, as well as inadequate knowledge of teaching strategies and approaches in mathematics.

Chen-Cheng, (2021) also found that while her respondents were capable teachers, they had not yet reached the level of competence necessary for optimum effectiveness. There was room for improvement in various aspects, such as educational technology integration, professional relationship, community linkages, and collaboration.

In contemporary education, numerous teacher-related factors have been identified as contributing to learners' subpar performance in mathematics. Sa'ad, Adamu, and Sadiq (2014) argue that inadequate teacher competence and lack of dynamism in teaching the subject result in negative attitudes among

students. Mathematics teachers often fail to make the subject practical and engaging, thereby detaching it from real-life contexts and leaving learners with a vague understanding.

Sharma (2018) further contends that present-day mathematics teaching suffers from various flaws, such as teachers' inability to create interest and novelty in the curriculum, the lack of appropriate teaching aids, and the failure to demonstrate the practical applications and utility of the syllabus to students. Bridging mathematics with other disciplines and real-world contexts is essential for enhancing comprehension.

Effective mathematics teachers possess not only a deep understanding of the subject matter but also expertise in the teaching of mathematics. Shulman's pioneering work of Pedagogical Content Knowledge (PCK) sparked considerable interest in developing this knowledge domain among mathematics teachers. MPK encompasses four critical domains: School mathematics curriculum, Students' cognition of mathematics, tasks of mathematics teaching, and mathematical discourse (Shulman, 1986). This is anchored on the theory of constructivism which emphasizes that students construct knowledge based on their experiences and interactions with the environment. Pedagogically competent teachers use this theory to scaffold students' learning, building on their existing knowledge, and utilizing the curriculum as a tool for facilitating understanding (Ball & Bass, 2004)

Succinctly, to effectively plan and design instruction, mathematics teachers must possess a comprehensive understanding of the school mathematics curriculum, curricular frameworks, and goals, as well as knowledge of the students, learning theories, and the broader community. This knowledge empowers teachers to unpack mathematical ideas, adapt lesson sequences, and implement the curriculum effectively. Moreover, teachers must be aware of the logical developmental explanations for the sequencing of mathematical topics to adjust lesson plans when necessary.

It is evident that teachers' competence and skills significantly impact how learners assimilate mathematical concepts. The experiences provided by educators play a pivotal role in shaping students' knowledge and skills. Asikhia (2010) underscores that mathematics teachers lacking sound subject proficiency and pedagogical content knowledge contribute to students' inadequate performance in mathematics.

In line with this, Mabena, Mokgosi, and Ramapela (2021) affirm that teacher-related factors, such as inadequate teaching experience and lack of pedagogical content knowledge and skills, contribute to poor learner performance in mathematics. Pedagogical content knowledge includes various aspects of quality instruction, encompassing interdisciplinary teaching, authentic assessment, and positive discipline.

Teachers expressed a desire to learn more about integrative teaching but lacked confidence in operationalizing it effectively in lesson planning, instructional materials development, subject matter organization, presentation, and evaluation. Furthermore, teachers had limited knowledge of constructivism as a learning process, despite some classrooms showing signs of using problem-solving, inquiry, or discovery approaches.

However, some positive findings emerged. James (2018) discovered that teacher's competence, particularly in instruction, was at a high level. The result of his study displayed that instructional abilities of teachers were rated high, including their ability to explain concepts accurately and command of the language.

Ragma, (2017) accentuated in his study that the facilitating skills of the teacher-respondents in City division of La Union was very good. He emphasized that teachers are using proper sources of assistance and guidance to the students in analyzing, understanding, and interpreting different real life mathematical problems and stressed that that the more competent the instructors, the better result when it comes to the teaching-learning process.

Guidance Skills

Educational Guidance plays a crucial role in helping students achieve self-understanding and self-direction to make informed choices and work towards their personal goals (Topp, Scott, & Ruano, 2018). For teachers, promoting learning is an inherent task, and they do so by guiding the learning process through thoughtful planning, organizing meaningful experiences, creating a conducive learning environment, utilizing diverse instructional materials, catering to individual differences, and assessing students' growth and development.

Cabuson (2004), as cited by Adam (2018), emphasized that teachers, as facilitators of learning, must possess special knowledge and skills in guiding, directing, and advising learners. This aspect gives depth to the teacher-student relationship, and teachers must be adept at assisting students with their challenges.

In a study conducted by Berthiaume (2021), teacher-respondents demonstrated high competence in providing a learning-conducive environment, which was recognized and appreciated by both students and school heads.

The research of Baliling (2020) revealed that mathematics teachers exhibited strong guidance skills, particularly in directing, supervising, and guiding the learning process in a nonthreatening atmosphere. Moreover, they were adept at understanding and addressing the varying levels and needs of their students, effectively directing their work.

Management Skills

The changing role of a teacher may cause unease for those who have entrenched traditional understanding and approaches of teaching and learning process. an effective teacher understands that today teacher's profession has become multifaceted, and a teacher's role is not merely imparting knowledge but bringing real-time experience to the classroom for the students with result-oriented efforts. The teachers themselves need to develop their skills and personality to justify their job. One such skills is Management skill (Bite, 2016).

Successful classroom management is linked to the teacher's competence in classroom management (Demirtas, 2015). Classroom management is related to a wide range of teacher-led activities, like organizing physical space, defining the classroom space, applying classroom management procedures, observing students' behavior, coping with unwanted behavior, using time effectively, motivating students to the lesson, encouraging students to learn responsibility, and encouraging them to take part in the classroom activities (Watkins & Wagner, 2010).

Okçu & Epçaçan (2013) revealed that among the dimensions of instructional competence, classroom management ranked the lowest However, Brophy and Alleman, (2011) disclose that teacher-respondents were good at classroom management. The researchers stress that although teachers hold a degree in social science, they were good at managing classes. This bears the same result in the study conducted by Baliling, (2020) who mentioned that the teacher-respondents were rated very well at guidance skills. This means that instructors were highly aware of the essentiality of motivation and strengthened positive attitudes such as giving commendations, appraisal, and approvals.

Evaluation Skills

Teacher's ability to evaluate and plan teaching and learning is one of the most important professional skills because systematic evaluation, planning and re-evaluation are an integral part of learning and

maximization of development, which makes teaching effective and provides students with profound understanding and competence (Vilkaste, 2018).

According to the Philippines Council of Mathematics Teacher Education, (2011), evaluation is an independent level of the learning process with its own specific didactic function and does not coincide either with evaluation or practice. After the teacher's evaluating students' knowledge, they can assess in different ways: verbal and written answers, oral presentations, artistic, technical, practical, and other assignments, project work, etc. Based on the goals and standards of knowledge in the curriculum, a teacher forms clear aspects and criteria for knowledge assessment, the methods used, etc. in advance, and presents them to students.

Flores (2019) revealed that the respondents in his study are perceived as very competent when it comes to assessment. She quoted that teachers understood the underlying theories and practices to improve the students' performance during classes.

In similar vein, Ragma (2017) found that in the evaluation and assessment part, the teacher-respondents were perceived as "very good". The researcher discloses that along the four competence dimensions, the skill on evaluation/assessment garnered the highest rating. This means that teachers were highly competent in formulating questions with objective of developing critical thinking.

Comparison of Perceived Instructional Competence among Group of Respondents

According to Bandelaria (2017), perceptions can vary between individuals, even among the same people over time. This notion is supported by the aphorism "Everyone experiences different time and space than everyone else but can still find commonalities at a certain time and space with everyone else." Commonalities in perception exist due to shared codes or representations for perception and actions, as proposed by the Common Coding Theory (Ragma, 2017).

Conversely, differences arise from variations in people's status, needs, personalities, and beliefs, leading to diverse perspectives. Moreover, selective perception plays a role in individual differences, as people tend to perceive information selectively based on their interests and preconceptions (Batin & Gacula, 2021).

Strengths and Weaknesses in teachers' competence

Teachers constantly encounter various challenges that demand their attention and resilience. These challenges can arise from external factors or internal sources. Externally, teachers may grapple with the issues related to student population, classroom sizes and other logistical concerns. Internally, they might face personal struggles, such as finding meaning in lesson preparation. Despite the hurdles, these challenges play a vital role in shaping a teacher's effectiveness in the classroom (Department of Education, 2023).

Guzman (2020) brought attention to the pressing issues in schools, not only concerning the shortage of teachers but also the significant lack of qualified and competent educators. The scarcity of teacher training opportunities, both in frequency and accessibility, was emphasized as a significant deficiency that educators encounter.

Roldan (2004) elucidated that secondary mathematics teachers in Region I were proficient in concept and computations, but they were deficient in their skills in problem-solving and the use of teaching strategies.

Flores (2019) revealed that problems on mathematics teaching were somewhat serious. She stressed that questioning technique; motivational strategies and management were the contributory factors in this finding.

Oredina (2006) in her dissertation revealed that teacher ‘s level of instructional competence was very good. The evaluation skills were rated highest while their teaching skills were the lowest.

Chapter II
Methodology
Research Design

This study will utilize a quantitative approach whose design is descriptive-developmental. According to Enzo (2014), the quantitative approach emphasizes objective measurements and the statistical, mathematical, or numerical analysis of data collected through polls, questionnaires, and surveys, or by manipulating pre-existing statistical data using computational techniques. This approach is apt in this study since this research will utilize a checklist and test for the collection of numerical data.

Correspondingly, descriptive research is a method for gathering, classifying, and tabulating data about current conditions or situations, practices, beliefs, processes, trends, and development, as well as cause-and-effect relationships, and then making appropriate interpretations of such data or information with or without statistical methods (Calmorin, 2005). The descriptive-comparative will be used to compare the respondents' perception of the instructional competence of Mathematics Teachers.

Lastly, a developmental research design will be employed. Developmental research is a procedure for preparing and devising educational outputs so that they can be utilized widely (Creswell, 2003). This design will be relevant in this study since it intends on crafting a proposed training program of based on the result of the study.

Population of the study

The participants in this research will consist of Secondary Mathematics Teachers and students within the City Division of Candon. To gather accurate data, a pre-survey will be conducted to determine the exact population of Mathematics teachers and students. The administrative personnel in charge of records will be consulted to assist in this process.

All School Heads teaching Mathematics will be considered for participation. As for the students, one-third of the class population will be included, which amounts to approximately 33% of the total number of students in each class. To ensure a representative sample, the researcher will adhere to the guidance provided by Ragma (2017), where a sample size of ten percent (10%) is deemed adequate. However, considering the statistical principle that larger sample sizes yield more valid results, the researcher opted for a sample size of thirty percent (30%) to enhance the credibility and acceptance of the study's conclusions, as suggested by Oredina (2006) for tiny populations.

Substitute or on-leave teachers will not be included as participants in this research. The table displays the distribution of the specified respondents from the five Public Secondary Schools in the City Division of Candon, Ilocos Sur, for the academic year 2023-2024.

Table 1. Distribution of the Respondents

Schools	Respondents		
	Students		Teachers
	N	n	N
Candon City High School	309	20	3
Candon City Information and Technology National High School	392	48	6
Candon National High School	2,380	142	14
Dr.Ricardo Gacula Memorial National High School	525	24	2
Sto. Tomas National High School	498	52	3
Total	4,104	286	28

Data Gathering Instrument

A questionnaire checklist, the key instrument in gathering the data in assessing the instructional competence of high school mathematics teachers in Public Secondary Schools was utilized in this study. Such questionnaire on instructional competence was composed of two parts: Part I elicited the profile of the Mathematics teachers along the age, sex, gadgets used in teaching, mathematics application, number of preparations, subject handled, number of preparation, highest educational attainment, number of years teaching Mathematics, number of technology-based and modular writing seminars/webinars attended, and highest educational qualifications; Part II, on the other hand, was drawn out the level of instructional competence along the four areas ─ teaching skills/facilitating skills, management skills, guidance skills, and evaluation skills. The statements in the questionnaire for student- respondents was rephrased in such a way that these are parallel to the statements in the questionnaires for teachers and heads. This rewording was established so that the student-respondents clearly understand the details for assessment.

The questionnaire checklist was a combination of the Class Observation Tool used for Proficient and Highly Proficient Teachers as stipulated in DepEd Memorandum No. 004 s. 2022 and the instrument used by Ragma (2017) in his study Content and Pedagogical Competence of Teachers in the Private Secondary Schools in San Fernando City La Union: Basis for a two-pronged Training Program.

Data Gathering Procedure

The questionnaire checklist undergoes validity and reliability. The School Principal and the Head Teacher in Mathematics looked into the purpose and suitability of the research instruments. To interpret its validity, the 5-point Likert Scale will be used:

Point Value	Range of Mean Values	Descriptive Rating (DR)
5	4.21 – 5.00	Very High Validity (VHV)
4	3.41 – 4.20	High Validity (HV)
3	2.61 – 3.40	Moderate Validity (MV)
2	1.81 – 2.60	Poor Validity (PV)
1	1.00 – 1.80	Very Poor Validity (VPV)

The computed validity rating was 4.88 described as "very highly valid". This means that the research tool can measure what it intends to measure.

Further, all comments and suggestions which will be made by the validators will be considered and incorporated.

As to the dependability and consistency of the instruments, it was pilot tested on 30 students and teachers in the Santiago National High School, Division of Ilocos Sur. Cronbach Alpha was used to calculate the reliability coefficient.

The tool was assessed using the Cronbach's Alpha, which yielded a reliability coefficient of 0.98. This value is categorized as very high, indicating that the assessment tool demonstrates a high degree of internal consistency. The very high reliability coefficients signifies that the tool is both consistent and dependable. This ensures that the tool will yield reliable results across different instances of use, making it a robust instrument for the study.

To interpret the reliability the following classification was used.

Range	Descriptive Scale
±1.00	Perfect Reliability
±0.71 - ±0.99	Very High Reliability
±0.51 - ±0.70	High Reliability
±0.21 - ±0.50	Low Reliability
±0.01 - ±0.20	Negligible Reliability
0.00	No Reliability

The collection of data was done through the help of key people in the division. The researcher first seeks the approval of the Schools Division Superintendent to float the questionnaire among Math teachers, and students. The principals and school heads was informed of the objectives of the research for clarity. The principals and the teachers met individually and in groups for the objectives of the study and for the direction setting after the retrieval of the questionnaires.

The questionnaire was personally retrieved by the researcher and kept with utmost confidentiality.

Statistical Treatment of Data

To give an accurate analysis of the data tabulated in the Google Sheets, the following were used:

For problem 1, frequency count and rates were used to determine the profile of the respondents.

For the mathematics training and seminars attended by teachers, data was categorized according to levels: school, local, national, and international. Each level corresponds to a particular number of points.

The scales below clarify the categorization:

Level	Frequency	PointEquivalent
School	1	1
Local	1	2
Regional	1	3
National	1	4
International	1	5

No. of points	Descriptive Equivalent rating
40 and above	Very Adequate (VA)
31-40	Moderately Adequate (MA)

21-20	Fairly Inadequate (FA)
11-20	Slightly Inadequate (SI)
1-10	Very Inadequate (VI)

For Problem 2, a weighted mean were employed to determine the level of instructional competence of the mathematics teachers. The 5-point Likert scale below were utilized.

Points	Ranges	DR	DR class
5	4.21-5.00	Excellent	Strength
4	3.41-4.20	Very Good	Strength
3	2.61-3.40	Good	Weakness
2	1.81-2.60	Fair	Weakness
1	1.00-1.80	Poor	Weakness

For problem 3, t- test was used to determine the difference in the perception of the two group of respondents.

For problem 4, Pearson and chi-square was used to determine a significant relationship between the profile of the mathematics teachers and the level of instructional competence of mathematics teachers along with the different identified skills.

For problem 5, the major strengths and weaknesses were deduced based on the findings, particularly on the level (content and instruction) through statistical ranking. An area were considered a strength when it will receive a descriptive rating of very good or excellent; otherwise, the area were considered a weakness. Moreover, the major strengths and weaknesses was drawn from the ratings given. Such ratings were ranked; hence the ranking system were used. The item that will get the highest mean value in the strengths will be ranked first indicating that is regarded as the foremost strength. This scheme will also apply to items considered as weaknesses.

To establish the validity, acceptability, and functionality of the proposed training program, it was presented to the Administrators of the Public Secondary Schools in the City Division of Candon, Ilocos Sur.

The validation was guided by the following point assignments:

Points	Ranges	DR
5	4.51-5.00	Very High (VH)
4	3.51-4.50	High (H)
3	2.51-3.50	Moderate (M)
2	1.51-2.50	Fair/Slight (F/S)
1	1.00-1.50	Low/Poor (L/P)

CHAPTER III
RESULTS AND DISCUSSIONS

This chapter deals with the table presentation, analysis, and interpretation of data generated from the major and specific problems of the study.

Profile of the Respondents

Figure 1 shows the profile of teachers along their demographics, teaching tools, and professional development, reflecting broader trends in educational practices and technological integration.

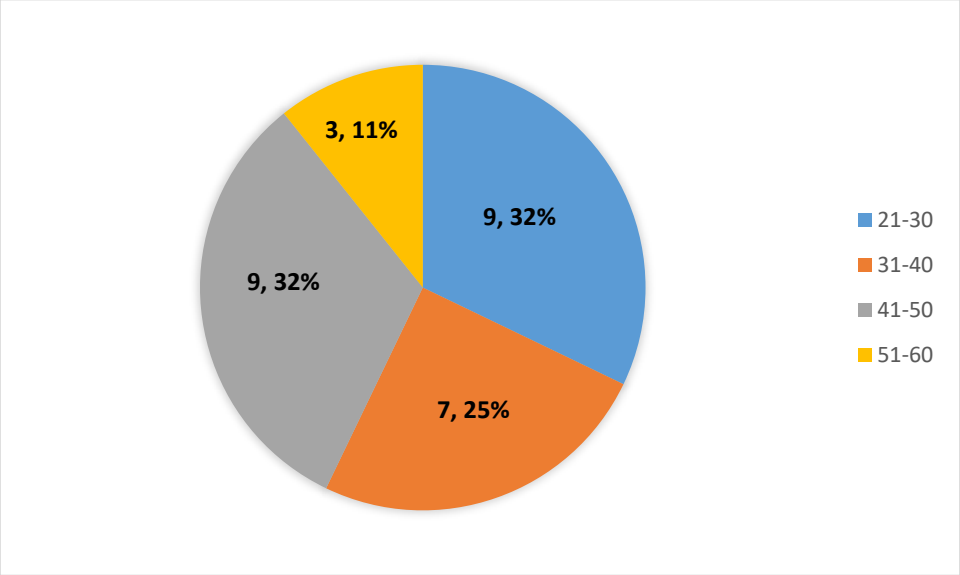

Figure 1. Profile of the Respondents along Age

On Age, the age distribution indicates that the majority of teachers are either in the early stages of their careers (21-30 years) or in mid-career (41-50 years), with each group comprising 32% of the sample (9 teachers each). This bimodal distribution suggests a mix of fresh perspectives from younger teachers and seasoned experience from older teachers.

Teachers' mathematics competence generally improves with experience. Younger teachers (21-30) bring recent content knowledge and innovative methods but may lack classroom experience. Those aged 31-50 tend to have a balanced mix of experience and ongoing professional development, enhancing their mathematics competence (Boyd et al., 2008; Rockoff, 2004).

Continuous professional development is crucial for maintaining and enhancing mathematics competence across all ages. Studies highlight the importance of ongoing training, particularly for those in the 31-50 age bracket (Garet et al., 2001).

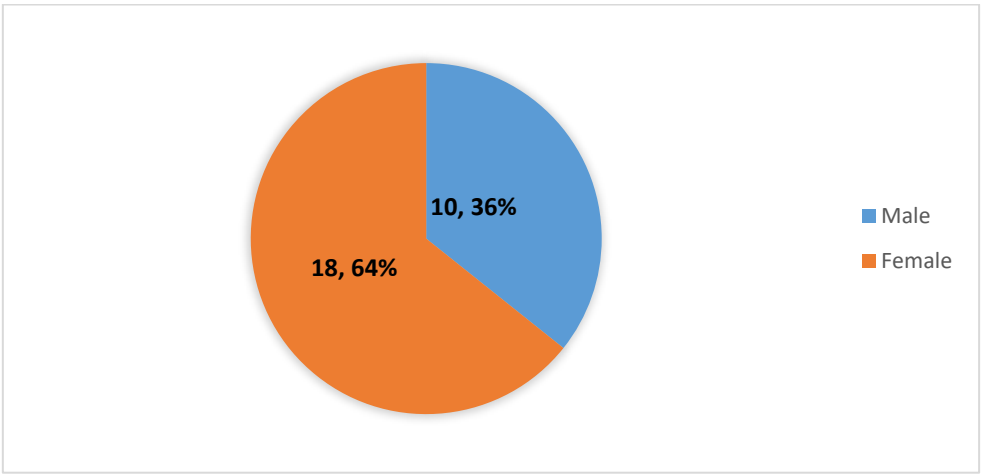

Figure 2. Profile of the Respondents along Sex

On Sex, the gender distribution is predominantly female, with 64% of the teachers being women. This skew towards female teachers is consistent with global trends in education, where teaching, especially at the primary and secondary levels, is often female-dominated.

Carrington et al. (2008) suggest that gender distribution among teachers can impact teaching styles and student perceptions. However, competence in mathematics is not necessarily gender-dependent but rather influenced by training, experience, and professional development.

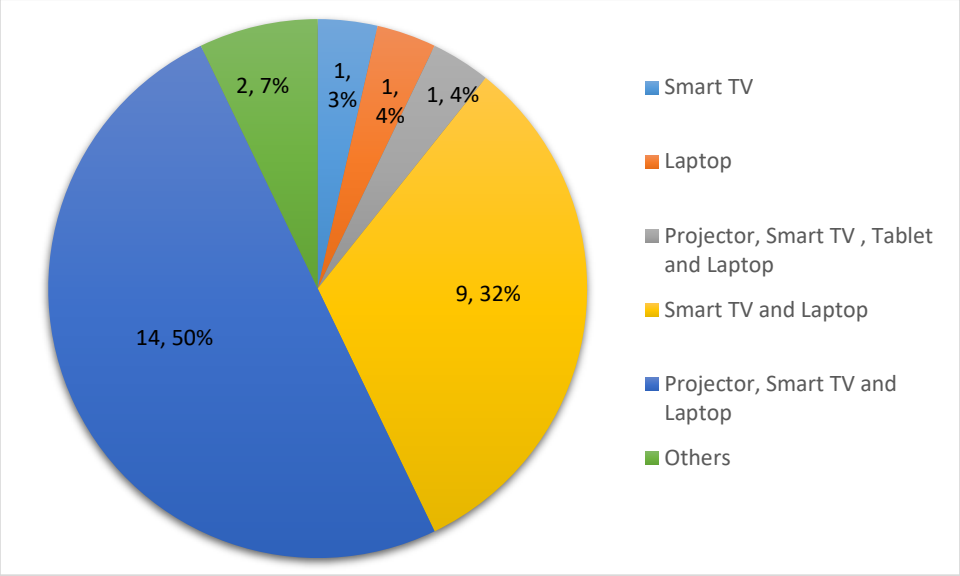

Figure 3. Profile of the Respondents along Gadgets used in Teaching

On Gadgets Used in Teaching, half of the teachers (14, 50%) use a combination of projector, smart TV, and laptop, highlighting the integration of multiple technological tools in the classroom. This combination suggests an effort to create a dynamic and interactive learning environment, leveraging visual aids and digital resources.

Ertmer and Ottenbreit-Leftwich (2013) highlights the importance of integrating technology in the classroom to enhance teaching and learning outcomes. The use of multiple gadgets, such as projectors, smart TVs, and laptops, is shown to support diverse learning styles and improve engagement.

According to the International Society for Technology in Education (ISTE), effective integration of technology, including the combination of multiple devices, can lead to improved student achievement and engagement (ISTE, 2017).

Studies indicate that teachers often prefer using multiple devices to address different teaching needs. For example, a study by Li and Ma (2010) found that using a combination of projectors, laptops, and other gadgets can facilitate various instructional strategies, from direct instruction to collaborative learning.

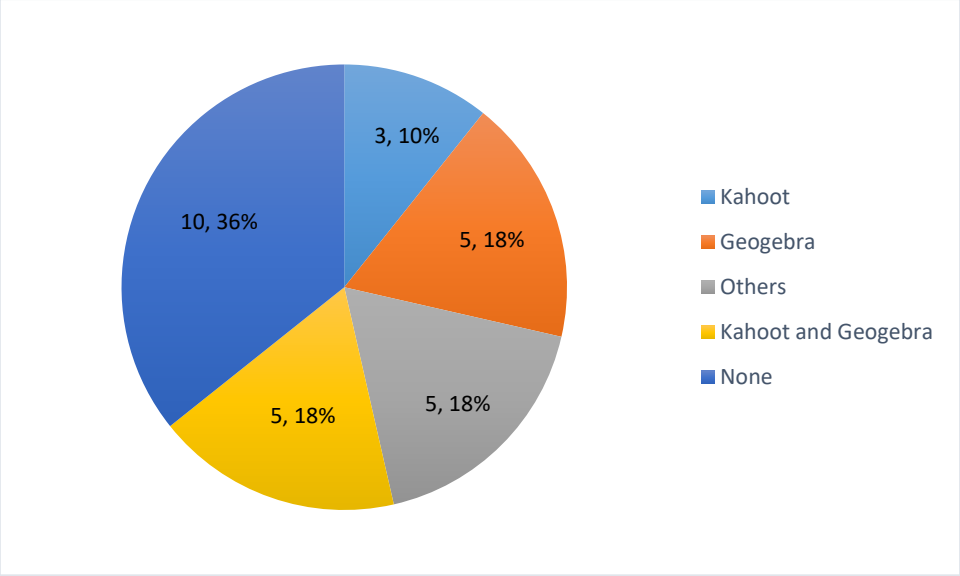

Figure 4. Profile of the Respondents along Interactive and Mathematical Applications

On Interactive and Mathematical Applications, the data shows that a variety of interactive and mathematical applications are used by teachers, with a notable number not using any applications. The use of Kahoot and Geogebra, either individually or in combination, aligns with research indicating that interactive tools can enhance student engagement and understanding of mathematical concepts (Wang, 2015; Hohenwarter & Fuchs, 2004). The preference for traditional methods by some teachers reflects ongoing barriers to technology integration, including lack of training and resources (Ertmer, 1999).

The highest frequency (36%) indicates that many teachers do not use any interactive or mathematical applications. This could reflect a lack of resources, training, or preference for traditional teaching methods. Research highlights the benefits of using interactive tools in education. Interactive applications like Kahoot can increase student engagement and motivation (Wang, 2015). Likewise, geogebra has been shown to improve students' understanding of mathematical concepts through visual and interactive means (Hohenwarter & Fuchs, 2004).

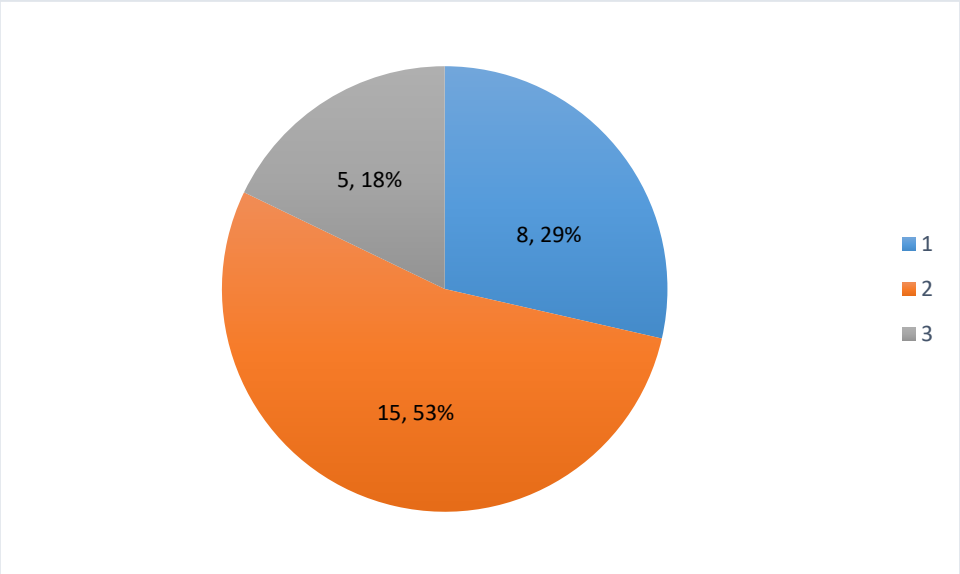

Figure 5. Profile of the Respondents along Number of Preparation

The data indicates that most teachers engage in two preparation sessions (15, 53%), which aligns with research suggesting that moderate preparation levels are optimal for effective teaching (Kunter et al., 2013). Adequate preparation is crucial for lesson planning and addressing student needs, contributing to better educational outcomes (Dicke et al., 2015). Schools that support structured preparation time and resources typically see more effective teaching and improved student performance (Darling-Hammond, 2000; Stronge, 2018).

18% of teachers reported having only one preparation session. This might indicate minimal preparation, which could be due to factors such as time constraints, confidence in their teaching abilities, or a lack of emphasis on extensive preparation.

36% of teachers have three preparation sessions. This indicates a thorough preparation process, potentially reflecting a focus on detailed lesson planning and possibly addressing different aspects of the curriculum or student needs.

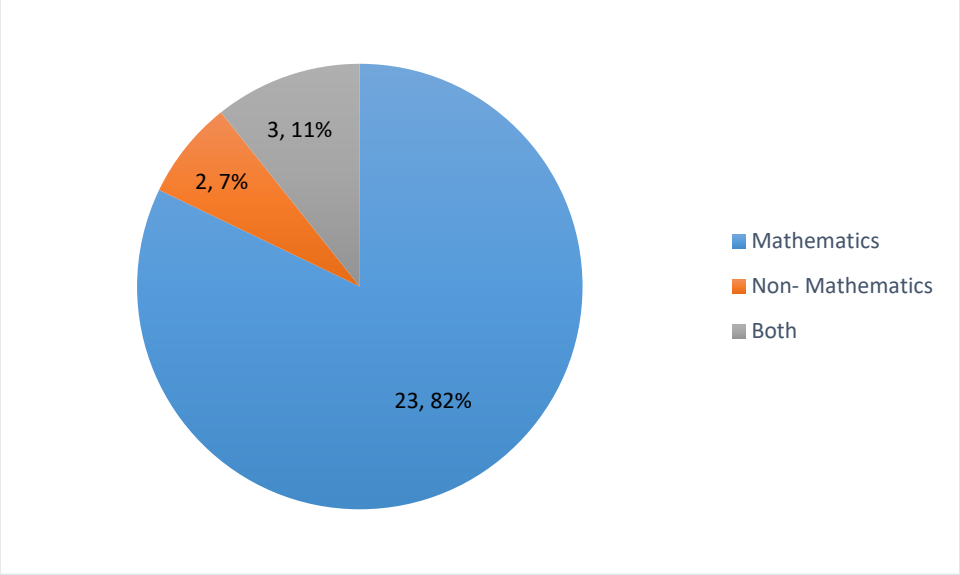

Figure 6. Profile of the Respondents along Subject Handled

On Subject Focus, the predominance of Mathematics teachers (23, 82%) points to a significant emphasis on STEM education within the surveyed schools. This focus aligns with global educational priorities to enhance competencies in science, technology, engineering, and mathematics.

The data indicates that a significant majority of teachers handle mathematics (23), which reflects the critical importance placed on mathematics education for developing essential skills (NCTM, 2014). The specialization in mathematics aligns with global priorities on STEM education, highlighting the need for strong mathematics instruction to support student success in various fields (English, 2016). The presence of teachers handling both mathematics and non-mathematics subjects suggests versatility, which is valuable in diverse educational contexts (Ball & Forzani, 2009). Teacher expertise in mathematics has been shown to significantly enhance student learning outcomes, emphasizing the importance of specialized knowledge (Hill, Rowan, & Ball, 2005; Shulman, 1986).

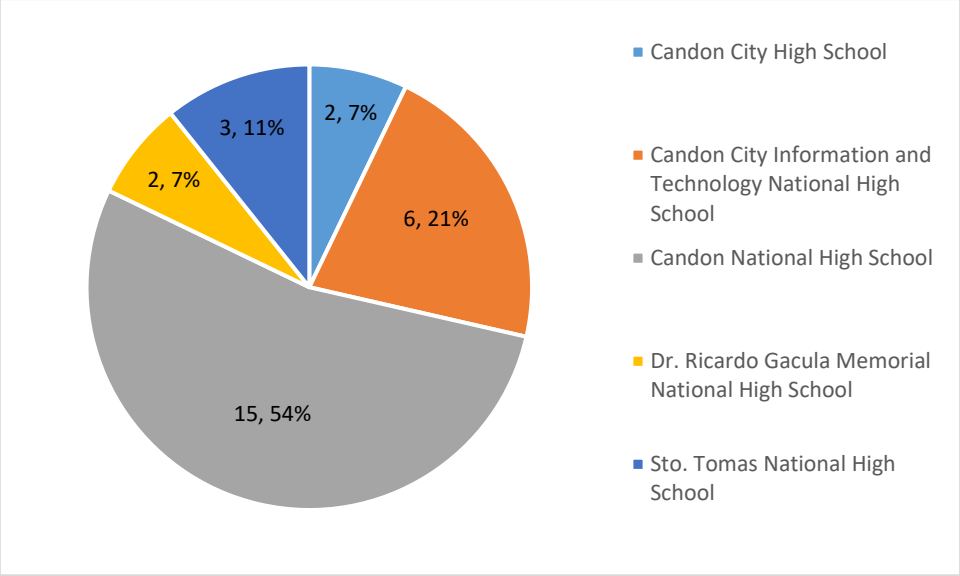

Figure 7. Profile of the Respondents along…….

On Institutional Employment, Candon National High School, employing 53.6% of the teachers (15 teachers), appears to be a central institution in this study. The concentration of teachers at this school might suggest it has a larger faculty or is a key site for educational initiatives in the region.

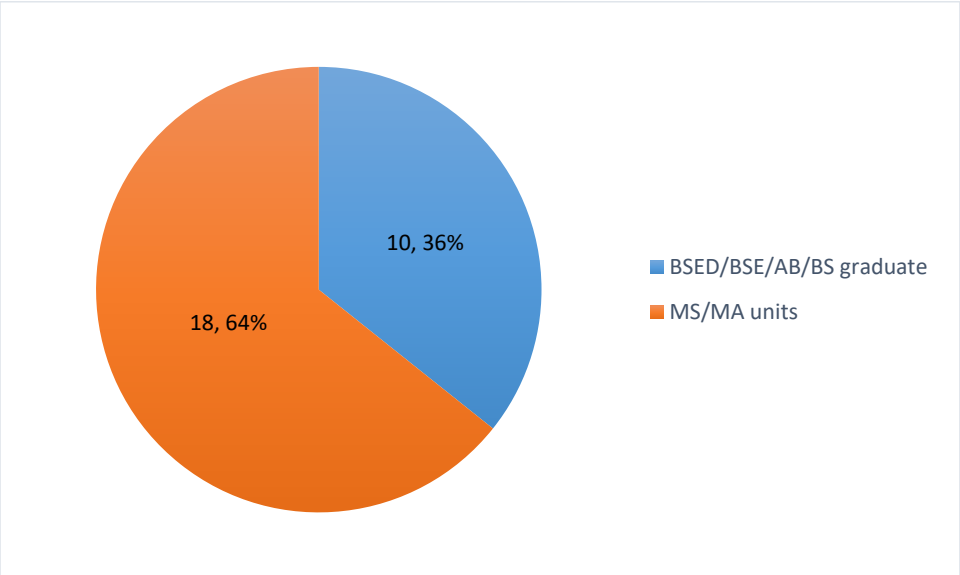

Figure 8. Profile of the Respondents along Highest Educational Qualification

On Educational Attainment, the majority of teachers hold a BSED/BSE/AB/BS degree (18, 64%), reflecting a solid foundational education among the teaching staff. This level of qualification is typical for secondary education teachers, ensuring they have the requisite subject knowledge and pedagogical skills.

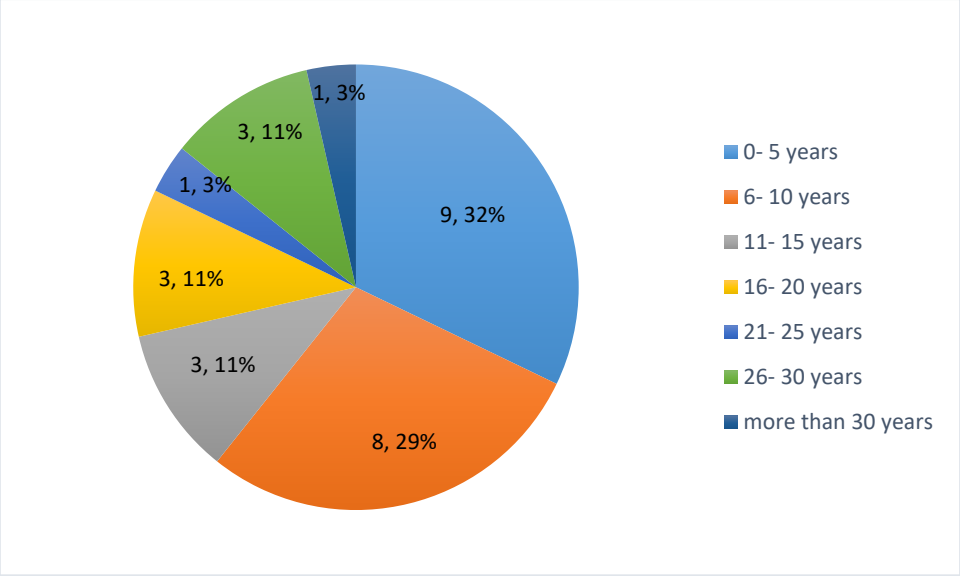

Figure 9. Profile of the Respondents along Number of Years in Teaching

On Teaching Experience, a significant number of teachers (9, 32%) have 0-5 years of teaching experience, indicating a substantial influx of new educators into the system. This influx of novice teachers might be driving the adoption of new teaching technologies and methods.

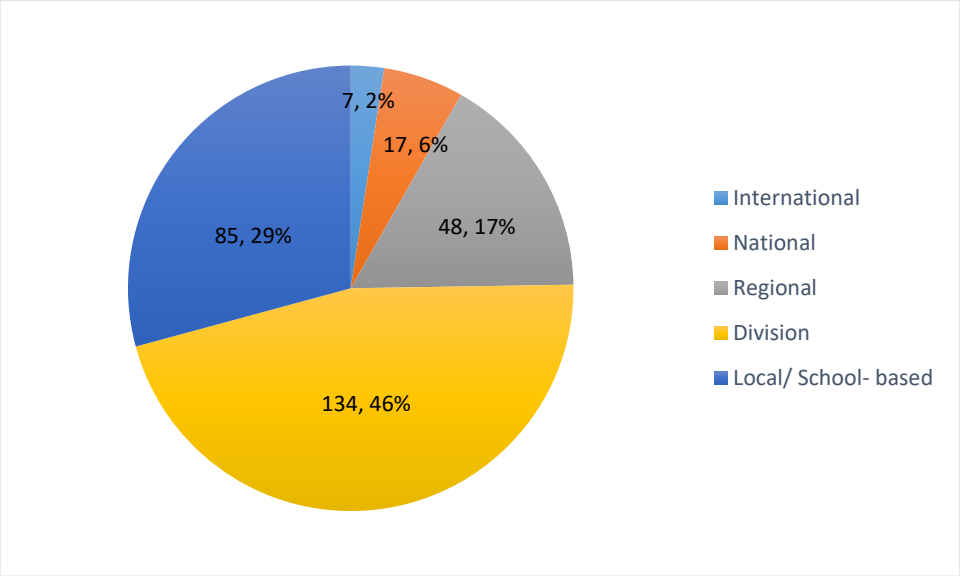

Figure 10. Profile of the Respondents Along Seminars Attended

Seminars Attended, this indicates that a significant number of teachers mostly attended seminars at the division level which gained 268 points (Very Adequate) and only a few among teachers who can participate at the international level (35, Moderately Adequate). The attendance data indicates a well-rounded engagement across various levels of seminars, with a particularly high focus on division-level seminars, suggesting a deep commitment to specialized or localized professional development. This diverse range of seminar attendance reflects a comprehensive approach to staying informed and engaged across different scopes of influence and practice.

Result further implies that teacher profile recommends a dynamic educational landscape. The mix of early-career and mid-career teachers brings innovation and experience. A female majority aligns with global trends in teaching. The significant use of technology enhances interactive learning. Applications like Kahoot and Geogebra make math more engaging. The emphasis on STEM highlights a focus on essential

skills. Candon National High School's high teacher concentration suggests its pivotal role. Most teachers' degrees ensure solid foundations, while new teachers drive tech adoption, reflecting an evolving environment.

This implies broader trends observed in educational technology integration, where younger and more tech-savvy teachers are leading the way in adopting new tools (Pew Research Center, 2013; Saleh & Al-Dera, 2013). Furthermore, the high percentage of mathematics teachers and their active use of technology could imply a strong emphasis on STEM education within the surveyed schools.

Generally, the profile of teachers in this study highlights a dynamic and evolving educational environment where young, technologically adept educators are driving innovation, particularly in STEM education. This drift is likely to continue as schools increasingly prioritize the integration of technology and the development of subject-specific expertise to enhance teaching and learning experiences.

Level of Instructional Competence of Mathematics Teachers

Table 2.a.1. Level of Instructional Competence of Mathematics Teachers on Teaching/ Facilitating Skills along substantiality of teaching

A. Teaching/Facilitating Skills	Teacher		Student		As a whole	
1. Substantiality of Teaching	Mean	DR	Mean		Mean	DR
The teacher…						
a. demonstrates a profound understanding of the lesson content and possesses extensive knowledge of the subject being taught.	4.71	E	4.63	E	4.67	E
b. stays informed about the latest advancements, research, and updates in their subject area, ensuring that students receive accurate and up-to-date information.	4.46	E	4.39	E	4.39	E
c. connects their teaching practices to the school's vision, mission, and philosophy, aligning instructional strategies and learning outcomes with national educational goals and standards.	4.50	E	4.59	E	4.58	E
d. ensures that all crucial aspects of the subject matter are covered during instruction, designing lessons that provide a well-rounded understanding of the subject for students.	4.50	E	4.54	E	4.54	E
e recognizes and appreciates students' prior knowledge, life experiences, and interests, incorporating these elements into lesson plans to make the content engaging and relatable.	4.64	E	4.53	E	4.54	E

f. goes beyond teaching academic concepts and incorporates practical applications of values and skills, using real-life examples to encourage students to apply learned knowledge in practical situations.	4.68	E	4.49	VG	4.50	E
g. designs and implements a diverse range of activities, such as puzzles, games, and recitations, to cater to different learning styles and actively engage students in the learning process.	4.43	E	4.37	E	4.38	E
h. establishes connections between the current lesson and other subjects or disciplines, demonstrating how concepts from different areas relate and complement each other, fostering a holistic understanding among students.	4.54	E	4.44	E	4.45	E
Grand Mean	**4.56**	**E**	**4.50**	**E**	**4.50**	**E**

Legend:

4.21-5.00	Excellent E

Table 2.a.1 shows that the level of instructional competence of Mathematics Teachers on Teaching/ Facilitating Skills along substantiality of teaching got a computed grand mean of 4.56 among teachers, 4.50 among students, and 4.50 as whole, entirely with a descriptive rating of excellent.

Among the Teachers, the teacher demonstrates a profound understanding of the lesson content and possesses extensive knowledge of the subject being taught got the highest computed mean of 4.71 with a descriptive rating of excellent while, the teacher designs and implements a diverse range of activities to cater to different learning styles got the lowest computed mean of 4.43 with a descriptive rating of excellent.

Among the students, the teacher demonstrates a profound understanding of the lesson content and possesses extensive knowledge of the subject being taught got the highest computed mean of 4.63 with a descriptive rating of excellent while, the designs and implements a diverse range of activities got the lowest computed mean of 4.37 with a descriptive rating of excellent.

As a whole, the teacher demonstrates a profound understanding of the lesson content and possesses extensive knowledge of the subject being taught got the highest computed mean of 4.67 with a descriptive rating of excellent while, designs and implements a diverse range of activities got the lowest computed mean of 4.38 with a descriptive rating of excellent.

It further implies that teachers in this study are highly proficient across various teaching and facilitating skills, as reflected by the overall Excellent ratings. The highest rated area is the deep understanding and extensive knowledge of lesson content, indicating that both teachers and students recognize the depth of subject mastery. The emphasis on practical applications and real-life examples is also highly rated, underscoring the importance of relevance in education. However, the slightly lower ratings for designing diverse activities and staying updated with the latest advancements suggest potential areas for professional

development to enhance engagement and maintain current pedagogical practices. Overall, the Excellent ratings across the board indicate a strong teaching environment that aligns well with educational standards and goals.

According to the research findings of Dervenis, Fitsilis, and Iatrellis (2022), which identify teachers' high levels of teaching and facilitating ability—specifically their strong knowledge of lesson content and application of practical applications—coincide with the literature that focuses on the value of subject expertise in effective teaching. For example, a study of teachers' classroom English ability identified a strong positive correlation between language ability and teaching self-efficacy, highlighting the value of subject-specific knowledge in the classroom.

Table 2.a.2. Level of Instructional Competence of Mathematics Teachers on Teaching/ Facilitating Skills along with quality of teacher's explanation

A. Teaching/Facilitating Skills	Teacher		Students		As a Whole	
2. Quality of teacher's explanation	Mean	DR	Mean	DR	Mean	DR
The teacher…						
a. conveys complex concepts in a clear and understandable manner, using appropriate examples, analogies, and visual aids to enhance students' comprehension.	4.61	E	4.63	E	4.62	E
b. encourages active learning by asking students to explain their answers or solutions, fostering critical thinking and analysis.	4.61	E	4.56	E	4.58	E
c. fosters a classroom environment where students feel comfortable expressing their opinions and perspectives, promoting critical thinking and open discussions.	4.61	E	4.48	E	4.54	E
d. employs instructional organizers, such as graphic organizers, outlines, or concept maps, to simplify complex lessons and aid students' understanding.	4.46	E	4.42	E	4.44	E
Grand Mean	**4.57**	**E**	**4.52**	**E**	**4.55**	**E**

Legend:

4.21-5.00	Excellent	E

Table 2.a.2 shows that the level of instructional competence of Mathematics Teachers on Teaching/ Facilitating Skills along quality of the teacher's explanation got a computed grand mean of 4.57 among teachers, 4.52 among students, and 4.55 as a whole, with credentials as excellent.

Among teachers, conveys complex concepts clearly and understandably, using appropriate examples, analogies, and visual aids to enhance students' comprehension, encourages active learning by asking students to explain their answers or solutions, fostering critical thinking and analysis, and fosters a classroom environment where students feel comfortable expressing their opinions and perspectives, promoting critical thinking and open discussions got the highest computed mean of 4.61 with a descriptive rating of excellent while, employs instructional organizers, such as graphic organizers, outlines, or concept maps, to simplify complex lessons and aid students' understanding got the lowest computed mean of 4.46 with a descriptive rating of excellent.

Among students, conveys complex concepts clearly and understandably, using appropriate examples, analogies, and visual aids to enhance students' comprehension got the highest computed mean of 4.63 with a descriptive rating of excellent while, employing instructional organizers, such as graphic organizers, outlines, or concept maps, to simplify complex lessons and aid students' understanding got the lowest computed mean of 4.42 with a descriptive rating of excellent.

As a whole, conveys complex concepts clearly and understandably, using appropriate examples, analogies, and visual aids to enhance students' comprehension got the highest computed mean of 4.62 with a descriptive rating of excellent while, employing instructional organizers, such as graphic organizers, outlines, or concept maps, to simplify complex lessons and aid students' understanding got the lowest computed mean of 4.44 with a descriptive rating of excellent.

It further implies that the effectiveness of clear and engaging explanations, conveying complex concepts in a comprehensible manner, utilizing appropriate examples, analogies, and visual aids to bolster student comprehension received the highest computed mean across all categories. However, while the employment of instructional organizers to simplify complex lessons garnered a slightly lower computed mean, it remained at a very high level, indicating areas for potential refinement in instructional techniques. The findings emphasize the important role of adept explanations in fostering student understanding and underscore the importance of ongoing support and development in maximizing the effectiveness of instructional organizers to facilitate student learning comprehensively.

Research indicates that teaching and facilitating skills, along with the quality of a teacher's explanations, significantly influence the instructional competence of mathematics teachers. According to the study by König et al. (2021) found that teachers' pedagogical competence is closely linked to instructional quality and student achievement in mathematics. Similarly, research by Ijeh (2013) highlights that competent mathematics teachers employ topic-specific instructional strategies, underscoring the importance of effective teaching skills in instructional competence.

Table 2.a.3. Level of Instructional Competence of Mathematics Teachers on Teaching/ Facilitating Skills along with receptivity to students' ideas and contributions

A. Teaching/Facilitating Skills	Teachers		Students			As a Whole
3. Receptivity to students' ideas and contributions	Mean	DR	Mean	DR	Mean	DR
The teacher…						
a. values students' questions and ideas, incorporating them into	4.61	E	4.55	E	4.58	E

	classroom discussions to enhance the overall learning experience.						
	b. actively encourages students to raise thought-provoking questions, stimulating meaningful engagement and growth.	4.61	E	4.44	E	4.52	E
	c. ensures that the content is appropriately challenging yet accessible to all students, promoting meaningful learning experiences.	4.50	E	4.49	E	4.50	E
	Grand Mean	**4.57**	**E**	**4.49**	**E**	**4.53**	**E**

Legend:

4.21-5.00	Excellent	E

Table 2.a.3 shows that the level of instructional Competence of Mathematics Teachers on Teaching/ Facilitating Skills along receptivity to students' ideas and contributions got a computed grand mean of 4.57 among teachers, 4.49 among the students, and 4.53 as a whole all with a descriptive rating of excellent.

Among the teachers, values students' questions and ideas, incorporating them into classroom discussions to enhance the overall learning experience and actively encourages students to raise thought-provoking questions, stimulating meaningful engagement and growth got the highest computed mean of 4.61 with a descriptive rating of excellent while, ensures that the content is appropriately challenging yet accessible to all students, promoting meaningful learning experiences got the lowest computed mean of 4.50 with a descriptive ratingof excellent.

Among the students, values students' questions and ideas, incorporating them into classroom discussions to enhance the overall learning experience got the highest computed mean of 4.55 with a descriptive rating of excellent while, actively encourages students to raise thought-provoking questions, stimulating meaningful engagement and growth got the lowest computed mean of 4.50 with a descriptive rating of excellent.

As a whole, values students' questions and ideas, incorporating them into classroom discussions to enhance the overall learning experience got the highest computed mean of 4.58 with a descriptive rating of excellent while, actively encourages students to raise thought-provoking questions, stimulating meaningful engagement and growth got the lowest computed mean of 4.45 with descriptive rating of excellent.

It further implies that teachers who prioritize incorporating students' questions and ideas into classroom discussions, enhancing the overall learning experience, received the highest mean, highlighting the crucial role of fostering inclusivity and engagement. Conversely, while ensuring that content is appropriately challenging yet accessible to all students received a slightly lower mean, it still demonstrated a very high level, indicating a need for continued attention to provide meaningful learning experiences for all. The result further highlight the importance of valuing student input and fostering engagement to enhance overall student growth and effectiveness in Mathematics education, emphasizing the ongoing need for inclusive and challenging instructional practices to optimize learning outcomes.

König et al. (2021), emphasized also that the teachers who engage with students' questions and ideas foster a more inclusive and participatory learning environment, leading to better learning outcomes.
In addition, Lumpe et al.(2012) pointed out that incorporating students' questions and ideas aligns with previous research that stresses the significance of fostering inclusivity and active participation in the classroom to maximize student growth. Teachers who create environments where students feel their ideas are valued are more likely to enhance overall learning experiences, as demonstrated by the higher mean scores in this area.

Table 2.a.4. Level of Instructional Competence of Mathematics Teachers on Teaching/ Facilitating Skills along the quality of the questioning procedure

A. Teaching/Facilitating Skills	Teachers		Students		As a Whole	
4. Quality of questioning procedure	Mean	DR	Mean	DR	Mean	DR
The teacher…						
a. asks questions that require students to think critically and engage in higher-order thinking.	4.57	E	4.47	E	4.52	E
b. allows students to explain their answers or solutions to questions, promoting active learning and deeper understanding.	4.57	E	4.57	E	4.57	E
c. provides sufficient time for students to process the question and formulate their responses	4.57	E	4.50	E	4.54	E
d. ensures that concepts and skills are learned effectively, reinforcing understanding through appropriate questioning	4.46	E	4.47	E	4.47	E
Grand Mean	**4.54**	**E**	**4.50**	**E**	**4.52**	**E**

Legend: 4.21-5.00 Excellent E

Table 2.a.4 shows that the level of instructional competence of Mathematics Teachers on Teaching/ Facilitating Skills along quality of questioning procedure got a computed grand mean of 4.54 among teachers, 4.50 among the students, and 4.52 as a whole all with a descriptive rating of excellent.
Among the teachers, asks questions that require students to think critically and engage in higher-order thinking, allows students to explain their answers or solutions to questions, promoting active learning and deeper understanding, and provides sufficient time for students to process the question and formulate their responses got the highest computed mean of 4.57 with a descriptive rating of excellent while, ensures that concepts and skills are learned effectively, reinforcing understanding through appropriate questioning got the lowest computed mean of 4.46 with a descriptive rating of excellent.
Among the students, allows students to explain their answers or solutions to questions, promoting active learning and deeper understanding got the highest computed mean of 4.57 with a descriptive rating of excellent while, asks questions that require students to think critically and engage in higher-order thinking

and ensures that concepts and skills are learned effectively, reinforcing understanding through appropriate questioning got the lowest computed mean of 4.47 with a descriptive rating of excellent.

As a whole, allows students to explain their answers or solutions to questions, promoting active learning and deeper understanding got the highest computed mean of 4.57 with a descriptive rating of excellent while, ensures that concepts and skills are learned effectively, reinforcing understanding through appropriate questioning got the lowest computed mean of 4.47 with a descriptive rating of excellent.

It further implies the importance of effective questioning strategies in Mathematics education. Teachers who engage students in critical thinking, and higher-order thinking, and provide adequate response time facilitate active learning and deeper understanding, as reflected by the highest mean scores. However, there's room for improvement in ensuring effective learning through questioning, although still at a very high level. This highlights the ongoing need for refining questioning techniques to foster active student engagement and comprehension in Mathematics education. Continued support and development in this area are crucial for enhancing teaching effectiveness and promoting deeper learning experiences for students.

Siller and Ahmad (2022) found that collaborative learning fosters critical thinking, supporting the importance of integrating student input into discussions. Attard (2012) similarly noted that student engagement improves when teachers encourage participation through effective questioning, reinforcing the need for an interactive classroom environment. Additionally, König et al. (2021) established a strong link between pedagogical competence, instructional quality, and mathematics achievement, showing that questioning strategies aid in guiding students through complex concepts and stimulating critical thinking. While the present study found that ensuring content accessibility had a slightly lower mean, it still reflected a high instructional standard, underscoring the need for continued optimization of questioning techniques. Collectively, these findings stress the necessity of student-centered instructional practices, where valuing student input and using thought-provoking questions enhance teaching effectiveness and learning outcomes.

Table 2.a.5. Level of Instructional Competence of Mathematics Teachers on Teaching/ Facilitating Skills along selection of teaching methods

A. Teaching/Facilitating Skills		Teachers		Students		As a Whole	
5. Selection of teaching methods	Mean	DR	Mean	DR	Mean	DR
The teacher uses teaching methods which are…						
a. relevant and applicable to the subject being taught	4.79	E	4.55	E	4.67	E
b. effectively explain ideas and problem-solving approaches	4.71	E	4.62	E	4.67	E
c. encouraging to the students to investigate and examine concepts independently	4.75	E	4.46	E	4.61	E
d. appropriate and beneficial for all students, ensuring no one is left behind.	4.57	E	4.47	E	4.52	E

e. intended to keep students engaged and motivated, promoting continuous learning	4.68	E	4.52	E	4.60	E
Grand Mean	**4.70**	**E**	**4.52**	**E**	**4.61**	**E**

Legend: 4.21-5.00 Excellent E

Table 2.a.5 shows that the level of instructional competence of mathematics teachers on teaching/ facilitating skills along selection of teaching methods got a computed grand mean of 4.70 among the teachers, 4.52 among the students, and 4.61 as a whole.

Among the teachers, relevant and applicable to the subject being taught got the highest computed mean of 4.79 with a descriptive rating of excellent while, appropriate and beneficial for all students, ensuring no one is left behind got the lowest computed mean of 4.57 with a descriptive rating of excellent.

Among the students, effectively explain ideas and problem-solving approaches got the highest computed mean of 4.62 with a descriptive rating of excellent while, encouraging to the students to investigate and examine concepts independently got the lowest computed mean of 4.46 with a descriptive rating of excellent.

As a whole, relevant and applicable to the subject being taught and effectively explain ideas and problem-solving approaches got the highest computed mean of 4.67 with a descriptive rating of excellent while, encouraging to the students to investigate and examine concepts independently and appropriate and beneficial for all students, ensuring no one is left behind got the lowest computed mean of 4.52 with a descriptive rating of excellent.

It further implies the critical role of aligning teaching methods with Mathematics content, with teachers who do so receiving the highest mean. However, there's a need for ongoing refinement to ensure these methods cater to all students effectively. Similarly, students benefit from clear explanations and problem-solving approaches, though there's potential for enhancing the encouragement of independent investigation. Moreover, the importance of teaching methods prioritizing clarity and problem-solving while fostering student autonomy and inclusivity. Continued emphasis on refining strategies to accommodate diverse student needs is vital for maximizing learning outcomes in Mathematics classrooms.

The National Council of Teachers of Mathematics (NCTM) advocates for teaching practices that promote reasoning and problem-solving, engaging students in tasks that encourage critical thinking and meaningful discussions. Additionally, active learning strategies that require cognitive engagement in constructing new knowledge, particularly through problem-solving, have been highlighted as essential in mathematics education.

Table 2.a.6. Level of Instructional Competence of Mathematics Teachers on Teaching/ Facilitating Skills along quality of information and communication technology used

A. Teaching/Facilitating Skills	Teachers		Students		As a Whole	
6. Quality of information and communication technology used	Mean	DR	Mean	DR	Mean	DR
The teacher uses…						
a. Interactive and mathematical applications	4.32	E	4.52	E	4.42	E

	b. Integration ICT in the teaching-learning process	4.36	E	4.27	E	4.32	E
	c. appropriate designs, animations, and graphic presentation and apply the "5-5-5" rule.	4.14	VG	4.32	E	4.23	E
	d. teaching with internet	4.07	VG	4.03	VG	4.05	VG
	e. overhead/LCD projector/Smart TV	4.54	E	4.37	E	4.46	E
	Grand Mean	**4.29**	**E**	**4.30**	**E**	**4.30**	**E**

Legend: 4.21-5.00 Excellent E
3.41-4.20 Very Good VG

Table shows that the level of instructional competence of mathematics teachers on teaching/ facilitating skills along quality of information and communication technology used got a computed grand mean of 4.29 among the teachers, 4.30 among the students, and 4.30 as a whole with a descriptive rating of excellent among all respondents.

Among the teachers, Overhead/LCD projector/Smart TV got the highest computed mean of 4.54 with a descriptive rating of excellent while, teaching with internet connectivity is the lowest computed mean of 4.07 with a descriptive rating of very good.

Among the students, computers for using interactive and mathematical applications in teaching got the highest computed mean of 4.52 with a descriptive rating of excellent while, teaching with internet connectivity got the lowest computed mean of 4.03 with a descriptive rating of very good.

As a whole, using overhead/ LCD projector/ Smart TV in teaching got the highest computed mean of 4.46 with a descriptive rating of excellent while, teaching with internet connectivity got the lowest computed mean of 4.05 with a descriptive rating of very good.

It further reveals areas for potential improvement in ICT integration within Mathematics education, with teaching with internet connectivity receiving the lowest mean among both teachers and students. This highlights the need for refinement in this aspect of ICT utilization to ensure its effectiveness. Conversely, using interactive and mathematical applications received the highest mean across all respondents, emphasizing their importance in instructional preparation. It further shows the significance of leveraging ICT tools effectively to enhance teaching and learning experiences in Mathematics education. However, continued refinement is essential to maximize the potential benefits of ICT integration and ensure its seamless integration into classroom practices.

Voogt et al.(2013) pointed out the role of Information and Communication Technology (ICT) in mathematics instruction, with interactive and mathematical applications receiving the highest mean across respondents, affirming their instructional value. However, teaching with internet connectivity received the lowest mean, suggesting challenges in accessibility or effectiveness, consistent with Ertmer and Ottenbreit-Leftwich's (2013) assertion that ICT's impact depends on teacher preparedness and infrastructure support. The findings emphasize the need for continuous refinement of teaching strategies and ICT integration to optimize learning experiences in mathematics classrooms.

Table 2.b.1. Level of Instructional Competence of Mathematics Teachers on guidance skills along quality of interaction with students

B. Guidance Skills	Teachers		Students		As a Whole	
1. Quality of interaction with students	Mean	DR	Mean	DL	Mean	DL
The teacher…						
a. actively engages students using a variety of instructional techniques, fostering interest and motivation through interactive discussions, hands-on activities, multimedia resources, or real-world examples	4.71	E	4.66	E	4.68	E
b. acknowledges and appreciates students' correct responses or achievements, reinforcing positive behavior	4.82	E	4.57	E	4.70	E
c. maintains a supportive and non-judgmental attitude when students make mistakes, encouraging a growth mindset	4.79	E	4.56	E	4.68	E
d. actively supports students in their efforts to improve, offering constructive feedback and guidance to enhance their work	4.57	E	4.62	E	4.60	E
e. sets high expectations for students' academic performance and behavior, motivating them to reach their full potential	4.50	E	4.43	E	4.47	E
Grand Mean	**4.68**	**E**	**4.57**	**E**	**4.63**	**E**

Legend: 4.21-5.00 Excellent E

Table 2.b.1. shows the level of instructional competence of mathematics teachers on guidance skills along quality of interaction with students got a computed mean of 4.68 among teachers, 4.57 among students, and 4.63 as a whole, all interpreted as excellent.

Among teachers, acknowledges and appreciates students' correct responses or achievements, reinforcing positive behavior got the highest computed mean of 4.82 with a descriptive rating of excellent while, sets high expectations for students' academic performance and behavior, motivating them to reach their full potential got the lowest computed mean of 4.50 with a descriptive rating of excellent.

Among students, actively engages students using a variety of instructional techniques, fostering interest and motivation through interactive discussions, hands-on activities, multimedia resources, or real-world examples got the highest computed mean of 4.66 with a descriptive rating of excellent while, sets high

expectations for students' academic performance and behavior, motivating them to reach their full potential got the lowest computed mean of 4.43 with a descriptive rating of excellent.

It further implies the important role of positive reinforcement and interactive teaching methods in guiding students towards academic success. While teachers who acknowledge and appreciate students' achievements received the highest mean, indicating the value of reinforcing positive behavior, setting high expectations for academic performance and behavior garnered the lowest mean, suggesting areas for improvement in motivating students. Generally, students show active participation through diverse instructional techniques proved highly effective in fostering interest and motivation. It also emphasizes the ongoing need to motivate students to excel both academically and behaviorally, with positive reinforcement being a crucial component of effective classroom guidance.

Pianta, Hamre, and Allen (2021) highlight that teacher-student interactions characterized by positive reinforcement and high expectations enhance student motivation and performance, while Hattie (2020) found that acknowledging students' achievements fosters engagement and academic resilience. Although positive reinforcement received the highest mean in the study, the relatively lower mean for setting high academic expectations suggests a need for improved strategies to further motivate students. These findings underscore the necessity of interactive teaching techniques and strong teacher-student relationships in optimizing learning experiences in mathematics classrooms.

Table 2.b.2. Level of Instructional Competence of Mathematics Teachers on guidance skills along with quality of students' activity

B. Guidance Skills	Teachers		Students		As a Whole	
2. Quality of students' activity	Mean	DR	Mean	DR	Mean	DR
The teacher ensures that…						
a. activities are practical, focused, and directly related to the subject matter	4.61	E	4.63	E	4.62	E
b. students are developing independence and responsibility	4.54	E	4.47	E	4.51	VG
c. activities are appropriate for students' skill levels, challenging them without overwhelming them	4.57	E	4.52	E	4.53	E
d. flexible time for students to engage in activities, allowing them to explore concepts thoroughly.	4.54	E	4.51	E	4.53	E
Grand Mean	**4.56**	**E**	**4.53**	**E**	**4.55**	**E**

Legend: 4.21-5.00 Excellent E

Table 2.b.2. shows the level of instructional competence of mathematics teachers on guidance skills along quality of students' activity got a computed grand mean of 4.56 among the teachers, 4.53 among the students, and 4.55 as a whole all with a descriptive rating of excellent.

Among teachers, activities are practical, focused, and directly related to the subject matter got the highest computed mean of 4.61 with a descriptive rating of excellent while, students are developing independence and responsibility and flexible time for students to engage in activities, allowing them to explore concepts thoroughly got the lowest computed mean of 4.54 with a descriptive rating of excellent.

Among students, activities are practical, focused, and directly related to the subject matter got the highest computed mean of 4.63 with a descriptive rating of excellent while, students are developing independence and responsibility got the lowest computed mean of 4.47 with a descriptive rating of excellent.

As a whole, activities are practical, focused, and directly related to the subject matter got the highest computed mean of 4.62 with a descriptive rating of excellent while, students are developing independence and responsibility got the lowest computed mean of 4.51 with a descriptive rating of excellent.

It further implies that instructional competence among mathematics teachers, with practical, focused activities garnering the highest mean. While teachers excel in designing subject-relevant activities, there's a need for improvement in fostering students' independence and allowing flexible exploration time. Similarly, students benefit from such activities but require further encouragement to develop independence and responsibility. It further stresses the significance of promoting active learning and student autonomy to improve instructional effectiveness and facilitate meaningful learning experiences in mathematics education.

These findings align with existing literature emphasizing the importance of practical, subject-focused activities in enhancing students' understanding and engagement in mathematics education (Hattie, 2009). Effective instructional strategies that integrate hands-on and contextually relevant learning opportunities significantly contribute to student learning outcomes (Boaler, 2016). However, while teachers excel in designing subject-relevant activities, there is a need for improvement in fostering students' independence and allowing flexible exploration time, as emphasized by Vygotsky's (1978) social constructivist theory, which highlights the importance of scaffolding and gradually encouraging autonomy in learning.

Similarly, students benefit from practical and subject-focused activities but require further encouragement to develop independence and responsibility. Studies suggest that fostering student autonomy leads to deeper learning and improved problem-solving skills in mathematics (Deci & Ryan, 2000). The findings further stress the significance of promoting active learning and student autonomy to improve instructional effectiveness and facilitate meaningful learning experiences in mathematics education. Research indicates that student-centered approaches, including inquiry-based learning and self-regulation strategies, enhance conceptual understanding and long-term retention of mathematical concepts (Zimmerman, 2002).

Table 2.c.1. Level of Instructional Competence of Mathematics Teachers on management skills along atmosphere in the classroom

C. Management Skills	Teachers		Students		As a whole	
1. Atmosphere in the Classroom	Mean	DR	Mean	DR	Mean	DR
The teacher…						
a. employs effective strategies to address and redirect student misbehavior, maintaining a positive learning environment	4.64	E	4.57	E	4.61	E
b. cultivates a friendly and welcoming classroom environment, fostering a sense of comfort and respect.	4.71	E	4.53	E	4.62	E
c. models good behavior, demonstrating respect, empathy, and professionalism to students.	4.75	E	4.59	E	4.67	E

	d. establishes clear rules and expectations for behavior, promoting a culture of respect and order in the classroom.	4.71	E	4.59	E	4.65	E
	e. uses positive discipline procedures focused on teaching and reinforcing appropriate behavior	4.64	E	4.54	E	4.59	E
	f. implements and upholds school policies and procedures, ensuring consistency and fairness	4.64	E	4.51	E	4.58	E
	g. empowers students by giving them a sense of control over their learning and behavior	4.64	E	4.53	E	4.59	E
	h. demonstrates strong organizational skills, punctuality, and effective time	4.57	E	4.56	E	4.57	E
	Grand Mean	**4.67**	**E**	**4.55**	**E**	**4.61**	**E**

Legend: 4.21-5.00 Excellent E

Table 2.c.1. shows the level of instructional competence of mathematics teachers on management skills along atmosphere in the classroom got a computed grand mean of 4.67 among the teachers, 4.55 among the students, and 4.61 as a whole.

Among the teachers, models good behavior, demonstrating respect, empathy, and professionalism to students got the highest computed mean of 4.75 with a descriptive rating of excellent while, demonstrates strong organizational skills, punctuality, and effective time got the lowest computed mean of 4.57 with a descriptive rating of excellent.

Among the students, models good behavior, demonstrating respect, empathy, and professionalism to students and establishes clear rules and expectations for behavior, promoting a culture of respect and order in the classroom got the highest computed mean of 4.59 with a descriptive rating of excellent while, implements and upholds school policies and procedures, ensuring consistency and fairness got the lowest computed mean of 4.51 with a descriptive rating of excellent.

It further implies the positive behavior modeling and clear expectations in shaping the mathematics classroom. Teachers demonstrating respect, empathy, and professionalism score highest, emphasizing the importance of strong teacher-student relationships. However, there's room for improvement in organizational skills and policy adherence among teachers. Likewise, students benefit from clear rules and positive role models, yet consistency in policy implementation needs attention.

These findings highlight the crucial role of positive behavior modeling and clear expectations in shaping the mathematics classroom. Research indicates that teachers who demonstrate respect, empathy, and professionalism foster a positive learning environment, enhancing student engagement and academic achievement (Marzano, Marzano, & Pickering, 2003). Strong teacher-student relationships built on trust and mutual respect contribute to improved classroom behavior and student motivation (Cornelius-White, 2007).

However, there is room for improvement in organizational skills and policy adherence among teachers. Effective classroom management requires not only fostering a supportive atmosphere but also implementing structured routines and policies consistently (Evertson & Weinstein, 2013). Likewise, while

students benefit from clear rules and positive role models, maintaining consistency in policy implementation remains an area for further attention. Research suggests that clear, consistently enforced rules contribute to a structured learning environment, reducing disruptions and promoting academic success (Emmer & Evertson, 2016).

Table 2.c.2. Level of Instructional Competence of Mathematics Teachers on management skills along conduct and return of evaluation materials

C. Management Skills	Teachers		Students		As a Whole	
2. Conduct and return of evaluation materials	Mean	DR	Mean	DR	Mean	DR
The teacher…						
a. carefully checks test papers, quizzes, assignments, and requirements, paying attention to detail	4.71	E	4.69	E	4.70	E
b. returns corrected papers, quizzes, performance tasks, and other requirements on time, providing timely feedback to students.	4.43	E	4.52	E	4.48	E
c. conducts assessments, such as quizzes, performance tasks, and examinations, efficiently to prevent cheating and maintain the integrity of evaluations	4.68	E	4.64	E	4.66	E
Grand Mean	**4.61**	**E**	**4.62**	**E**	**4.62**	**E**

Legend: 4.21-5.00 Excellent E

Table 2.c.2. shows the level of instructional competence of mathematics teachers on management skills along conduct and return of evaluation materials got the computed grand mean of 4.61 among the teachers, 4.62 among the students, and 4.62 as a whole all with a descriptive rating of excellent.

Among the teachers, carefully checks test papers, quizzes, assignments, and requirements, paying attention to detail got the highest computed mean of 4.71 with a descriptive rating of excellent while, returns corrected papers, quizzes, performance tasks, and other requirements on time, providing timely feedback to students got the lowest mean of 4.43 with a descriptive rating of excellent.

Among the students, carefully checks test papers, quizzes, assignments, and requirements, paying attention to detail got the highest computed mean of 4.69 with a descriptive rating of excellent while, returns corrected papers, quizzes, performance tasks, and other requirements on time, providing timely feedback to students got the lowest computed mean of 4.52 with a descriptive rating of excellent.

As a whole, carefully checks test papers, quizzes, assignments, and requirements, paying attention to detail got the highest computed mean of 4.70 with a descriptive rating of excellent while, returns corrected papers, quizzes, performance tasks, and other requirements on time, providing timely feedback to students got the lowest computed mean of 4.48 with a descriptive rating of excellent.

It further implies that the meticulousness of mathematics teachers in evaluating materials, emphasizing attention to detail in assessment. However, there's a significant gap in promptly returning corrected

materials, highlighting the need for timely feedback to students. Similarly, students benefit from thorough evaluation but face delays in feedback receipt, potentially affecting their learning. Thus, the importance of meticulous assessment and timely feedback in supporting student learning and academic growth in mathematics. Addressing these areas can enhance evaluation practices, fostering improved student outcomes and learning experiences in mathematics education.

These findings highlight the importance of meticulous assessment in mathematics education, emphasizing teachers' attention to detail in evaluating student work. Research indicates that thorough assessment practices contribute to improved student learning by ensuring accurate evaluation of understanding and skills (Brookhart, 2017). However, the gap in promptly returning corrected materials suggests a need for improvement in providing timely feedback, which is crucial for student learning and academic growth (Hattie & Timperley, 2007).

Timely feedback helps students identify their strengths and areas for improvement, enabling them to adjust their learning strategies effectively (Shute, 2008). Delays in feedback can hinder students' ability to make immediate corrections and improvements, impacting their overall progress in mathematics (Black & Wiliam, 2018). Therefore, addressing this issue by ensuring prompt return of assessment materials can enhance evaluation practices, fostering improved student outcomes and more effective learning experiences in mathematics education.

Table 2.d.1. Level of Instructional Competence of Mathematics Teachers on evaluation skills along quality of the appraisal questions.

D. Evaluation Skills	Teachers		Students		As a Whole	
1. Quality of the Appraisal questions	Mean	DR	Mean	DR	Mean	DR
The teacher is able to…						
a. pose appraisal questions that effectively assess students' comprehension and understanding of the subject matter	4.64	E	4.60	E	4.62	E
b. design appraisal questions that guide students towards identifying and articulating the essential points or key concepts of the lesson	4.61	E	4.53	E	4.57	E
c. ensure that appraisal questions cover the topics and lessons taught in the class, assessing the students' grasp of the entire curriculum	4.57	E	4.52	E	4.55	E
d. help guide students in evaluating their own learning, promoting self-awareness and metacognition	4.64	E	4.52	E	4.58	E
e. provide individualized comments on assignments or assessments, offering clear and	4.50	VG	4.53	E	4.52	E

	constructive feedback to support student growth						
	Grand Mean	**4.59**	**E**	**4.54**	**E**	**4.56**	**E**

Legend: 4.21-5.00 Excellent E

Table 2.d.1. shows the level of instructional competence of mathematics teachers on evaluation skills along quality of the appraisal questions got a computed grand mean of 4.59 among the teachers, 4.54 among the students, and 4.56 as a whole all with a descriptive rating of excellent.

Among the teachers, pose appraisal questions that effectively assess students' comprehension and understanding of the subject matter and help guide students in evaluating their own learning, promoting self-awareness and metacognition got the highest computed mean of 4.64 with a descriptive rating of excellent while, provide individualized comments on assignments or assessments, offering clear and constructive feedback to support student growth got the lowest computed mean of 4.50 with a descriptive rating of excellent.

Among the students, pose appraisal questions that effectively assess students' comprehension and understanding of the subject matter got the highest computed mean of 4.60 with a descriptive rating of excellent while, ensure that appraisal questions cover the topics and lessons taught in the class, assessing the students' grasp of the entire curriculum and help guide students in evaluating their own learning, promoting self-awareness and metacognition got the lowest computed mean of 4.52 with a descriptive rating of excellent.

As a whole, pose appraisal questions that effectively assess students' comprehension and understanding of the subject matter got the highest computed mean of 4.62 with a descriptive rating of excellent while, ensure that appraisal questions cover the topics and lessons taught in the class, assessing the students' grasp of the entire curriculum, help guide students in evaluating their own learning, promoting self-awareness and metacognition, and provide individualized comments on assignments or assessments, offering clear and constructive feedback to support student growth got the lowest computed mean of 4.52 with a descriptive rating of excellent.

It further implies the importance of appraisal questions in evaluating students' comprehension and promoting self-awareness and metacognition in mathematics education. Teachers who effectively pose such questions received the highest mean, indicating their efficacy in assessing understanding and guiding student self-evaluation. However, providing individualized comments on assignments, offering clear feedback for student growth, received a lower mean, suggesting a potential area for improvement in enhancing feedback mechanisms. Similarly, students benefit from well-structured appraisal questions but require assurance that these questions cover the entire curriculum, fostering a comprehensive understanding.

These findings emphasize the importance of well-structured appraisal questions in evaluating student comprehension and fostering self-awareness and metacognition in mathematics education. Research suggests that formative assessments, when designed effectively, enhance student understanding and engagement, allowing them to reflect on their learning and make necessary adjustments (Black & Wiliam, 2018).

However, the lower mean for providing individualized feedback highlights an area for improvement in enhancing feedback mechanisms. Effective feedback is a crucial element of formative assessment, as it supports student growth by offering specific, clear, and constructive guidance (Brookhart, 2017).

Additionally, while students benefit from well-structured appraisal questions, they also require assurance that these assessments comprehensively cover the curriculum, ensuring a holistic understanding of mathematical concepts (Hattie & Timperley, 2007). Addressing these areas can enhance the effectiveness of appraisal questions in supporting student learning and achievement.

Table 2.d.2. Level of Instructional Competence of Mathematics Teachers on evaluation skills along quality of assignment/ enrichment activities

D. Evaluation Skills	Teachers		Students		As a Whole	
2. Quality of Assignments/enrichment activities	Mean	DR	Mean	DR	Mean	DR
The teacher provides and considers…						
a. varied approaches to measure the amount of learning, catering to various learning preferences	4.54	E	4.57	E	4.56	E
b. Assignment/enrichment activities that support learning	4.64	E	4.56	E	4.60	E
c. Subject requirements that are practical and challenging	4.64	E	4.47	E	4.56	E
d. Adequate time for students to complete assignments/requirements	4.64	E	4.47	E	4.56	E
e. Availability of materials in giving assignments and subject requirements	4.64	E	4.47	E	4.56	E
Grand Mean	**4.62**	**E**	**4.51**	**E**	**4.57**	**E**

Legend: 4.21-5.00 Excellent E

The data in Table 2.d.2 presents the level of instructional competence of mathematics teachers in terms of evaluation skills, specifically focusing on the quality of assignments and enrichment activities, as rated by both teachers and students.

The findings show consistently high ratings across all indicators. Teachers rated themselves with a grand mean of 4.62, interpreted as Excellent, while students gave a slightly lower but still Excellent rating of 4.51. The combined grand mean is 4.57, also falling under the Excellent. This indicates that, as a whole, mathematics teachers are perceived to demonstrate a high level of competence in designing and implementing evaluation tasks that enhance student learning.

Among the specific indicators, both teachers and students gave the highest ratings to providing assignments/enrichment activities that support learning, with teachers rating of 4.64 (Excellent) and students of 4.56 (Excellent). Conversely, slightly lower ratings—though still high—were observed in areas such as providing subject requirements that are practical and challenging, allowing adequate time for completion, and ensuring availability of materials, where students rated them at 4.47 (Excellent).

The consistent ratings suggest that teachers are highly competent in crafting meaningful, supportive, and inclusive evaluation activities. However, the slightly lower student ratings in some areas hint at potential

areas for improvement, such as ensuring that all students have access to required materials and enough time to complete assignments, as well as maintaining a balance between challenge and practicality in tasks. Both self-assessment and student feedback affirm that mathematics teachers are excelling in evaluation skills related to assignments and enrichment activities, though minor enhancements could further improve the learning experience from the students' perspective. The data implies that while mathematics teachers demonstrate high competence in evaluation skills, ongoing efforts to make assignments more accessible, equitable, and supportive will further strengthen the learning environment, ultimately contributing to improved student outcomes and satisfaction.

Diversifying assessment methods is crucial in addressing varied learning preferences. Increasing the number of different types of formative assessment practices in classrooms can significantly contribute to student learning (Yurtcu & Çetinkaya, 2021). Moreover, offering a variety of assessment methods ensures that every student has the best possible chance to demonstrate their learning, thereby fostering greater engagement (University of Reading, 2023).

Table 2.d.3. Level of Instructional Competence of Mathematics Teachers on evaluation skills along with the quality of appraising students' performance.

D. Evaluation Skills	Teachers		Students		As a whole	
3. Quality of appraising students' performance	Mean	DR	Mean	DR	Mean	DR
The teacher…						
a. employs the standard grading system of the school, ensuring consistency in evaluation.	4.79	E	4.69	E	4.74	E
b. grades and scores students with accuracy and fairness, reflecting the true performance of each student	4.82	E	4.60	E	4.7	E
c. encourages students' participation in creating rubrics	4.50	E	4.48	E	4.49	E
d. utilizes criteria/rubrics in checking requirements	4.61	E	4.58	E	4.60	E
Grand Mean	**4.68**	**E**	**4.59**	**E**	**4.64**	**E**

Legend: 4.21-5.00 Excellent E

Table 2.d.3. shows that the level of instructional competence of mathematics teachers on evaluation skills along quality of appraising students' performance got a computed grand mean of 4.68 among the teachers, 4.59 among the students, and 4.64 as a whole.

Among the teachers, got the highest computed mean of 4.82 with a descriptive ratng of excellent while, encourages students' participation in creating rubrics got the lowest mean of 4.50 with a descriptive rating of excellent.

Among the students, employs the standard grading system of the school, ensuring consistency in evaluation got the highest computed mean of 4.69 with a descriptive rating of excellent while, encourages students' participation in creating rubrics got the lowest mean of 4.48 with a descriptive rating of excellent.

As a whole, employs the standard grading system of the school, ensuring consistency in evaluation got the highest computed mean of 4.74 with a descriptive rating of excellent while, encourages students' participation in creating rubrics got the lowest mean of 4.49 with a descriptive rating of excellent.

It further implies the accurate and equitable grading practices in mathematics education. Teachers who prioritize precision and impartiality in grading received the highest mean, emphasizing the importance of maintaining integrity in assessment. However, there's room for improvement in involving students in rubric creation, as indicated by lower means among both teachers and students. While standard grading systems ensure consistency, encouraging student participation in rubric development could deepen their understanding of assessment criteria.

Fair and transparent grading practices, including clear guidelines and rubrics, help students understand expectations and how their work will be evaluated (Columbia University, 2023). Equitable grading also ensures that students master skills and knowledge while promoting transparency and inclusivity (University of California, Berkeley, 2023). Additionally, involving students in rubric creation enhances their learning experience by fostering motivation and self-direction, helping them develop a deeper understanding of assessment criteria (TeachersFirst, 2023). Encouraging student participation in this process strengthens accountability and engagement, leading to a more effective educational environment (Gallucci, 2020). Therefore, while maintaining accurate grading is crucial, integrating students into rubric development can enhance fairness, inclusivity, and student learning outcomes in mathematics education.

Table 2. f. Summary Table on the level of instructional competence of mathematics teachers as perceived by themselves and students

INDICATORS	Teachers OVERALL MEAN		Students		As a Whole	
A. Teaching/Facilitating Skills	4.54	E	4.47	E	4.51	E
B. Guidance Skills	4.63	E	4.55	E	4.59	E
C. Management Skills	4.65	E	4.57	E	4.61	E
D. Evaluation Skills	4.63	E	4.54	E	4.59	E

Legend: Descriptive Level
4.51-5.00 Excellent (E)

Table 2 presents the level of instructional competence of Mathematics teachers across various teaching skills, guidance skills, management skills, and evaluation skills.

The high proficiency demonstrated by Mathematics teachers across instructional, guidance, management, and evaluation skills, as indicated in the results, is promising for student learning outcomes. The consistently high ratings suggest that teachers are adept at employing effective instructional strategies, fostering positive interactions with students, managing classroom activities efficiently, and evaluating student performance accurately. These competencies are essential for creating a conducive learning environment where students are actively engaged and supported in their academic growth. The emphasis on effective questioning techniques, appropriate teaching methods, and thorough assessment practices reflects a holistic approach to teaching and learning.

Moreover, the alignment of these competencies with established educational theories by Darling-Hammond (2000), Shulman (1987), and Goe et al. (2008), highlights their significance in promoting student success. Moving forward, continued professional development and support for teachers in honing

these skills can further enhance their effectiveness in facilitating meaningful learning experiences and optimizing student outcomes in Mathematics education.

Significant Difference in the Instructional Competence

Table 3. Difference in the instructional competence of the teachers as perceived by students and teachers

Skills	Levene's Test for Equality of Variances F	t-test for Equality of Means sig.	Sig. (2-tailed) t	Mean Difference Df
Teaching/Facilitating Skills	2.522	0.113	0.769	312
Guidance Skills	0.690	0.407	0.693	312
Management Skills	0.773	0.380	0.584	312
Overall Instructional Competence	1.910	0.168	0.841	312

The results from the table show no significant differences between the perceptions of students and teachers regarding various instructional competencies, such as Teaching/Facilitating Skills, Guidance Skills, Management Skills, and Overall Instructional Competence.

For Teaching/Facilitating Skills, the results show no significant difference, with a t-test Sig. (2-tailed) value of 0.769. This indicates that both students and teachers perceive the teaching and facilitating abilities of mathematics teachers similarly.

Research by Goe, Bell, and Little (2008) supports this, asserting that the quality of teaching is often recognized equally by students and teachers when effective teaching practices are implemented consistently. Studies also show that student feedback on teaching performance is increasingly being recognized as a reliable indicator of instructional competence (Roche & Marsh, 2002). This corroborates the current findings, suggesting that students and teachers generally agree on the quality of instruction provided by mathematics teachers.

Moreover, a study by Scherer et al. (2016) highlights that student perceptions of teaching quality are often aligned with teacher self-evaluations, particularly when the teaching approach is student-centered. In such classrooms, both students and teachers are actively engaged in the learning process, which leads to a shared understanding of instructional competence. This supports the present findings, indicating that when teachers employ student-focused teaching strategies, both groups perceive teaching skills similarly.

Regarding Guidance Skills, the data shows a t-test Sig. (2-tailed) value of 0.693, indicating no significant difference between students' and teachers' perceptions.

This finding is consistent with studies by Hattie and Timperley (2007), which emphasize the role of feedback in the teaching-learning process. When teachers provide clear and constructive guidance, students often feel adequately supported, and teachers believe they are offering sufficient feedback.

However, Hattie and Timperley (2018) also found that in some contexts, students may feel under-supported in receiving detailed feedback, even if teachers think they are providing enough guidance. In this study, the alignment of perceptions suggests that teachers in the sample are providing guidance that meets students' expectations.

Additionally, Boud and Molloy (2013) discuss how formative feedback and ongoing guidance play critical

roles in both the short-term and long-term learning outcomes of students. In environments where continuous feedback is integrated into classroom practices, students and teachers often converge in their assessment of guidance quality. The current data aligns with these findings, highlighting that consistent feedback practices lead to similar perceptions of guidance skills between students and teachers.

For Management Skills, the t-test Sig. (2-tailed) value of 0.584 indicates no significant difference in perceptions. Classroom management is a crucial aspect of instructional competence, and its effectiveness is typically evident to both students and teachers.

Research by Marzano, Marzano, and Pickering (2003) underscores that effective classroom management strategies contribute to a productive learning environment and are usually perceived positively by both teachers and students. Their study suggests that when classroom rules and routines are clear and consistently enforced, students and teachers tend to have similar views on the effectiveness of management skills.

In addition, Freiberg (2002) points out that successful classroom management leads to higher student engagement, which in turn aligns student and teacher perspectives on how well the classroom is being managed. In the context of the current findings, the alignment between students' and teachers' perceptions suggests that mathematics teachers in the study have established effective classroom management strategies that resonate well with both groups.

The analysis of Overall Instructional Competence also shows no significant difference, with a t-test Sig. (2-tailed) value of 0.841. This overall alignment between students and teachers suggests that there is a shared understanding of the teachers' instructional effectiveness across all competencies. Research by Stronge (2018) highlights that instructional competence is a multifaceted concept involving teaching skills, guidance, management, and evaluation abilities. When teachers demonstrate a high level of competence across these areas, both students and teachers are likely to perceive the instructional quality similarly.

A study by Kunter et al. (2013) also found that student and teacher perceptions of instructional quality are closely aligned when teachers exhibit high levels of professional competence, especially in subject matter knowledge and classroom management. The findings suggest that in cases where teachers are well-prepared and skilled in their instructional delivery, there is little discrepancy in how their competence is perceived by students and teachers. This is reflected in the current data, where both groups' perceptions of overall instructional competence are in agreement.

The results of this analysis have several important implications for teaching practices and professional development in mathematics education. The alignment of perceptions between students and teachers suggests that current instructional practices are effective and consistent.

This is particularly important for teacher evaluations and professional development programs, as it indicates that both students and teachers value similar aspects of instructional competence. Educational institutions can build on this by further integrating student feedback into teacher evaluations, knowing that such feedback is a reliable reflection of actual instructional competence.

Moreover, professional development programs can focus on maintaining and enhancing the skills that are already recognized and valued by both students and teachers, such as classroom management and teaching facilitation.

Additionally, the absence of significant differences across these competencies suggests that the existing teacher training and support systems may be adequate in preparing teachers to meet both student expectations and institutional standards. However, continuous feedback from both students and teachers

is necessary to ensure that any emerging gaps in perceptions, especially in areas like guidance and feedback, are promptly addressed. Educational policies can also emphasize the importance of reflective practices and ongoing dialogue between students and teachers to maintain alignment in their perceptions of instructional competence.

Therefore, the data analysis reveals no significant differences between students' and teachers' perceptions of instructional competence across various skills, including Teaching/Facilitating Skills, Guidance Skills, Management Skills, and Overall Instructional Competence. These findings align with several recent studies that highlight the convergence of student and teacher evaluations of teaching quality when effective instructional strategies are employed. The alignment in perceptions underscores the importance of maintaining strong instructional practices and ensuring that teachers receive continuous professional development. This consistency in feedback between students and teachers is vital for fostering a productive and collaborative learning environment.

Significant Relationship between the profile of the mathematics teachers and the level of instructional competence of mathematics teachers along the different identified skills

Problem 4. Is there a significant relationship between the profile of the mathematics teachers and the level of instructional competence of mathematics teachers along the different identified skills?

Table 4. Relationship between the profile of the mathematics teachers and the level of instructional competence of mathematics teachers

Profile/Level of instructional competence	Teaching/Facilitating Skills	Guidance Skills	Management Skills	Evaluation Skills
a. age	-0.103	0.085	0.133	0.106
b. sex	0.182	0.185	0.190	0.077
c. gadgets used in teaching	0.287	0.285	0.158	0.135
d. mathematical applications used	0.002	-0.246	-0.242	-0.171
e. number of preparations	-0.050	-0.206	-0.070	-0.200
f. subjects handled (math or non-math)	-0.213	**-0.423***	-0.228	-0.339
g. highest educational qualification	0.041	0.118	0.050	-0.034
h. number of years in teaching mathematics	-0.140	0.135	0.080	0.064
i. number of mathematics training and seminars attended	0.118	0.125	0.098	0.159

*correlation is significant 0.05 level

The findings presented in Table 4 provide valuable insights into how various aspects of a mathematics teacher's profile relate to their instructional competence. The correlations, though mostly weak, point to certain trends that can help in understanding and improving teaching effectiveness in mathematics.

One of the most striking observations is the significant negative correlation between the subjects handled (math or non-math) and the guidance skills of teachers. This implies that teachers who are tasked with handling both math and non-math subjects may struggle to guide students effectively. The added workload and shift in content focus might lead to divided attention and reduced ability to provide meaningful guidance, which is a crucial component of student support and classroom interaction. This finding suggests that specialization in teaching subjects—particularly in mathematics—could improve the quality of student-teacher engagement and support.

The usage of gadgets in teaching and both teaching/ facilitating and guidance skills has positive correlation. This implies that integrating technology into the classroom can be beneficial in making instruction more engaging and accessible. It may also reflect a teacher's openness to innovation and adaptability—traits that often translate to more dynamic and student-centered teaching approaches. However, this must be balanced with careful planning and training, as not all technological tools are equally effective.

In contrast, the use of mathematical applications shows a negative correlation with instructional competence across all domains, particularly in guidance and management skills. This may seem counterintuitive, but it could reflect poor implementation or lack of proper training in using these applications effectively. If teachers rely too heavily on apps without aligning them with curriculum goals or student needs, it may undermine classroom management and personalized guidance. This highlights the importance of strategic and informed integration of educational technology.

The number of teaching preparations also shows a slightly negative relationship with instructional competence, especially in guidance and evaluation. This suggests that teachers with multiple preparations may face challenges in focusing on developing deeper instructional practices, possibly due to increased workload and time constraints. Therefore, limiting the number of different subjects or levels a teacher prepares for might allow them to focus more on quality instruction and student interaction.

Interestingly, commonly assumed indicators of teacher effectiveness such as age, years of teaching experience, and highest educational qualification show very weak correlations with competence. This suggests that longevity in the profession or formal qualifications alone do not guarantee instructional effectiveness. On the other hand, participation in trainings and seminars has a weak to moderate positive effect, especially on evaluation skills. This underlines the role of continuous professional development in enhancing teacher performance, particularly in areas that require updated knowledge and refined techniques.

In assumption, while most variables in the study show weak correlations with instructional competence, a few stand out as potentially impactful. Teaching only mathematics subjects and effectively using gadgets in the classroom are associated with better instructional performance, especially in guidance and teaching skills. Conversely, overreliance on math applications and juggling multiple teaching preparations may negatively impact instructional quality. These findings emphasize the importance of focused teaching assignments, meaningful use of technology, and ongoing professional development in fostering competent and effective mathematics educators.

Moreover, the negative relationship between the number of teaching preparations and instructional competence suggests that excessive teaching loads may hinder teacher effectiveness. Schools should aim

to assign manageable teaching loads to allow educators to concentrate on lesson quality and student engagement. The study also shows that formal qualifications and years of teaching experience have little to no significant impact on instructional competence. In contrast, attendance at professional trainings and seminars shows a positive influence, particularly on evaluation skills. This implies that continuous professional development plays a more crucial role in enhancing teaching effectiveness than traditional indicators like age or academic attainment.

These findings suggest a need to rethink how teacher performance is evaluated. Rather than relying solely on static credentials, schools might benefit from adopting more dynamic and performance-based assessments, such as classroom observations, peer feedback, and student outcomes. Overall, the study emphasizes the importance of supporting mathematics teachers through appropriate teaching assignments, targeted training, effective use of technology, and reduced workload to foster higher instructional competence and ultimately improve student learning outcomes.

Strengths and Weaknesses of Mathematics Teachers

Table 5. Strengths and Weaknesses of Mathematics Teachers

INDICATORS	Mean	DR
A. Teaching/Facilitating Skills		
1. Substantiality of Teaching	4.50	S
2. Quality of teacher's explanation	4.52	S
3. Receptivity to students' ideas and contributions	4.50	S
4. Quality of questioning procedure	4.51	S
5. Selection of teaching methods	4.54	S
6. Quality of information and communication technology used	4.30	S
B. Guidance Skills		S
1. Quality of Interaction with students	4.58	S
2. Quality of students' activity	4.54	S
C. Management Skills		S
1. Atmosphere in the Classroom	4.56	S
2. Conduct and return of evaluation materials	4.62	S
D. Evaluation Skills		S
1. Quality of the Appraisal questions	4.55	S
2. Quality of Assignments/enrichment activities	4.52	S
3. Quality of appraising students' performance	4.60	S

Legend: 4.21- 5.00 Strength S

The table shows the mean scores and descriptive ratings (DR) of instructional competence across different domains: Teaching/Facilitating Skills, Guidance Skills, Management Skills, and Evaluation Skills.

On Teaching/Facilitating Skills: Overall, teachers demonstrate strong competence in various teaching aspects. They score highly in explaining concepts with a computed mean of 4.52 and selecting appropriate teaching methods with a computed mean of 4.54. However, there's room for improvement in the use of information and communication technology with a computed mean of 4.30, indicating a potential area for enhancement in integrating technology into teaching practices.

On Guidance Skills, Teachers exhibit high competence in interaction with students computed mean of 4.58 and the quality of students' activity computed mean of 4.54, suggesting effective guidance practices in promoting student engagement and participation.

On Management Skills, Teachers maintain a conducive classroom atmosphere with a computed mean of 4.56 and efficiently handle evaluation materials with a computed mean of 4.62, indicating strong management abilities crucial for effective teaching and learning.

On Evaluation Skills, Teachers demonstrate proficiency in crafting appraisal questions with a computed mean of 4.55 and assessing students' performance with a computed mean of 4.60, highlighting their ability to conduct fair and comprehensive evaluations. However, there's room for improvement in the quality of assignments/enrichment activities with a computed mean of 4.52, suggesting a need for more robust and varied assessment practices.

In general, the results recommend that while teachers excel in various instructional domains, there are areas for refinement, particularly in integrating technology into teaching, enhancing assessment practices, and diversifying assignment activities. Strengthening these areas could further enhance instructional effectiveness and promote meaningful learning experiences for students.

Based on the results, retooling training program was crafted. Cayogyog (2022) found out a significant improvement in teaching strategies and pedagogical approaches to enhace teaching performance. On Teaching/Facilitating Skills under quality of information and communication technology used has the lowest mean(4.30), therefore a three-day training program on Applying Content Knowledge and Pedagogy within and across Curriculum, Building Digital Activities using DEMOS and Collaborative Assessment may be proposed to enhance the content and instructional competence of the mathematics teachers.

The computed validity rating was 4.86, described as "strongly valid." This means that the training design is highly appropriate, well-structured, and effectively meets its intended objectives, ensuring its relevance and applicability to the target participants.

CONCLUSIONS

Based from the following findings these following conclusions were drawn:

1. The teacher profile highlights a dynamic and evolving educational landscape where technology integration, STEM emphasis, and a balance of experience and innovation drive continuous improvement in teaching and learning.
2. The strong proficiency of Mathematics teachers across key instructional areas underscores their ability to foster effective learning environments, aligning with established educational theories and emphasizing the need for continuous professional development to further enhance student outcomes.
3. The findings indicate no significant differences between students' and teachers' perceptions of instructional competence across key areas, reinforcing the effectiveness of current teaching practices and the reliability of student feedback in evaluating instructional quality, while highlighting the need for continuous professional development to sustain alignment and enhance teaching effectiveness.
4. The study concludes that while traditional teacher profile variables such as age, sex, educational attainment, and experience have minimal impact on instructional competence, factors like teaching load, subject specialization, effective use of gadgets, and participation in professional development significantly influence the teaching effectiveness of mathematics educators.
5. The findings indicate that while mathematics teachers demonstrate strong instructional competence across teaching, guidance, management, and evaluation skills, areas for improvement include

integrating technology into teaching and enhancing assessment practices, which, if addressed, could further optimize instructional effectiveness and student learning outcomes.

6. The retooled training program and validated effectively addresses gaps in ICT integration and pedagogical approaches by proposing a three-day to enhance mathematics teachers' instructional competence.

RECOMMENDATIONS

Based on the following conclusions the following recommendation were drawn:

1. Schools may provide targeted training on digital tools like Kahoot and GeoGebra for Mathematics teachers, establish mentorship programs where experienced educators guide younger teachers in classroom management while learning modern teaching strategies, and allocate resources for improving technology access to sustain its role as a leader in instructional innovation.
2. Schools may sustain high instructional competence by providing continuous professional development, reinforcing effective teaching strategies, and fostering a supportive learning environment to enhance student engagement and success in Mathematics education.
3. The strong alignment between students' and teachers' perceptions of instructional competence underscores the effectiveness of current teaching practices, highlighting the need for continuous professional development, student-centered strategies, and ongoing feedback integration to sustain high-quality mathematics education.
4. Schools and educational leaders assign mathematics teachers to teach math subjects exclusively to enhance their instructional competence, provide continuous professional development opportunities focused on effective teaching strategies and evaluation skills, promote the meaningful integration of technology and gadgets in instruction through proper training, and manage teaching loads by limiting the number of preparations to ensure that teachers can focus on delivering quality instruction and supporting student learning effectively.
5. Schools should enhance instructional competence by providing training on integrating ICT tools into teaching, improving assessment practices through varied and high-quality enrichment activities, and refining assignment design to ensure comprehensive student evaluation, while sustaining strong guidance, management, and evaluation skills to maximize student engagement and learning outcomes.
6. It is recommended to implement the three-day training program on content knowledge application, digital activity development, and collaborative assessment to enhance mathematics teachers' instructional competence, particularly in ICT integration, with continuous evaluation to ensure its effectiveness.
7. Future research should explore the long-term impact of technology on teaching, mentorship between experienced and younger teachers, workload management strategies, digital tools' effectiveness in student learning, gender influences on teaching methods, and the adaptation of training programs to modern education needs.

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