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Teachers' Ideology and Mathematics Pedagogical Practices in Secondary Grades

Sheila S. Padillo[1*], Pepa V. Pontillas[1], Gerlinda G. Corpuz[1], Jovit D. Comon[1]

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ABSTRACT

Teachers' Ideology in Mathematics played a crucial role in shaping classroom decisions and practices. In today's 21st-century classroom, there is an increasing demand for learners who can not master mathematical concepts, think critically, and solve problems. This study aimed to determine the respondents' level of ideology in Mathematics and their Mathematics pedagogical practices. Particularly, this study sought to find out the level of teachers' ideology in Mathematics; examine the respondents' level of Mathematics pedagogical practices; and determine the significant relationship between respondents' level of ideology in Mathematics and their Mathematics pedagogical practices. The study involved one hundred fifty-four (154) Grade 7 Mathematics teachers and used a descriptive-correlational research design. The universal sampling technique was employed in this study. The instruments were patterned and modified, and the statistical treatments used were the mean, standard deviation, and Pearson Correlation. Findings revealed that the respondents' assessment of their level of ideology in Mathematics was very high in personal conception, and their Mathematics pedagogical practices were highly practiced in learning materials. The correlation between respondents' ideology in mathematics and their Mathematics pedagogical practices was significant. The study concludes that personal conception demonstrates the respondents' positive views of Mathematics as a meaningful and dynamic discipline and learning materials have contributed positively to learners' mathematical understanding and learning experiences. It recommends that teachers should strengthen their assumptions about teaching and learning Mathematics and use varied assessment practices to further improve learners' mathematical understanding, critical thinking, and problem-solving skills.

INTRODUCTION

Background of the Study

Mathematics education is important in developing students' logical reasoning, critical thinking, and problem-solving skills, which are foundational to learning. However, many students continue to encounter difficulties in mastering mathematical concepts due to several instructional factors, including teachers' ideology in Mathematics and pedagogical practices.

In the Division of Bukidnon, Grade 7 Mathematics teachers have their own teaching methods, unique teaching beliefs, expectations, and different learning environments and resources. Some classrooms are fully equipped with multimedia devices, while others can only rely on blackboards and chalk for lectures, especially in the remote areas where instructional resources are limited. The availability of teaching resources varies in quantity; some schools can provide complete sets of teaching aids and workbooks, while some teachers must make their own learning tools. Even the teachers' professional growth experiences vary; not all teachers received equal opportunities for training and workshops due to the large population of teachers in the Division of Bukidnon. Some teachers accumulated learning experience entirely through hands-on practice in the classroom settings.

A recent survey shows that Mathematics is very challenging for many students worldwide; 65% of students scored below the minimum proficiency level in Mathematics on the PISA test, indicating a need to enhance Mathematics instruction (OECD, 2022). In the meantime, the results of the most recent NAT (National Assessment Tests) show that Filipino students' mastery of Mathematics is significantly below the target level, with an overall percentage of 49. 64 percent, while the percentage of students with low, very low, and extremely low mastery levels is 39. 79 percent (Department of Education, 2023). Similar findings were found in the Division of Bukidnon, where scores range from 38 to 49 percent, with many students falling into low proficiency, and the overall percentage of passing scores falls between 45 and 50 percent.

Further, teachers' ideology is an important factor associated with Mathematics pedagogical practices, particularly in classroom interaction, the selection of learning materials, and assessment strategies. Teachers' beliefs about the nature of Mathematics and students' abilities may influence their instructional decisions, classroom engagement, and approaches to developing learners' higher-order thinking skills (Wang & Degol, 2021; García & Weiss, 2021; Liu & Bonner, 2022). Effective Mathematics teaching also requires teachers to translate mathematical concepts into meaningful learning experiences, use appropriate instructional resources, and apply varied assessment strategies (Hill & Chin, 2021; Depaepe *et al.*, 2021).

The study aims to provide insights gained from the

[1] PHINMA Cagayan de Oro College, Philippines
[*] Corresponding author's email: sheila.padillo003@deped.gov.ph

study may offer relevant information on how teachers' personal conceptions, attitudes, and assumptions about Mathematics are associated with their pedagogical practices. The findings may provide a basis for identifying areas that can be strengthened through professional development, resource support, and appropriate instructional interventions to enhance Mathematics teaching and learning in the Division of Bukidnon.

LITERATURE REVIEW

This section reviews literature and related studies taken from books, articles, journals, publications, and research studies that have bearing on the present study. It includes teachers' ideology in Mathematics in terms of personal conception, attitude, and assumption, as well as Mathematics pedagogical practices based on classroom interaction, learning materials, and assessment.

Teachers' Ideology in Mathematics

Teachers' ideology in Mathematics is beliefs, expressed through their personal conceptions, attitudes, and assumptions about Mathematics and its teaching and learning. Teachers' beliefs about math directly impact how they make instructional choices, what type of pedagogy they use, and ultimately how good of an educational experience they can give their students (Beswick, 2021). Teachers who are very confident in their profession tend to use high-quality instructional methods and these methods are positive factors in improving students' performance in mathematics (Felbrich *et al.*, 2022). More broadly speaking, professional beliefs and values have been shown to be significant in forming effective instruction, promoting student engagement and supporting conceptual development (Leder *et al.*, 2021).

The individual beliefs of the teacher about Mathematics serve as the basis for their instructional decision-making; therefore, these individual beliefs will have a major effect upon the quality of student learning in the classroom (Beswick, 2021), and the professional beliefs of the teacher will allow him/her to be more confident in using instructional methods that are effective for promoting student understanding of mathematics and raising achievement levels (Felbrich *et al.*, 2022). Teachers' beliefs and assumptions change over time. This happens through their experiences by reflecting on their teaching and by taking part in professional learning communities. These changes help teachers better meet the needs of their students and their classrooms (Leder *et al.* 2021; Felbrich *et al.* 2022).

Personal Conception

Teachers' personal conceptions of Mathematics affect how they think about the subject. Teachers may consider mathematics either as a system of rules and the correct way of doing things or as a subject matter of research in itself. Mathematics teachers whose viewpoint aligns with the mathematical language of problem solving are of the opinion that students should learn how to generate their own answers or explanations, although that may involve making mistakes (Chapman, 2022). The position of the teacher is not only to teach how to use rules and methods. It is these teachers who are also supporters of the idea of promoting classroom interaction and encouraging students to explain their thinking. Those who believe in Mathematics as something that should be studied consider it possible to help any student understand Mathematics provided proper assistance.

Different students have different ways of interpreting Mathematics. Each student understands Mathematics in a way that is dependent on the various teacher-related ways and means involved in teaching Mathematics in order for Mathematics to be effectively learned in classrooms through the use of different means and methods of solving problems. Moreover, teachers consider it important to learn how to develop thinking and reasoning skills by learning from peers' approaches, as indicated by Webb *et al.* (2021). Teachers who modify their pedagogical approach in order to meet different perceptions and ideas of students are those teachers who are more likely to create an inclusive environment in the classroom, where every student will be perceived as a mathematical thinker who looks for solutions to mathematical problems. Moreover, seeing Mathematics as a set of fixed rules and regulations might create limitations for the implementation of various ways to learn this interesting subject. In contrast, viewing Mathematics as a dynamic process that requires using exploratory and problem-solving methods. Creative thinking about Mathematics helps teachers to notice and appreciate the fact that problem solving involves creativity and the explorative nature of students (Ernest, 2021).

Teachers' beliefs and instructional practices relate to how they approach and implement instructional practices in teaching Mathematics (Li *et al.*, 2022). Similarly, teachers' underlying conceptions and decision-making during whole-class mathematical discourse show the relevance of teachers' interpretations of students' mathematical thinking in shaping classroom interactions (Kooloos *et al.*, 2022). In the Philippine context, constructivist teachers' beliefs and instructional practices highlighted the relationship between teachers' beliefs and their approaches to Mathematics instruction (Balanlay, 2021). Furthermore, teachers' beliefs about Mathematics, its teaching, and learning may hold different conceptions about the nature of Mathematics and how it should be taught and learned (Vesga-Bravo *et al.*, 2022).

Attitude

Teachers' feelings, confidence, motivation, and emotional outlook toward Mathematics influence both their teaching methods and the classroom atmosphere. How teachers engage with mathematics and relate it to real-life situations plays a key role in fostering a positive attitude toward the subject (Zhang & Liu, 2021). Moreover, teachers' enjoyment of mathematics, their confidence in handling it, and their attitudes are linked to the instructional strategies they employ and the learning environments

they create (Andrews & Xenofontos, 2022).

A teacher's attitude is reflected in how they respond to their students' ideas. Educators who listen attentively to students' contributions during discussions create a nurturing learning environment that encourages students to express their thoughts (Chapman & Bindewald, 2021). When teachers feel positive about teaching and show enthusiasm for their subject, they recognize their students' input, which in turn motivates students to engage more actively in learning mathematics (Webb *et al.*, 2022).

Conversely, teachers who hold negative attitudes toward their students are less able to utilize effective teaching strategies that help students fully grasp mathematical concepts. This often leads to teacher-centered classrooms where only the teacher's ideas are valued (Chapman, 2022; Webb *et al.*, 2022). When teachers have confidence in teaching Mathematics, they are more likely to use varied teaching strategies. They also prefer explanations over fixed procedures. This approach helps students understand better (Bostwick *et al.*, 2021). The mathematical disposition of Filipino teachers shows a strong emphasis on building positive attitudes toward Mathematics. This includes supporting learners who are ready to take on mathematical tasks and challenges (Llagas, 2021).

Similarly, supporting students' perseverance in mathematical problem-solving can help learners persist in working through challenging mathematical tasks (DiNapoli and Miller, 2022). Teachers' positive attitudes toward problem solving and students' efforts can support classroom environments where learners are encouraged to engage with challenging mathematical ideas. Furthermore, professional development can help teachers feel more confident about giving Mathematics help. This shows how important it is for teachers to believe in their ability to meet the needs of students (DePiper *et al.*, 2021).

Assumption

Assumptions referred to teachers' beliefs and expectations regarding the teaching and learning of Mathematics. Teachers who believed that mathematical ability develops through effort and that all students can attain high levels of achievement tended to establish classrooms characterized by higher expectations and more equitable participation, thereby reducing Mathematics anxiety and enhancing student agency (Boaler & Zoido, 2021). Teachers' assumptions about how students learn Mathematics were associated with their instructional decisions, particularly their willingness to offer opportunities for exploration, discussion, and the use of multiple solution methods (Schoenfeld, 2022).

When teachers believe that every student is capable of learning Mathematics at the highest levels, achievement and engagement generally improve because mistakes are regarded as a natural and valuable component of learning rather than as failure, while Mathematics is viewed as a process of sense-making instead of mere memorization (Boaler, 2022).

This dimension also influenced the degree of structure provided by teachers. Explicit instruction, incorporating detailed, step-by-step explanations, supported students who have trouble in Mathematics by developing procedural fluency and reducing cognitive load (Stockard *et al.*, 2021). Meanwhile, worked examples and guided explanations assisted students who required support in linking procedures with conceptual understanding, particularly during the initial stages of learning (Fyfe & Rittle-Johnson, 2022). However, presenting too many solution methods at an early stage may overwhelm students. Restricting alternative methods until students establish a strong foundation can reduce confusion and promote deeper understanding of core procedures (Fyfe & Rittle-Johnson, 2022), and focusing on one clear, efficient method first can reduce cognitive load and support mastery before additional strategies are introduced (Sweller, 2023; Stockard *et al.*, 2021).

The K to 12 teachers' mindsets regarding mathematical ability highlight the relevance of teachers' beliefs about whether mathematical ability can develop through learning and effort (Willingham *et al.*, 2021). Similarly, the role of explicit instruction in Mathematics, particularly in providing structured explanations, modeling, guided practice, and support for learners who experience difficulties in understanding mathematical concepts (Long *et al.*, 2021). Furthermore, the use of explicit instruction in supporting struggling students in Mathematics learning emphasizes the importance of clear and systematic instructional support (Bouck *et al.*, 2022). Moreover, Mathematics teachers' reflective thinking and its implementation in professional practice highlight the importance of teachers' reflection on instructional decisions and students' learning needs (Aldahmash *et al.*, 2021). Also, the value of comparing and discussing multiple mathematical strategies gives opportunities for students to examine different solutions and approaches and develop deeper mathematical understanding (Star *et al.*, 2021).

Mathematics Pedagogical Practices

Pedagogical practices are the teachers' instructional practices in Mathematics through their classroom interaction, use of learning materials, and assessment practices in facilitating students' mathematical learning. Beliefs extend beyond abstract cognitive structures; they actively influence classroom behavior and are positively related to instructional quality and student learning outcomes (Daumiller *et al.*, 2021). A teacher's constructivist orientation toward the subject shaped both the organization and delivery of content and the broader classroom environment (Fang & Teo, 2021), whereas teachers' beliefs about assessment are shaped by their pre-existing beliefs regarding the nature of Mathematics teaching and learning (Tamba & Cendana, 2021). Teachers' motivation and favorable attitudes toward teaching are reflected in their classroom conduct and the quality of their interactions with students (Daumiller *et al.*, 2021).

However, the strength of these relationships may vary according to teachers' outcomes and attitudes toward instructional decisions, while factors such as self-efficacy, teaching context, and classroom climate may either enhance or constrain these effects (Fang & Teo, 2021). Because these beliefs tend to operate at a deeper level and are less consciously recognized, their influence on teaching practice may be more subtle and difficult to identify than that of more explicit beliefs (Tamba & Cendana, 2021).

Classroom Interaction

Classroom interaction typically represents communication between students and teachers during lessons. This interaction can take on many forms, including asking and answering, discussing ideas, and doing different tasks together. Quality mathematics education is based on such concepts as learner-centered teaching and collaborative learning, which help to involve students in the process of gaining new knowledge (UNESCO 2021). Classroom discussions and teaching provide positive communication strategies that improve students' learning outcomes (Hattie, 2023).

Furthermore, teachers who know the needs of their students apply different forms of learning aimed at discussion, especially when it comes to teaching abstract concepts in mathematics and guiding students through the learning process (OECD, 2021). The use of innovative pedagogical methods that promote active learning and inquiry-based learning is proven to contribute to students' academic success (Hattie, 2023); inquiry-based learning improves critical thinking, creativity, and cooperation in one's studies (UNESCO, 2021).

Moreover, the development of collaborative learning strategies among students allows for teamwork and social interaction and is considered an important aspect of quality Mathematics education (UNESCO, 2021). The interactions in Dialogic Mathematics classrooms would help teachers understand how they facilitate opportunities for students to take part in classroom discussions and gain knowledge from the interaction. In Mathematics classrooms, teachers use collaborative learning strategies for assessing and providing chances for their students' collaboration, cooperation, and leadership skills in cooperative work (Schwarz *et al.*, 2021).

Similarly, an inquiry-based approach provides opportunities for students to explore mathematical ideas, participate in discussions, and communicate their thinking during the learning process (Lee and Ban, 2022). Also, teachers who pay attention to the Mathematics conversations that their students have when they work in groups can make a difference in how often the students talk to each other. This kind of talking helps students get better at thinking about Mathematics problems (Sjöblom *et al.* 2023).

Learning Materials

Learning materials are tools and resources used to present mathematical concepts from abstract to concrete so that students can understand them more easily. By using different resources like manipulatives, visual aids, worksheets, and online tools, students get familiar with abstract ideas in Mathematics. The integration of materials into Mathematics education shows increased success in the learning process of the students. Hands-on activities are beneficial to students; they help develop a strong understanding of mathematical concepts (Muhammad *et al.*, 2023). The use of various concrete learning tools like algebra tiles, counters, fraction bars, and 3D models provides students with chances to enhance their Mathematics skills and improve their performance (Muhammad *et al.*, 2023). Furthermore, the use of materials related and useful in everyday life makes the learning experience more relevant and meaningful for students. Educational resources help learners to connect what they already know with new information and apply that knowledge to solve problems (Picat & Natividad, 2023).

Using instructional sheets in the learning context has a positive effect on how students perform (Solis Pasia, 2024). These sheets help to increase engagement in the classroom and provide teachers with a way to assess how well students understand the material, which allows teachers to change their teaching methods based on this assessment (Educational Resources Review, 2023). Worksheets that have exercises that go from simple counting tasks to more complex activities act as a useful connection between theoretical knowledge and practical skills instead of just being tools for repetitive practice (Baruiz & Dioso, 2023). Furthermore, interactive digital tools allow students to see the links between concrete and abstract mathematical concepts through active problem-solving, which improves their understanding and their higher-order thinking skills (OECD, 2023).

Integrating digital technologies into Mathematics education positively impacts equality, effectiveness and engagement of students (UNESCO, 2023). Technology-related learning materials promote students' understanding of concepts through students' application and manipulation of technology (Bush, 2021). Worksheets focusing on real-life problems are effective in developing students' mathematical problem-solving skills and enhance active learning in Mathematics education (Rahmadani & Amir MZ, 2021). In the Philippines, the Will-Skill-Tool model emphasized that teachers be equipped with necessary skills and/or have access to adequate technology tools in the process of teaching and learning Mathematics education (Sasota *et al.*, 2021). There is further evidence to support that teachers who have a positive attitude towards instructional materials usually develop advanced teaching aids that are practical and fit students' daily lives (Wang *et al.*, 2021).

Assessment

Assessment is teachers' different strategies, approaches, and methods to evaluate and monitor students' progress.

This information gives them an idea of the level of students' understanding in learning the Mathematics subject. When students receive feedback that is suitable, they can utilize their assessments as tools for learning; they can understand the significance of their evaluations, and they can relate their results to their learning goals, which enables them to learn from the mistakes they have made (Wiliam & Leahy, 2021). Feedback that is timely and clear is very important for both teachers and students because it assists in improving the practices of teaching and learning (Hattie & Clarke, 2021).

When the criteria for assessment and the objectives for learning are not clear, this can take away many chances for students to show what they have learned. In this situation, the judgments made about individual assessments can play a significant role in the learning process (Guskey, 2021). Also, teachers frequently do not give students feedback in a timely manner. Formative assessment gives teachers the ability to keep track of how students are doing and to change their teaching methods when necessary (Black & Wiliam, 2021). Good assessment in the classroom creates feedback that is meaningful and helps students grow while also allowing teachers to change how they teach Mathematics (Brookhart, 2021). Using effective teaching methods that focus on students in Mathematics education is very important for the academic success and overall development of students (Darling-Hammond *et al.*, 2021). In addition, having a variety of effective teaching practices is seen as one of the best ways to improve academic performance in Mathematics education (OECD, 2021).

Formative assessment practice in Mathematics can support students' mathematical achievement (Boström & Palm, 2023). Similarly, teachers' perceptions of continuous assessment highlight the role of regular assessment in monitoring students' learning and informing instructional decisions (Davis & Gbormittah, 2023). Digital portfolios as an assessment strategy have the potential to support reflection, feedback, and students' engagement in the learning process (Marinho *et al.*, 2021). In addition, assessment feedback proomotes student engagement, trust, and transparency, particularly when learners understand how their work is assessed and how they can use feedback to improvement (Smith & Lowe, 2021). Furthermore, classroom assessment as co-regulated learning can support students' goal setting, self-monitoring, feedback use, and adjustment of learning strategies (Andrade *et al.*, 2021).

Theoretical Framework

This study was anchored on Paul Ernest's Theory of Mathematics Education (1991), which explains that teachers hold different views about the nature of Mathematics and how it should be taught and learned. Ernest identified three major ideological perspectives: instrumentalist, Platonist, and problem-solving. The instrumentalist view considers Mathematics as a collection of rules, facts, and procedures that learners need to master and apply correctly. The Platonist view regards Mathematics as an organized and established body of knowledge that exists independently and can be understood through logical reasoning and discovery. Meanwhile, the problem-solving view considers Mathematics as a dynamic, creative, and continually developing discipline in which learners construct understanding through exploration, reasoning, and problem solving. These perspectives provide a basis for understanding teachers' personal conceptions, attitudes, and assumptions about Mathematics and its teaching.

Teachers' ideology in Mathematics is reflected in their beliefs about how students learn, how mathematical knowledge is developed, and what roles teachers and learners should assume in the classroom. Teachers who view Mathematics primarily as rules and procedures may place greater emphasis on direct instruction, demonstration of procedures, and correct answers. Teachers who view Mathematics as an organized body of knowledge may emphasize conceptual understanding, logical reasoning, and systematic explanations. Meanwhile, teachers who hold a problem-solving orientation may provide opportunities for students to explore mathematical ideas, use different solution strategies, collaborate with peers, and connect Mathematics to real-life situations. Thus, teachers' personal conception, attitude, and assumption about Mathematics may be associated with the ways they interact with students and make instructional decisions.

Ernest's theory therefore provides a useful foundation for understanding the relationship between teachers' ideology in Mathematics and their pedagogical practices. Teachers' beliefs and perspectives are associated with their classroom interaction, the selection and use of learning materials, and the ways they assess students' mathematical learning. Teachers who value exploration and problem solving may incorporate inquiry-based activities, contextualized tasks, and opportunities for students to explain different solution methods. Those who emphasize procedural knowledge may give greater attention to demonstrations, guided practice, and structured assessments. In this study, Ernest's theory supports the understanding of how teachers' personal conception, attitude, and assumption about Mathematics are associated with their pedagogical practices in terms of classroom interaction, learning materials, and assessment. It provides a theoretical basis for examining teachers' ideology not simply as abstract beliefs, but as perspectives that are meaningfully related to their instructional decisions and classroom practices.

Conceptual Framework

This study illustrates the relationship between teachers' ideology in Mathematics as the independent variable and pedagogical practices as the dependent variable. As shown in Figure 1, teachers' ideology is composed of three key variables: personal conception, attitude, and assumption, while pedagogical practices are reflected through classroom interaction, learning materials, and assessment. The arrow in the diagram indicates the

assumed relationship between teachers' ideology in mathematics and their pedagogical practices.

Further, the study's independent variable is teachers' ideology in Mathematics in terms of personal conception, attitude, and assumption and it serves as basis for understanding how teachers perceive the subject and approach instruction. Personal conception refers to teachers' beliefs and views about the nature of Mathematics, and how it is understood and learned through reasoning, understanding, problem-solving, creativity, exploration, and connection to real-world experiences. Attitude includes teachers' feelings, motivation, engagement, and confidence in teaching and instructional delivery on the mathematics subject. Moreover, assumption refers to teachers' beliefs and expectations about the teaching and learning of Mathematics. These three variables determine the different teachers' ideologies in teaching and learning Mathematics.

On the other hand, the dependent variable is Mathematics pedagogical practices based on classroom interaction, learning materials, and assessment and serve as instructional learning practices used by teachers during Mathematics instruction. Classroom interaction refers to communicating, taking part in the educational process by students, questioning, discussing, and enhancing learning with the aid of other people. In this regard, learning materials contain instructional instruments, while assessment refers to methods of evaluating and monitoring students. In turn, these indicators have an effect on different teaching methods, as well as on teaching methods in Mathematics. Thus, the framework examines how the identified teacher's ideology relates to their Mathematics pedagogical practices in teaching the subject.

Statement of the Problem

This study aimed to determine the teachers' ideology and Mathematics pedagogical practices in secondary grades in the Division of Bukidnon during the School Year 2025-2026.

Specifically, it sought to answer the following questions:

1. What is the respondents' level of ideology in Mathematics in terms of personal conception, attitude, and assumption?
2. What is the respondents' level of Mathematics pedagogical practices based on classroom interaction, learning materials, and assessment?
3. Is there a significant relationship between respondents' level of ideology in Mathematics and their Mathematics pedagogical practices?

Scope and Limitations

This study focused on determining teachers' ideology in Mathematics and their Mathematics pedagogical practices in secondary grades in the Division of Bukidnon, School Year 2025-2026. The respondents were the one hundred fifty-four (154) Grade 7 Mathematics teachers in the aforesaid division. The independent variables were limited only to teachers' ideology in Mathematics in terms of personal conception, attitude, and assumption. Moreover, the dependent variables were also limited to Mathematics pedagogical practices based on classroom interaction, learning materials, and assessment

MATERIALS AND METHODS

Research Design

This study used a descriptive-correlational research design to examine the relationship between teachers' ideology in Mathematics and their pedagogical practices among Mathematics teachers in the Division of Bukidnon. Descriptive-correlational research is a non-experimental design that aims to describe variables and determine the degree of relationship between them without manipulating any conditions or establishing cause-and-effect relationships. It allowed the researcher to gather quantitative data and analyze how variables are associated with one another.

The descriptive component was used to determine the level of teachers' ideology in terms of personal conception, attitude, and assumption, as well as the level of their pedagogical practices in terms of classroom interaction, learning materials, and assessment. These variables were measured using a structured questionnaire, and the results were analyzed using descriptive statistics such as mean and standard deviation to describe the respondents' responses.

The correlational component of the study was utilized to examine whether a significant relationship exists between teachers' ideology and their pedagogical practices. Correlational research enabled the researcher to determine the strength and direction of the relationship between two or more variables using statistical measures such as the Pearson correlation coefficient (r).

Study Setting

This study was conducted in the Department of Education, Division of Bukidnon. It is a province located in Region X-Northern Mindanao, which is bordered by Misamis Oriental to the north, Agusan del Sur and Davao del Norte to the east, Davao del Sur, Davao City, and North Cotabato to the south, and Lanao del Sur to the west. It is the largest division among the 14 Divisions in Region X-Northern Mindanao. Teachers and field officials take a long trip to reach the Division Office located in the City of Malaybalay. These circumstances greatly affect the delivery of the instructional resources, technical assistance, instructional supervision, and monitoring of DepEd programs, projects, and activities.

Conducting the study within this division provides a relevant and diverse educational context for examining teachers' ideology in Mathematics and their pedagogical practices across different school environments.

Research Respondents and Sampling Technique

The respondents of this study were the one hundred fifty-four (154) Grade 7 Mathematics teachers in the

Division of Bukidnon.

This study used universal sampling, which means that all Grade 7 Mathematics teachers in the Division of Bukidnon were included as respondents. Rather than selecting a portion of the population, every teacher that met the criteria was invited to participate in the study. This method is especially suitable to the population of Grade 7 Mathematics teachers in the division because the number of teachers to include is small enough to be included, eliminating the need to select a smaller sample from the group.

Universal sampling, also called population sampling, is a type of sampling that includes every member of a defined population in the study instead of selecting only a subset. This method is particularly useful when the population being studied is small enough to reach and when the aim is to obtain data that truly represents the entire population without leaving out any members.

In the context of this study, all Grade 7 Mathematics teachers in the Division of Bukidnon are included to ensure that every voice and perspective is heard and taken into account. This is important in examining teachers' ideology and their Mathematics pedagogical practices because each teacher has a distinct perspective and method to Mathematics instruction, and documenting all of these perspectives will obtain a more complete set of findings that truly reflects what Mathematics education looks like across the whole division.

Research Instrument

The primary instrument used is a patterned and modified questionnaire anchored on the Theory of Mathematics Education of Ernest and Pedagogical Content Knowledge (PCK) framework of Shulman. The questionnaire was composed of two parts.

Part I inquired on the level of teachers' ideology in Mathematics in terms personal conception, attitude, and assumption. This was based on Ernest's Theory of Mathematics Education on the three major ideological perspectives such as instrumentalist, Platonist, and problem-solving.

Part II elicited information on teachers' pedagogical practices in Mathematics based on classroom interaction, learning materials, and assessment. This was patterned and modified on Shulman's Pedagogical Content Knowledge (PCK) Framework.

The instrument used a four-point Likert scale ranging from Strongly Disagree to Strongly Agree. Prior to administration, the questionnaire was validated by experts in education research to ensure clarity, content validity and reliability.

Validity and Reliability of the Instrument

The questionnaires were subjected to validity and reliability testing to ensure their correctness and effectiveness. To evaluate the validity of each tool, a panel of three experts was formed, including a Mathematics Master Teacher from Junior High Schools, a Mathematics Master Teacher from Senior High Schools, and a vice president from a higher education institution. Drawing on their diverse expertise and extensive experience in education, the experts conducted a thorough review of the research instrument. Their feedback enabled an assessment of the instrument's content validity and suitability for the study.

The pilot test, conducted in April 2026, aimed to examine the content validity of the research instrument. This pre-testing phase allowed the experts to verify whether the instrument was clear, relevant, and reliable before the main research commenced. The pilot test proved valuable by helping the researchers identify any issues with the questions, instructions, and research procedures. It included thirty 30 Grade 7 Mathematics secondary school teachers from the Division of Valencia City. The results of the pre-testing were good and there were no further questions on the questionnaire. Cronbach's alpha was used to make sure that the results of the study were valid and reliable. The results showed that the Cronbach's alpha coefficient calculated for the Ideology in Mathematics teachers' scale equals 0.90, for the Mathematics Pedagogical Practices scale - 0.90, and for the total scale - 0.90. This indicates that the instrument used has high internal consistency and reliability.

Data Gathering

The following procedure for gathering data was followed: First, a formal letter requesting permission to conduct the study was secured from the School of Professional and Graduate Studies and submitted to the Schools Division Superintendent of Bukidnon for approval. After obtaining the approval, letters requesting permission to conduct the study. The researcher coordinated with the respective school heads to facilitate the distribution and administration of the research instrument to the Grade 7 Mathematics teachers.

Second, after securing permission from the concerned school heads, a total of 154 Grade 7 Mathematics teachers participated in the study. Eighty-three respondents accomplished the printed questionnaire, while seventy-one respondents completed the questionnaire electronically through Google Forms through this link https://forms.gle/9oogeKU1xCYkmidA6. Within the Division of Bukidnon Mathematics teachers have a group chat where the researcher shared the link. Before filling out the questionnaire the researcher explained the study to the respondent taking part and gave them an informed consent form.

The researcher informed the respondents about what the study wanted to find out and how it would be done. The researcher also explained that taking part was completely voluntary. The researcher also told them about the steps taken to keep their information private and safe. The respondents taking part had time to read and sign the informed consent form. They also had time to ask questions if they needed an explanation about the instructions or the questions on the form. For the study, the researcher collected and organized the answers from

both Google Forms and the paper questionnaires. The researcher made sure that all the information collected would stay private and would only be used for the study.

Statistical Treatment of Data

After collecting and documenting the data obtained from the study, the following statistical tools were employed:

Problem 1 utilized descriptive statistics, including the mean and standard deviation distribution, to determine the level of teachers' ideology in Mathematics.

Problem 2 used descriptive statistics, including the mean and standard deviation distribution, to evaluate the extent of teachers' Mathematics pedagogical practices.

Problem 3 employed the Pearson Product Moment Correlation Coefficient (r) to determine whether a significant relationship existed between teachers' ideology in Mathematics and their pedagogical practices. The mean, standard deviation, and Pearson product-moment correlation coefficient (r) were used to analyze the data that were gathered from the participants. Every statistical method was employed to address the problem statement. The null hypothesis was rejected or accepted based on the p-value, which was tested at the significance level of 0. 05.

Ethical Considerations

This study adhered to ethical standards to protect the respondents' rights, privacy, and welfare. It was voluntary for the respondents to take part in the study. Additionally, they were given the opportunity to leave the study at any time and were informed of its goals. The respondents' privacy and anonymity were protected. In particular, the respondents' names and educational institutions were not made publicly available. The respondents' information was used only for research purposes and was securely stored to prevent unauthorized access.

Furthermore, prior to conducting the study, permission to gather information from the respondents was sought, and the respondents' responses were obtained ethically and accurately. The study also complied with the requirement to report the research truthfully and transparently without misrepresenting the facts. By adhering to these ethical standards, the study intended to uphold the highest level of responsibility and integrity while protecting the rights and welfare of the mathematics teachers who participated in it.

Using artificial intelligence (AI) tools was declared in the AI declaration form provided in Appendix F. As part of maintaining transparency and academic integrity, the researcher has documented all AI tools used, the specific prompts provided, and how the AI-generated outputs were utilized in the preparation of the manuscript. This declaration followed the ethical guidelines for AI use in graduate research.

RESULTS AND DISCUSSION

This section presents the results and discussion of the study. The data gathered from the survey questionnaires were presented in a tabular form, analyzed, and interpreted based on the statement of the problem stated earlier.

Results

Problem 1. What is the respondents' level of ideology in Mathematics in terms of personal conception, attitude, and assumption?

Table 1: Summary of the Respondents' Level of Ideology in Mathematics

Variable	Mean	SD	Interpretation
Personal Conception	3.84	0.66	Very High
Attitude	3.81	0.56	Very High
Assumption	3.71	0.52	Very High
Overall	3.79	0.58	Very High

Legend:
3.26- 4.00 Strongly Agree/ Very High
1.76- 2.50 Disagree/ Low
2.51- 3.35 Agree/ High
1.00- 1.75 Strongly Disagree/ Very low

Table 1 presents the summary distribution of the respondents' level of ideology in Mathematics in terms of personal conception, attitude, and assumption, with an overall mean of 3.79 (SD=0.58), interpreted as Very High. This means that the respondents feel positive about Mathematics and the way it is taught. The teachers appear to be quite optimistic, and their positive attitudes actually assist them in teaching Mathematics in ways that help students to better grasp the concepts. This implies that they do not merely view Mathematics as a large collection of rules; they perceive it as something that can be understood

Additionally, the respondents think that children should learn by thinking independently, discussing their thoughts, researching information, and actually solving real problems. Teachers often have good intentions and high expectations, but putting those beliefs into actual classroom practice is not always straightforward. At times, there is a disconnect between what teachers believe and what they actually do in the classroom.

In this case, the teacher talked openly about their views on teaching math and felt that their expectations and attitudes were on the same page. Basically, a teacher's mindset and understanding of math really shape the way they teach and the methods they pick (Beswick, 2021). Teachers who have professional beliefs are more likely to

use teaching methods that are of high quality and help students do well in Mathematics (Felbrich *et al.*, 2022). Also, teachers' beliefs and values are important in making math lessons and helping students stay interested and really understand mathematical concepts (Leder *et al.*, 2021).

Similarly, teachers with a strong and well-developed ideology in Mathematics tend to view mathematics learning as more than memorizing rules and procedures; they recognize the importance of students' active participation, reasoning, and construction of mathematical understanding. Teachers' beliefs about the nature of Mathematics, teaching, and learning were reflected in their lesson planning and instructional practices, although differences could exist between teachers' stated beliefs and their actual classroom practices (Vesga-Bravo *et al.*, 2022). These findings support that teachers' personal conceptions, attitudes, and assumptions provide an important perspective on how they approach the teaching of Mathematics.

On the other hand, the highest variable personal conception got a mean of 3.84 (SD=0.66), interpreted as Very High. This means that the respondents had a very strong personal understanding and appreciation of Mathematics as a subject while recognizing their role in enabling learners to obtain mathematical proficiency. This implies that teachers with positive professional beliefs have the potential to offer students mathematical opportunities, encourage them to articulate their thoughts, and promote their mathematical reasoning and understanding of the concepts.

Teachers with strong conceptions of Mathematics view it as a worthwhile and interesting discipline rather than a set of rules and procedures. These teachers value students' mathematical thinking, reasoning, explanations, and understanding. The personal conceptions of Mathematics by teachers could influence the strategies and approaches that they use in teaching the subject. Teachers with strong personal beliefs are more likely to promote learner-centered instruction wherein students participate actively in constructing their mathematical knowledge.

Teachers' personal conceptions of Mathematics and its pedagogy, therefore, determine their learning-related strategies and decisions and, consequently, the quality of students' learning experiences (Beswick, 2021). In addition, teachers with strong professional beliefs are more confident in adopting successful instructional practices that enhance learners' mathematical progress and academic accomplishment (Felbrich *et al.*, 2022). Likewise, the beliefs of teachers about Mathematics, its teaching, and learning guided their responses to the items under consideration (Vesga-Bravo *et al.*, 2022).

However, the variable assumption got the lowest mean of 3.71 (SD=0.52), interpreted as Very High. This means that respondents had a very high level of beliefs and expectations about how Mathematics should be taught and how students are expected to learn Mathematics, although to a lesser extent than the other variable, indicating that teachers may benefit from continuous development of their beliefs and expectations. This implies that teachers may place greater emphasis on their own beliefs about how Mathematics should be taught and learned, rather than considering students' actual learning experiences and expectations.

The teacher's beliefs and assumptions can be formed through their experiences, reflection, and participation in professional learning communities, which in turn help them improve their practices (Leder *et al.*, 2021). Professional development can transform and fine-tune the beliefs of teachers when they are exposed to new strategies to embrace and are given opportunities to reflect on the outcomes in their classrooms, as professional beliefs are continuously shaped by adapting to educational reforms and diverse contexts, which assist teachers in providing Mathematics instruction that is more relevant and responsive to the classroom (Felbrich *et al.*, 2022).

Moreover, teachers may need to scrutinize their beliefs and practices to appropriately respond to the differing learning needs of their students. Teachers' reflective thinking is an essential component in understanding and improving their professional practice. This underlines the importance of continuous professional development that enhances teachers' reflection and evaluation skills (Aldahmash *et al.*, 2021). The findings indicate that teachers' assumptions about Mathematics and how Mathematics can be taught and learned can continue to develop through classroom experiences, reflection, and professional learning.

Problem 2. What is the respondents' level of Mathematics

Table 2 : Summary of the Respondents' Level of Mathematics Pedagogical Practices

Variable	Mean	SD	Interpretation
Classroom Interaction	3.69	0.62	Highly Practiced
Learning Materials	3.70	0.65	Highly Practiced
Assessment	3.67	0.70	Highly Practiced
Overall	3.69	0.66	Highly Practiced

Legend:
3.26- 4.00 Strongly Agree/ Highly Practiced
1.76- 2.50 Disagree/ Slightly Practiced
2.51- 3.35 Agree/ Practiced
1.00- 1.75 Strongly Disagree/ Not Practiced

pedagogical practices based on classroom interaction, learning materials, and assessment?

Table 2 shows the summary distribution of the respondents' level of Mathematics pedagogical practices with an overall mean of 3.69 (SD = 0.66), interpreted as Highly Practiced. This means that the respondents had highly practiced effective pedagogical practices in teaching Mathematics. This implies teachers can practice methods of teaching that promote the process of learning and make the students involved in the process, like they understand that it is important to use various teaching techniques, to combine different types of classroom interaction, and to use different assessment techniques instead of relying on one method of teaching. Teachers also provide opportunities for the students to be involved in Mathematics learning. Teachers encourage their students to express mathematical thoughts, provide their explanations, and participate in discussions and solving problems.

Moreover, teachers demonstrate that they use strategies of classroom interaction with the aim of encouraging students to share mathematical ideas, provide explanations, and participate in problem-solving activities. Teachers also employ educational tools to develop mathematical skills, realizing the importance of certain didactic resources in teaching children some mathematical skills. As for assessment, teachers are aware of students' accomplishments, provide feedback, and use assessment information to improve the process of education.

The overall findings show that Grade 7 Mathematics teachers understand how important it is to combine classroom interaction, appropriate learning materials, and meaningful assessment. These elements help create supportive and engaging learning experiences in Mathematics. When teachers use effective teaching practices, students are more likely to learn meaningfully and stay engaged. This happens when students have chances to take part in classroom discussions, explore ideas, apply their knowledge to real tasks, and share their mathematical thinking (Darling-Hammond *et al.* 2021).

Good teaching requires teachers to pick and use methods that meet students' needs and help them grow in learning. Teachers may encourage students to talk during class by using any available tools or materials so that all students feel engaged with the subject matter. Following this, it is necessary for teachers to determine if students truly understand the material and to make adjustments if something is not being understood (OECD, 2021).

On the other hand, the highest mean variable, Learning Materials, interpreted as Highly Practiced. This means that the respondents made good use of the teaching materials when they were teaching Mathematics. They recognized that providing students with the appropriate resources and tools has a significant impact on how mathematical ideas are explained. Because math can often be quite abstract, having the right materials allows teachers to make those difficult concepts more tangible and easier for students to understand. The use of these tools not only aids in effective teaching but also clarifies those challenging topics and makes them more relatable for everyone in the classroom.

Further, a range of teaching methods is employed to demonstrate the significance of concepts and to apply skills in various contexts. Teaching tools are selected with care in Mathematics classes because they assist the teacher in conducting lessons and conveying the essential knowledge. The teacher considers teaching resources as something that enhances the instruction that takes place in the classroom. This indicates that instructional resources do not take the place of teachers but instead support the learning process for students by providing additional means to comprehend concepts and skills.

Teaching materials that are suitable are important for ensuring that education is equal, accessible, and transformative for all students (UNESCO, 2021). Similarly, the appropriate teaching materials contributed to students' engagement and achievements when they were utilized together with effective teaching methods (Hattie, 2023). Furthermore, teachers assessed teaching materials based on various factors, which included how engaging those materials were for students, how challenging they were, and whether they fulfilled the academic and instructional needs of students (Wang *et al.*, 2021).

However, the variable assessment got the lowest mean of 3.67 (SD = 0.70), interpreted as Highly Practiced. This means that the respondents have used the assessment frequently during their Mathematics instruction, but not as much as they have used other parts of the instruction, which suggests that there is an opportunity for better use of the assessment. This implies a chance for teachers to use various types of authentic assessments that are relevant to evaluate the students' mathematical thinking, the strategies they use to solve problems, and their understanding of the material. This appears that teachers will continue to use traditional assessment methods such as tests and quizzes because these methods are simpler to implement, particularly in larger classes. In contrast, authentic assessment or informal assessment tends to be more complex and requires more time to conduct.

For Mathematics, it is necessary for teachers to examine how correct the answers from students are and also how the students arrived at those answers before providing feedback. There is a requirement to prepare students for standardized tests, but teachers frequently use fewer options when they assess students. Generally, when teachers and students find themselves in situations where they are testing the skills of students and interacting, particularly when the tests cover the same skills and topics, they tend to spend less time on classroom assessment methods such as portfolios, performance tasks, and open-ended questions, which can be perceived as tedious and time-consuming. This situation occurred because the evaluation was being conducted in the Division of Bukidnon.

The RUQA is a test utilized in the Division of Bukidnon

for assessing how well students are performing, and it relies on multiple-choice questions for this assessment. These questions can create challenges for students, especially when they want to demonstrate their thought processes, validate their answers, or apply different strategies to solve math problems, which might have been evaluated through the PISA test. If teachers had not reviewed previous texts, they would not implement formative methods such as asking questions, participating in problem-solving activities, assessing through performance evaluations, and using portfolios. Assessment in the classroom is important for learning because it enables both teachers and students to collect information from assessments to set educational objectives, provide feedback, and modify lesson plans for improvement.

Formative assessments are used to evaluate how well students are performing in their studies and to identify strategies that students need to adopt in order to improve as learners (Black and Wiliam, 2021). Classroom assessment also has benefits because it aids students in learning more effectively and assists teachers in determining what they should teach most effectively (Brookhart, 2021). The evidence shows that the teachers make assessments of their students' learning but lack the opportunities to take part in multiple, authentic, and formative assessment practices that examine the mathematical reasoning, process, concepts, and progress.

Problem 3. Is there a significant relationship between respondents' level of ideology in Mathematics and their Mathematics pedagogical practices?

Table 3 : Result of the Test on the Relationship Between the Respondents' Ideology in Mathematics and their Mathematics Pedagogical Practices

Teachers' Ideology in Mathematics	**Mathematics Pedagogical Practices**			**OVERALL**
	Classroom Interaction	**Learning Materials**	**Assessment**	
	r-value	r-value	r-value	r-value
	p-value	p-value	p-value	p-value
Personal Conception	0.73	0.22	0.93	0.63
	0.03	0.02	0.02	0.02
	S	S	S	S
Attitude	0.36	0.17	0.20	0.24
	0.01	0.03	0.02	0.02
	S	S	S	S
Assumption	0.23	0.14	0.12	0.16
	0.03	0.02	0.03	0.03
	S	S	S	S

Legend: significant at p<0.05
S-Significant
NS- Not Significant

Table 3 presents the results of the test of the significant relationship between the respondents' ideology in Mathematics and their Mathematics pedagogical practices. Statistical analysis reveals compelling findings with consistently low p-values (all p<0.05*), indicating a significant relationship; therefore, the null hypothesis is rejected. Thus, there is a significant relationship between teachers' ideology in Mathematics and their Mathematics pedagogical practices.

The data further mean that teachers' personal conceptions demonstrated a strong positive relationship with the three dimensions of pedagogical practices. The overall correlation coefficient was r-value = 0.63 and p-value = 0.02, which indicated that teachers who have strong conceptions about the nature, purpose, and learning of Mathematics show more favorable pedagogical practices in engaging classroom interaction, selecting appropriate learning materials, and assessing students' learning effectively.

Teachers' attitudes in Mathematics also showed significant positive relationships with pedagogical practices. The overall correlation was r-value = 0.24 and p-value = 0.02, which means that teachers' attitudes toward Mathematics are linked to how they implement classroom interaction, use learning materials, and conduct assessments. These findings imply that teachers with a positive attitude toward Mathematics engaged learners more actively, presented mathematical concepts with greater confidence, and provided learning experiences that supported students' participation and understanding.

Similarly, the teacher's assumptions in Mathematics showed a statistically significant positive relationship with pedagogical practices. The overall relationship was r-value = 0.16 and p-value = 0.03, which indicated that teachers' assumptions toward Mathematics are associated with how they implement classroom interaction, use learning materials, and conduct assessments.

The rejection of the null hypothesis implies that there is a significant relationship between respondents' level

of ideology in Mathematics and their Mathematics pedagogical practices. The result showed that teachers' personal conceptions, attitudes, and assumptions about Mathematics are significantly associated with their classroom interaction, use of learning materials, and assessment practices. These findings highlight that teachers' ideology in Mathematics is meaningfully associated with their instructional decisions and classroom practices. Teachers' beliefs and perspectives about Mathematics are associated with how they interact with students, select, and use learning materials, and assess students' mathematical learning.

The findings supported Paul Ernest's Theory of Mathematics Education, which emphasizes that teachers' beliefs and conceptions about mathematics influence their approaches to teaching and their pedagogical practices. The present findings are likewise consistent with Nguyen and Tran (2023), who emphasized that teachers' conceptions of mathematics influence their teaching practices. Furthermore, Zhu *et al.* (2021) found that mathematical beliefs are associated with teaching practices. Moreover, Skilling and Stylianides (2023) highlighted that the values of the teachers are important for making classroom instruction effective, engaging, and meaningful to students' learning. Additionally, Thurm and Barzel (2022) emphasized how these values, like beliefs, feelings, and perspectives, can influence the teaching methods used by the teacher in delivering good and quality Mathematics education.

CONCLUSION

Based on the results and findings of this study, the following conclusions are drawn:

The study concludes that most of the respondents use their personal conception as their guide in teaching and learning Mathematics. They apply real-world situations to make mathematical concepts meaningful to students. Moreover, learning materials reveal the respondents' commitment to using appropriate and varied instructional resources to enhance learning. They provide worksheets to reinforce skills and concepts in Mathematics.

With the significant relationship between teachers' ideology in Mathematics and their Mathematics pedagogical practices, the study concludes that the higher the level of teachers' ideology in Mathematics, the higher the level of their Mathematics pedagogical practices.

Recommendations

Based on the above conclusion, the following recommendations were proposed.

1. The teachers must be allowed to apply alternative ways of solving mathematical problems. They must also conduct guided problem-posing activities at least once a week, which will enable the students to discover different solutions and deeper understanding in Mathematics.

2. The school heads should conduct seminars, training, and workshops in Mathematics with a focus on various assessment strategies, especially the use of Mathematics portfolios; they should provide practical training to teachers on designing portfolio tasks, developing assessment rubrics and assessing the students' mathematics solutions, reflections, and projects at least once every quarter to help Mathematics teachers monitor and evaluate the students' progress and give meaningful insights regarding their progress in Mathematics.

3. Teachers should strengthen their attitude toward teaching and learning Mathematics, particularly their confidence in teaching mathematical concepts. They should engage in peer collaboration and attend at least one professional development activity each quarter to improve their subject knowledge and teaching strategies.

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