

Exploring teacher ingenuity in addressing low emerging performance in mathematics: Prospects and challenges

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ABSTRACT

Low emerging performance in early-grade mathematics presents a significant challenge to the development of foundational numeracy skills among learners. This qualitative study explored the ingenuity of Grade 1 teachers in addressing low emerging performance in mathematics, focusing on the prospects and challenges encountered in translating assessment results into effective instructional interventions. Anchored on Bandura's Self-Efficacy Theory and Constructivist Learning Theory of Piaget and Vygotsky, the study examined how teachers' creativity, adaptability, and resourcefulness shaped early mathematics instruction. Using a phenomenological research design, the study involved eight Grade 1 teachers from selected public elementary schools in the Las Nieves District, Division of Agusan del Norte. Data were gathered through in-depth interviews and were analyzed using Braun and Clarke's thematic analysis. Findings revealed that teacher ingenuity was manifested through multisensory numeracy instruction, hands-on and manipulative-based learning, differentiated and remedial instruction, play-based strategies, contextualized and integrated learning, and limited technology-supported instruction. Teachers creatively utilized locally available and improvised materials, games, songs, movement-based activities, peer assistance, and real-life contexts to address learners' numeracy difficulties. These strategies resulted in increased learner engagement, positive emotional responses toward mathematics, improved confidence, and enhanced foundational numeracy skills, particularly in number recognition and counting. However, teachers also encountered challenges such as limited instructional resources, time constraints, large class sizes, insufficient professional development opportunities, and the effects of learning loss. The study concludes that teacher ingenuity plays a crucial mediating role in improving early mathematics learning outcomes and proposes a strategic plan to strengthen instructional support and sustain innovative, learner-centered practices.

Keywords: Early numeracy, Grade 1 Mathematics, low emerging performance, qualitative study, teacher ingenuity

Date Submitted: January 16, 2026
Date Accepted: January 29, 2026
Date Published: February 16, 2026

DOI: <http://doi.org/10.69651/PIJHSS0501810>

Recommended citation:

Ocio, C. C. (2026). Exploring teacher ingenuity in addressing low emerging performance in mathematics: Prospects and challenges. Pantao (The International Journal of the Humanities and Social Sciences) 5 (1), 9033-9048. <http://doi.org/10.69651/PIJHSS0501810>

INTRODUCTION

Mathematics is a foundational subject that shapes students' cognitive development, especially in the early years of education. In Grade 1, learners begin to acquire essential numerical skills, problem-solving strategies, and logical reasoning abilities that serve as cornerstones for future academic success. Effective mathematics instruction requires teachers to use innovative and resourceful learning strategies. Teacher ingenuity, defined as a teacher's resourcefulness, creativity, and use of adaptive strategies, plays a critical role in fostering learning. Through ingenuity, teachers design personalized, engaging, and context-sensitive experiences, often with minimal resources and limited time. Currently, the Philippine education system uses mathematics assessments to evaluate learners' skills through a pre-test administered during the first week of the school year and a post-test after the third quarter to measure numeracy and problem-solving abilities. At Ibulan Elementary School, diagnostic tests in mathematics revealed that Grade 1 learners faced significant difficulties in numeracy, with 75% of learners classified as low emerging and 25% at the developing level. This finding prompted the researcher to conduct a study focusing on strategies to address the challenges faced by low-emerging learners in mathematics. Within the Agusan del Norte Division, no documented evaluation links Rapid Mathematics Assessment (RMA) results to teachers' instructional ingenuity. This study specifically explored how teachers' instructional ingenuity can be used to improve Grade 1 learners' RMA results from low emerging to developing, and eventually to at-grade level.

This study was anchored on two theoretical frameworks: Bandura's Self-Efficacy Theory (1977, 1997) and Social Learning Theory (1977). Bandura's Self-Efficacy Theory highlights an individual's belief in their ability to organize and execute actions for managing situations. In teaching, self-efficacy refers to the teacher's confidence in planning, organizing, and implementing strategies that support student learning. High self-efficacy leads teachers to take on challenges, persist through difficulties, and recover from setbacks. This theory explains how teachers' confidence drives ingenuity, as creative and context-sensitive strategies enhance Grade 1 learners' mathematics performance. Bandura's Social Learning Theory posits that learning occurs through observation, imitation, and social interaction. Learners acquire knowledge not only through direct experience but also by observing the behaviors and strategies modeled by others, particularly teachers. In the context of Grade 1 mathematics, low-performing learners can benefit from teachers' innovative and adaptive approaches, as observing problem-solving strategies, enthusiasm, and persistence encourages imitation and engagement. Vicarious reinforcement, such as praise for correct responses or modeling effective strategies, further motivates learners to adopt similar behaviors. Teacher ingenuity, manifested through creative instructional methods, scaffolding, and real-time feedback, facilitates observational learning, helping students understand mathematical concepts and improve performance.

The conceptual framework of this study was guided by the Input-Process-Output (IPO) model and anchored on the premise that teacher ingenuity is a critical factor in addressing the low emerging performance of Grade 1 learners in mathematics, serving as a driver for innovative, adaptive, and resourceful teaching practices. Teacher ingenuity includes classroom practices, positive outcomes, and creative teaching strategies through differentiated instruction, contextualized learning activities, improvisation of instructional materials, learner-centered strategies, and the use of manipulatives, games, real-life examples, and formative assessments tailored to learners' developmental levels, prior knowledge, and learning pace, consistent with Constructivist Theory (Piaget, 1952; Vygotsky, 1978). The relationship between teacher ingenuity and learner performance is further shaped by the prospects and challenges teachers

encounter, including professional development, administrative support, collaboration, class size, time constraints, and parental involvement.

The resourcefulness and creativity inherent in teacher ingenuity serve as a driving force for educational continuity and learner engagement, particularly during times of crisis. Catoto and Dilangalen (2023) explored how teachers in geographically isolated schools devised innovative instructional approaches during the COVID-19 pandemic, revealing that teachers utilized parental involvement, improvised learning modules, community learning hubs, and social media platforms to ensure continuous learning despite connectivity and logistical barriers. Similarly, research in geographically isolated and disadvantaged areas in the Philippines has documented the resilience and creativity of teachers who employ contextualized strategies, including locally available materials, indigenous games, and community-based learning, to sustain students' participation and comprehension. These findings demonstrate that Filipino teachers' ingenuity is not merely an individual skill but a collective response to systemic educational inequities.

Teacher ingenuity, as conceptualized through Amabile's Componential Theory of Creativity, encompasses domain-relevant knowledge, creativity-relevant skills, and intrinsic motivation. Recent studies affirm that fostering teacher creativity is pivotal in enhancing educational outcomes. Wang et al. (2025) explored how teacher workload and time allocation impact the prioritization of creative pedagogies in Chinese secondary schools, highlighting the challenges teachers face in balancing administrative duties with innovative teaching practices. Similarly, Yuhertiana (2024) examined the creative performance of lecturers in post-pandemic Indonesia, noting that external pressures can both hinder and stimulate creative teaching approaches. Low emerging performance in mathematics encompasses teachers' engagement in stimulating creative approaches and strategies in teaching. Klimenko (2023) found that cognitive mediation of divergent thinking and flexible, open evaluation strategies were associated with higher creativity scores among students, suggesting that teachers' creative assessment strategies can significantly influence student performance in mathematics. However, the underutilization of diagnostic assessments remains a challenge. Espinosa et al. (2021) noted that diagnostic assessments are often underutilized in public school systems, especially in Southeast Asia, due to a lack of training and misalignment between tools and classroom realities.

Teacher ingenuity remains the central driver of effective instructional improvement in mathematics classrooms. Chianson-Akaa, Achor, and Rott (2024) emphasized that creativity in instructional approaches, particularly through technology-creativity fostering behaviors, enhances numeracy teaching outcomes by enabling teachers to design engaging and adaptive tasks. Similarly, Dogbe et al. (2024) found that teacher ingenuity mediates between institutional communication and learner achievement, suggesting that creative professional practices can amplify systemic supports. In designing contextualized mathematical problems, Zulkardi et al. (2020) showed that teachers' innovative use of real-life contexts improves number sense among early graders. Moreover, Kron et al. (2021) illustrated that teachers' choices in diagnostic interview tasks reflect their ingenuity, as they not only uncover misconceptions but also refine professional knowledge. In technology-supported settings, Arpornsuwan et al. (2022) demonstrated that AI-enabled personalization strengthens learning outcomes only when teachers actively curate and creatively modify instructional pathways.

Fast feedback loops and adaptive teaching have demonstrated substantial influence on Grade 1 mathematics outcomes. Dierkx et al. (2025) traced early numeracy development into Grade 1, showing that learners' growth trajectories depend significantly on timely teacher interventions following assessments. Furner (2024) highlighted how concrete-representational-abstract teaching sequences, coupled with diagnostic checks, reduced math anxiety and

improved problem-solving among primary learners. At the country level, Igarashi et al. (2023) noted alarming declines in foundational skills in the Philippines, highlighting the urgency of early diagnostics. Bernardo et al. (2022) reinforced this through PISA analyses, which linked low-performing Filipino learners to insufficient early-grade interventions. The MATATAG Curriculum (DepEd Order No. 10, s. 2024) explicitly strengthens foundational mathematics instruction and mandates formative diagnostics, institutionalizing mathematics assessment practices in Grade 1 classrooms.

Digital game-based learning has emerged as a highly effective approach to scaffold mathematics learning in primary classrooms, significantly influencing students' perceptions of the subject. Teacher scaffolding in this context can be implemented through whole-class and one-to-one strategies, each playing distinct yet complementary roles (Siklander, 2020). Active and experiential learning in mathematics has a profound, transformative impact on student outcomes, fostering not only conceptual understanding but also essential problem-solving skills. Policymakers and educators are strongly encouraged to integrate these strategies into the curriculum, as they enhance overall educational effectiveness and cultivate higher-order thinking skills (Doz, 2024). Empirical evidence further demonstrates that such active engagement not only strengthens students' motivation and enthusiasm for learning but also significantly improves achievement and retention (Pandey et al., 2024). Schools experienced learning loss due to the abrupt transition to virtual instruction during the COVID-19 pandemic, particularly in mathematics (Weever, 2020). Teachers face challenges in developing instructional materials, managing classrooms, and accessing resources, which are exacerbated by systemic issues such as inadequate administrative support and resource limitations, while burnout and stress levels among teachers are notably high (Escasinas, 2025). Addressing these challenges requires systemic reform, including targeted professional development, improved resource allocation, and comprehensive wellness initiatives.

Statement of the problem

This study explored the ingenuity of Grade 1 teachers in addressing low emerging mathematics performance, as well as the prospects and challenges they encountered in doing so. Specifically, it aimed to answer the following questions:

1. How does teachers' ingenuity in the classroom address low emerging performance in mathematics of Grade 1 learners be manifested in terms of: (a) Lesson Preparation; (b) Lesson Delivery; (c) Selection and Utilization of Instructional Materials; and (d) Assessment?
2. What prospects can be drawn from the teacher's ingenuity in addressing low emerging performance in mathematics?
3. What are the challenges encountered by the teachers in addressing low emerging performance in mathematics?
4. Based on the study's findings, what strategic plan for addressing low emerging performance may be proposed?

METHODOLOGY

This study employed a qualitative research approach to explore teacher ingenuity in addressing low emerging performance in Mathematics among Grade 1 learners, focusing on the prospects and challenges encountered in the implementation of innovative instructional strategies. The methodological framework was designed to provide an in depth understanding of teachers' lived experiences, classroom practices, and professional insights in responding to learners who demonstrate difficulties in foundational numeracy. The study followed a

phenomenological research design, which was selected because it allows the researcher to capture and interpret the meanings individuals attach to their lived experiences. In the context of this investigation, the phenomenological approach enabled the researcher to examine how Grade 1 teachers experience, interpret, and respond to low emerging performance in Mathematics among their learners. Through this design, the study sought to uncover the strategies, challenges, and opportunities encountered by teachers as they apply creative instructional approaches to enhance learners' mathematical competencies. The phenomenological method was therefore appropriate because it provided a structured yet flexible framework for exploring the depth and complexity of teachers' experiences while maintaining a strong emphasis on participants' perspectives and narratives.

The research was conducted in public elementary schools located in Cluster 3 of the Las Nieves District under the Division of Agusan del Norte. The geographical location of the study area was approximately 60 kilometers from the center of Butuan City. The schools included in Cluster 3 were accessible through land transportation, and travel from Butuan City proper to the district required approximately two hours by bus or jeepney. The selection of this locale provided a relevant setting for examining the experiences of teachers working in public elementary schools where learners often demonstrate varied levels of readiness in Mathematics. The contextual characteristics of the district, including its distance from the urban center and the educational environment of its public schools, allowed the study to capture authentic classroom realities and instructional practices related to early grade mathematics instruction.

The participants of the study consisted of eight (8) Grade 1 Mathematics teachers drawn from the public elementary schools within Cluster 3 of the Las Nieves District. The participants were selected through complete enumeration, ensuring that all Grade 1 teachers responsible for mathematics instruction in the cluster were included in the study. These teachers were directly responsible for conducting mathematics assessments and implementing instructional interventions based on the results of learners' performance. The schools represented in the participant group included Balungagan Elementary School with one (1) participant, Ibuan Elementary School with one (1) participant, Fatima Elementary School with one (1) participant, Durian Elementary School with one (1) participant, Casiklan Central Elementary School with one (1) participant, New Canaan Elementary School with one (1) participant, Lawan Lawan Elementary School with one (1) participant, and Bokbokon Elementary School with one (1) participant. The total number of participants in the study was therefore eight (8) Grade 1 teachers. These participants were selected because they were actively involved in teaching mathematics to Grade 1 learners and were directly responsible for assessing learners' mathematical performance and implementing strategies to address low emerging results.

The study utilized complete enumeration as the sampling design in order to include participants who possessed the most relevant experience and knowledge regarding low emerging performance in Grade 1 Mathematics. Complete enumeration ensured that every Grade 1 teacher in the selected cluster of schools was represented in the study. In addition to being part of the Grade 1 teaching staff, participants were expected to have at least three (3) years of experience in primary education teaching and to be actively involved in conducting diagnostic or rapid mathematics assessments. These criteria ensured that the participants possessed sufficient professional experience and familiarity with the assessment and intervention processes associated with addressing learners' difficulties in Mathematics.

Data for the study were gathered using a guided semi structured interview schedule developed specifically to explore teachers' experiences, strategies, challenges, and perspectives in addressing results related to learners' performance in Mathematics. The interview guide was constructed based on the statement of the problem and was designed to

encourage participants to share detailed narratives about their instructional practices and professional insights. The guide included several core questions accompanied by follow up prompts intended to encourage deeper elaboration of participants' responses. In the first main question, three (3) follow up questions were included to explore specific classroom practices and strategies. In the second main question, two (2) follow up questions were used to clarify teachers' perspectives and experiences. The third problem included three (3) follow up questions that allowed participants to elaborate freely on their ingenuity in teaching Mathematics. The complete interview guide questions were provided in Appendix C and served as the primary instrument for collecting qualitative data during the interview sessions.

The reliability and validity of the research instrument were carefully established to ensure the consistency, credibility, and trustworthiness of the data gathered during the study. Because the study employed a qualitative research design, reliability was addressed through methodological procedures that strengthened the dependability of the interview guide and the data collection process. One important procedure was expert validation. The interview guide questions were reviewed by experts in Mathematics education and qualitative research methodology. These experts evaluated the wording, clarity, alignment, and relevance of each question in relation to the objectives of the study. Their feedback contributed to refining the structure and content of the interview guide, ensuring that the questions accurately captured teachers' ingenuity, challenges, and prospects in addressing low emerging performance in Mathematics. Revisions were made based on their recommendations in order to improve clarity and ensure that the questions effectively elicited meaningful responses from participants.

A tryout procedure was also conducted to further strengthen the reliability of the research instrument. The interview guide was pilot tested with one (1) Grade 1 teacher who was not included among the actual participants of the study. The tryout process allowed the researcher to evaluate several aspects of the interview guide, including the clarity of the questions, the appropriateness of the language used, the logical sequence of the questions, and the estimated time required to complete the interview. Feedback obtained during the pilot testing stage provided insights into how participants interpreted the questions and whether the interview flow supported natural and meaningful responses. Based on the results of the tryout, minor revisions were introduced to enhance the clarity, coherence, and sequencing of the interview guide questions.

Prior to the conduct of the study, the researcher followed formal procedures for securing authorization and approval from relevant educational authorities. Permission to conduct the research was requested from the Schools Division Superintendent of the Division of Agusan del Norte. Additional approval was obtained from the Public Schools District Supervisor and from the school heads of the participating elementary schools within Cluster 3 of the Las Nieves District. These permissions ensured that the research activities were conducted in accordance with institutional guidelines and educational policies.

Data were collected through in depth face to face interviews with the teacher participants. Each interview session was conducted individually to allow participants to express their experiences and perspectives freely without external influence. With the consent of the participants, all interviews were audio recorded to ensure accurate documentation of responses. The recorded interviews were subsequently transcribed verbatim to preserve the original statements and expressions of the participants for analysis. In addition to interview transcripts, supplementary data were gathered through field notes, classroom observations, and document reviews related to low emerging performance in Mathematics and the lesson plans prepared by the teachers. These additional sources of information provided contextual insights that supported the interpretation of the interview data.

The data collection process adhered strictly to ethical standards governing educational research. Participants were fully informed about the objectives of the study and the nature of

their participation before the interviews were conducted. Informed consent was obtained from each participant, ensuring that participation in the study was voluntary. Participants were assured that their responses would remain confidential and that their identities would not be disclosed in the presentation of the research findings. These ethical safeguards ensured that the rights, dignity, and privacy of the participants were protected throughout the research process.

The qualitative data gathered from interviews, observations, and document reviews were analyzed using thematic analysis guided by the six-phase framework proposed by Braun and Clarke (2006). The analysis began with familiarization with the data, during which the researcher repeatedly read the interview transcripts and field notes to gain a comprehensive understanding of the content. This was followed by the generation of initial codes, where meaningful segments of data were identified and labeled according to their relevance to the research questions. The third phase involved searching for themes by organizing related codes into broader categories that represented recurring patterns in the participants' responses. The fourth phase consisted of reviewing themes to ensure that they accurately reflected the coded data and the overall dataset. During the fifth phase, the themes were clearly defined and named to capture the central ideas represented in each category. The final phase involved producing the research report, in which the themes were presented and interpreted in relation to the objectives of the study.

Codes and themes were developed inductively, meaning that they emerged directly from the participants' responses rather than being predetermined by the researcher. This inductive approach ensured that the analysis remained grounded in the lived experiences and authentic perspectives of the teachers. To strengthen the trustworthiness of the findings, triangulation was employed by comparing interview data with classroom documents and field notes. This process allowed the researcher to verify the consistency of information across multiple sources of data. Member checking was also conducted as an additional strategy to enhance credibility. Participants were given the opportunity to review the interpretations derived from their responses in order to confirm the accuracy of the researcher's understanding. Through these procedures, the study ensured that the analysis of teachers' ingenuity in addressing low emerging performance in Mathematics among Grade 1 learners remained credible, dependable, and firmly grounded in the data collected from the participants.

RESULTS AND DISCUSSION

This chapter presents the results and discussion of the findings based on qualitative data gathered from eight (8) Grade 1 teacher participants who were purposively selected for their direct experience in handling learners with low emerging performance in Mathematics. The study employed a qualitative research design using in-depth interviews as the primary data collection method. The transcribed responses of the participants were systematically coded and analyzed using thematic analysis to identify recurring patterns, categories, and themes related to teachers' ingenuity in addressing learners' low mathematical performance. The discussion that follows is grounded strictly in the data gathered from the participants and interpreted in direct relation to the objectives of the study. The analysis focuses on the classroom practices, instructional strategies, assessment approaches, innovations, learner reactions, sustainability prospects, and challenges encountered by teachers in supporting foundational numeracy development among Grade 1 learners.

The findings reveal that teachers' ingenuity in addressing the low emerging performance of Grade 1 learners in Mathematics is manifested primarily through intentional lesson preparation and structured lesson delivery. The thematic analysis indicates two major patterns within instructional planning, namely strategic and differentiated lesson preparation

and scaffolded and responsive lesson delivery. Teachers consistently reported simplifying mathematical concepts and breaking lessons into smaller and manageable instructional steps to accommodate learners' limited numeracy readiness. Participants P1, P3, P5, and P7 emphasized the practice of breaking down mathematical concepts into smaller components through structured lesson planning, while participants P2, P4, and P6 highlighted the importance of aligning lesson objectives with the Most Essential Learning Competencies (MELCs) and assessment results. These practices demonstrate curriculum-based planning that directly targets areas where learners demonstrate low performance. One teacher articulated this approach by explaining that "I divide the lesson into small steps because they cannot understand it all at once" (P1), while another participant stated that "I adjust my objectives depending on what the learners can already do" (P3). These responses illustrate how teachers intentionally modify instructional goals based on learners' current capabilities, thereby reducing cognitive overload and increasing the likelihood of mastery.

Contextualization also emerged as a key element in lesson preparation. Teachers integrate real-life examples and familiar classroom objects to make mathematical concepts more meaningful and accessible to learners. Participants explained that examples such as fruits, coins, and classroom objects help learners relate abstract numerical concepts to their daily experiences. One teacher stated, "I use examples like fruits, coins, or things inside the classroom so they can relate" (P4), while another participant explained that "when the problem is connected to their daily life, they understand it better" (P2). These instructional practices reflect a learner-centered approach in which mathematical ideas are embedded in learners' lived experiences, enabling more meaningful knowledge construction.

In terms of lesson delivery, the findings show that teachers rely heavily on multisensory and scaffolded instructional strategies. Participants P1, P2, P6, and P8 described the use of visual aids and manipulatives such as flashcards, counters, and number lines to support conceptual understanding. Teachers also emphasized the importance of guiding learners through step-by-step modeling and collaborative practice before allowing independent work. One participant explained, "I demonstrate first, then we answer together, before they try on their own" (P7). Teachers further highlighted the use of continuous formative assessment through frequent questioning and immediate feedback. Participant P2 reported, "I ask questions every time to check if they are following," demonstrating how teachers monitor learner understanding throughout the lesson. Additionally, participants P4, P6, and P8 described the use of mathematics games and interactive activities to increase learner engagement and participation. These practices collectively illustrate scaffolded and responsive lesson delivery in which instruction is continuously adjusted based on learners' immediate performance and comprehension.

The results indicate that teachers' strategies in lesson preparation and delivery align closely with constructivist-oriented and experiential numeracy models that emphasize activity-based engagement as a foundation for early number sense. Studies by Furner (2024), Doz (2024), and Pandey et al. (2024) affirm that concrete and interactive learning experiences strengthen mathematical comprehension among early-grade learners. Similarly, Klimenko (2023) noted that the use of visual and physical representations enhances cognitive mediation and flexible thinking in mathematics learning. The teachers' practices observed in this study therefore reflect developmentally appropriate pedagogical approaches that support the transition from concrete experiences to abstract mathematical reasoning.

Another dimension of teachers' ingenuity emerged in the selection and utilization of instructional materials and assessment strategies. Thematic analysis revealed two dominant instructional patterns related to material utilization and two additional patterns related to assessment practices. Teachers demonstrated resourceful and contextualized instruction by utilizing improvised materials such as bottle caps, sticks, and recycled objects. Participants P1,

P3, and P5 emphasized the intentional use of these materials to make numerical concepts tangible and understandable for learners. One teacher explained, “Ginagamit ko po ang bottle caps at patpat para mas makita nila ang actual na pagbibilang” (P1). Another participant emphasized the importance of manipulatives by stating, “Mas naiintindihan nila kapag may hawak silang counters kaysa puro sulat lang sa papel” (P4). These responses demonstrate how teachers creatively transform locally available materials into effective learning tools for developing numeracy skills.

Teachers also reported intentionally selecting visual and interactive instructional materials such as number charts, games, and manipulatives to enhance motivation and comprehension. Participant P3 explained that “kapag ginagawa naming parang laro ang addition, mas active sila at gustong sumagot,” while participant P2 noted that worksheets are modified and simplified before gradually increasing difficulty levels. These strategies reflect engaging and differentiated learning support in which materials and tasks are adapted to match learners’ readiness levels.

Assessment practices further demonstrate teachers’ ingenuity in supporting learners with low emerging performance. Participants P1, P4, and P6 reported using oral questioning, counting drills, and classroom observation as continuous formative monitoring techniques. One teacher described the use of individualized counting exercises by explaining, “Pinapa-count ko sila nang paisa-isa para makita ko kung saan sila nahihirapan” (P6). Teachers also reported implementing performance tasks, short quizzes, and one-on-one remediation sessions as targeted and responsive interventions. Participant P7 stated, “Kapag may batang hindi makasabay, kinausap ko siya one-on-one at binibigyan ng mas madaling activity.” These practices demonstrate how assessment results guide instructional decisions and targeted remediation efforts. The findings confirm that continuous formative monitoring allows teachers to immediately identify misconceptions and adjust instruction accordingly.

The use of contextualized materials and ongoing assessment practices reflects teachers’ adaptive expertise in responding to learners’ mathematical difficulties. Furner (2024) emphasized that concrete–representational–abstract instructional sequences significantly improve conceptual understanding and reduce mathematics anxiety among primary learners. Similarly, Doz (2024) and Pandey et al. (2024) argued that experiential learning enhances learner motivation and retention. The instructional practices reported by teachers in this study therefore align with established pedagogical models that emphasize concrete engagement and diagnostic feedback as foundations for early numeracy development.

The thematic analysis also revealed four major innovations and creative strategies employed by teachers in addressing low emerging performance in mathematics. The first emerging theme is hands-on and manipulative-based learning. Participants P2, P3, P4, and P8 emphasized the use of concrete materials such as sticks, bottle caps, and other real objects to support learners’ understanding of numbers and simple operations. One participant explained that learners understand numbers more easily when they “use sticks or bottle caps... and real objects to support or to let the learners understand the numbers and simple operations like addition” (P2). Another participant stated that “using counters, sticks, or bottle caps” helps make abstract mathematical concepts concrete for young learners (P3). These strategies allow learners to visualize mathematical relationships and actively manipulate materials, which aligns with constructivist principles that emphasize learning through direct interaction with objects.

The second theme is differentiated and remedial instruction. Participants P1 and P6 highlighted the practice of grouping learners according to ability levels and providing simplified remedial activities. One teacher explained, “I use differentiated instruction by grouping learners according to their ability levels and giving additional support to low-

emerging learners” (P1). Another participant emphasized the importance of tailoring activities to learners’ individual strengths and weaknesses (P6). These practices reflect teachers’ ability to translate diagnostic assessment results into targeted learning interventions that address specific learner needs.

The third theme identified through thematic analysis is play-based and experiential learning. Teachers described the use of board games, counting races, number bingo, and other playful activities to increase learner engagement and participation. Participant P5 explained that learners enjoy board games because “*ganahan gina kaya sila mag-participate, kay enjoy gina sila... kung kuhaan sa dice nga five, mag-ihap na sila.*” Similarly, participant P4 described using number bingo and counting races to make mathematics lessons enjoyable and engaging. These strategies transform learning into an interactive and motivating experience, reducing anxiety and encouraging persistence among struggling learners.

The fourth theme is contextualized and integrated learning with technology support. Teachers reported embedding mathematics concepts in stories, real-life situations, and cross-curricular activities. Participant P7 explained that “short stories related to addition” help learners understand mathematical operations more clearly. Some teachers also explored the use of digital tools and online mathematics games to enhance engagement and personalize instruction. Participant P6 described using technology to extend learning opportunities and provide additional practice activities for learners.

The findings regarding teaching innovations align with Amabile’s Componential Theory of Creativity, which emphasizes the role of domain-relevant knowledge, creativity-relevant skills, and intrinsic motivation in effective teaching. Studies by Wang et al. (2025) and Yuhertiana (2024) confirm that teacher creativity significantly enhances learner engagement and academic outcomes. Similarly, research by Chianson-Akaa et al. (2024) and Martín-Cudero et al. (2024) highlights the importance of contextualized and innovative teaching practices in improving mathematics instruction in resource-constrained environments.

Teachers’ ingenuity was also evident in the positive reactions and outcomes observed among learners. Thematic analysis identified two major patterns in learner responses. The first theme is enhanced learner engagement through interactive activities. Teachers consistently reported increased participation, excitement, and attentiveness when learners were exposed to interactive strategies such as games, manipulatives, and hands-on tasks. Participant P2 explained that “they are excited when they match the pictures or even when they count the numbers... they really participate during the task,” while participant P8 observed that mathematics games such as number matching and board games significantly increase participation. Participant P6 further described how learners become excited when using manipulatives for counting activities. These observations demonstrate that interactive learning experiences reduce participation barriers and encourage active involvement in mathematics lessons.

The second theme identified is positive emotional response to multisensory learning. Teachers reported that strategies involving movement, songs, colorful materials, and physical activities generate enjoyment and confidence among learners. Participant P1 explained that “in learning through games and songs, the learners show enthusiasm and enjoyment... even shy learners become more confident.” Participant P4 described how learners become interested and excited when physical activities such as jumping are incorporated into lessons. Similarly, participant P5 observed that colorful learning materials stimulate curiosity and encourage participation. These findings indicate that multisensory instructional approaches foster positive emotional engagement and reduce mathematics anxiety among learners.

The observed learner responses align with existing research on experiential and active learning. Furner (2024) emphasized that multisensory instructional strategies reduce mathematics anxiety and improve learners’ attitudes toward the subject. Pandey et al. (2024)

also found that experiential learning enhances motivation, persistence, and conceptual understanding. The increased confidence and participation observed in this study therefore demonstrate how creative instructional strategies create supportive learning environments that encourage learners to engage actively with mathematical concepts.

Beyond immediate instructional practices, the study also explored the sustainability of teaching strategies used to address low emerging performance in mathematics. Thematic analysis identified three major themes related to sustainability, namely continuous teacher development, adaptive learner-centered instruction, and technology and resource integration. Participants P1, P2, P3, P4, P5, P6, and P8 emphasized the importance of professional development activities such as regular teacher trainings, In-Service Training (INSET), Learning Action Cell (LAC) sessions, reflection activities, and innovation sharing. Teachers indicated that ongoing professional development enables them to refine instructional strategies and remain responsive to learners' evolving needs.

Participants P2, P3, P4, P7, and P8 highlighted the role of adaptive learner-centered instruction in sustaining effective mathematics teaching. Teachers reported using differentiated instruction, routine-based activities, repetition, and continuous learner monitoring to maintain consistent progress among learners. The ability to adjust instruction based on learner readiness ensures that teaching strategies remain effective and relevant.

Technology and resource integration also emerged as a sustainability factor. Participants P2, P4, P5, P6, and P8 described using digital tools, interactive games, manipulatives, and mathematics resource corners to enrich learning environments. Studies by Arpornsuwan et al. (2022) and Siklander (2020) confirm that technology-supported learning enhances academic outcomes when teachers use digital tools to scaffold problem-solving and conceptual understanding.

Despite these innovations, the findings also reveal several challenges encountered by teachers in addressing low emerging performance in mathematics. Thematic analysis identified four primary difficulties, namely time and curriculum pressure, diverse and varied learning needs, technology and infrastructure challenges, and insufficient teaching and learning resources. Teachers reported that limited instructional time restricts opportunities for hands-on and remedial activities. Participant P2 explained that "pila raka minutes na kayong prepare, and then di na kaya mid kayong mo'og hands-on nga activities," while participant P3 noted that strict adherence to the class program makes it difficult to allocate sufficient time for learners who require additional support.

Teachers also reported challenges in managing classrooms with diverse learner abilities. Participant P4 explained that varied learning levels require extensive differentiation, while participant P8 emphasized the difficulty of managing diverse learner needs within a single classroom. Resource limitations further compound these challenges. Participants reported shortages of manipulatives, visual aids, and other learning materials necessary for effective mathematics instruction. Participant P3 explained that "kung wala pod mi gamit, dili pod mi makakandakana," emphasizing the difficulty of implementing hands-on strategies without adequate materials.

Limited access to technology and unstable infrastructure also restrict the integration of digital learning tools. Participant P7 described unreliable internet connectivity and electricity as barriers to technology use, while participant P5 reported limited access to digital resources. These findings indicate that teachers' instructional ingenuity often operates within structural constraints that limit the scalability of innovative practices.

Parental involvement and home environment factors also influence teachers' efforts to support learners with low emerging performance. Teachers reported that learners demonstrate faster improvement when parents provide guidance and reinforcement at home. Participants

P1, P2, and P6 emphasized that learners progress more quickly when parents actively monitor homework and practice activities. Conversely, limited parental involvement slows learner progress and increases teachers' instructional workload. Teachers therefore highlighted the importance of school-home collaboration through PTA meetings, group chats, and regular communication to support learners' academic development.

Overall, the findings of this study demonstrate that teachers' ingenuity plays a critical role in addressing low emerging performance in Grade 1 mathematics. Through differentiated lesson planning, contextualized instructional materials, interactive teaching strategies, and continuous formative assessment, teachers create learning environments that support the development of foundational numeracy skills. The positive learner responses observed in the study further indicate that innovative and multisensory strategies enhance engagement, confidence, and motivation among learners.

In synthesis, the results demonstrate that teachers' creative instructional practices significantly contribute to improving the mathematical engagement and foundational skills of Grade 1 learners with low emerging performance. The integration of differentiated instruction, contextualized materials, experiential learning strategies, and continuous assessment enables teachers to address diverse learner needs effectively. However, sustaining these practices requires continuous professional development, adequate instructional resources, supportive institutional systems, and active collaboration between schools and families. These findings contribute to the growing body of research emphasizing the importance of teacher ingenuity and adaptive pedagogy in strengthening early numeracy instruction. The insights generated from this analysis provide a foundation for the proposed strategic plan aimed at enhancing teacher capacity, improving instructional support systems, and strengthening collaborative partnerships to address persistent challenges in early-grade mathematics education.

CONCLUSION

This study examined the ingenuity of Grade 1 teachers in addressing the low emerging performance of learners in Mathematics by exploring their classroom practices, instructional strategies, use of materials, learners' responses during assessment, sustainability prospects, institutional support, and the challenges encountered in implementing innovative teaching approaches. The investigation focused on how teachers design and implement creative instructional strategies, how learners respond to these practices, and what factors influence the sustainability of such strategies in improving early numeracy performance. The study employed a qualitative research design using a phenomenological approach to capture the lived experiences of teachers in addressing low emerging performance in Mathematics. Eight (8) Grade 1 teachers participated in the study, and data were collected through in depth interviews. The collected narratives were transcribed and analyzed using thematic analysis in order to identify recurring patterns and themes that describe teachers' experiences, strategies, and perspectives regarding the development of learners' mathematical competencies.

The findings revealed that teacher ingenuity plays a significant role in improving the mathematical performance of Grade 1 learners who demonstrate low emerging numeracy skills. Teachers demonstrated creativity and adaptability in their classroom practices through the use of multisensory numeracy instruction, resourceful teaching practices, learner centered numeracy activities, and real-life numeracy contextualization. These practices included the integration of visual, auditory, and kinesthetic strategies, the use of improvised low-cost instructional materials, and the implementation of collaborative and game-based learning activities that enhance learners' engagement and comprehension of mathematical concepts. By employing these strategies, teachers were able to create interactive and meaningful learning environments that supported the development of foundational numeracy skills. The findings

further indicated that innovative teaching strategies and creative instructional practices were manifested through hands on and manipulative based learning, differentiated and remedial instruction, play based and experiential learning, contextualized and integrated learning, and technology supported strategies. These approaches enabled teachers to address diverse learner needs and to provide multiple opportunities for learners to understand mathematical concepts through concrete and contextualized learning experiences.

The results also demonstrated that learners responded positively to these creative instructional approaches. Learners exhibited increased engagement, positive emotional responses, and noticeable improvement in numeracy skills. These improvements were reflected in learners' enhanced ability to recognize numbers, perform counting activities, retain mathematical concepts, and participate actively in classroom tasks. The increased motivation and confidence observed among learners indicate that innovative teaching practices contribute not only to cognitive development but also to positive learner attitudes toward Mathematics. However, despite the effectiveness of these instructional strategies, the study also revealed several challenges that teachers encounter in implementing innovative approaches. These challenges included time constraints associated with curriculum demands, the presence of diverse learning needs within the classroom, limited availability of instructional materials, and infrastructural limitations that restrict the use of technology and other learning resources. These factors create additional pressures for teachers who are already working to address learning gaps among early grade learners

The findings further highlighted that the sustainability of innovative instructional practices depends on multiple interconnected factors. Continuous professional development emerged as an important element in sustaining effective teaching practices. Activities such as In Service Training, Learning Action Cell sessions, mentoring programs, reflective teaching practices, and the sharing of best practices strengthen teachers' pedagogical knowledge and enhance their creative capacities. These professional development opportunities enable teachers to refine instructional approaches, align assessment practices with classroom realities, and maintain effective strategies for addressing low emerging mathematics performance. In addition, adaptive and learner centered instruction was identified as a key factor in sustaining learning gains. Strategies such as differentiated instruction, routine based learning activities, repeated practice, formative assessment, and contextualized learning tasks allow teachers to monitor learner progress closely and provide timely interventions for learners who require additional support.

The integration of technology and instructional resources was also identified as an important component in strengthening mathematics instruction. The use of ICT tools, interactive games, instructional videos, manipulatives, and enriched classroom environments enhances learners' conceptual understanding and motivation. When these resources are used creatively and strategically, both digital tools and low-cost instructional materials contribute to meaningful learning experiences and sustained improvements in early mathematics outcomes. Nevertheless, the study also confirmed that the long-term sustainability of these strategies requires strong institutional and collaborative support. Challenges such as limited resources, heavy workload demands, and diverse learner needs continue to affect teachers' ability to fully implement innovative instructional approaches. Consequently, sustained improvement in Grade 1 mathematics performance requires coordinated efforts that involve institutional support, continuous professional development, parental involvement, and collaborative partnerships among teachers, school leaders, and other stakeholders.

Overall, the study confirms that addressing low emerging performance in Grade 1 Mathematics is a multidimensional process that requires the integration of teacher ingenuity, continuous professional development, adaptive instructional practices, and strategic use of

resources. Teachers' creative and resourceful approaches play a vital role in bridging learning gaps in foundational numeracy skills and in promoting active learner engagement and conceptual understanding. However, the effectiveness of these practices depends not only on teachers' individual initiatives but also on the broader support systems that sustain and strengthen instructional innovation.

In light of these findings, several implications for practice and improvement can be drawn. Teachers are encouraged to continue strengthening the use of hands on, multisensory, and play based strategies to sustain learner engagement and deepen conceptual understanding among low emerging learners. Regular reflection on classroom practices, systematic documentation of innovative strategies, and active participation in Learning Action Cell sessions can further enhance teachers' instructional approaches and promote collaborative professional learning. Teachers may also continue to refine differentiated and remedial instruction by using formative assessment data to guide targeted interventions that respond directly to learners' individual needs.

School leaders and administrators have an important role in supporting these initiatives by providing structured instructional support that allows teachers sufficient time for remediation, collaborative planning, and reflective practice. Schools may prioritize the provision of low-cost manipulatives, visual aids, and ICT tools to ensure equitable access to instructional resources. Establishing mathematics resource corners and strengthening peer mentoring systems among teachers may further support the continuous improvement of mathematics instruction. At the policy level, the Department of Education may continue strengthening professional development programs that focus on early numeracy instruction, differentiated teaching strategies, play based learning, and contextualized instructional approaches aligned with the MATATAG Curriculum. In addition, policies that address class size management and the possible deployment of learning support teachers may help provide additional assistance to learners who demonstrate low emerging performance.

Parental involvement and community collaboration also play a significant role in sustaining learners' progress in mathematics. Schools may strengthen parental engagement programs by providing parents with practical strategies that allow them to reinforce numeracy skills at home. Consistent school home communication mechanisms may also be maintained to ensure that learner progress is monitored holistically and that parents remain actively involved in supporting their children's learning. Finally, future researchers may consider extending this line of inquiry by exploring quantitative or mixed method approaches that measure the impact of teacher ingenuity on learner achievement. Further investigations may also examine the long-term effects of innovative instructional strategies on numeracy development beyond Grade 1 and conduct comparative studies across schools or districts in order to identify effective practices and scalable instructional models.

Through these combined efforts, the development and sustainability of innovative mathematics instruction can be strengthened, ultimately contributing to improved numeracy outcomes and more equitable learning opportunities for Grade 1 learners who experience difficulties in mathematics.

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