

Role of Professional Learning Communities (PLCs) as a Mediator Between Transformational Leadership and Teacher Performance in the District of Aritao

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Abstract This study evaluated how Grade 5 teachers in public elementary schools within the Montalban District applied innovative instructional methods in mathematics during the 2025–2026 academic year. It focused on teachers' demographic characteristics, the degree to which they employed instructional innovations such as mastery learning strategies, teaching techniques, and educational resources, factors affecting adoption of innovative teaching methods, and obstacles faced during implementation. A descriptive-survey research design was utilized, using a researcher-adapted questionnaire distributed to all 28 Grade 5 Mathematics teachers in the district. Data analysis involved frequency, percentage, weighted mean, and standard deviation. Most participants were female, married, held master's degrees, and had significant teaching experience. The results indicated a very high level of instructional innovation use, with educational resources and teaching techniques receiving the highest ratings, followed by mastery-learning strategies. Teachers consistently consider learners' abilities, positive attitudes, instructional goals, and content nature when choosing suitable pedagogical methods. Despite the high level of implementation, respondents identified significant challenges, notably students' weak reasoning and inference skills, lack of interest in mathematics, and inadequate mastery of basic mathematical operations. These challenges underscore the necessity of ongoing instructional support and student intervention to enhance the effectiveness of innovative teaching practices. In conclusion, the study concludes that mathematics teachers are committed to adopting innovative pedagogical methods despite classroom challenges. Findings inform professional development and instructional interventions.

Keywords: *Mathematics Pedagogy; Instructional Innovation; Mastery Learning; Teaching Methods; Public Elementary Teachers*

INTRODUCTION

Math is seen all over the world as a key subject that is important for building skills such as critical thinking, problem-solving, logical reasoning, and decision-making. It plays a significant role in both developing our minds and in practical everyday life (Charles, 2024; Maralova, 2024). However, despite its importance, there is a lot of worry about students not doing well and losing interest in math, which is a major problem for schools everywhere (Antao et al., 2024). To tackle this, there is a push for new ways of teaching— such as using technology, project-based learning, and making math relevant to real life—to get students more involved, help them understand concepts better, and boost their grades in math (Adelabu et al., 2022; Charles, 2024; Mahmuti et al., 2025). These educational innovations are great for getting students to participate actively, encouraging creativity, and cutting down on math anxiety, which helps them achieve more and prepare for the complex challenges of the 21st century (Abdul Hamid & Kamarudin, 2021; Bhuttah et al., 2024; Wong & Ramo, 2025).

Mathematics is a key focus of the Philippine basic education curriculum because it is crucial for building foundational skills needed for academic success. However, there are still hurdles to overcome when it

comes to improving mathematical achievement. National and international assessments show that there are gaps in how students perform and engage with the subject (Luzano, 2024). To tackle these challenges, the Department of Education has rolled out programs that encourage learner-centered and innovative teaching methods. These are aimed at helping students understand math better and stay motivated. These initiatives highlight the need to equip teachers with effective teaching strategies and the right resources to meet the diverse needs of learners, acknowledging that teacher competence is central to improving education (Luzano, 2024a).

In the Montalban District, public elementary schools face specific hurdles when teaching Mathematics to Grade 5 students. Teachers have noticed that there is a mix of approaches when it comes to using mastery learning strategies, teaching methods, and resources, which can impact students' motivation and their grasp of concepts. There is a real push to introduce new teaching practices, but teachers find it difficult to effectively implement these innovations in their classrooms. They face issues such as limited access to technology, insufficient training, and a wide range of student abilities, all of which make it difficult to consistently deliver innovative math lessons (Cahapay & Labrador, 2022; Luzano, 2024a; Valle, 2024). To tackle these challenges and boost math learning outcomes in the district, it is important to focus on improving teachers' professional development, especially when it comes to new teaching techniques and using technology (Luzano, 2024a; Prestoza, 2024). Although there is a lot of information about innovative teaching practices in mathematics, not much research has examined how Grade 5 teachers in public elementary schools, particularly in the Montalban District, are using them. Few studies have examined how mastery learning strategies, teaching methods, and resources work together in this local setting. In addition, there is a lack of data on what influences the adoption of these new teaching methods and the challenges teachers face when implementing them. This study aims to fill these gaps by examining the extent of innovation being used and identifying the factors and obstacles that Grade 5 Mathematics teachers in Montalban face.

RESEARCH QUESTIONS

This study aimed to assess the extent of the use of instructional innovations in teaching Mathematics among Grade 5 teachers in public elementary schools in the Montalban District.

Specifically, this study sought to answer the following research questions.

- What is the profile of mathematics teachers in public elementary schools in the Montalban District?
- What is the extent of the utilization of instructional innovations in mathematics teaching in terms of mastery learning strategies, teaching methods, and pedagogical resources?
- What factors influence the utilization of pedagogical innovations in mathematics instruction?
- What challenges do mathematics teachers encounter when implementing instructional innovations?

METHODS

Research Design

This study employed a descriptive-survey research design to assess the extent of the utilization of instructional innovations in mathematics teaching among Grade 5 teachers in public elementary schools in the Montalban District. The design was appropriate because it systematically described teachers' instructional practices, factors influencing the use of innovative pedagogy, and challenges encountered during implementation without manipulating any variables. Descriptive statistics were used to summarize and interpret the data collected.

Locale of the Study

This study was conducted in 21 public elementary schools in the Montalban District, Division of Rizal, Philippines, during the 2025–2026 school year. The district was selected because it provides an

appropriate context for examining the implementation of instructional innovations in mathematics by public elementary school teachers.

Respondents of the Study

The respondents were Grade 5 Mathematics teachers employed in public elementary schools in the Montalban District. These teachers were selected because they were directly responsible for delivering mathematics instruction and implementing innovative pedagogical practices in their classrooms.

Sampling Technique

The study employed total enumeration sampling, wherein Grade 5 mathematics teachers from 21 public elementary schools were invited to participate. This sampling technique ensured complete representation of the target population and minimized sampling bias by including all qualified respondents.

Research Instrument

Data were collected using a researcher-adapted questionnaire developed from the related literature and previous studies on mathematics pedagogy and instructional innovation. The instrument consisted of five sections: (1) respondents' demographic profile, (2) mastery learning strategies, (3) teaching methods and pedagogic resources, (4) factors influencing the use of pedagogy, and (5) challenges encountered in implementing instructional innovations. Before data collection, the questionnaire was validated by experts to ensure content validity and clarity.

Data Gathering Procedure

After obtaining approval from the concerned school authorities, the researcher personally administered the questionnaires to the respondents. The purpose of the study was explained, and informed consent was obtained prior to participation. Completed questionnaires were retrieved, checked for completeness, encoded, and organized for statistical analysis while ensuring the confidentiality of all responses.

Data Analysis

The collected data were analyzed using descriptive statistical methods. Frequencies and percentages were used to describe the respondents' demographic characteristics, while weighted means and standard deviations were employed to determine the extent of instructional innovation, factors influencing pedagogical practices, and challenges encountered. The findings were interpreted using appropriate descriptive scales corresponding to each variable of interest.

RESULT AND DISCUSSION

Table 1. Demographic Profile of the Respondents

Profile Variable	Category	Frequency (f)	(%)
Age	20–25	6	21.42
	26–30	6	21.42
	31–35	5	17.85
	36–40	4	14.28
	40 and above	7	25.00
Gender	Male	8	28.57
	Female	20	71.43
Civil Status	Single	6	21.43
	Married	22	78.57
Highest Educational Qualification	Bachelor's Degree	7	25.00

Length of Mathematics Teaching Experience	Master's Units	4	14.29
	Master's Degree Holder	10	35.71
	Doctoral Units	5	17.86
	Doctoral Degree Holder	2	7.14
	1–5 years	8	28.57
	6–10 years	7	25.00
	11–15 years	3	10.71
	16 years and above	10	35.71
	Outstanding	15	53.57
	Very Satisfactory	10	35.71
Performance Rating	Satisfactory	3	10.71
Mathematics-Related Trainings and Seminars Attended*	Local	28	100.00
	Division	28	100.00
	Regional	24	85.71
	National	12	42.86
	International	8	28.57

Note: Multiple responses were allowed for training and seminars attended; therefore, percentages exceeded 100% when summed across the categories.

Table 1 outlines the demographic characteristics of 28 Grade 5 Mathematics teachers from public elementary schools in the Montalban District. Most of the participants were women (71.43%), most were married (78.57%), and 35.71% had earned a master's degree. A significant portion had been teaching Mathematics for 16 years or more (35.71%), and over half were rated as Outstanding in their performance (53.57%). Regarding professional development, all participants had attended Mathematics-related training at local and division levels, while fewer had engaged in national (42.86%) and international (28.57%) seminars. Collectively, these teachers form a group with substantial experience and professional engagement, suggesting that they have the educational qualifications and teaching expertise required to adopt innovative instructional methods in Mathematics.

Table 2. Extent of the Utilization of Instructional Innovations in Mathematics Teaching

Dimension	Overall Mean	SD	Interpretation
Mastery Learning Strategies	4.21	0.59	Always
Teaching Methods	4.35	0.49	Very Effective
Pedagogic Resources	4.37	0.54	Very Effective
Grand Mean	4.31	0.54	Very High Utilization

Table 2 presents data on instructional innovations in mathematics education from 28 participants. The dimensions evaluated were Mastery Learning Strategies, Teaching Methods, and Pedagogic Resources, rated on a scale where higher mean scores indicate greater use or effectiveness. Mastery Learning Strategies had a mean of 4.21 and SD of 0.59, suggesting that these strategies are always used in mathematics instruction. This indicates the consistent use of mastery approaches to ensure that students reach high proficiency before advancing. Teaching Methods received a higher mean of 4.35 (SD = 0.49), rated “Very Effective,” indicating highly efficient and varied instructional methods for teaching mathematics. Pedagogic Resources obtained a mean of 4.37 with an SD of 0.54, also rated “Very Effective,” highlighting the active use and perceived efficacy of materials and resources that support the mathematics curriculum and engage students. The overall mean is 4.31 (SD = 0.54), corresponding to “Very High Utilization.” This suggests that instructional innovations are thoroughly implemented

through mastery learning, effective teaching methods, and pedagogic resources to improve educational outcomes. Although no specific study in the provided context directly reports this table, the findings are consistent with research emphasizing mastery learning for student engagement(Buraphadeja & Srisarkun, 2024)and effective instructional strategies and resources in various educational settings(Magayon & Tabuzo, 2024).

Table 3. Factors Considered in Making Use of Pedagogy

Factors Considered in Making Use of the Pedagogy	Mean	SD	Interpretation
Learners' capabilities	4.55	0.51	Always
Availability of resources	4.30	0.61	Always
Attitude	4.65	0.49	Always
School environment	3.75	0.73	Very Often
Objectives to be achieved	4.30	0.58	Always
Nature of the content	4.45	0.52	Always
Teacher's own preparation and mastery	4.10	0.67	Very Often
Overall Mean	4.30	0.59	Always

Table 3 outlines the elements educators prioritize for effective pedagogy, using a mean rating scale where higher values signify greater importance. These elements encompass learners' abilities, resources, attitudes, school environment, goals, content, and teacher expertise. Data reveal that learners' abilities, attitudes, content, resources, and goals have mean scores exceeding 4.3, categorized as "Always," indicating consistent prioritization. Notably, teacher or stakeholder attitude holds the highest mean (4.65), highlighting the impact of mindset on pedagogical success. This aligns with research emphasizing teacher mindset's influence on teaching quality and student achievement(Herdian et al., 2024). School environment and teacher preparation have lower means (3.75 and 4.10), interpreted as "Very Often," suggesting that they are less consistently emphasized. The significance of contextual factors is supported by literature identifying infrastructure and institutional support as crucial in selecting teaching strategies(Aryanti et al., 2024). Overall, with a grand mean of 4.30 (SD = 0.59), educators nearly always consider student readiness, resources, content, and mindset in pedagogical planning, highlighting the dynamic nature of effective teaching across diverse settings.

Table 4 Challenges Encountered in Implementing Instructional Innovations

Challenges Encountered	Mean	SD	Interpretation
Lack of knowledge of the fundamental operations	4.25	0.63	Very Serious
Big classes	4.10	0.71	Serious
Weak understanding of the problem	4.15	0.68	Serious
Weak sense of reasoning/inferences	4.55	0.51	Very Serious
Absenteeism due to family problems	4.20	0.65	Very Serious
Poverty	4.05	0.74	Serious
Health problems	4.20	0.64	Very Serious
Insufficiency of allowance	4.10	0.69	Serious
Carelessness in the process of answering	3.80	0.82	Serious
Inadequate instructional materials	3.70	0.87	Serious
Poor administrator–teacher–student relationship	4.20	0.66	Very Serious
Lack of interest	4.30	0.60	Very Serious
Overall Mean	4.13	0.68	Serious

Table 4 outlines the difficulties faced by Grade 5 mathematics teachers when applying new teaching methods. With an overall mean of 4.13 (SD = 0.68), classified as Serious, it is evident that teachers still encounter significant obstacles in implementing innovative mathematics instruction. The most

prominent challenge identified was a weak sense of reasoning and inferences ($M = 4.55$, $SD = 0.51$), followed by a lack of interest ($M = 4.30$, $SD = 0.60$) and insufficient knowledge of basic operations ($M = 4.25$, $SD = 0.63$). These results highlight ongoing issues with students' reasoning abilities, motivation, and understanding of fundamental mathematical concepts in the classroom. Although the lack of instructional materials ($M = 3.70$, $SD = 0.87$) had the lowest mean, it was still deemed a serious issue. Overall, the findings suggest that enhancing students' foundational skills, boosting their engagement, and ensuring sufficient instructional support are crucial for the effective implementation of innovative mathematics teaching. These conclusions align with earlier research that underscores the importance of learner readiness, instructional resources, and ongoing teacher support for successful mathematics instruction (Cahapay & Labrador, 2022; Luzano, 2024a; Valle, 2024; Magayon & Tabuzo, 2024).

Table 5. Summary of the Assessment of Instructional Innovations in Mathematics Teaching

Construct	Mean	SD	Interpretation
Pedagogic Resources	4.37	0.54	Very Effective
Teaching Methods	4.35	0.49	Very Effective
Factors Considered in Making Use of the Pedagogy	4.30	0.59	Always
Mastery Learning Strategies	4.21	0.59	Always
Challenges Encountered in Implementing Instructional Innovations*	4.13	0.68	Serious
Overall Grand Mean	4.27	0.58	High Implementation of Instructional Innovations

Table 5 provides an evaluation of the overall effectiveness of instructional innovations in mathematics education. Among the key dimensions, Pedagogic Resources achieved the highest average score ($M = 4.37$, $SD = 0.54$), reflecting teachers' views that these resources are highly effective in enhancing mathematics teaching. Teaching Methods ($M = 4.35$, $SD = 0.49$) and Factors Considered in Utilizing the Pedagogy ($M = 4.30$, $SD = 0.59$) followed closely, indicating that educators consistently employed effective teaching techniques and considered significant pedagogical considerations during instruction. Mastery Learning Strategies also received a commendable rating ($M = 4.21$, $SD = 0.59$), highlighting their frequent application in classrooms. Although the Challenges Encountered in Implementing Instructional Innovations had a mean score of 4.13 ($SD = 0.68$) and were deemed serious, the overall grand mean of 4.27 ($SD = 0.58$) signifies a high level of implementation of instructional innovations. These results imply that despite the challenges faced, teachers are dedicated to adopting effective and innovative teaching methods to enhance mathematics learning. These findings align with previous research, underscoring that effective instructional strategies, suitable pedagogical resources, and ongoing professional support are crucial for improving mathematics instruction and student outcomes (Charles, 2024; Luzano, 2024a; Mahmuti et al., 2025).

CONCLUSION

This study concluded that Grade 5 mathematics teachers in public elementary schools in Montalban District demonstrated a high level of use of instructional innovations in their teaching practices. Teachers effectively employed mastery learning strategies, diverse teaching methods, and pedagogical resources to enhance mathematics instruction. They also consistently considered important pedagogical factors, such as learners' capabilities, teacher attitude, instructional objectives, and the nature of the

content, when selecting appropriate teaching approaches. Despite this positive implementation, teachers continued to encounter significant challenges, particularly in addressing students' weak reasoning and inference skills, limited interest in mathematics, and inadequate mastery of fundamental mathematical concepts. These findings suggest that while instructional innovations are widely practiced, continuous support for both teachers and learners is necessary to maximize the effectiveness of mathematics instruction and improve students' learning outcomes.

RECOMMENDATIONS

Based on the findings of this study, school administrators and education officials should enhance professional development programs that focus on innovative mathematics teaching strategies, learner-centered instruction, and integration of appropriate pedagogical resources. It would be beneficial for teachers to continue enhancing students' reasoning skills, conceptual understanding, and interest in mathematics through engaging and interactive learning activities. Schools should also consider improving access to instructional materials and providing continuous academic support to address learning difficulties among students. Additionally, fostering collaboration among teachers, school leaders, and parents could help minimize learner-related challenges such as absenteeism and low motivation. Finally, future researchers might conduct similar studies with larger samples and different educational settings or employ inferential statistical analyses to further examine the relationships among instructional innovations, teacher characteristics, and student learning outcomes.

LIMITATIONS OF THE STUDY

This study had several limitations that should be considered when interpreting its findings. First, the research was conducted among selected public elementary school teachers in Montalban, Rizal. Therefore, the findings may not be generalizable to teachers in private schools or to those in other districts or regions with different educational contexts, instructional resources and learner demographics.

FUTURE RESEARCH DIRECTIONS

Future studies are encouraged to expand the scope of the research by including public and private elementary schools from other districts, divisions, or regions to allow broader comparisons and improve the generalizability of the findings. Researchers may employ longitudinal research designs to examine the long-term impact of innovative mathematics pedagogies on students' academic achievement, mathematical reasoning, problem-solving skills, engagement, and attitudes toward mathematics. Experimental or quasi-experimental studies evaluating the effectiveness of specific instructional innovations—such as inquiry-based learning, differentiated instruction, collaborative learning, game-based learning, STEM integration, and technology-enhanced teaching—are also recommended.

ETHICS STATEMENT

This study was conducted in accordance with accepted ethical standards for educational research. Prior approval to conduct the study was obtained from the appropriate educational authorities and school administrators before data collection commenced. Participation in the study was voluntary, and informed consent was obtained from all teacher participants after they were informed of the study's objectives, procedures, expected benefits, and minimal risks.

REFERENCES

- Abdul Hamid, N. H., & Kamarudin, N. (2021). Assessing Students' Mathematics Achievement and Mathematical Creativity using Mathematical Creative Approach: A Quasi-Experimental Research. *Asian Journal of University Education*, 17(2), 100. <https://doi.org/10.24191/ajue.v17i2.13399>
- Adelabu, F. M., Alex, J. K., Ngwabe, A., Tatira, B., & Boateng, S. (2022). Creation of Innovative Teaching Spaces with Gamma Tutor: A Techno-Blended Model for Rural Mathematics Teaching. *Journal of*

- Education and E-Learning Research*, 9(4), 249–257. <https://doi.org/10.20448/jeelr.v9i4.4244>
- Antao, M. A., Morales, R. S., Ting, V. B., Abdurahman, J. T., Jalaidi, S. M., Kadil, H. L. S., Abdulmajid, B. P., Espartero, M. M., & Verdeflor, R. N. (2024). Behavior shifts through non-traditional math teaching strategies integrating real-life transactions for non-math enthusiasts. *Environment and Social Psychology*, 9(7). <https://doi.org/10.59429/esp.v9i7.2642>
- Aryanti, A., Hikamudin, E., Muryanto, R., Peniasiania, D., & Heryani, R. (2024). A Scoping Literature Review about Impact of Lesson Study on Teacher Pedagogy: Effective Solutions in Learning Practices. *Indonesian Journal of Educational Research and Review*, 7(2), 369–383. <https://doi.org/10.23887/ijerr.v7i2.78838>
- Bhuttah, T. M., Xusheng, Q., Abid, M. N., & Sharma, S. (2024). Enhancing student critical thinking and learning outcomes through innovative pedagogical approaches in higher education: the mediating role of inclusive leadership. *Scientific Reports*, 14(1), 24362. <https://doi.org/10.1038/s41598-024-75379-0>
- Buraphadeja, V., & Srisarkun, V. (2024). Mastery learning in CS1: a longitudinal study during and post-pandemic. *Discover Education*, 3(1). <https://doi.org/10.1007/s44217-024-00361-x>
- Cahapay, M. B., & Labrador, M. G. P. (2022). Instructional practices of Filipino teachers in remote mathematics education in COVID-19 times. *International Journal of Didactical Studies*. <https://doi.org/10.33902/ijods.202211753>
- Charles, M. A. A. (2024). Exploring the role of innovation in enhancing mathematics achievement in higher secondary students. *Edelweiss Applied Science and Technology*, 8(6). <https://doi.org/10.55214/25768484.v8i6.3237>
- Herdian, H., Septiningsih, D. S., Wahidah, F. R. N., & Aziez, F. (2024). Growth Mindset Training for Teacher: Method of Changing the Teacher's Mindset. *Journal of Learning Theory and Methodology*, 5(1), 25–31. <https://doi.org/10.17309/jltm.2024.5.1.04>
- Luzano, J. F. (2024a). Multifaceted structures of mathematics education in the Philippines: a case analysis. *Diversitas Journal*, 9(3). <https://doi.org/10.48017/dj.v9i3.3062>
- Luzano, J. F. (2024b). Optimizing Ipsative Assessment in the Philippines: A Narrative Review on the Experiences of Mathematics Teachers. *Diversitas Journal*, 9(2). <https://doi.org/10.48017/dj.v9i2.2964>
- Mahmuti, A., Hamzić, D. K., & Thaqi, X. (2025). The impact of contextual teaching and learning on improving student achievement in economic mathematics. *International Electronic Journal of Mathematics Education*, 20(3), em0833. <https://doi.org/10.29333/iejme/16233>
- Magayon, V. C., & Tabuse, V. (2024). Least mastered skills and effective instruction in teaching general mathematics in the Philippines. *Cypriot Journal of Educational Sciences*, 19(4), 333–354. <https://doi.org/10.18844/cjes.v19i4.9010>
- Maralova, B. (2024). Development and Cultivation of Mathematical Literacy: A Pedagogical Perspective. *Eurasian Science Review an International Peer-Reviewed Multidisciplinary Journal*, 2(2), 94–99. <https://doi.org/10.63034/esr-55>
- Prestoza, M. J. (2024). Assessing remote learning's feasibility: A comprehensive analysis of Philippine public-school teachers' use of learning management systems and blended learning approaches. *Journal of Research, Policy & Practice of Teachers & Teacher Education*, 14(1), 21–27. <https://doi.org/10.37134/jrppte.vol14.1.3.2024>
- Valle, L. (2024). Reimagining mathematics education: Identifying training needs and challenges among public elementary school teacher's post-pandemic. *International Journal of Education and Practice*, 12(3), 527–539. <https://doi.org/10.18488/61.v12i3.3723>
- Wong, J., & Ramo, C. M. (2025). Unraveling the link: math anxiety's role in the relationship between math self-efficacy and math achievement. *Diversitas Journal*, 10(1). <https://doi.org/10.48017/dj.v10i1.2994>

AI DISCLOSURE STATEMENT

Artificial intelligence (AI)-assisted writing tools were used solely to assist with grammar checking,

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