Teachers' Instructional Strategies in Mathematics and Critical Thinking Dispositions of Learners

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ABSTRACT

This study examined the relationship between teachers' instructional strategies and the critical thinking dispositions of learners in Mathematics at Agusan del Sur National High School. The research focused on five instructional strategies: Collaborative Learning, Differentiated Instruction, Inquiry-Based Learning, Use of Visual Aids and Manipulatives, and Real-World Applications. It also assessed learners' critical thinking dispositions in terms of Inference, Deduction, and Evaluation of Arguments. A quantitative descriptive correlational design was employed, with data collected from 40 Mathematics teachers and 1,600 learners using researcher-made questionnaires. Findings revealed that teachers strongly agreed on their use of these strategies, while learners only agreed, indicating a slight disparity in perception. Learners rated their critical thinking dispositions positively, though teachers rated them slightly lower. A significant positive correlation was found between instructional strategies and critical thinking dispositions, suggesting that effective teaching methods enhance learners' critical thinking skills. Collaborative Learning and Real-World Applications were particularly impactful, while the Use of Visual Aids and Manipulatives showed room for improvement. The study concluded that while teachers employ diverse strategies, there is a need to align these methods more closely with learners' experiences to maximize their effectiveness. Recommendations include developing an intervention program to strengthen instructional practices, providing professional development for teachers, and designing tasks that explicitly foster critical thinking. The findings contribute to the ongoing discourse on effective Mathematics education and underscore the importance of student-centered approaches in cultivating 21st-century skills.

Keywords: Mathematics Education, Instructional Strategies, Critical Thinking Dispositions, Mathematics Education, Collaborative Learning, Inquiry-Based Learning, Real-World Applications

INTRODUCTION

Instructional Strategies are at the core of students' learning thinking skills particularly in mathematics, where problem-solving and analytical thinking are crucial. The practice of lecture-based teaching methods around the world has been predominantly criticized for making students passive learners, and failing to develop higher-order thinking skills, as it is associated with the passive transmission of knowledge (Alharbi, 2022). When teachers use such methods, students are less likely to collaborate, question, or invent things, which is one of the main reasons they find it difficult to develop the problem-solving and analytical skills necessary to handle complex tasks (Andrade & Pasia, 2020).

In Saudi Arabia, a study by Alharbi et al. (2022) has reported an alarming situation for the academic performance of students, where in 2011, about 27.5% of students scored zero in division-related assessments, the failure rate increased to 49.6% in 2010, 46.4% in 2013, and, reached 60.5%, in math and science subjects, in 2015. The results prove that the students' academic problems are, to a large extent, caused by insufficient critical thinking skills and thus by the lack of teaching methods that could revive creativity (Gulnaz, 2020).

Across the country, teachers in the Philippines are identifying this as a real need for instructional strategies to be used to assist active learning as an essential part of good instruction. Studies point to the successful approaches being student-centered whereby problem-based, cooperative, and inquiry-based learning are the pedagogical

methods found to be the most effective to address the key critical thinking skills (Eslit, 2023).

Across the country teachers in the Philippines are realizing more and more how important it is to use teaching methods that encourage students to be active participants. As the world changes and the skills needed in the 21st century become clearer, traditional teacher focused lessons are making way for more student-focused strategies. These approaches give learners a chance to take charge of their own learning, which research like Eslit's (2023) shows is highly effective. Methods such as problem-based learning, teamwork, and inquiry-based activities help students develop critical thinking skills, these are essential not just in school but in everyday life. These kinds of lessons do more than keep students interested; they also promote teamwork, curiosity, and a deeper understanding of the material. As the Department of Education pushes to include more 21st-century skills in the curriculum, exploring these teaching strategies becomes really important. This is especially true in subjects like Math, where logical reasoning and critical thinking are key. That is why this study looks at what teaching strategies teachers are using now and how these methods affect students' ability to think critically. The goal is to create an intervention that makes learning more meaningful and reflective for students.

The issue of lack of critical thinking skills among students at Agusan del Sur National High School creates an option for the enhancement of students' critical thinking dispositions by improving their curiosity, open-mindedness, and perseverance which are the basic skills needed in critical thinking. One of the remarkable subjects in the said event is traditional memorizing instead of the reflective and independent thinking method from the very beginning which is reported to them. This behavior comes as a result of teaching that is based on memorizing facts and using figures than introducing the students to the new skills of critical analysis and evaluation. Despite the fact that the teachers may not be doing it on purpose, they might create an environment of passivity which makes the students not participate in questioning, analyzing, and critiquing. Hence, students are less likely to participate actively in critical discussions, offer different views, or include complicated topics in their discourse, thus they lose the vigor to probe supposition and produce evidence-based conclusions.

The researcher has a personal connection to the study because she has been a mathematics teacher at Agusan del Sur National High School. She has seen the transition of the different programs of the school aside from the general curriculum, the Special Science Classes to the Science, Technology, and Engineering Program which included new subjects and curriculum changes, creating the Special Program in Journalism which focuses on learners inclined on journalism, the school has Special Programs in Arts and Sports too. Through different programs in the school, the researcher has witnessed varied student behaviors which consequently made it possible to compare the teaching strategies and, therefore, the differences in the students' critical thinking dispositions. Unlike previous studies, this study focuses only on mathematics teachers' instructional strategies and their relationship with learners' critical thinking dispositions in the educational context of Agusan del Sur National High School. The conclusions of this study are also expected to be a considerable addition to the body of literature on teaching strategies and critical thinking dispositions.

Research Objectives

The study aims to determine teachers' instructional strategies in relation to critical thinking dispositions of learners. Specifically, it seeks to answer the following questions:

1. What is the level of teachers' instructional strategies in Mathematics class in terms of:

1.1 Collaborative learning;
1.2 Differentiated instruction;
1.3 Inquiry based learning;
1.4 Use of visual aids and manipulatives; and,
1.5 Real world applications?

2. What is the level of critical thinking dispositions of learners in terms of:

2.1 Inference;
2.2 Deduction; and,
2.3 Evaluation of arguments?

3. Is there a significant relationship between teachers' instructional strategies and critical thinking dispositions of learners?

METHODOLOGY

This research will utilize a quantitative descriptive-correlation approach. Quantitative research designs emphasize numerical and consistent data, focusing on thorough and convergent reasoning to test hypotheses and establish patterns, rather than divergent exploration of ideas (Creswell & Creswell, 2018). Quantitative design entails the systematic empirical examination of observable events through statistical, mathematical, or computer methodologies. This study quantitatively evaluates teachers' instructional strategies in relation to critical thinking dispositions of learners. The research will employ a descriptive design to collect data on the present condition or existing trends. The research investigates the historical context, including relational factors, dominant behaviors, beliefs, and continuous processes.

The descriptive correlation method is a statistical technique used to evaluate the relationship between variables. This study seeks to determine and examine teachers' instructional strategies in relation to critical thinking dispositions of learners.

Population and Sample

The respondents of the study will be the select forty Mathematics teachers presently employed at Agusan del Sur National High School and at least 1600 learners. Teachers are required to be actively engaged in teaching Mathematics throughout the data collection period.

The study will exclude teachers on leave during the data collection period, as their absence may hinder their capacity to provide pertinent information.. Additionally, educators not instructing in Mathematics, regardless of their employment at Agusan del Sur National High School, will be excluded from the study to ensure a concentrated examination of subject-specific instructional strategies and their effects on learners' critical thinking dispositions in Mathematics.

The selection of respondents will be conducted through the convenience sampling technique. Convenience sampling is a non-probability method that involves selecting participants based on their accessibility, proximity, and willingness to engage in the study. This technique entails the selection of readily accessible samples, including individuals from a particular location, organization, or group. Convenience sampling is frequently employed for rapid and economical data collection, particularly in exploratory research or under conditions of limited time and resources.

Statistical Tool

The following statistical tools will be utilized for data analysis and interpretation.

Mean. The mean score will be employed to evaluate the teachers' instructional strategies and critical thinking dispositions of learners.

Standard Dev. The standard deviation indicates the dispersion of data within a group in relation to the average (mean) or expected value.

Pearson Correlation. The Pearson r correlation will be employed to determine the significant relationship between variables.

RESULTS

Level of Teachers' Instructional Strategies

Teachers' Instructional Strategy on **Collaborative Learning** according to the learners shows that, overall, teachers tend to use collaborative learning strategies in their math classes. This is reflected in the average score of 3.37, which falls into the "Agree" category. It suggests that students generally see their teachers as encouraging teamwork and cooperation during math lessons. Looking closer at specific aspects: The highest score was for encouraging students to work together in groups to solve math problems, with a mean of 3.41. This indicates that teachers often use this approach. It supports the idea that working together helps students understand and remember math concepts better. On the other hand, the lowest score was for implementing group activities that require students to discuss and collaborate on math ideas, with a mean of 3.32. While this still counts as "Agree," it's slightly lower, which might mean there's room to make these activities more engaging or better structured. Overall, all items are within the "Agree" range, so it's clear that collaborative strategies are regularly part of math teaching. Still, they aren't necessarily used in a very intense or consistent way across all classrooms. This is important because research shows that working together helps improve communication, critical thinking, and social skills—all essential for developing students' ability to think critically, which is a main focus of this study. The similar average scores across the different items suggest that teachers are using a variety of collaborative methods in a balanced way. However, since the scores aren't close to the maximum, there's potential to boost these practices even more. This could be done through more training, better management of group work, or incorporating technology tools that assist collaboration.

Collaborative Learning base on teachers views has an overall mean of 3.80, which corresponds to a 'Strongly Agree', it shows that teachers are very committed to using collaborative learning strategies in their math classes. This indicates they really focus on encouraging teamwork and peer interaction as a key part of teaching. The top-rated items, both with an average score of 3.85, show that teachers often promote group problem-solving and create opportunities where students work together and share different strategies. These methods support a student-centered approach, helping students understand concepts more deeply by working with their classmates. All the scores fall into the 'Strongly Agree' category, which means teachers are consistently and purposefully practicing collaborative learning. This strong emphasis is also reflected in students' views, which have a slightly lower mean of 3.37. This suggests that students see collaboration as important, but their experiences might vary a little from what teachers intend to do.

Differentiated Instruction based on learners response shows that teachers have a mean of 3.34, which translates to an overall equivalent of 'Agree' about their use of different teaching strategies in Math classes. It suggests that teachers are making efforts to meet different learning needs by adjusting their teaching, the materials they use, and the pace of lessons. When looking at the specific areas measured, the highest mean is 3.36 shows that teachers often use a variety of teaching methods to suit different learning styles. This indicates that teachers understand how important it is to adapt their teaching for better engagement and understanding. On the other hand, the lowest mean is 3.31 relates to providing different levels of support and resources, pointing to the possibility that, even though differentiation is happening, there may be some limitations. Overall, the data suggests that differentiated instruction is being applied fairly regularly, but there's still room to improve differentiation and better support each student's needs.

Teachers' response on Differentiated Instruction with a mean of 3.60, means "Strongly Agree," teachers are actively using different teaching strategies in Math classes. This shows they are committed to addressing the varying needs, learning styles, and levels of their students. The highest-rated points, like "modifying assignments and assessments" and "using a variety of instructional strategies," both at 3.65, emphasize that teachers intentionally personalize learning experiences and employ multiple methods to support individual differences. Meanwhile, the slightly lower ratings around 3.55 for customizing teaching approaches and adjusting pacing indicate that while these methods are practiced, their application may differ depending on the classroom situation. Overall, these results point to teachers consistently practicing differentiated instruction with purpose. However, when we look at students' perspective, who gave a mean score of 3.34 (meaning "Agree"), it seems there's a bit of a gap. Students might not fully notice or feel the effects of the personalized teaching efforts. This

suggests that teachers could improve how they communicate these strategies and make them more visible during lessons.

Inquiry-Based Learning survey from the learners side is all about Table 6, the overall mean is 3.40, which falls into the 'Agree' category, indicating that they regularly use inquiry-based learning strategies in their math lessons. This suggests that students notice their teachers making efforts to encourage curiosity, exploration, and active problem-solving. The most highly rated statement was about encouraging students to ask questions and explore math concepts through guided discovery, with a mean score of 3.48. This shows that teachers focus a lot on promoting questioning and exploration, reflecting a move from traditional, teacher-centred methods toward more student-centered approaches where learners build their understanding. Slightly lower ratings, around 3.37 to 3.38, were seen in areas related to classroom participation, using open-ended questions, and supporting independent inquiry. Overall, the findings suggest that inquiry-based learning is indeed in use and seen positively, but there's room to enhance practices that encourage students to go beyond guided questions and develop their own reflective math thinking.

The teachers view on Inquiry-Based Learning, on average, teachers rated their emphasis on inquiry-based learning at 3.66, which corresponds to "Strongly Agree." This shows that many teachers really focus on encouraging their students to explore, think critically, and solve problems on their own in math classes. The most positively rated statement was about creating a classroom where students are actively involved in exploring mathematical ideas, with a mean score of 3.78. This emphasizes teachers' efforts to make learning interactive and student-centered. Other strategies like using open-ended questions to boost critical thinking (mean of 3.70) and designing activities based on real-life problems (mean of 3.60) also show that teachers are keen on sparking curiosity and engaging students deeply with math content. While these indicate strong agreement, they point to some opportunities for improvement, especially in creating more chances for students to explore independently and engage in meaningful discussions. Overall, it seems teachers are committed to promoting an inquiry-based approach by offering opportunities for students to think critically, explore independently, and connect math to real-world situations. Students seem to notice and appreciate these efforts, with a mean score of 3.40, indicating that they find this approach helpful and effective. However, there may still be some room for improvement when it comes to fully supporting independent inquiry in the classroom.

The learner's response on the **Use of Visual Aids and Manipulatives**, has an overall mean of 3.37, which falls into the 'Agree' category, shows that teachers usually make good use of visual aids and hands-on tools when teaching math. This means students likely benefit from different kinds of supports that help them understand difficult or abstract ideas more easily. The item with the highest mean, about 3.41, that is things like regularly using charts and diagrams to explain math—indicates these traditional visual methods are common and helpful. On the other hand, the item with the lowest mean, around 3.32, about using physical objects like blocks or counters, suggests teachers do use these tools but maybe not as often. This could be because they don't have enough supplies or time. Seeing consistent agreement across these points shows that teachers really see the value in visual and hands-on learning for math. Still, the slightly lower scores for physical manipulatives and interactive tools emphasize an opportunity to give students more access to these resources. Doing so could make lessons more engaging and help students learn in different ways.

Teachers' response on the Use of Visual Aides and Manipulatives is presented in Table 9, it has an overall mean of teachers is 3.45, which corresponds to a general feeling of 'Agree.' This suggests that teachers regularly incorporate visual aids and hands-on tools, like manipulatives, into their math lessons. It shows they're committed to helping students understand concepts better through different visual and physical learning methods. The most positively rated item, "Using visual aids such as charts and diagrams frequently," with a mean of 3.70, indicates that teachers often rely on these tools to clarify mathematical ideas. This is especially helpful for making abstract topics easier to picture. On the other hand, the item with the lowest mean, "Using physical manipulatives like blocks or counters," at 3.18, hints that while manipulatives are used, they might not be a regular part of every lesson compared to visual aids or digital resources. Overall, it looks like visual aids and models are key parts of teaching for these educators. However, there's room to bring in more hands-on activities and digital tools to create a more engaging and varied learning experience. Student feedback, with a mean of 3.37, suggests there's some agreement on this, but also shows that increasing utilizing manipulatives and

interactive digital techniques could be beneficial.

Real World Applications in the view of the learner about their teacher showed an overall mean of 3.40, which falls into the 'Agree' category, suggests that teachers are generally good at tying real-world examples into their math lessons. This means students see math as relevant and related to daily life. The most highly rated statement, "connect mathematical lessons to real-world scenarios to enhance students' understanding, "with a mean of 3.47. This shows that teachers put real effort into making math meaningful. Other questions about how math relates to everyday activities and careers also scored high, confirming that teachers focus on relevance and practical application. Even though all areas received an 'Agree' rating, the lowest mean of 3.36 was for designing projects based on real-life situations. This might mean that such project-based activities aren't used as often as direct examples or discussions. It could be an opportunity to get students more involved by adding more hands-on tasks or real-world problems to work on. Overall, it's clear that applying math to real life is a strong part of how teachers teach. This helps students understand and value math as a useful, essential skill.

The teachers' view on Real world Applications has an overall mean of 3.63, which corresponds to 'Strongly Agree,' suggesting that teachers often make an effort to link math lessons to real-life situations. This helps students see how math is relevant beyond the classroom and makes learning more meaningful. The most positively rated statement was 'connect mathematical lessons to real-world scenarios,' with a mean score of 3.75. This indicates that teachers strongly focus on demonstrating how math applies to everyday life. Similarly, statements like 'use practical examples from everyday life,' which scored an average of 3.65, and 'incorporate current events and real-world data,' with a mean of 3.63, show that teachers actively bring real-world contexts into their lessons. Although all areas scored well, the item 'design projects and assignments that require students to apply math in real-life contexts' received the lowest rating of 3.48. This suggests that while teachers do connect lessons to real life, giving students hands-on projects or practical tasks might be less common. Overall, teachers seem to highly value making math relevant, showing a clear effort to connect classroom learning with real-world applications. This is also reflected in students' perceptions, which averaged 3.40; it indicates that students notice these efforts, but there's still room to include more project-based activities and diverse real-life examples to make learning even more engaging.

Level of Critical Thinking Dispositions

The **Inference** based on learners' responses shows the overall mean of 3.36, which corresponds to a rating of 'Agree,' shows that most students usually have good skills in understanding and making sense of mathematical information. This means they are generally good at interpreting data, recognizing patterns, and drawing logical conclusions from what they see. The most positively received statement, 'Identified patterns and connections between ideas or data,' scored a mean of 3.39, emphasizing that learners are strong at spotting relationships, an important part of solving problems and reasoning in math. On the other hand, the statement with the lowest score, 'Distinguished relevant from irrelevant information when making inferences,' with a mean of 3.30, suggests that students may need a bit more help in filtering out the important bits from the less important when analyzing data. Overall, this indicates that students have a good to very good ability to infer, but they could improve further by practicing how to pick out key details and reach conclusions from complex, unfamiliar information—like word problems or real-world math situations.

Inference according to the teachers has an overall average score is 3.24, which roughly translates to an overall "Agree" feeling among teachers. This shows that most teachers see their students as capable of making inferences, although there's still room for improvement. The highest mean of 3.35, on interpreting information accurately to form conclusion. This indicates that students are generally good at making reasonable inferences by combining their knowledge with information they interpret. On the other hand, the lowest mean, 3.05, was for the ability to tell apart relevant from irrelevant information when making inferences. This suggests students find it hard to filter out unnecessary details and focus on what is important, which can make their inferences less strong and less accurate. Overall, students can usually make inferences, but they might improve even more if they practice better skills in recognizing key information and applying it, especially when they face complex situations with lots of data or conflicting ideas.

Learners' responses on **Deduction** has an overall mean of 3.38, which falls into the "Agree" category, indicates that learners generally show a good ability in deductive reasoning when it comes to Mathematics. This suggests they are able to follow broad rules, analyze different situations, and work through logical steps to solve problems and draw correct conclusions. The highest-rated statement, "accurately follow a sequence of logical steps to arrive at conclusions," with a mean of 3.41, shows that students are fairly confident in using structured methods to solve problems—an important part of mathematical deduction. Other strong scores, like applying rules or theories systematically which is 3.39, support this idea even more. On the other hand, the lowest score, "apply general principles to specific situations," with a mean of 3.37, still falls in the "Agree" range but might point to a need for some students to get more practice connecting abstract ideas to real-world situations. Overall, the data suggests learners have a solid foundation in deductive thinking, which is key for tackling more complex problems. Focusing on building skills like structured problem-solving, justifying answers, and analyzing mistakes can help learners improve even further.

For the teachers, Deduction has the overall average score of 3.21, which falls into the category of "Agree," suggests that teachers generally see their learners as capable of deductive reasoning. However, there are some areas where learners could improve. The most positively rated statement, "using rules or theories to solve problems systematically," scored a mean of 3.25. This shows that learners are sometimes able to apply general rules in an organized way, which is an important part of deductive thinking. On the other hand, statements like "recognize flawed reasoning when deducing solutions from given premises," with an average of 3.23, and "accurately follow a sequence of logical steps," with an average of 3.20, imply that although learners can reach conclusions, they may have trouble spotting errors or making sure their logical processes are correct. The overall lower average in this area suggests that, while learners grasp the basics of deduction, they could benefit from more chances to practice following logical steps carefully and identifying mistakes, which would help them make stronger, more accurate deductions.

Evaluation of Arguments based on learners' responses shows the overall mean of 3.35 falls in the 'Agree' range, which shows that learners generally have a positive attitude towards evaluating arguments in Mathematics. This suggests that they are usually good at analyzing the strength, logic, and evidence supporting mathematical ideas. The highest-rated statement, 'compare opposing arguments to determine which is more reasonable based on evidence,' with a mean of 3.39, reflects students' ability to consider different viewpoints, an important part of critical thinking. Conversely, the lowest-rated statement, 'evaluate arguments by identifying any logical fallacies present,' with a mean of 3.30, indicates that recognizing mistakes in reasoning is still an area where some learners are improving. These findings suggest that while students can assess and compare arguments reasonably well, they could benefit from more targeted teaching on spotting logical fallacies and checking if arguments are valid. Improving this skill can help them make better judgments during math discussions and when explaining their ideas.

Learners' ability on Evaluation of Arguments according to teachers has an overall mean of 3.11, which corresponds to an "Agree" response, suggests that teachers think students have some ability to evaluate arguments. It also indicates that their skills in this area are still developing and can be improved. The highest-rated statement, "Critically assess the strength and validity of arguments," with a mean of 3.18, shows that learners are somewhat capable of evaluating arguments, but they still face challenges in doing so effectively. On the other hand, the lowest-rated statement, "Assess the credibility of sources used in presenting arguments," with a mean of 3.05, hinted that the learners might struggle to tell reliable sources from unreliable ones, an essential skill when evaluating arguments today. Overall, this tells us that learners can evaluate arguments to some extent, but they need more practice in judging the quality of evidence, spotting logical fallacies, and critically assessing sources to strengthen their argumentation skills.

Relationship between Instructional Strategies and Critical Thinking Dispositions

Through Pearson correlation analysis, there is a strong positive link ($r = 0.683$, $p < 0.01$) between the teaching methods teachers use and how learners develop critical thinking skills. The very small p-value ($p = .000$) tells us this connection is statistically significant, meaning that when teachers use more effective instructional strategies, learners tend to show stronger critical thinking abilities. This finding aligns with earlier research by Abrami et al. (2015), which found that clear, direct, and integrated teaching methods help learners improve their

critical thinking. In other words, improving how teachers teach can help learners boost their higher-level thinking, reasoning, and evaluation skills across subjects like math and beyond.

DISCUSSIONS

Level of Teachers' Instructional Strategies

The level of teachers' instructional strategies in Mathematics class in terms of; Collaborative learning; Differentiated instruction; Inquiry based learning. Use of visual aids and manipulatives; and, Real world applications, was found out that teachers generally rated their teaching strategies quite high across the board, especially in areas like Collaborative Learning, and Real-World Application which resulted that they Strongly Agree. On the other hand, learners perceptions were a bit more moderate, leaning towards just agreeing, with overall scores slightly lower. This shows that while teachers are pretty confident about their use of these methods, learners might not always notice or feel how effective they really are. These results pointed out, that good teaching strategies, especially those that promote collaborative learning and real-world application can really boost how engaged learners are and how well they understand things.

Teachers often mention that they regularly include group activities and peer discussions when teaching math. This shows that they see the importance of learners working together to solve problems and understand concepts more deeply. It creates a classroom environment where learners feel encouraged to share ideas and collaborate, making math a more interactive and engaging subject. These claims are supported by the results of the study.

Teachers work hard to adapt their teaching methods to fit the different needs of their learners. They pay attention to how each learner learns best, how ready they are to proceed, and what interests them. Because of this, teachers often change their lessons, activities, and tests to help everyone learn better. This makes the classroom more welcoming and effective for all learners.

You can see that teachers are using inquiry-based learning in the classroom. They encourage learners to ask questions, explore math ideas, and develop their own understanding. This way of teaching puts learners at the center, making curiosity, investigation, and discovery the main focus of learning.

In Math classes, teachers often use visual aids and hands-on tools like blocks or drawings to make tricky concepts easier to understand. These tangible and visual resources help learners picture what is happening and grasp ideas more quickly. This method works especially well for learners who learn best by seeing or doing things, making math feel less like just numbers and more like something they can really picture in their minds.

Teachers often incorporate real-life examples into their lessons. This means they connect math ideas to everyday situations that learners can relate to, making the lessons feel more real and relevant. When lessons include these kinds of authentic contexts, learners usually stay more interested and motivated to learn.

Level of Critical Thinking Disposition

The level of critical thinking dispositions of learners in terms of Inference, Deduction, and, Evaluation of arguments, it is found that both teachers and students agree that learners have a moderate level of critical thinking skills when it comes to making inference, deductions, and evaluating arguments. Teachers' ratings were a bit lower, suggesting they see room for growth in these areas. Still, the overall consensus is that students are developing important higher-level thinking skills, but there is definitely space to improve further. As Facione (1990) points out, consistently working on cultivating critical thinking is key to success not just in school but for lifelong learning too. And, of course, how well teachers encourage these skills plays a big role.

Learners generally have a good attitude towards making inferences. This means they're often willing to interpret patterns, draw conclusions from data, and make reasonable judgments. They tend to go beyond just the surface information, which shows they have a solid foundation for thinking analytically.

The learners also seem comfortable with deductive reasoning. They tend to use general rules to understand specific cases and follow logical steps to reach their conclusions. This shows they can think in a structured and

logical way when solving math problems.

With regard to evaluating arguments, students tend to demonstrate a critical stance. They are often cautious in accepting claims and make efforts to assess the logic, consistency, and credibility of information. This indicates their growing awareness of reasoning quality and their willingness to challenge weak arguments.

Correlation between Teachers' Instructional Strategies and Critical Thinking Dispositions of Learners

The relationship between teachers' instructional strategies and critical thinking dispositions of learners is significant. The data suggests a strong correlation between how Mathematics Teachers Instructional Strategies and the way learners develop their Critical Thinking Dispositions. When learners often work together to solve problems, explore questions on their own, and are encouraged to connect math ideas to real-life situations, they usually get better at making inferences, deductions, and evaluating arguments. These skills are essential for tackling difficult math problems and making sound, logical decisions. This supports previous research, like the study by Abrami et al. (2015), which found that instruction aimed at encouraging critical thinking can lead to real improvements in both learners attitudes and performance.

This connection is clearly reflected in the impressive performances of Agusan Sur National High School (ASNHS)learners in various Mathematics competitions over recent years. The school's math program, built on flexible and engaging teaching methods, that led to many notable achievements across different levels: · local and national wins: ASNHS has consistently done well in the National Science Quest, winning several titles in events like Math Trail, Math History Quiz Bee, Sudoku, and Damath, which show the learners deep understanding of math and strong logical skills. These contests require not just knowing the content but also working well with others and thinking critically under time limits.

International recognition, the school has also sent teams to major global contests like the Thailand International Mathematical Olympiad (TIMO), Hong Kong International Mathematical Olympiad (HKIMO), and the Philippine International Mathematical Olympiad (PIMO). Learners from ASNHS have earned medals, including Gold, Silver, Bronze, and Merit awards, demonstrating their global math skills.

CONCLUSION

Based on findings of the study, it's clear that mathematics teachers often use a variety of teaching methods like Collaborative Learning, Differentiated Instruction, Inquiry-Based Learning, Using Visual Aids and Manipulatives, and Real-World Applications. Teachers rated these strategies as strongly agreed they use them, but learners only agreed that these methods are happening. This difference suggests that what teachers think they're providing isn't always fully seen or felt by learners. If there's a gap like this, it might lessen how much these strategies really help students stay engaged and develop their thinking skills. The success of strategies like differentiated instruction depends not just on trying them out but also on how well they meet each learner's unique needs and levels of readiness. The learners also had a positive attitude toward critical thinking skills, agreeing that they can infer, make deductions, and evaluate arguments. However, teachers rated learners' critical thinking attitudes slightly lower than the students did, showing that teachers and students see these skills differently. It emphasizes that critical thinking involves both skills and the willingness or attitude to think critically, and developing both is key for helping students grow. Interestingly, the data showed a strong positive correlation between the way teachers teach and students' critical thinking attitudes. This means that learners tend to improve their critical thinking when they're taught with diverse and well-planned methods. It emphasizes how instructional approaches directly influence how students think analytically and evaluate information. All in all, the results emphasize how important good instructional strategies are in shaping how learners think and how willing they are to think critically. Using teaching methods that really adapt to learners' needs could help close the gap between what teachers aim to do and what learners actually experience, boosting their capacity for thoughtful, independent thinking.

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