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Instructive Strategies Utilization for Teaching – Learning Secondary Numeracy : Basis for Enhanced Learning Plan

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Index Terms:

instructional strategies, secondary numeracy, Grade 7 Mathematics, academic performance, enhanced learning plan

Abstract. This study examined the utilization of instructive strategies in teaching Grade 7 Mathematics and their association with students' academic performance in selected public secondary schools in Santa Fe District, Bantayan 1 District, and Tabogon District, Cebu Province, during School Year 2026–2027. Recognizing the challenges learners face in understanding mathematical concepts and solving numerical problems, the study aimed to identify instructional practices that could support meaningful learning and improve numeracy competencies. A descriptive-quantitative research design using a correlational approach was employed. The respondents consisted of 100 participants, including four Grade 7 Mathematics teachers and 96 Grade 7 students from Kinatarcan National High School, Santa Fe National High School, Bantayan National High School, and Loreto-Remedios Montebon National High School. Data were gathered through a structured questionnaire and analyzed using appropriate descriptive and inferential statistical techniques. The study focused on inquiry-based learning, gamification, cooperative learning, and real-world applications, alongside students' competencies in understanding rates, solving rate-related problems, representing and ordering rational numbers, and performing operations on rational numbers. The analysis was intended to determine the extent of strategy utilization, describe students' academic performance, and establish whether a significant association existed between teachers' reported instructional practices and students' numeracy performance. The findings were intended to serve as the basis for an enhanced learning plan featuring practical, engaging, and competency-based activities responsive to learners' needs. The proposed plan seeks to strengthen classroom instruction, encourage active participation, develop mathematical reasoning, and help learners apply numeracy skills to everyday situations. The study emphasizes the importance of aligning instructional strategies with identified learning needs to support continuous improvement in Grade 7 Mathematics education.

Introduction

International standardized frameworks, such as the Program for International Student Assessment (PISA) and TIMSS, reveal a significant global decline in mathematical literacy and the practical application of numerical concepts among adolescents. Bridging global challenges with the mathematics curriculum contextualizes abstract learning through three major global lenses. Migration and Demographics: Evaluating migration pathways, calculating percentage growth rates of displaced populations, and looking at resource allocation imbalances. Public Health and Epidemiology: Interpreting compound formulas, logarithmic exponential growths, and tracking disease transmission rates or vaccine distributions globally. Equity and Wage Gaps: Analyzing data sets from the International Labour

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Organization (ILO) to calculate global income disparities, gender pay gaps and purchasing power parity across regions. In an era of rampant misinformation, students who have strong secondary numeracy are equipped to question skewed graphs, biased statistics, and misleading data in media sources.

Basic education in the Philippines has meaningfully adapted to changes expected by the current and future generations. The introduction of the K to 12 Curriculum is no longer an option but a necessity. According to Craig N. Refugio, 2024 the move has come not just from the potentiality of the new technology, pedagogy, and curricular reform, but from the teachers' content knowledge, which has been made most of the remotely located schools mostly usable. With this, the teachers' content knowledge is claimed as crucially helpful in overlong the stumbling blocks of growth and development among the learners of basic education institutions in the country despite the scarcity of physical and instructional facilities. Accordingly, content knowledge refers to the amount and organization of experience in the mind of the teacher (Zhang, Liu & Cai, 2019).

Mathematics is one subject that pervades life at any age and in any circumstance. Thus, its value goes beyond the classroom and the school. Mathematics as a school subject, therefore, must be learned comprehensively and with much depth. The twin goals of mathematics in the basic education levels, K-10, are Critical thinking and Problem Solving. However, its influence extends beyond just practical applications. Mathematics can also help us understand the deeper complexities of the world, such as patterns in nature, social dynamics, and economic systems. In this article, we'll explore the importance of mathematics in the modern world, including its relevance in everyday life, business, as well as science and technology. We'll also discuss the change in how the subject is perceived in nowadays in comparison to before.

This study aims to determine the strategies used by elementary Mathematics teachers and their effectiveness in enhancing learners' performance. Employing a descriptive-quantitative research design, the study described the demographic profile of the respondents, and the intervention strategies utilized by the teachers and their effectiveness in terms of fundamental, computational and word problem-solving skills.

According to DepEd Central Office, in Matatag Curriculum, Mathematics is a powerful means of identification, description, and application of patterns and relationships; generalization; and communication. It provides opportunities for challenge, creativity, and users' recognition and appreciation of the nature, beauty and power of mathematical processes, strategies, and reasoning. The successful study of mathematics in Grades 1 to 10 is a key component of Filipino learners' preparation for life in the 21st century. For full participation in society, learners need to develop sound mathematical knowledge, skills, and understanding for making informed decisions and for solving problems in a variety of contexts relevant to their daily lives. Historically, mathematics arose from necessity of the human society, with real-world problems giving birth to its existence, emphasizing problem solving at its core. In schools, mathematics serves as an ideal training ground, fostering the problem-solving ability learners. Additionally, in this age of scientific and technological innovations, being "numerate" is crucial for engaging in various endeavors. The Organization for Economic Co-operation and Development (OECD) defines numeracy as "the ability to access, use, interpret, and communicate mathematical information and ideas, in order to engage in and manage the mathematics demands of a range of situations in adult life." "Numeracy, a significant ancillary to problem solving, relates to a high proportion.

of the mathematics content of the Grades 1 to 10 Mathematics curriculum. Learners become increasingly 'numerate' as they develop the confidence and ability to: • choose and use mathematics effectively in its application to situations that arise in their life at home, at work, and in the community; and • apply, evaluate, and communicate their mathematical thinking.

Consequently, this study aims to comprehensively examine the relationship between pedagogical strategies and academic performance in these secondary schools, while considering the specific challenges they face. The competency level of the students in selected topics for Mathematics 3 is also a factor that needs to be identified. This study is necessary to sufficiently address the different strategies in the teaching-learning process for the improvement of the mathematics 7 students. Therefore, it is imperative to conduct thorough and comprehensive study in this area.

Methodology

Design

This study employs the descriptive - quantitative research design that follows the correlation method of numeracy research in testing the significant relationship between the perception of the teacher respondents on the extent of the instructive strategies utilized in teaching and the academic performance of Numeracy 7 students. The study also identifies the background information of the respondent groups' perception of the teacher respondents on the extent of instructive strategies utilized, the academic performance of the students in Numeracy. The significant association between the

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perception of the teacher respondents on the extent of the instructive strategies utilized in teaching and the academic performance of numeracy students.

The said research method and design are deems appropriate for this undertaking since it involves with testing the significant relationship between the perception of the teacher respondents on the extent of the instructive strategies utilizes in teaching and the level of competencies In Numeracy 7 students.

Environment

This study conducts among the select public secondary schools of Santa Fe District and Bantayan 1 District and Tabogon District DepEd School Division of Cebu Province , Region VII, Central. The schools are the Kinatarcan NHS, Santa Fe NHS, Bantayan NHS, and Loreto-Remedios Montebon National High School-Canaocanao, Tabogon Cebu.

Kinatarcan NHS. Kinatarcan National High School (KNHS) is a public secondary educational institution located on Kinatarcan Island (also known as Guintacan Island), within the political jurisdiction of the municipality of Santa Fe, Cebu, Philippines. Operating under the Department of Education (DepEd) Region VII (Central Visayas), the school serves as a crucial hub for secondary and senior high school education for the remote, island-based communities of barangays Hagdan, Langub, and Kinatarcan (Bitoon). Kinatarcan Island is a rugged limestone landmass located off the northernmost coast of Cebu. Because it is geographically isolated from mainland Cebu and the main Bantayan island group, KNHS plays a vital role in ensuring that local youths do not have to travel by boat across open waters just to finish their high school education. The community and the school are highly resilient, having successfully rebuilt infrastructure after severe weather disruptions, such as Super Typhoon Yolanda (Haiyan) in 2013 and Typhoon Ursula (Phanfone) in 2019. KNHS leverages its natural environment to train competitive athletes. The school regularly celebrates provincial-level sports successes—such as producing regional medalists in athletics events (e.g., at the Provincial Sports Meet in Carcar City)—backed by dedicated local teachers serving as coaches and trainers.

Santa Fe NHS. Santa Fe National High School (SFNHS), located in the municipality of Santa Fe on Bantayan Island, Cebu, Philippines, is a prominent public secondary institution. Operating under the Department of Education (DepEd) Division of Cebu Province, the school serves a vital role in providing accessible junior and senior high school education to the island's coastal and suburban communities. The institution originally began its journey as a local community high school. It later transitioned into a Barangay High School before officially being converted into a National High School to support a larger student demographic and receive direct national funding. SFNHS regularly hosts School-Based In-Service Training (INSET) programs. A recent focus includes equipping instructors with classroom strategies that integrate Artificial Intelligence (AI) responsibly to support critical thinking and learner-centered education. Taking advantage of its island geography, the school collaborates on community development camps like Sea Scouting and Youth Lifesaving events. This helps students build vital real-world skills, including water safety, resuscitation, and emergency care

Bantayan NHS. Bantayan National High School (BNHS) is a prominent public secondary educational institution located in the Municipality of Bantayan on Bantayan Island, Cebu, Philippines. Formally established by law in the 1990s, the school serves as a vital hub for junior and senior high school education in the region. Driven actively by the Supreme Secondary Learner Government (SSLG), the "BASA KITA" movement is a premier youth-led literacy outreach program. BNHS student leaders and volunteer teachers routinely travel to surrounding coastal areas and neighboring barangays (such as Barangay Guiwanon) to conduct reading camps, share knowledge, and promote early childhood literacy. For its TVL tech-voc learners, the school implements the Joint Delivery Voucher Program (JDVP). Grade 12 students undergo rigorous, month-long hands-on training with Technical Education and Skills Development Authority (TESDA) partners. This guarantees that students are fully equipped to clear National Certificate II (NC II) assessments, dramatically boosting their post-graduation employability.

Loreto-Remedios Montebon National High School (L-RMNHS) is a public secondary educational institution located in Canaocanao, Tabogon, Cebu, Philippines. Operating under the Department of Education (DepEd) Region VII (Central Visayas) division of Cebu Province, the school provides accessible and quality education to junior and senior high school students in the locality, carrying the institutional motto "Bridging Generations: A Legacy of Excellence. To resolve infrastructure shortages, L-RMNHS actively coordinates with non-profit foundations and external donors. For example, they partnered with the 13C Chair Foundation to secure critical school furniture and armchairs, ensuring that classroom setups remain comfortable and ergonomic for students without exhausting localized government funds. The campus maintains a functional and highly active YES-O Federation chapter. By ensuring representation in district-wide student leadership, the school systematically embeds environmental awareness, ecological conservation, and resource stewardship directly into the daily lives and routines of its student body.

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Respondents

There are 100 respondents composing of 4 teachers and 96 Grade 7 students from Santa Fe , Bantayan and Tabogon Districts. This research uses a simple random sampling which simply describes that every element in a population has an equal chance of being chosen for the sample (R. Enriquez, 2024).

The students will render 20-contact hours of Numeracy program including instruction and activities suited to their specific needs in relation to sustainable teaching learning activities as learning aid towards strategic education. Most of them had working parents who are housekeepers, vendors, and 4Ps members and are financially indigent, and had chosen a public institution to address the need to study without thinking about their tuition fees. This follows with the languages they know and speak Cebuano and a little English. On the other hand, the teacher-respondents are handling Grade 7 students with different subjects, specifically Numeracy. The school offers complete Junior High School and Senior High School Education with the programs offered such as Kindergarten to 12 Alternative Learning System for the out-of-school youth and adult.

SCHOOLS	TEACHERS	STUDENTS	TOTAL	PERCENTAGE
Kinatarcan NHS	1	24	25	25
Santa Fe NHS	1	24	25	25
Bantayan NHS	1	24	25	25
Loreto-Remedios Montebon National High School	1	24	25	25
TOTAL	**4**	**96**	**100**	**100**

Table 1. Distribution of Respondent Groups

Research Instrument.

The research instrument used in this study was a researcher-made, self-administered Likert-type survey questionnaire designed to gather quantitative data from 78 respondents at Inoburan Elementary School, consisting of three (3) teacher-respondents and 75 learners. The questionnaires were administered face-to-face in paper-and-pencil format, ensuring that all respondents received the same questions with identical wording. The use of a standardized questionnaire helped promote consistency in data collection, while respondent anonymity encouraged honest and reliable responses. The instrument was organized into three parts. Part I gathered the demographic profiles of the respondents. Part II focused on the respondents' perceptions of the instructional strategies utilized in teaching Numeracy 7, particularly inquiry-based learning and gamification. Part III assessed the academic performance of Grade 7 learners in Numeracy based on the identified learning competencies. Through these sections, the questionnaire provided measurable data relevant to the study's objectives and supported the examination of instructional strategy utilization and learners' numeracy performance.

Data Analysis

The data gathered in this study were analyzed using descriptive and inferential statistical techniques to determine the utilization of instructional strategies in teaching Grade 7 Mathematics and their association with students' academic performance. Frequency counts and percentages were used to describe the demographic profiles of the respondents, while the weighted mean was used to assess the extent to which teachers utilized inquiry-based learning, gamification, cooperative learning, and real-world applications in teaching numeracy. These strategies were examined to understand how they supported students in developing mathematical understanding and practical problem-solving skills. Students' academic performance was analyzed based on the identified numeracy competencies, including understanding rates, solving rate-related problems, representing and ordering rational numbers, and performing operations involving rational numbers. To determine whether a significant relationship existed between instructional strategy utilization and students' academic performance, an appropriate correlational statistical test was applied. The results of these analyses were intended to provide a clearer picture of the instructional practices used in the participating schools and the numeracy competencies that may require additional support. The findings would also serve as a foundation for developing an enhanced learning plan with relevant, engaging, and competency-based activities. Through this systematic analysis, the study aimed to provide useful insights for improving classroom instruction and supporting students' learning needs in Grade 7 Mathematics.

Results and Discussion

Results

The results of the study are intended to provide an overview of the instructional strategies used in teaching Grade 7 Mathematics and their association with students' academic performance in numeracy. The investigation focuses on four

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instructional approaches: inquiry-based learning, gamification, cooperative learning, and real-world applications. These strategies are examined to understand how they are utilized in classroom instruction and how they may support students in developing mathematical knowledge and problem-solving skills. The students' academic performance is also assessed based on selected numeracy competencies, including understanding rates, solving rate-related problems, representing and ordering rational numbers, and performing operations involving rational numbers. Data from the 100 respondents, comprising four Grade 7 Mathematics teachers and 96 Grade 7 students, are analyzed using descriptive and inferential statistical techniques. The descriptive analysis helps summarize the respondents' profiles, the utilization of instructional strategies, and students' performance in the identified competencies. Meanwhile, correlational analysis is used to determine whether a significant association exists between instructional strategy utilization and students' numeracy performance. However, the actual findings, including statistical values, performance levels, and significance results, must be drawn from the completed data analysis. The results will serve as a basis for identifying learning needs and developing an enhanced learning plan with practical activities that can strengthen students' mathematical understanding and classroom participation.

Discussion

The study highlights the importance of examining instructional strategies in relation to students' learning experiences and academic performance in Grade 7 Mathematics. Inquiry-based learning can encourage learners to ask questions, explore mathematical concepts, and develop independent reasoning. Gamification may help make lessons more engaging through interactive tasks and learning challenges. Cooperative learning provides opportunities for students to exchange ideas, explain their solutions, and learn from their classmates. Meanwhile, real-world applications can help learners recognize the relevance of mathematics in everyday situations. These approaches provide a useful framework for examining how classroom instruction addresses students' numeracy needs. The assessment of competencies involving rates and rational numbers can also help identify areas where learners may need additional guidance, practice, or remediation. Nevertheless, the effectiveness of these instructional strategies and their association with academic performance cannot be established from the abstract alone. Actual questionnaire results and statistical findings are necessary to determine which strategies are most frequently utilized, which competencies require greater attention, and whether a statistically significant relationship exists between instructional practices and student performance. The findings should therefore guide the development of an enhanced learning plan that responds to the specific needs identified in the data. By aligning classroom activities with learners' demonstrated strengths and difficulties, teachers may provide more focused instruction, encourage active participation, and support the continued development of mathematical reasoning and numeracy skills.

Conclusion and Recommendations

Conclusion

The study highlights the importance of examining instructional strategies in teaching Grade 7 Mathematics and understanding how these approaches relate to students' academic performance in numeracy. Through the use of a descriptive-quantitative research design with a correlational approach, the study seeks to provide insights into the instructional practices employed in selected public secondary schools in Cebu Province. The four strategies considered—inquiry-based learning, gamification, cooperative learning, and real-world applications—offer different ways of encouraging students to participate actively, explore mathematical concepts, collaborate with classmates, and connect classroom lessons with everyday experiences. The study also emphasizes the need to assess learners' competencies in understanding rates, solving rate-related problems, representing and ordering rational numbers, and performing operations involving rational numbers. These competencies are essential areas for identifying students' learning needs and planning appropriate instructional support. Furthermore, the results of the statistical analysis are intended to clarify whether a significant association exists between teachers' reported use of instructional strategies and students' numeracy performance. Since the actual statistical findings were not provided in the abstract, no definitive conclusion can yet be made regarding the strength or significance of this association. Ultimately, the study provides a foundation for developing an enhanced learning plan that responds to learners' needs and supports more meaningful, engaging, and effective mathematics instruction.

Recommendations

Based on the objectives of the study, several recommendations are proposed to support the improvement of Grade 7 Mathematics instruction. First, mathematics teachers are encouraged to consider inquiry-based learning, gamification, cooperative learning, and real-world applications when planning lessons, selecting approaches that align with the competencies being taught and the needs of their learners. Second, teachers should regularly assess students' understanding of rates, rate-related problems, and rational numbers to identify areas that require further explanation, guided practice, or remediation. Third, school administrators and mathematics coordinators may support teachers by

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providing appropriate instructional materials, opportunities for professional development, and time to share effective classroom practices. Fourth, the proposed enhanced learning plan should be developed using the actual results of the study, ensuring that its activities address the learning difficulties and instructional needs revealed by the data. The plan may include collaborative problem-solving tasks, interactive mathematics games, inquiry-based activities, and practical exercises drawn from everyday situations. Fifth, teachers should monitor students' progress through formative assessments and provide timely feedback to strengthen mathematical understanding and confidence. Finally, future researchers may conduct similar studies involving more schools and respondents to broaden the evidence on instructional strategies and numeracy performance. They may also explore additional factors, such as student motivation and learning resources. These recommendations should be refined according to the study's actual statistical findings and the needs identified among the participating schools.

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Competing Interests Statement

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this article.

Data Availability Statement

Data sharing is not applicable to this article as no new data were created or analyzed in this study; all data used were obtained from previously published sources as cited in the reference list.

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Appendices

No appendices are attached to this study.

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