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Instructional Factors Affecting the Mathematics Performance and Problem-Solving Skills of Grade 7 and Grade 8 Students in Panan-awan Integrated School

Anthony P. Arcelo
Panan-awan Integrated School, Southern Leyte, Philippines

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Email of Corresponding Author: anthony.arcelo@deped.gov.ph

Abstract

This study examined the instructional factors affecting the mathematics performance and problem-solving skills of Grade 7 and Grade 8 students at Panan-awan Integrated School during School Year 2025–2026. The study was anchored on Constructivist Learning Theory by Piaget (1970), Vygotsky's Zone of Proximal Development (1978), and Sweller's Cognitive Load Theory (1988), emphasizing learner-centered instruction, guided learning, and effective management of cognitive processes. A quantitative descriptive-correlational research design was employed. The respondents consisted of 30 Grade 7 and Grade 8 students selected through convenience sampling. Data were gathered using a researcher-made and expert-validated structured questionnaire utilizing a four-point Likert scale, supplemented by observation and performance tests. Data were analyzed using frequency count, percentage, weighted mean, and Pearson Product-Moment Correlation Coefficient. Findings revealed that instructional factors—teaching strategies, instructional materials, classroom management, assessment and feedback, and learner engagement—were generally rated highly and were evident in mathematics instruction. Students demonstrated moderate mathematics performance in computational skills, conceptual understanding, and accuracy in solving mathematical tasks. In problem-solving, learners showed basic ability in understanding problems and carrying out solutions but demonstrated weaknesses in planning appropriate strategies, solving independently, and checking and interpreting results. Correlation analysis showed significant positive relationships between instructional factors and mathematics performance ($r = 0.62$) and between instructional factors and problem-solving skills ($r = 0.65$), indicating that stronger instructional practices were associated with better learning outcomes. The study recommends strengthening instructional approaches, expanding the use of instructional materials and technology, increasing opportunities for guided and independent problem-solving, and providing continued institutional support for teachers. The study aligns primarily with Sustainable Development Goal (SDG) 4 – Quality Education by promoting effective mathematics instruction, learner engagement, and improved educational outcomes. It also reflects support for SDG 9 through instructional innovation and technology-supported learning practices. The study contributes to sustainability by providing evidence that may guide instructional improvement, strengthen institutional decision-making, and support long-term educational development through enhanced mathematics competence and problem-solving skills among junior high school learners.

Keywords: Assessment and Feedback; Classroom Management; Instructional Factors; Instructional Materials; Learner Engagement; Mathematics Performance; Problem-Solving Skills; Teaching Strategies

1. Introduction

Mathematics education is essential in developing learners' analytical reasoning, logical thinking, computational competence, conceptual understanding, and problem-solving skills. However, Grade 7 and Grade 8 learners often experience difficulties in mathematics performance and problem-solving because of instructional and learner-related factors (Pizon & Ytoc, 2021). Thus, examining how teaching strategies, instructional materials, classroom management, assessment and feedback, and learner engagement affect mathematics outcomes is important in improving junior high school mathematics instruction (Li, Wijaya, & Chen, 2024). This study investigates the instructional factors affecting the mathematics performance and problem-solving skills of Grade 7 and Grade 8 students at Panan-awan Integrated School. It focuses on instructional factors in terms of teaching strategies, use of instructional materials, classroom management, assessment and feedback, and learner engagement. It also examines mathematics performance in terms of computational skills, conceptual understanding, and accuracy in solving mathematical tasks, and problem-solving skills in terms of understanding the problem, planning appropriate strategies, carrying out the solution, and checking and interpreting results.

1.1 Instructional Factors Affecting Mathematics Performance and Problem-Solving Skills of Grade 7 and Grade 8 Students

Instructional strategies are major factors that influence students' mathematics achievement. Diverse approaches such as direct instruction, inquiry-based learning, collaborative learning, and technology-integrated instruction have been found to improve mathematics performance (Dela Peña & Doronio, 2025). Inquiry-oriented and participatory strategies also improve students' attitudes toward mathematics, which may support better academic outcomes (Domu & Mangelep, 2024). Learner engagement is also essential in mathematics instruction. Engaging practices are positively related to mathematics performance and problem-solving ability (Ermac & Tan, 2023). Game-based learning improves Grade 7 students' achievement and classroom participation (Ibona-Mabini & Petancio, 2025), while collaborative and structured activities strengthen problem-solving skills more effectively than traditional teacher-centered methods (Ermac & Tan, 2023). However, weak foundational knowledge and low motivation continue to hinder problem-solving development among middle school learners (Domu & Mangelep, 2024). Affective and cognitive factors further shape mathematics learning. Interventions that reduce mathematics anxiety and strengthen critical thinking improve confidence and academic performance (Aujero & Fuentebilla, 2025). Conceptual and procedural errors among Grade 8 students show the need for guided practice and focused feedback (Santos & Reyes, 2023). Motivation, learning style, and teaching strategies also predict mathematics performance (Pizon & Ytoc, 2021), while gamified and interactive strategies enhance engagement and higher-order mathematical thinking (Cruz & Villanueva, 2024).

1.2 Related Literature on Teaching Strategies, Instructional Materials, Classroom Management, Assessment and Feedback, and Learner Engagement

Foreign and local studies consistently show that learner-centered, collaborative, inquiry-based, problem-based, and technology-supported instruction improves mathematics performance and problem-solving skills. Problem-based learning, active engagement, collaborative learning, and structured problem-solving interventions strengthen conceptual understanding, computational skills, perseverance, and achievement (Patunah, Herman, & Hasanah, 2024; DiNapoli, 2024; Junaid, 2025; Vessonen, 2025). Digital tools, visual aids, real-world connections, joint productive activities, and structured instruction also improve motivation, confidence, interaction, and problem-solving accuracy (Xu et al., 2022; Ezkel Pelayo & Tan, 2025; Ermac & Tan, 2023; Domu & Mangelep, 2024). Assessment and feedback are also important in mathematics learning. Targeted feedback, continuous assessment, and formative assessment help learners identify errors, refine strategies, monitor progress, and improve conceptual mastery and accuracy (Igcalinos, 2025; Pamonag, 2025; Diaz & Olivares, 2021; Lacson & Rosales, 2022). Context-oriented, learning-style-aligned, and problem-based approaches further develop analytical thinking and strategic problem-solving (Sitaraman & Hariri, 2025; Serrano, 2025; Siregar & Van Keulen, 2025). Instructional innovation and teacher support also influence mathematics outcomes. Problem-based learning, collaborative problem-solving, structured numerical exercises, mental math instruction, and AI-supported collaboration improve self-regulation, reasoning, computational proficiency, speed, accuracy, engagement, strategy planning, and solution verification (Budiarto, 2024; Macapayad, 2025; Torres-Peña et al., 2025; DeHaan, 2025; Lyu et al., 2026). Similarly, learner-centered instruction, instructional quality, scaffolding, cooperative learning, classroom discourse, questioning strategies, teacher competence, self-regulated learning, flipped classrooms, meaningful tasks, and positive teacher beliefs contribute to achievement and problem-solving performance (Alabdulkareem, 2022; Areepattamannil & Khine, 2020; Bicer et al., 2021; Cobb, Jackson, & Dunlap, 2020; Cengiz & Turgut, 2023; Kay & Rodriguez, 2021; Cevikbas & Kaiser, 2020; Sullivan et al., 2022; Charalambous, 2021; Jensen et al., 2022; Chen & Chang, 2024; Clark-Wilson et al., 2021; Fang & Yang, 2023; Llinares & Roa, 2020; Narayan & Mejias, 2022; Oliveras & Aragón, 2023; Sahin & Sarı, 2020; Schukajlow & Leiss, 2021; Uzuntiryaki-Kondakci & Çapa Aydin, 2025). In the Philippine context, DepEd emphasizes effective instruction, appropriate assessment, and learner engagement in improving junior high school mathematics achievement (DepEd, 2020). Local studies show that student-centered teaching, targeted interventions, numeracy programs, differentiated instruction, realistic mathematics education, problem-solving maps, teacher competence, classroom management, and curriculum implementation improve computational accuracy, conceptual understanding, reasoning, and achievement (Dela Peña & Doronio, 2025; Flores et al., 2024; Catador & Fernando, 2024; Insorio & Librada, 2025; Romero et al., 2025; Palomar, 2023; Flores et al., 2024; Ignacio & Bajet, 2025). Low interest, mathematics avoidance, and anxiety hinder problem-solving, while supportive classrooms, positive attitudes, manipulatives, visual aids, contextualized instruction, collaborative learning, metacognitive instruction, self-regulation, interactive instruction, inquiry-based activities, and concept mapping enhance motivation, accuracy, and achievement (Pentang et al., 2023; Abuzo, 2023; Hilario & Martin, 2020; Andrada & De Guzman, 2023; Bagadiong & Calizo, 2022; Cruz & Tagle, 2024; Bautista & Manalo, 2024; Cabalona & Dela Rosa, 2025; Carbonell & Santos, 2023; De Leon & Calderon, 2022; Dizon & Castillo, 2025; Gonzales & Mercado, 2025; Emata & Ramírez, 2024; Escala & Balbuena, 2023; Bañez & Quimbo, 2021; Mendoza & Cajucom, 2021; Salazar & Enriquez, 2023; Rebollo & Reyes, 2024; Torres & Luna, 2025; Alcanzare & Visaya, 2025). National policies and programs, including DepEd Order No. 021, s. 2020, and the Metrobank-MTAP-DepEd Math Challenge, further support instructional quality and problem-solving proficiency (DepEd, 2025). Overall, the reviewed literature shows that teaching strategies, instructional materials, classroom management, assessment and feedback, learner engagement, teacher support, technology integration, and supportive learning environments are important in improving mathematics performance and problem-solving skills.

1.3 Mathematics Instruction in the Local, National, and Global Context of Panan-awan Integrated School

Globally, mathematics instruction emphasizes learner-centered learning, problem-based instruction, collaboration, scaffolding, technology integration, feedback, and learner engagement to improve achievement and problem-solving skills. Nationally, Philippine mathematics education under the K to 12 curriculum promotes computational skills, conceptual understanding, critical thinking, and meaningful learning. DepEd policies and programs also support curriculum alignment, assessment, instructional quality, and problem-solving proficiency (DepEd, 2020; DepEd, 2025). Locally, this study is conducted at Panan-awan Integrated School in Barangay Panan-awan, Cawayan, Masbate. Masbate is an island province composed of Masbate, Ticao, and Burias and is located between Luzon and the Visayas while being politically part of the Bicol Region. Panan-awan Integrated School originated from Panan-awan Elementary School, which began offering Grade I classes in 1946 and became a complete elementary school in 1950. In School Year 2025–2026, the school was officially integrated to bring secondary education closer to learners and reduce transportation-related burdens on families. The study is limited to Grade 7 and Grade 8 students enrolled during School Year 2025–2026. It focuses only on mathematics classes at Panan-awan Integrated School and does not include teachers, parents, other stakeholders, other subjects, or extracurricular activities. External factors such as socio-economic background, home environment, personal learning styles, and individual intelligence are acknowledged but not included. Data are gathered through questionnaires, observation, and performance tests.

1.4 Theoretical and Conceptual Basis for Instructional Factors, Mathematics Performance, and Problem-Solving Skills

This study is anchored on Constructivist Learning Theory by Piaget (1970), Vygotsky's Zone of Proximal Development (ZPD) (Vygotsky, 1978), and Cognitive Load Theory by Sweller (1988). Piaget (1970) explains that learners actively construct knowledge through meaningful tasks, prior experiences, and interaction with their environment. This supports learner-centered strategies, collaboration, interactive tasks, and concrete or visual materials in mathematics instruction. Vygotsky (1978) emphasizes that learners can reach higher levels of understanding through guidance, scaffolding, and social interaction. This supports guided practice, cooperative learning, peer-assisted activities, and teacher facilitation in developing mathematics performance and problem-solving skills. Sweller's Cognitive Load Theory (1988) explains that learning improves when instruction reduces unnecessary mental load and supports schema construction. This supports visual aids, manipulatives, structured tasks, step-by-step guidance, differentiated instruction, contextualized learning, and concept mapping. Conceptually, the study follows the Input-Process-Output model. The input includes the respondents' profile, instructional factors, mathematics performance, and problem-solving skills. The process includes data gathering through questionnaires, observation, and performance tests, followed by analysis using percentage, weighted mean, and Pearson r correlation. The output includes the identified levels of instructional factors, mathematics performance, problem-solving skills, and the relationships among these variables.

1.5 Research Gaps and Rationale for Examining Grade 7 and Grade 8 Mathematics Learners at Panan-awan Integrated School

Although many studies have examined instructional strategies, materials, assessment, feedback, classroom environment, engagement, and technology in mathematics education, most focus on isolated strategies or single outcomes. There is limited research examining the combined influence of teaching strategies, instructional materials, classroom management, assessment and feedback, and learner engagement on both mathematics performance and problem-solving skills within the same learner population. This study addresses that gap by examining how multiple instructional factors affect the mathematics performance and problem-solving skills of Grade 7 and Grade 8 students at Panan-awan Integrated School. It provides a localized basis for improving mathematics instruction in a newly integrated school context. Specifically, the study seeks to determine the respondents' profile, the level of instructional factors, the level of mathematics performance, the level of problem-solving skills, and the relationships between instructional factors and mathematics outcomes.

1.6 Alignment of Mathematics Instruction, Learner Performance, and Problem-Solving Skills with Relevant Sustainable Development Goals

This study aligns with SDG 4 – Quality Education because it focuses on improving mathematics instruction, learner engagement, assessment, feedback, and problem-solving among Grade 7 and Grade 8 students. By examining instructional factors that may enhance computational skills, conceptual understanding, accuracy, and problem-solving ability, the study supports inclusive and effective learning. The study also relates to SDG 8 – Decent Work and Economic Growth because mathematics competence and problem-solving skills are foundational to future employability, productivity, and participation in economic life. It supports SDG 9 – Industry, Innovation and Infrastructure through its attention to instructional innovation, digital tools, technology-integrated instruction, and AI-supported learning in mathematics education. SDG 17 – Partnerships for the Goals is also relevant because the integration of Panan-awan Integrated School involved the support of teachers, parents, community stakeholders, barangay officials, and municipal officials.

1.7 Contribution of the Study to Educational, Socio-Economic, Community, Institutional, and Technological Sustainability

This study contributes to educational sustainability by supporting evidence-based improvement of mathematics instruction at Panan-awan Integrated School. By identifying how instructional factors affect mathematics performance and problem-solving skills, the findings may guide teachers and administrators in improving teaching strategies, classroom management, instructional materials, assessment practices, feedback, and learner engagement. The study also supports socio-economic and community sustainability because stronger mathematics and problem-solving skills may help learners develop competencies needed for academic advancement, future employment, practical decision-making, and community participation. Since Panan-awan Integrated School was established to bring secondary education closer to learners, the study also supports local educational access and helps reduce burdens on families. Institutional sustainability is addressed because the findings may guide school planning, professional development, instructional support, and assessment improvement. Technological and innovation sustainability is also reflected in the study's recognition of digital tools, visual aids, gamification, technology-integrated instruction, and AI-assisted learning as possible supports for engagement, conceptual understanding, and problem-solving.

1.8 Significance of Instructional Factors in Mathematics Learning to Students, Teachers, Administrators, Researchers, and the Community

The study is significant to students because it may help them understand how instructional practices affect their learning, engagement, mathematics performance, and problem-solving skills. It is significant to teachers because it may guide improvements in teaching strategies, classroom management, instructional materials, assessment, feedback, and learner engagement. It is significant to school administrators because it may provide information for professional development, instructional planning, and classroom improvement. The study may also serve as a reference for researchers studying instructional factors, mathematics performance, and problem-solving skills in Philippine schools. It may benefit the community by supporting the development of competent and critical-thinking learners who can contribute to community development. Finally, it benefits the researcher by deepening understanding of instructional practices, research methods, and student learning outcomes.

2. Material and methods

2.1 Research Design

This study employed a quantitative descriptive-correlational research design to examine the instructional factors affecting the mathematics performance and problem-solving skills of Grade 7 and Grade 8 students at Panan-awan Integrated School. The descriptive part of the study described the respondents' profile in terms of age, sex, and grade level. It also determined the level of instructional factors in terms of teaching strategies, use of instructional materials, classroom management, assessment and feedback, and learner engagement. In addition, it assessed the level of mathematics performance in terms of computational skills, conceptual understanding, and accuracy in solving mathematical tasks, as well as the level of problem-solving skills in terms of understanding the problem, planning appropriate strategies, carrying out the solution, and checking and interpreting results. The correlational part of the study determined whether significant relationships existed between instructional factors and students' mathematics performance, and between instructional factors and students' problem-solving skills. According to John W. Creswell & Creswell (2018), quantitative descriptive and correlational research designs are appropriate when describing existing conditions and examining relationships among variables as they naturally occur. Similarly, Donald Ary et al. (2019) emphasized that correlational studies are useful in educational research when determining the degree of association between variables, particularly in relation to student outcomes. This design was appropriate because it allowed the researcher to collect and analyze numerical data without manipulating the variables.

2.2 Locale of the Study

The study was conducted at Panan-awan Integrated School, located in Panan-awan, Cawayan, Masbate. The school served as the research locale because it offered Grade 7 and Grade 8 classes and provided the context for examining instructional factors related to mathematics performance and problem-solving skills. The setting was appropriate for the study because the respondents were directly involved in mathematics learning within the school during the conduct of the research.

2.3 Respondents of the Study

The respondents of the study were Grade 7 and Grade 8 students of Panan-awan Integrated School. A total of thirty students participated in the study. These respondents were selected because they were the target population of the research and were directly involved in the mathematics classes being examined.

2.4 Sample and Sampling Procedure

The study used convenience sampling in selecting the respondents. This sampling technique was used because it allowed the researcher to gather data from students who were readily available, accessible, and willing to participate during the data

collection period. Although convenience sampling does not ensure a fully representative sample, it was suitable for the study considering the limited time and resources available. It also provided relevant information from students directly connected to the study's objectives.

2.5 Research Instrument

The researcher used a structured survey questionnaire as the main data-gathering instrument. The questionnaire was researcher-made and developed based on the objectives of the study and related literature on mathematics performance, problem-solving skills, and instructional factors affecting students' learning. It was organized according to the variables of the study to ensure clarity, consistency, and ease of response. The first part of the questionnaire gathered the demographic profile of the respondents, including age, sex, and grade level. The second part measured instructional factors in terms of teaching strategies, use of instructional materials, classroom management, assessment and feedback, and learner engagement. The third part assessed students' mathematics performance in terms of computational skills, conceptual understanding, and accuracy in solving mathematical tasks. The fourth part measured students' problem-solving skills in terms of understanding the problem, planning appropriate strategies, carrying out the solution, and checking and interpreting results. The instrument used a four-point Likert scale with the responses Strongly Agree, Agree, Disagree, and Strongly Disagree. Before administration, the questionnaire was reviewed and validated by experts in education to ensure clarity, appropriateness, and alignment with the study objectives. Their comments and recommendations were incorporated to improve the wording and structure of the instrument.

2.6 Data Gathering Procedure

The data gathering procedure followed several phases. First, the researcher developed the research title and submitted a research capsule to the adviser for review. The capsule included the proposed title, statement of the problems, theoretical background, respondents and sampling, research design, and sources. Comments and suggestions were considered in improving the proposal. After approval of the title and proposal, the researcher developed and validated the research instrument. The questionnaire items were prepared based on the study's scope and objectives. The researcher then prepared a permission letter, which was noted by the adviser and submitted to the Office of the Schools Division Superintendent for approval. Upon approval, the researcher administered the questionnaires to the respondents. Instructions were clearly explained, and sufficient time was given for the respondents to answer the questionnaire. After completion, the questionnaires were retrieved. The gathered data were then recorded, tabulated, analyzed, and interpreted with the assistance of an expert statistician. The results served as the basis for presenting the findings, drawing conclusions, and formulating recommendations.

2.7 Data Analysis Techniques

The study used frequency count and percentage to describe the demographic profile of the respondents in terms of age, sex, and grade level. These statistical tools were used to determine the number and proportion of respondents under each category. Weighted mean was used to determine the level of instructional factors, mathematics performance, and problem-solving skills of the Grade 7 and Grade 8 students. This allowed the researcher to summarize the respondents' ratings and interpret the level of each variable. Pearson Product-Moment Correlation Coefficient was used to determine the significant relationship between instructional factors and mathematics performance, as well as the significant relationship between instructional factors and problem-solving skills. This statistical tool was appropriate for identifying the degree and direction of relationship between the study variables.

3. Results and Discussion

3.1 Demographic Profile of Grade 7 and Grade 8 Students

3.1.1 Age of the Respondents

Among the 30 respondents, most were 13 years old, with 12 students or 40.00%. This was followed by 11 students or 36.67% who were 14 years old, and 7 students or 23.33% who were 12 years old. No respondent belonged to the age bracket of 15 years old and above. The result shows that the respondents were within the usual age range for Grade 7 and Grade 8 learners. This suggests that the sample represents students who are developmentally expected to engage in logical thinking and problem-solving tasks. This result is supported by Piaget's Cognitive Development Theory, which explains that learners aged 11–15 are in the formal operational stage where they begin to develop logical thinking and problem-solving skills.

3.1.2 Sex of the Respondents

In terms of sex, 19 respondents or 63.33% were female, while 11 respondents or 36.67% were male. This shows that female students formed the majority of the respondents in the study. The finding indicates that the sample had a higher representation of female learners than male learners. This distribution reflects the gender composition of the respondents who participated in the study. This finding is supported by UNESCO (2021), which reported that female learners are increasingly participating in mathematics education, especially in basic education levels.

3.1.3 Grade Level of the Respondents

The respondents were equally distributed according to grade level. Fifteen students or 50.00% were from Grade 7, and 15 students or 50.00% were from Grade 8. This equal distribution ensured balanced representation from both grade levels. It also allowed the study to reflect the perspectives of both Grade 7 and Grade 8 learners. This is supported by Bruner's Discovery Learning Theory, which emphasizes that learning should be structured progressively across grade levels.

3.2 Level of Instructional Factors Affecting Grade 7 and Grade 8 Students

3.2.1 Teaching Strategies

The respondents strongly agreed that teaching strategies were evident in their mathematics instruction, with an overall weighted mean of 3.58. The highest-rated indicators were the teacher's presentation of step-by-step procedures in solving problems and provision of examples before exercises, both with a weighted mean of 3.63. This was followed by clear explanation of mathematics lessons with 3.60 and use of varied strategies with 3.57. The lowest indicator was checking students' understanding during the lesson, with a weighted mean of 3.47, though it was still interpreted as strongly agree. The result implies that teaching strategies significantly support students' understanding of mathematics lessons. Step-by-step instruction, examples, and varied strategies appear to help learners follow mathematical processes and engage more effectively in class. This is supported by Patunah, Herman, and Hasanah (2024), who found that problem-based learning enhances problem-solving skills.

3.2.2 Use of Instructional Materials

The respondents strongly agreed that instructional materials were used effectively in mathematics instruction, with an overall weighted mean of 3.43. The highest-rated indicator was the availability of learning materials for all students, with a weighted mean of 3.57. This was followed by the use of materials that make lessons easier to understand with 3.53, visual aids with 3.43, worksheets for practice with 3.33, and technology integration with 3.30. The findings suggest that instructional materials help learners understand mathematical concepts and improve their learning experience. The availability of materials, visual aids, and worksheets supports comprehension and engagement, although technology integration received the lowest rating. Cruz & Tagle (2024) added that visual aids reduce misconceptions. These studies confirm the importance of instructional materials in mathematics learning.

3.2.3 Classroom Management

The respondents strongly agreed that classroom management contributed to mathematics learning, with an overall weighted mean of 3.36. The highest-rated indicator was the teacher's creation of a positive learning environment, with a weighted mean of 3.63. This was followed by keeping students focused on learning tasks with 3.47, managing time effectively with 3.37, and organizing classroom activities with 3.27. Maintaining order during math class received the lowest mean of 3.07 and was interpreted as agree. The result indicates that classroom management helps create a structured and supportive environment for learning mathematics. A positive learning atmosphere and effective organization can improve student focus, discipline, and participation. Flores et al. (2024) emphasized that effective classroom management enhances performance.

3.2.4 Assessment and Feedback

The respondents strongly agreed that assessment and feedback were practiced in mathematics instruction, with an overall weighted mean of 3.39. The highest-rated indicator was the use of quizzes and exercises to check understanding, with a weighted mean of 3.63. This was followed by clear explanation of mistakes with 3.47, opportunities to improve performance with 3.43, and timely feedback on activities with 3.30. Discussing common errors after assessments received the lowest mean of 3.13 and was interpreted as agree. The findings show that assessment and feedback contribute to students' learning improvement and understanding of mathematical concepts. Quizzes, exercises, feedback, and correction of mistakes help learners identify areas for improvement and develop better performance. Cevikbas and Kaiser (2020) confirmed that feedback significantly improves achievement. These studies support effective assessment practices.

3.2.5 Learner Engagement

The respondents strongly agreed that learner engagement strategies were implemented in mathematics instruction, with an overall weighted mean of 3.45. The highest-rated indicator was allowing students to ask questions during class, with a weighted mean of 3.60. This was followed by encouraging participation with 3.50, motivating students to answer questions with 3.43, helping students develop interest in mathematics with 3.40, and encouraging group work and discussions with 3.30. The result suggests that learner engagement supports students' participation, interaction, and motivation in mathematics learning. Allowing students to ask questions and participate actively may help improve understanding and academic involvement. Oliveras & Aragón (2023) noted that engagement improves motivation and performance. These studies confirm its importance in mathematics learning.

3.3 Level of Mathematics Performance of Grade 7 and Grade 8 Students

3.3.1 Computational Skills

The respondents agreed that they demonstrated computational skills in mathematics, with an overall weighted mean of 2.84. The highest-rated indicator was performing basic mathematical operations accurately, with a weighted mean of 3.33. This was followed by solving numerical problems correctly with 2.87, applying formulas correctly with 2.73, performing computations with minimal errors with 2.70, and completing computation tasks on time with 2.57. The result indicates that students have basic computational ability but still need improvement in speed, accuracy, formula application, and error reduction. Although students can perform basic operations, they may benefit from more practice and strengthened computation instruction. Macapayad (2025) emphasized collaborative learning improves accuracy. These studies support strengthening computation instruction.

3.3.2 Conceptual Understanding

The respondents agreed that they demonstrated conceptual understanding in mathematics, with an overall weighted mean of 2.85. The highest-rated indicator was understanding why a solution works, with a weighted mean of 3.17. This was followed by understanding the concepts taught in class with 3.03, explaining mathematical ideas in their own words with 2.80, relating lessons to real-life situations with 2.67, and applying concepts to new problems with 2.57. The finding suggests that students understand basic mathematics concepts but still encounter difficulty applying these concepts to new problems and real-life contexts. This shows the need for instruction that strengthens deeper conceptual learning and transfer of knowledge. Bautista and Manalo (2024) emphasized differentiated instruction improves learning. These studies support deeper instruction.

3.3.3 Accuracy in Solving Mathematical Tasks

The respondents agreed that they demonstrated accuracy in solving mathematical tasks, with an overall weighted mean of 2.98. The highest-rated indicator was checking answers before submitting work, with a weighted mean of 3.37. This was followed by following steps carefully when solving problems with 3.30, performing well in quizzes and tests with 2.88, avoiding common mistakes with 2.73, and solving math problems accurately with 2.60. The result shows that students tend to check their answers and follow procedures, but they still need improvement in avoiding errors and solving problems accurately. Reinforcing accuracy-focused instruction may help improve confidence and performance in mathematics. DeHaan (2025) emphasized guided instruction improves precision. These studies support accuracy-focused teaching.

3.4 Level of Problem-Solving Skills of Grade 7 and Grade 8 Students

3.4.1 Understanding the Problem

The respondents agreed that they demonstrated basic ability in understanding mathematical problems, with an overall weighted mean of 2.53. The highest-rated indicator was distinguishing relevant from irrelevant information, with a weighted mean of 2.70. This was followed by identifying important information in word problems with 2.67, identifying what a problem is asking and understanding problems before solving them, both with 2.57. The lowest-rated indicator was restating the problem in their own words, with a weighted mean of 2.13 and interpreted as disagree. The findings indicate that students can identify important information in mathematical problems, but they struggle to restate problems in their own words. This difficulty may affect comprehension and problem interpretation. Cobb et al. (2020) emphasized scaffolding improves comprehension. These studies support problem interpretation instruction.

3.4.2 Planning Appropriate Strategies

The respondents disagreed that they effectively planned appropriate strategies in solving mathematical problems, with an overall weighted mean of 2.46. The highest-rated indicator was choosing the correct strategy to solve a problem, with a weighted mean of 2.90 and interpreted as agree. However, students disagreed that they could plan steps before solving, decide which formula or method to use, choose alternative strategies, and break complex problems into simpler steps, with the lowest mean of 2.10 for breaking complex problems into simpler steps. The result shows that planning strategies is one of the weaker areas of students' problem-solving skills. Students may know a possible strategy but experience difficulty organizing steps, selecting methods, and simplifying complex problems. Emata and Ramírez (2024) emphasized metacognitive instruction improve planning. These studies support strategy instruction.

3.4.3 Carrying Out the Solution

The respondents agreed that they demonstrated basic ability in carrying out solutions, with an overall weighted mean of 2.55. The highest-rated indicator was solving problems step by step, with a weighted mean of 3.03. This was followed by following planned steps correctly with 2.63. However, students disagreed that they could complete solutions independently, apply correct operations, and maintain accuracy while solving, with maintaining accuracy receiving the lowest mean of 2.20. The findings suggest that students can follow step-by-step procedures but still need support in applying correct operations, working independently, and maintaining accuracy. This indicates the need for guided and practice-oriented instruction. Hilario and Martin (2020) emphasized guided practice improves solution skills. These studies support step-by-step instruction.

3.4.4 Checking and Interpreting Results

The respondents disagreed that they effectively checked and interpreted results after solving mathematical problems, with an overall weighted mean of 2.50. The highest-rated indicator was checking answers after solving a problem, with a weighted mean of 3.20 and interpreted as agree. However, students disagreed that they could interpret results in relation to the problem, identify and correct mistakes, determine if answers make sense, and explain their solution process, with the lowest mean of 2.13 for explaining the solution process. The result indicates that although students check their answers, they still struggle with explaining, interpreting, and evaluating their solutions. This shows the need for reflective problem-solving instruction that helps students examine the meaning and accuracy of their answers. Schukajlow and Leiss (2021) emphasized reflection improves interpretation. These studies support reflective learning strategies.

3.5 Relationship Between Instructional Factors and Mathematics Performance

The Pearson r correlation result showed a computed r-value of 0.62, interpreted as a strong positive linear relationship between instructional factors and mathematics performance. With 28 degrees of freedom, a 0.05 level of significance, and a critical r-value of ±0.3610, the computed r-value was greater than the critical value. Therefore, the null hypothesis was rejected, indicating a statistically significant relationship. This result means that instructional factors are strongly and positively related to students' mathematics performance. Effective teaching strategies, instructional materials, classroom management, assessment and feedback, and learner engagement may contribute to better mathematical proficiency and learning outcomes among Grade 7 and Grade 8 students.

3.6 Relationship Between Instructional Factors and Problem-Solving Skills

The Pearson r correlation result showed a computed r-value of 0.65, interpreted as a strong positive linear relationship between instructional factors and problem-solving skills. With 28 degrees of freedom, a 0.05 level of significance, and a critical r-value of ±0.3610, the computed r-value was greater than the critical value. Thus, the null hypothesis was rejected, confirming a statistically significant relationship. This finding indicates that instructional factors are strongly and positively related to students' problem-solving skills. Effective instructional practices, including teaching strategies, assessment and feedback, learner engagement, and classroom management, may help improve students' analytical and mathematical problem-solving abilities.

4. Conclusion & Recommendations

The study concluded that instructional factors significantly influence the mathematics performance and problem-solving skills of Grade 7 and Grade 8 students at Panan-Awan Integrated School. The respondents were mostly 13 years old, predominantly female, and equally distributed between Grade 7 and Grade 8. Instructional factors such as teaching strategies, instructional materials, classroom management, assessment and feedback, and learner engagement were generally rated highly, showing that these practices were evident in mathematics instruction. Students demonstrated moderate mathematics performance in computational skills, conceptual understanding, and accuracy in solving mathematical tasks, but still needed improvement in applying concepts, completing tasks efficiently, and maintaining accuracy. In problem-solving, students showed basic ability in understanding problems and carrying out solutions, but weaknesses were evident in planning strategies, solving independently, checking answers meaningfully, and interpreting results. The significant positive relationships between instructional factors and mathematics performance, as well as between instructional factors and problem-solving skills, indicate that stronger instructional practices are associated with better student outcomes.

Based on the findings, mathematics teachers should continue strengthening effective teaching strategies, including clear explanations, step-by-step procedures, examples before exercises, and varied approaches to help students understand mathematical concepts. They should also enhance the use of instructional materials and technology to make lessons more engaging and easier to understand. More opportunities should be provided for students to practice problem-solving, especially in planning strategies, applying correct operations, working independently, and interpreting results. School administrators should support teachers through professional development, training, and adequate instructional resources to improve mathematics instruction. Future researchers may conduct similar studies with a larger sample size or in other schools to further validate the relationship between instructional factors, mathematics performance, and problem-solving skills.

The study was limited to 30 Grade 7 and Grade 8 students of Panan-Awan Integrated School and focused only on instructional factors affecting mathematics performance and problem-solving skills. The findings were based on data gathered through a structured questionnaire and analyzed using descriptive and correlational statistics. Since the study used a limited sample and was conducted in one school setting, the results may not fully represent other grade levels, schools, or learning contexts. The study also focused only on selected instructional factors, mathematics performance indicators, and problem-solving skill areas, so other possible influences on student learning were not covered.

Compliance with ethical standards

The study was conducted among Grade 7 and Grade 8 students of Panan-awan Integrated School using a quantitative descriptive-correlational design. Data were gathered through a structured questionnaire, with permission requested through a letter noted by the adviser and submitted to the Office of the Schools Division Superintendent for approval. The questionnaire was administered to the respondents after instructions were clearly explained, and the gathered data were recorded, tabulated, analyzed, and interpreted for research purposes.

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