Learner-Centered Teaching Strategy in Mathematics: Real-Life Application Activities for Grade 5

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ABSTRACT

This study focused on the development of a learner-centered teaching strategy in Mathematics that incorporated real-life application activities for Grade Five pupils in Liloan District, Southern Leyte Division during the academic year. It examined several aspects of the teaching-learning process, specifically the pupils' performance in Mathematics, the extent to which teachers developed performance standards, the teaching strategies they employed, and the implementation of learner-centered instructional procedures. Employing a descriptive survey method, the researcher gathered data through a researcher-made achievement test administered to pupils and a survey questionnaire distributed to teachers, subject area coordinators, and school heads. Findings revealed that Grade Five pupils demonstrated an average level of performance in Mathematics, indicating room for improvement. Performance standards were found to be satisfactorily developed, suggesting that teachers had established clear expectations for learning outcomes. Teaching strategies were oftentimes utilized, showing that teachers made consistent efforts to apply varied approaches in instruction. However, learner-centered instructional procedures were only sometimes applied, highlighting a gap in fully engaging pupils in active, meaningful learning experiences. These results underscored the need for stronger emphasis on learner-focused practices to enhance pupils' mathematical understanding and performance. In response, the study developed a learner-centered teaching strategy with real-life application activities designed to improve engagement, deepen comprehension, and strengthen learning outcomes. By integrating real-world contexts into lessons, the strategy aimed to make Mathematics more relevant, practical, and accessible, thereby fostering improved academic achievement and greater enthusiasm for the subject among Grade Five pupils.

Keywords: *learner-centered teaching, Mathematics education, real-life application activities, Grade Five pupils, teaching strategies*

INTRODUCTION

Mathematics is a powerful means of identification, description, and application of patterns and relationships, generation, 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.

As such, numeracy, a significant ancillary to problem solving, relates to a high proportion of the mathematics content of the Grade 5 Mathematics curriculum. Hence, learners become increasingly numerate as they develop the confidence and ability to: (a) choose and use mathematics effectively in its application to situations that arise in their lives at home, at work, and in the community; and (b) apply, evaluate, and communicate their mathematical thinking (DepEd, 2023).

In the Enhanced K to 10 Curriculum Guide in Mathematics for Grade 5, the learners are expected to understand and demonstrate the following standards, namely: (a) the learners can use 12- and 24- hour time; compare the time in world time zones with the time in the Philippines; use the GMDAS rules for 3 or more different operations; multiply fractions; and determine the area of a parallelogram, triangle, and trapezoid, (b) the learners are able to divide fractions; compare, order, and round decimals to the nearest one thousandth; add and subtract decimal numbers; use divisibility rules; and distinguish prime numbers from composite numbers; (c) the learners are able to identify, construct, and interpret double bar graphs and double line graphs; draw conclusions and make inferences from data represented in double bar graphs and double line graphs; calculate theoretical probability; and multiply and divide decimal numbers; and (d) the learners are able to apply the GMDAS rules with operations with fractions and decimals; illustrate and describe solid figures and their nets; determine the surface area of solid figures; distinguish between cubes and rectangular prisms, and estimate their volumes; and draw the image of an object after applying rotation about a point (DepEd, 2023).

To facilitate the development of the performance standards, there is a need to develop a learner-centered teaching strategy in Mathematics and real-life application activities for Grade 5.

The theory behind utilizing the learner-centered teaching strategy, real-life application activities is significantly great, as according to Weimer (2013), learner-centered teaching strategy like student engagement, active learning involves students in their own learning, are a necessary component of learner-centered teaching.

Thus, Weimer (2013) underscored five characteristics of learner-centered teaching which are: (1) learner-centered teaching engages students in the hard, messy work of learning, (2) learner-centered teaching includes explicit skill instruction, (3) learner-centered teaching encourages students to reflect on what they are learning and how they are learning it, (4) learner-centered teaching motivates students by giving them some control over learning processes; and (5) learner-centered teaching encourage collaboration.

The aforcited characteristics of learner-centered teaching put the teachers in a hot seat where they are guided to let students do more learning tasks, teach students how to think, solve problems, evaluate evidence, analyze arguments, generate hypotheses, and include assignment components in which students reflect, analyze and critique what they are learning and how they are learning it. The goal is to make students aware of themselves as learners and to make students aware of themselves as learners and to make learning skills something students want to develop. Weimer (2013) disclosed that in learner-centered teaching, teachers work to develop structures that promote shared commitments to learning. As such, teachers must see learning individually and collectively as the most important goal of any educational experience.

In implementing the learner-centered teaching strategy, teachers, according to Weimer (2013), must develop real-life application activities to make meaningful and long-term understanding; engaging in deep learning approaches to achieve lifelong learning among Grade 5 students.

In the context of Daniel Leonard (2024), real-world Math activities that engage students bridge the gap between abstract math concepts and real-life experiences, which make the subject accessible and relevant for learners.

It stretches that real-life application activities connect theoretical knowledge to practical situations and include hands-on experiences like simulations, brainstorming, role-playing, and field trips. Other activities involve project-based learning, case studies, and community service projects, which allow for problem-solving and skill development in real-world contexts.

In the situation in Liloan District, Southern Leyte Division, the Grade 5 pupils were exposed to the traditional classroom practice where teachers were doing too many tasks for learners. The teachers ask the questions, call on learners, add details to their answers, and do the review and preview. On any given day, in most classes, teachers are working much harder than the learners. As a result, many learners 223 or (52%) failed in the first quarter of school year 2025-2026 in the achievement test in Mathematics (SMEA, 2025), as they were not actively participating in activities led by themselves.

This result is substantiated by the Rapid Mathematics Assessment (RMA) results of school heads and numeracy coordinators, which are presented as follows. (Out of the 430 pupils assessed, 48 pupils belong to highly proficient, 50 belong to proficient, 102 belong to transitioning, 101 belong to low proficient and 129 pupils belong to not proficient during the second quarter of school year 2025-2026 which points to develop the learner-centered teaching strategy in Mathematics, real-life application activities for Grade 5, hence, this studyStudy was conducted.

Statement of the Problem

This study aimed to develop a learner-centered teaching strategy in Mathematics, real-life application activities for Grade 5.

Specifically, this studyStudy sought to answer the following questions:

1. What is the performance level of the Grade 5 pupils in Mathematics?

2. To what extent do teachers develop the following performance standards among Grade 5 pupils

    2.1 The learners can use 12- and 24- hour time; compare the time in world time zones with the time in the Philippines; use the GMDAS rules for 3 or more different operations; multiply fractions; and determine the area of a parallelogram, triangle, and trapezoid

    2.2 The learners can divide fractions; compare, order, and round decimals to the nearest one thousandth; add and subtract decimal numbers; use divisibility rules; and distinguish prime numbers from composite numbers

    2.3 The learners can identify, construct, and interpret double bar graphs and double line graphs; draw conclusions and make inferences from data represented in double bar graphs and double line graphs; calculate theoretical probability; and multiply and divide decimal numbers

    2.4 The learners can apply the GMDAS rules with operations with fractions and decimals; illustrate and describe solid figures and their nets; determine the surface area of solid figures; distinguish between cubes and rectangular prisms, and estimate their volumes; and draw the image of an object after applying rotation about a point

3. To what extent are the following teaching and learning strategies utilized by teachers in teaching Mathematics among Grade 5 pupils?

    3.1 Learner-centered Teaching Strategy

    3.2 Verbalization Learning Strategy

    3.3 Verbalization Learning Strategy

    3.4 Concept Development Teaching Strategy

    3.5 Explorative Problem-Solving Teaching Strategy

4. To what extent are the following instructional procedures on learner-centered strategy undertaken by teachers in teaching Mathematics among Grade 5 pupils?

    4.1 Learning Objectives

    4.2 Learning Content

    4.3 Performance Standards

    4.4 Learner-Centered Teaching and Learning Activities

        4.4.1 Motivational Activities

        4.4.2 Developmental Activities

        4.4.3 Enrichment Activities

4.5 Learning Assessment

4.6 Real-Life Application Activities

4.7 Learning in Capsule

4.8 Assessment Review

4.9 Evaluation for Learning Adjustment

5. What real-life application activities on learner-centered teaching strategy in Mathematics for Grade 5 may be developed based on the findings of the study?

Theoretical Framework of the Study

The theoretical framework of the study is grounded on the concepts, ideas and theories on the teaching of Mathematics, learner-centered teaching, the real-life application activities, and the researcher's desire to develop a learner-centered teaching strategy in Mathematics, real-life application activities for Grade 5.

The theory behind Mathematics teaching is outlined in DepEd (2023) as learners who receive Mathematics education services should conceptually understand as well as develop accurate execution of standard algorithms to solve computational problems in mathematics. This requires a combined instructional focus on procedural learning and conceptual understanding, which is important to ensure that all students learn and master mathematics.

Mathematics is a powerful means of identification, description, and application of patterns and relationships, generation, 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.

As such, numeracy, a significant ancillary to problem solving, relates to a high proportion of the mathematics content of the Grade 5 Mathematics curriculum. Hence, learners become increasingly numerate as they develop the confidence and ability to: (a) choose and use mathematics effectively in its application to situations that arise in their lives at home, at work, and in the community; and (b) apply, evaluate, and communicate their mathematical thinking (DepEd, 2023).

The theory of Weimer (2013) on learner-centered teaching strategy emphasizes teaching, such as student engagement and active learning, which involve students in their own learning, which are necessary components of learner-centered teaching.

Thus, Weimer (2013) underscored five characteristics of learner-centered teaching which are: (1) learner-centered teaching engages students in the hard, messy work of learning, (2) learner-centered teaching includes explicit skill instruction, (3) learner-centered teaching encourages students to reflect on what they are learning and how they are learning it, (4) learner-centered teaching motivates students by

giving them some control over learning processes; and (5) learner-centered teaching encourage collaboration.

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In implementing the learner-centered teaching strategy, teachers, according to Weimer (2013), must develop real-life application activities to make meaningful and long-term understanding; engaging in deep learning approaches to achieve lifelong learning among Grade 5 students.

In the theory of Daniel Leonard (2024), real-world Math activities are activities that engage students, bridge the gap between abstract math concepts and real-life experiences, which make the subject accessible and relevant for learners.

It stretches that real-life application activities connect theoretical knowledge to practical situations and include hands-on experiences like simulations, brainstorming, role-playing, and field trips. Other activities involve project-based learning, case studies, and community service projects, which allow for problem-solving and skill development in real-world contexts.

Ultimately, the theories on Mathematics teaching, learner-centered teaching strategy and the real-life application activities for Mathematics form the theoretical framework of this study which led to develop the learner-centered teaching in Mathematics and real-life application activities for Grade 5.

Conceptual Framework of the Study

This study aimed to develop a learner-centered teaching in Mathematics, real-life application activities for Grade 5.

Central of this study are the following (1) determined the performance level of the Grade 5 pupils in Mathematics; (2) determined the extent to which the following performance standards were developed by teachers among Grade 5 pupils, namely: (a) the learners are able to use 12- and 24- hour time; compare the time in world time zones with the time in the Philippines; use the GMDAS rules for 3 or more different operations; multiply fractions; and determine the area of a parallelogram, triangle, and trapezoid, (b) the learners are able to divide fractions; compare, order, and round decimals to the nearest one thousandth; add and subtract decimal numbers; use divisibility rules; and distinguish prime numbers from composite numbers; (c) the learners are able to identify, construct, and interpret double bar graphs and double line

graphs; draw conclusions and make inferences from data represented in double bar graphs and double line graphs; calculate theoretical probability; and multiply and divide decimal numbers; and (d) the learners are able to apply the GMDAS rules with operations with fractions and decimals; illustrate and describe solid figures and their nets; determine the surface area of solid figures; distinguish between cubes and rectangular prisms, and estimate their volumes; and draw the image of an object after applying rotation about a point; (3) analyzed the extent to which the following teaching and learning strategies were utilized by teachers in teaching Mathematics among Grade 5 pupils, namely: (a) learner-centered teaching strategy, (b) performance-based teaching and learning strategy, (c) verbalization learning strategy, (d) concept developmental strategy; and (e) explorative problem-solving teaching strategy; and (4) determined the extent to which the following instructional procedures on learner-centered teaching strategy were undertaken by teachers in teaching Mathematics among Grade 5 pupils, namely: (a) learning objectives, (b) learning content, (c) performance standards, (d) learner-centered teaching and learning activities which included motivational activities, developmental activities and enrichment activities, (e) learning assessment (f) real-life application activities, (g) learning in capsule, (h) assessment review; and (i) evaluation for learning adjustment which served as the bases in developing the learner-centered teaching in Mathematics, real-life application activities for Grade 5. Figure 1 shows the conceptual framework of the study.

The diagram explains that the performance level of the Grade 5 pupils in Mathematics is sought. In the process, it would need some supplementary data like the mean values and qualitative descriptions on the extent to which the performance standards were developed, the extent to which the teaching and learning strategies were utilized and the extent to which the instructional procedures were undertaken by teachers, which led t the conceptualization of the study.

The implementation of the learner-centered teaching strategy in Mathematics, real-life application activities for Grade 5, would be realized among Grade 5 pupils as well as the teachers themselves.
It is further believed that learner-centered teaching in Mathematics, real-life application activities for Grade 5, would improve the learning outcomes of the pupils vis-à-vis the school.
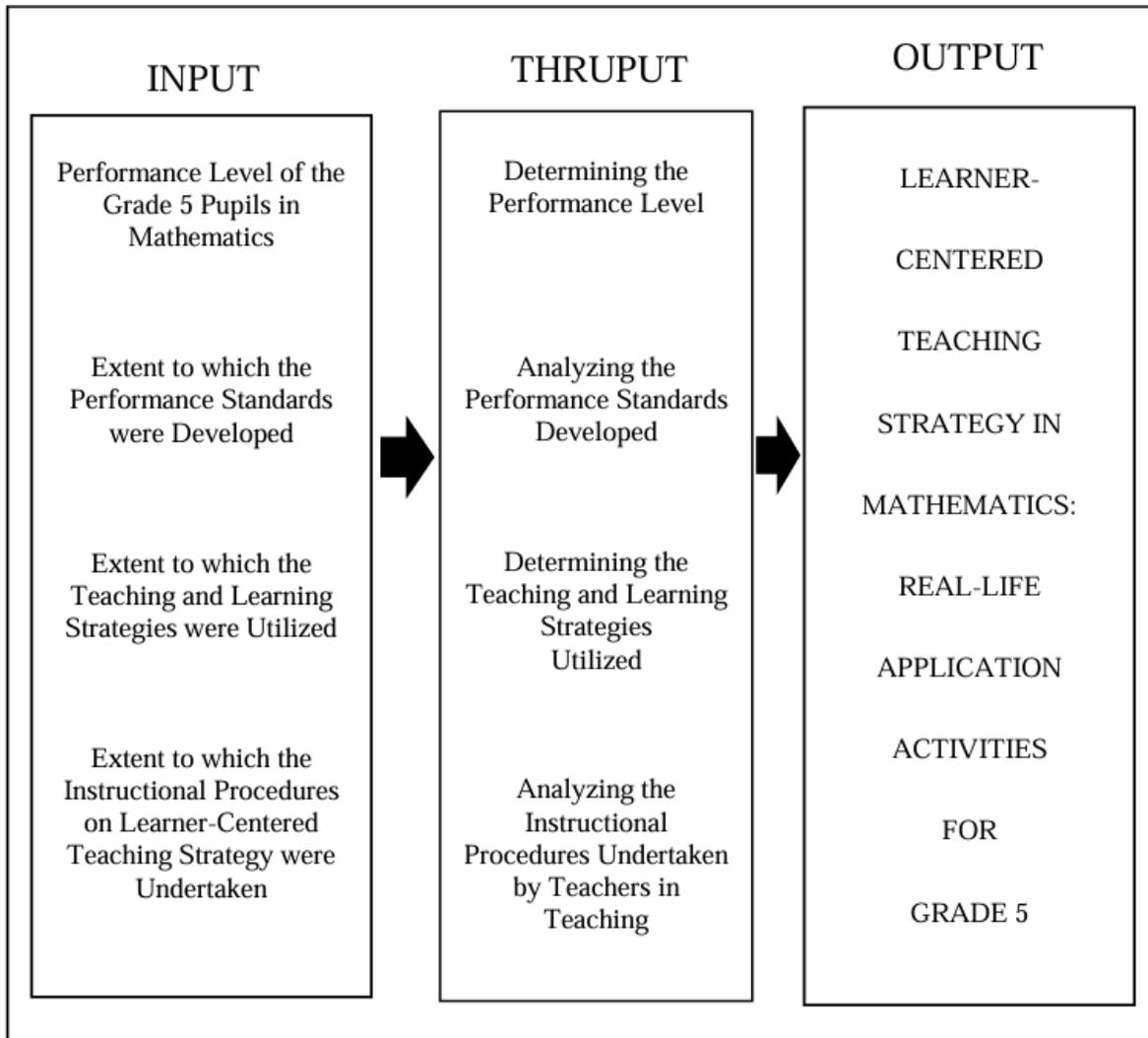
INPUT

Performance Level of the Grade 5 Pupils in Mathematics

Extent to which the Performance Standards were Developed

Extent to which the Teaching and Learning Strategies were Utilized

Extent to which the Instructional Procedures on Learner-Centered Teaching Strategy were Undertaken

THRUPUT

Determining the Performance Level

Analyzing the Performance Standards Developed

Determining the Teaching and Learning Strategies Utilized

Analyzing the Instructional Procedures Undertaken by Teachers in Teaching

OUTPUT

LEARNER-CENTERED TEACHING STRATEGY IN MATHEMATICS: REAL-LIFE APPLICATION ACTIVITIES FOR GRADE 5

Figure 1: **The Conceptual Framework of the Study**

Significance of the Study

The findings and output of the study would be significant to the following groups of people in charge of making education work among Grade 5 learners in Mathematics.

Teachers. The learner-centered teaching in Mathematics, real-life application activities for Grade 5, would lead the teachers to provide the framework for meeting the goals of education outlined in the curriculum, and would enable them to create a classroom culture were using concrete materials and learning experiences are common for all learners.

Pupils. The output of this study would lead the pupils to boost their engagement. It would also leverage a learner's curiosity and develop it into a strong interest in Math. Even if they are not overly supervised, they can take the lead, dig deeper, and engage in discussions and disputes, which leads to increased engagement. As a result, they would learn more effectively when engaged in learning because learning-centered teaching nurtures enthusiasm.

Researcher. The output of the study would be significant to the researcher as it would serve as a model on how to develop a learner-centered teaching in Mathematics, with real-life application activities for Grade 5. This would also serve as a related study in the same context.

Curriculum Developers. Information obtained from research findings about the effectiveness of the learner-centered approach and its application can be useful for the development of the Grade 5 Mathematics curriculum. This information ensures the development of more interesting and relevant educational experiences for the different needs of the students.

School leaders. The study's findings can help school administrators create professional development programs for teachers that focus on student-centered methods and how to use math in real life. It can also help with the distribution of resources to make these changes in education easier, which will lead to better student outcomes.

Parents and Community. This study improves mathematics instruction, while indirectly benefiting parents and the broader society. Students with mathematical proficiency are more equipped to tackle real-world challenges, promoting a more numerate and capable society. Emphasizing practical applications of mathematics increases its relevance and understanding for parents, thereby fostering a helpful educational environment at home.

Scope and Delimitation of the Study

This study had delimited to the Grade 5 pupils, teachers teaching Mathematics, and the school heads of the respondent schools of Liloan District, Southern Leyte Division.

This study aimed to develop a learner-centered teaching in Mathematics, real-life application activities for Grade 5.

Central of this study were the following (1) determined the performance level of the Grade 5 pupils in Mathematics; (2) determined the extent to which the following performance standards were developed by teachers among Grade 5 pupils, namely: (a) the learners are able to use 12- and 24- hour time; compare the time in world time zones with the time in the Philippines; use the GMDAS rules for 3 or more different operations; multiply fractions; and determine the area of a parallelogram, triangle, and trapezoid, (b) the learners are able to divide fractions; compare, order, and round decimals to the nearest one thousandth; add and subtract decimal numbers; use divisibility rules; and distinguish prime numbers from composite numbers; (c) the learners are able to identify, construct, and interpret double bar graphs and double line graphs; draw conclusions and make inferences from data represented in double bar graphs and double line graphs; calculate theoretical probability; and multiply and divide decimal numbers; and (d) the learners are able to apply the GMDAS rules with operations with fractions and decimals; illustrate and describe solid figures and their nets; determine the surface area of solid figures; distinguish between cubes and rectangular

prisms, and estimate their volumes; and draw the image of an object after applying rotation about a point; (3) analyzed the extent to which the following teaching and learning strategies were utilized by teachers in teaching Mathematics among Grade 5 pupils, namely: (a) learner-centered teaching strategy, (b) performance-based teaching and learning strategy, (c) verbalization learning strategy, (d) concept developmental strategy; and (e) explorative problem-solving teaching strategy; and (4) determined the extent to which the following instructional procedures on learner-centered teaching strategy were undertaken by teachers in teaching Mathematics among Grade 5 pupils, namely: (a) learning objectives, (b) learning content, (c) performance standards, (d) learner-centered teaching and learning activities which included motivational activities, developmental activities and enrichment activities, (e) learning assessment (f) real-life application activities, (g) learning in capsule, (h) assessment review; and (i) evaluation for learning adjustment which served as the bases in developing the learner-centered teaching in Mathematics, real-life application activities for Grade 5.

This study will involve all the 430 Grade 5 pupils, all the 26 teachers, all the 23 subject area coordinators, and the 23 school heads of the respondent schools, which was conducted during the school year 2025-2026. Also, this study utilized an achievement test, which was answered by the Grade 5 pupils and the survey questionnaire was answered by the subject area coordinators, the teachers, and school heads of the respondent schools.

Definition of Terms

To facilitate understanding of the study, the following terms are defined conceptually and operationally.

Achievement. Conceptually, this term is related to something accomplished (Merriam-Webster, 2014). As used in this study, the term refers to the results of the 50-item test in Mathematics made by the researcher and answered by the Grade 5 pupils of the respondent schools.

Concept Development Learning Strategy. Concept formation is an inductive learning process that emphasizes how concepts are refined. It builds on basic concepts, which are part of the learner's prior knowledge, and as conceptual inter-relationships develop, a framework for new understanding is established (Baurejan-Oberoi, 2015). In this study, the term is used as one of the learning strategies in Mathematics among Grade 5 pupils.

Explorative Problem-Solving Strategy. This term refers to a strategy in teaching, particularly in Mathematics, where the teacher provides explorative Mathematical situational activities in such an efficient way to develop the 21st century skills like critical analysis and solving problems.

Learner-Centered Teaching Strategy. This term also refers to student-centered or child-centered teaching, which is characterized by student participation and a focus on tailoring teaching methodologies to individual student needs, learning styles, skills and goals. It involves clear skill instruction, reflection on learning and how it is achieved, student control over learning and collaboration within the classroom community (Tzenios, 2022). In this study, the term is used as a strategy in teaching and learning Mathematics among Grade 5 pupils of the respondent schools.

Learning Content. This term refers to the learning topics or subjects matter treated in Mathematics, which involved the sharing of information or knowledge about what the teacher wants the students to know and be able to do by the end of the lesson.

Learning Continuity Activities. The term refers to the provision of learning activities in Mathematics with opportunities to build competence in procedural understanding, to develop and refine understanding of numeracy concepts discussed in the classroom, and to help pupils build progressively new levels of thinking.

Learning Experience. This term refers to the different activities in the lesson given as reinforcement tasks to develop, refine and master the learning competencies or skills in Mathematics.

Objective-based Activities. This term refers to the setting out of what pupils should be able to do, understand and behave after completing their course. The objectives define the scope of the content covered in the unit or lesson and the learning outcomes to be achieved. As such, objectives help the learners set the learning outcome for themselves in the process of learning the concept.

Performance Level. This term refers to the description of the levels of quality attainment within each criterion that are incrementally identified as low, good, better, and best (Khosrow-Pour, 2018). In this study, this term refers to one of the problem statements which determined through giving an achievement test in Mathematics for Grade 5 pupils.

Performance Standards. This term refers to expectations for instruction, assessment, and pupil work, and these incorporate. Content Standards define the level of work that demonstrates achievement of the standards (Paxton, 2023). In this study, this term refers to one of the problem statements that asked school heads, subject area coordinators in Mathematics, and teachers about the extent of developing the performance standards in Mathematics memory by teachers among Grade 5 pupils.

Questions-based Problem-solving Activities. Question-based problem-solving activities in this study refer to problem-solving to questions that emerge in the learners' daily lives, which require problem-solving skills to enable them to overcome these kinds of problems. Therefore, problem-solving skills, which have an important place not only in Mathematics but also in the learner's real life.

Real-Life Application Activities. This term is used to bridge the gap between classroom learning and everyday life, enhancing pupils' engagement and understanding (Aquino, 2009). These activities, in this study, can involve various methods like using real-life examples, simulations or projects that relate to pupils' personal experiences.

Reflections. This term refers to the learners' idea in recording their reflections on the topics discussed or listened to in class. Such activity would improve the pupils' learning outcomes.

Strategy. This term refers to a careful plan or method for achieving an end (Merriam-Webster, 2014). In this study, the term refers to the concrete-representational-abstract instructional approach utilized by teachers in teaching Mathematics among Grade 5 pupils of the respondent schools.

Verbalization Learning Strategy. This term refers to a strategy where pupils are encouraged to articulate their reasoning through processes while solving problems, promoting deeper understanding and

improved problem-solving skills. This approach is also called the think-aloud strategy, where pupils are involved in explaining their reasoning, steps and decisions aloud, either individually or in groups, as they work through mathematical tasks.

LITERATURE REVIEW

Related Literature

Conceptually, school effectiveness is the quality of being able to produce desired results or a positive influence. This view assumes that the effectiveness of a school is determined by the high performance of the students. This implies that if the school is to continue to exist, it must satisfy the expectations of the parents and the community or society that it serves.

It connotes that the system of education is to provide quality learning among learners with good teachers to carry out the goal of education to raise the performance level of the learners. Since Mathematics is a diverse discipline with its universal applicability and finds widespread use in various fields of endeavor, especially on solving real-world problems, it is therefore essential that learners be mathematically proficient and critical thinkers to tackle such problems effectively.

Learners who receive Mathematics education services should conceptually understand as well as develop accurate execution of standard

algorithms to solve computational problems in mathematics. This requires a combined instructional focus on procedural learning and conceptual understanding, which is important to ensure all students learn and master mathematics, as outlined by DepEd (2023).

Furthermore, the Department of Education (2023) stressed that Mathematics is a powerful means of identification, description and application of patterns and relationships, generation, and communication, providing opportunities for challenge, creativity, and users' recognition and appreciation of the nature, beauty and power of mathematical processes, strategies, and reasoning.

As such, numeracy, a significant ancillary to problem solving, relates to a high proportion of the mathematics content of the Grade 5 Mathematics curriculum. Hence, learners become increasingly numerate as they develop the confidence and ability to: (a) choose and use mathematics effectively in its application to situations that arise in their lives at home, at work, and in the community; and (b) apply, evaluate, and communicate their mathematical thinking (DepEd, 2023).

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In another development, the NTC Corporate (2022) articulates that in real-world connections are lessons that involve actual experiences, events or objects. It is also known as experiential learning (NTC

Corporate, 2022). Real-world connection activities aim to bridge the gap between classroom learning and everyday life, enhancing student engagement and understanding. These activities can involve various methods, such as using real-life examples. Simulations or projects that relate to students' personal experiences. As such, real-world connection activities include current events, news articles or everyday situations to illustrate concepts taught in class, personal experiences, guest speakers, simulations, role playing and authentic projects.

Furthermore, the NTC Corporate (2022) underscored that teaching Mathematics is remarkably great as real-world connections can be used to promote greater engagement, understanding and retention of all kinds of subjects. When students engage in real world situations that exemplify the lessons they are receiving, they are receiving, they take these lessons out of the theoretical world and put them into the world they live in and experience. When experiential learning techniques are used, it gives students a leg up in understanding how the lesson applies to their lives. This is when lesson engagement and retention become stronger.

Real-world connection activities aim to bridge the gap between classroom learning and everyday life, enhancing student engagement and understanding. These activities can involve various methods, such as using real-life examples, simulations, or projects that relate to students' personal lives experiences. Here is a breakdown of real-world connection activities and how they can be implemented: (1) Making direct connections: Real-life examples, teachers can use current events, news articles, or everyday situations to illustrate concepts taught in class; Personal experience, encourage students to share their own experiences related to the lesson topic, fostering a sense of relevance and connection; and Guest speakers, invite professionals or individuals with expertise in the subject matter to share their experiences and insights, (2) Simulations and Role-Playing: Simulations, create simulations of real-world scenarios, allowing students to actively engage with the concepts and practice decision- making; Role-playing, assign roles to students and have them act out scenarios related to the lesson, promoting deeper understanding and empathy, (3) Project-based Learning: Authentic projects, design projects that require students to apply their knowledge and skills to solve real-world problems or create something meaningful; and Community involvement, integrate projects that involve collaborating with community members or organizations, fostering a scene of social responsibility, and (4) Utilizing Technology: Virtual field trips, use virtual reality or online resources to explore real-world locations and environments related to the lesson; Interactive simulations, engage students with interactive simulations and games that allow them to explore concepts and practice skills in a virtual setting. Example of Activities: Shopping spree math, create shopping scenarios with real store ads and receipts to practice percentage problems, fractions, and decimals; Building a city, students can work together to plan and design a city, incorporating various mathematical and scientific concepts; Analyzing new articles, students can analyze news articles related to the lesson topic, identifying key information and making connections to their own lives; and Conducting surveys, students can conduct survey on a topic relevant to the lesson and analyze the results, practicing data collection and analysis skills (NTC Corporate, 2022).

Related Studies

The following studies are cited herein as they are related to the present study. In terms of design methodology and instrumentation, they differ in terms of locale of the study and focus on grade level.

In the international scene, the Study of Perkkila (2016) revealed that early and continued reflection about Mathematics beliefs and practices, beginning in teacher preparation, is the key to improving the quality of Mathematics instruction and minimizes in consistence's between beliefs and practices. Teachers should not work in isolation, either, but as members of learning communities. It is important to encourage them to work and pursue new ideas together because by considering both the positive and negative consequences of various teaching practices, teachers would come to a better understanding of their own beliefs and would consider whether they are consistent with their goals when teaching their pupils.

In the local scene the Study of Gongora (2025) which aimed to develop a problem-solving teaching strategy in Mathematics, technology integration model of activities for Grade 7 showed an average performance level in Mathematics; a satisfactorily development of the performance standards; and a sometimes utilization of the teaching and learning strategies which led the researcher to develop the problem-solving teaching strategy in Mathematics, technology integration model of activities for Grade 7.

In another development, the Study of Gajol (2025) which utilized the descriptive survey method of research which involved 476 Grade 8 students showed a low performance level in Mathematics: a satisfactorily development of the performance standards; and sometimes utilization of the teaching and learning strategies which led the researcher to develop a concept-driven strategy in teaching Mathematics, explorative learning activities for Grade 8. As such, the researcher encouraged the maximum utilization of the developed concept-driven strategy in teaching Mathematics, exploratory learning activities for Grade 8 among the respondent schools.

Likewise, the Study of Viñas (2021) which aimed to determine the performance level of the Kindergarten learners, with the end in view of designing an analytical visual strategy in Mathematics; experiential-based activities for Kindergarten, utilized the descriptive survey method of research which involved 483 kindergarten learners, 12 teachers teaching Kindergarten, and 16 school heads broken down as 5 teachers-in-charge, 6 head teacher and 5 principals which was conducted during the school year 2020-2021. A self-structured survey questionnaire with a 5-point scale response was used to gather the needed data. The data were tabulated and computed through frequency counts, percentage and weighted mean. An analysis of the data showed an average performance in Mathematics; the performance standards were satisfactorily developed; the strategies in teaching were sometimes utilized; and the experiential-based activities on analytical inquiry strategy were sometimes undertaken, which led the researcher to design the analytical visual strategy in Mathematics, experiential-based activities for kindergarten.

Another related study in terms of content is the investigation of Tomas (2019) on collaborative learning strategy in teaching General Mathematics for Grade 11, reflective journal, and life application revealed a low performance in General Mathematics of Grade 11 students, a satisfactory development of the performance standards, but a sometimes utilization of the teaching strategies. However, the collaborative learning strategies were satisfactorily undertaken. The low performance of the students might

boil down to poor recording of the students' reflections, which led the researcher to the development of the reflective journal and life application.

Another related study in terms of design and instrumentation is the Study of Monsanto (2021) which revealed a low performance level in Mathematics; the content learning areas were sometimes undertaken; the performance standards were poorly developed; the strategies in teaching were sometimes utilized; and the instruction in General Mathematics, web-enhanced activities for Grade 11 ere sometimes undertaken which led the researcher to develop the E-self modular instruction in General Mathematics, web-enhanced activities for Grade 11.

Likewise, the Study of Gontiñas (2023) which aimed to develop an explorative learning strategy in Mathematics, self-study activities for Grade 8, utilized the descriptive survey method of research which involved 499 Grade 8 students, 21 teachers teaching Mathematics, 4 coordinators or department heads, and 4 school heads of the respondent schools which was conducted during the school year 2022-2023, revealed an average performance level in Mathematics; the performance standards were satisfactorily developed; the teaching and learning strategies were sometimes utilized; and the instructional procedures on explorative learning strategy were sometimes undertaken which led the researcher to develop the explorative learning strategy in Mathematics, self-study activities for Grade 8.

Similarly, the Study of Cayondong (2023) which aimed to develop an inquiry-based teaching strategy in General Mathematics, reflective learning activities for Grade 11, utilized the descriptive survey method of research which involved 1140 Grade 11 students, 7 teachers teaching General Mathematics, 2 department heads and all the 5 school heads of the respondent schools which was conducted during the school year 2022-2023, revealed a low performance level in General Mathematics; the

performance standards were satisfactorily developed; the strategies were sometimes utilized; and the instructional procedures on inquiry-based teaching strategy in General Mathematics, reflective learning activities were oftentimes undertaken, which led the researcher to develop the inquiry-based teaching strategy in General Mathematics, reflective learning activities for Grade 11.

In the same vein, the Study of Baustista (2020) on reflective journal and life application in teaching Mathematics for Grade 10, collaborative learning strategy revealed a low performance level of Grade 10 students in Mathematics; and a satisfactory development of the performance standards which signaled for the development of the reflective journal and life application in teaching Mathematics for Grade 10, collaborative learning strategy.

The study of Palamos (2017) on an intensive program in Mathematics For Kindergarten, which focused on learning through involvement of learners in teaching the process, found that the most suitable approach in teaching Mathematics for Kindergarten learners was through interactive involvement among learners.

Ultimately, the review of related literature and studies provided the researcher with a rich background in developing the learner-centered teaching strategy in Mathematics, and real-life application activities for Grade 5.

METHODS

Research Design

This study aimed to develop a learner-centered teaching in Mathematics, real-life application activities for Grade 5.

Central of this Study were the following (1) determined the performance level of the Grade 5 pupils in Mathematics; (2) determined the extent to which the following performance standards were developed by teachers among Grade 5 pupils, namely: (a) the learners can use 12- and 24- hour time; compare the time in world time zones with the time in the Philippines; use the GMDAS rules for 3 or more different operations; multiply fractions; and determine the area of a parallelogram, triangle, and trapezoid, (b) the learners can divide fractions; compare, order, and round decimals to the nearest one thousandth; add. and subtract decimal numbers; use divisibility rules; and distinguish prime numbers from composite numbers; (c) the learners are able to identify, construct, and interpret double bar graphs and double line graphs; draw conclusions and make inferences from data represented in double bar graphs and double line graphs; calculate theoretical probability; and multiply and divide decimal numbers; and (d) the learners are able to apply the GMDAS rules with operations with fractions and decimals; illustrate and describe solid figures and their nets; determine the surface area of solid figures; distinguish between cubes and rectangular prisms, and estimate their volumes; and draw the image of an object after applying rotation about a point; (3) analyzed the extent to which the following teaching and learning strategies were utilized by teachers in teaching Mathematics among Grade 5 pupils, namely: (a) learner-centered teaching strategy, (b) performance-based teaching and learning strategy, (c) verbalization learning strategy, (d) concept developmental strategy; and (e) explorative problem-solving teaching strategy; and (4) determined the extent to which the following instructional procedures on learner-centered teaching strategy were undertaken by teachers in teaching Mathematics among Grade 5 pupils, namely: (a) learning objectives, (b) learning content, (c) performance standards, (d) learner-centered teaching and learning activities which included motivational activities, developmental activities and enrichment activities, (e) learning assessment (f) real-life application activities, (g) learning in capsule, (h) assessment review; and (i) evaluation for learning adjustment which served as the bases in developing the learner-centered teaching in Mathematics, real-life application activities for Grade 5.

Locale of the Study

This study was conducted in all elementary schools of Liloan District, Southern Leyte Division, which was done during the school year 2025-2026. The schools are: (1) Liloan Central School, (2) Amaga Elementary School, (3) Fatima Elementary School, (4) Tabugon Elementary School, (5) San Roque Elementary School, (6) Magaupas Elementary School, (7) Ilag Elementary School, (8) Himay-angan Elementary School, (9) Mariano Silot Memorial Elementary School, (10) Bahay Elementary School, (11) Pres. Quezon Elementary School, (12) Caligangan Elementary School, (13) Pandan Elementary School, (14) Catig Elementary School, (15) Estela Elementary School, (16) Guintoylan Elementary School, (17) Anibo Elementary School, (18) Candayuman Elementary School, (19) New Malangza Elementary School,

(20) San Isidro Elementary School, (21) Calian Elementary School, (22) Pres. Roxas Elementary School and (23) Cagbungalon Elementary School.

Liloan is one of the four municipalities of Panay Island. While a portion of its jurisdiction is located in the mainland of Southern Leyte (29%), a bigger portion (71%) is located in the northernmost tip of Panaon Island. It is bounded by the Municipality of Libagon and the mountains of St. Bernard Municipality in the north, by the Municipalities of San Francisco, Pintuyan, and San Ricardo in the South, by San Juan Bay and Surigao Strait in the East, and by the Municipality of San Francisco and Sogod Bay in the West.

It has coordinates of 10°9'41″ North latitude and 125°7'49″ East longitude.

The municipality is about 112 kilometers away from Maasin City, the province's capital, and 151 kilometers away from Tacloban City, the regional capital.

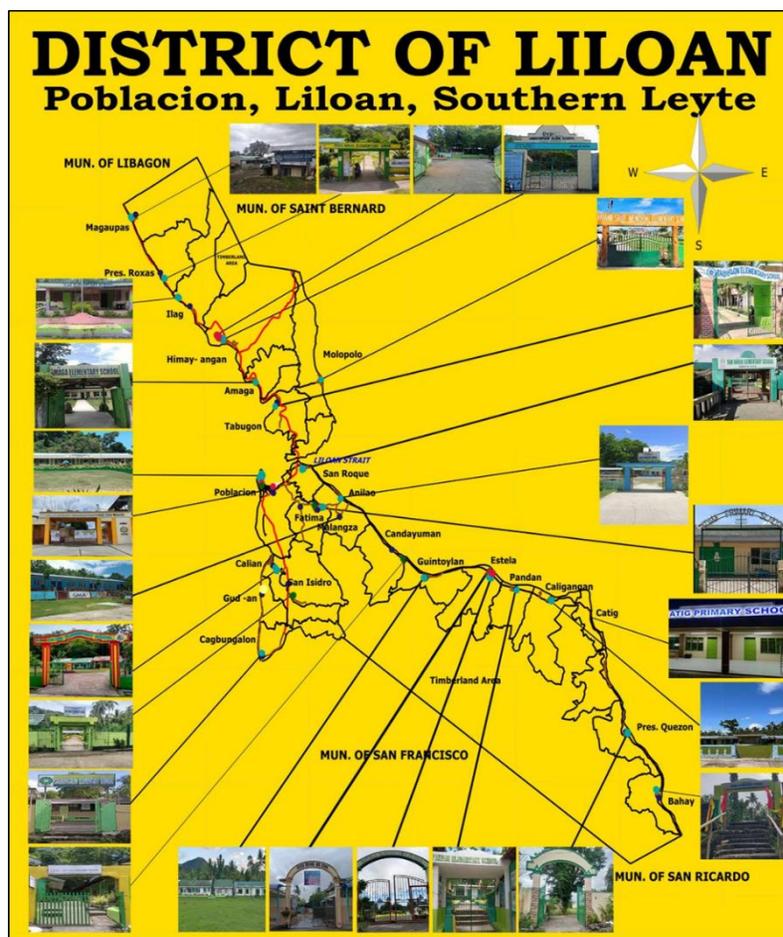Figure 2 shows the map of Liloan District, Southern Leyte Division, showing the schools involved in this studyStudy.

Figure 2. *Map of Liloan District, Southern Leyte Division showing the Elementary Schools Involved in the study.*

Respondents of the Study

Table 1. *Distribution of Respondents*

Schools	Teachers	Subject Area Coordinators	School Heads	Grade 5 Students	
				Enrollment	Active Respondents
1. Amaga Elementary School	1	1	1	3	3
2. Anilao Elementary School	1	1	1	14	14
3. Bahay Elementary School	1	1	1	6	6
4. Cagbungalon Elementary School	1	1	1	9	9
5. Calian Elementary School	1	1	1	21	21
6. Caligangan Elementary School	1	1	1	10	10
7. Candayuman Elementary School	1	1	1	8	8
8. Catig Elementary School	1	1	1	7	7
9. Estela Elementary School	1	1	1	12	12
10. Fatima Elementary School	1	1	1	24	24
11. Guintoylan Elementary School	1	1	1	18	18
12. Himay-angan Elementary School	2	1	1	66	66
13. Ilag Elementary School	1	1	1	21	21
14. Liloan Central School	2	1	1	67	67
15. Magaupas Elementary School	1	1	1	15	15
16. Mariano Silot Memorial Elementary School	1	1	1	13	13
17. New Malangza Elementary School	1	1	1	9	9
18. Pandan Elementary School	1	1	1	8	8
19. Pres. Quezon Elementary School	1	1	1	10	10
20. Pres. Roxas Elementary School	1	1	1	10	10
21. San Isidro Elementary School	1	1	1	11	11
22. San Roque Elementary School	2	1	1	55	55
23. Tabugon Elementary School	1	1	1	13	13
Total	**26**	**23**	**23**	**430**	**430**

The respondents of the studyStudy were all the 430 Grade 5 pupils, all the 26 Mathematics teachers, all the 23 subject area coordinators and all the 23 school heads of the respondent schools, which was conducted during the school year 2025-2026.

Table 1 shows the distribution of respondents.

Research Instruments

The research instruments used in this study were the researcher-made achievement test for Grade 5 pupils and a survey questionnaire for the teachers teaching Mathematics, and school heads of the respondent schools. These are described as follows:

The Researcher-made Achievement Test. The researcher-made achievement test in Mathematics is composed of a 50-item test, which will be answered by the Grade 5 pupils to determine the performance level of the pupils of the respondent schools.

The Survey Questionnaire. The survey questionnaire is divided into three parts. Part I elicited the extent to which the performance standards were developed. Part II solicited the extent to which teachers in teaching Mathematics utilized the teaching and learning strategies, and Part III elicited the extent to which teachers in teaching Mathematics undertook the instructional procedures on learner-centered teaching strategies.

Validation of the Instruments

To determine the validity of the instruments, a dry run of the researcher-made achievement test and the survey questionnaire was conducted in San Francisco Central School, Southern Leyte Division. Both the validation school and the respondent schools belong to Southern Leyte Division, and both speak the Sinogbuanong-Bisaya dialect/language; hence, there is an equivalence in characteristics and socio-economic status of the pupils.

Data Gathering Procedure

The gathering of the data was done by first asking permission from the Schools Division Superintendent of Southern Leyte Division, and the school heads of the respondent schools. Upon approval, the researcher looked into the total number of pupil-respondents through the school records, taking 100% of the total enrolment. Then the researcher conducted the survey questionnaire with the teachers. The pupils and teachers-in-charge of the Grade 5 pupil-respondents were given a discussion on the purpose of the test. The Grade 5 pupils answered the researcher-made achievement test, and the survey questionnaire will be answered by teachers, the subject area coordinators and school heads of the respondent schools.

The data gathering was a one-shot activity. The researcher immediately retrieved the copies of the questionnaire to give ample time for the interpretation of the results.

Statistical Treatment of Data

All data gathered were tallied, organized, analyzed and interpreted with the use of appropriate statistical tools.

To measure the performance level of the Grade 5 pupils, the formula below was used:

$$MPS = \frac{\sum ws}{N} \times 100$$
$$\overline{Tn1}$$

where:

MPS $\quad$ = Mean Percentage Score
$\sum ws$ $\quad$ = Sum of Weighted Score
N $\quad$ = Number of cases
$\overline{Tn1}$ $\quad$ = Total Number of Items

Likewise, the summarized data obtained from the survey questionnaire were analyzed and interpreted using descriptive statistics such as frequency counts, mean percentage score and the weighted mean.

The formula is as follows:

$$P = \frac{f}{N} \times 100$$

where:

P $\quad$ = $\quad$ Percentage
f $\quad$ = $\quad$ Frequency
N $\quad$ = $\quad$ Number of Cases

To find the weighted score, each indicator is given a number. The response for each part is multiplied by the weight assigned and added to get the sum of the product of the weighted score divided by the number of cases.

The formula is as follows:

$$\bar{x} = \frac{\sum ws}{N}$$

where:

$\bar{x}$ $\quad$ = $\quad$ Mean
$\sum ws$ $\quad$ = $\quad$ Sum of Weighted Score
N $\quad$ = $\quad$ number of cases

To describe the performance level of the Grade 5 pupils in Mathematics, the following mean values and qualitative descriptions were used.

Mean Percentage Score	Qualitative Description
75% and above	High Performing
51% - 74%	Average Performing
50% and below	Low Performing

To determine the extent to which the performance standards in Mathematics were developed by teachers among Grade 5 pupils, the following mean values and qualitative descriptions were used.

Mean Value	Qualitative Description
4.20 – 5.00	Outstandingly Developed
3.40 – 4.19	Very Satisfactorily Developed
2.60 – 3.39	Satisfactorily Developed
1.80 – 2.59	Poorly Developed
1.00 – 1.79	Never Developed

Mean Value	Qualitative Description
4.20 – 5.00	Always Utilized
3.40 – 4.19	Oftentimes Utilized
2.60 – 3.39	Sometimes Utilized
1.80 – 2.59	Seldom Utilized
1.00 – 1.79	Never Utilized

To determine the extent to which the instructional procedures on learner-centered teaching strategy were undertaken by teachers in teaching Mathematics, the following mean values and qualitative descriptions were used.

Mean Value	Qualitative Description
4.20 – 5.00	Always Undertaken
3.40 – 4.19	Oftentimes Undertaken
2.60 – 3.39	Sometimes Undertaken
1.80 – 2.59	Seldom Undertaken
1.00 – 1.79	Never Undertaken

RESULTS AND DISCUSSION

Performance Level of the Grade 5 Pupils in Mathematics

Table 2 presents the performance level of the Grade 5 pupils in Mathematics as measured by the achievement test conducted during the school year 2025-2026.

From among the 23 respondent schools, it could be gleaned that the highest mean obtained was 84.88, interpreted as "high performing", achieved by New Malangza Elementary School. The second to the highest mean obtained was 78.00, interpreted as "average performing", achieved by Fatima Elementary School. The lowest mean obtained was 28.80, interpreted as "low performing", achieved by San Isidro Elementary School.

Table 2. *Performance Level of the Grade 5 Pupils in Mathematics*

Schools	Mean Percentage Score (MPS)	Interpretation
1. Amaga Elementary School	42.66	Low Performing
2. Anilao Elementary School	55.71	Average Performing
3. Bahay Elementary School	41.00	Low Performing
4. Cagbungalon Elementary School	41.11	Low Performing
5. Calian Elementary School	58.38	Average Performing
6. Caligangan Elementary School	61.00	Average Performing
7. Candayuman Elementary School	63.75	Average Performing
8. Catig Elementary School	45.42	Low Performing
9. Estela Elementary School	40.66	Low Performing
10. Fatima Elementary School	78.00	High Performing
11. Guintoylan Elementary School	46.33	Low Performing
12. Himay-angan Elementary School	67.25	Average Performing
13. Ilag Elementary School	42.47	Low Performing
14. Liloan Central School	59.53	Average Performing
15. Magaupas Elementary School	48.13	Low Performing
16. Mariano Silot Memorial Elementary School	44.00	Low Performing
17. New Malangza Elementary School	84.88	High Performing
18. Pandan Elementary School	54.50	Average Performing
19. Pres. Quezon Elementary School	52.00	Average Performing
20. Pres. Roxas Elementary School	51.18	Average Performing
21. San Isidro Elementary School	28.80	Low Performing
22. San Roque Elementary School	68.25	Average Performing
23. Tabugon Elementary School	33.69	Low Performing
Average Mean	**52.55**	**Average Performing**

Further analysis showed that the performance level of the Grade 5 pupils in Mathematics revealed an "average performance" as indicated by the obtained average mean percentage score of 52.55.

The picture that emerges from the analysis of the pupils' performance level shows that of the 23 respondent schools, two schools are high performing schools, 10 are average performing schools, while 11 respondent schools are low performing schools, which signaled the researcher to develop a learner-centered teaching strategy in Mathematics, real-life application activities for Grade 5.

The theory behind adopting the learner-centered teaching strategy is substantially great, as according to Weimer (2013) learner-centered teaching strategy involves the learners in their own learning, which is a very necessary component of a learner-centered teaching. In fact, Weimer (2013) underscored five characteristics of learner-centered teaching, namely: (1) learner-centered teaching engages learners in the hard, messy work of learning, (2) learner-centered teaching includes explicit skills instruction, (3) it encourages learners to reflect on what they are learning and how they are learning it, (4) it motivates learners by giving them some control over learning processes; and (5) learner-centered teaching encourage collaboration.

Hence, the said characteristics put a premium on teachers to lead the learner to do more learning tasks, teach the learners to think, solve problems, evaluate evidence, analyze arguments, generate hypothesis and include assignment components in which the learners reflect, analyze and critique. They are learning how they are learning it.

Extent to which the Performance Standards were Developed

Table 3 presents the data on the extent to which the performance standards were developed by teachers among Grade 5 pupils.

As revealed in Table 3, the item on the learners can divide fractions; compare, order, and round decimals to the nearest one thousandth; add and subtract decimal numbers; use divisibility rules; and distinguish prime numbers from composite numbers got the highest mean score of 3.86, interpreted as "very satisfactorily developed." The item on the learners can identify, construct, and interpret double bar graphs and double line graphs; draw conclusions and make inferences from data represented in double bar graphs and double line graphs; calculate theoretical probability; and multiply and divide decimal numbers got the second to the highest mean score of 3.39, interpreted as "satisfactorily developed." While on the item the learners can apply the GMDAS rules with operations with fractions and decimals; illustrate and describe solid figures and their nets; determine the surface area of solid figures; distinguish between cubes and rectangular prisms, and estimate their volumes; and draw the image of an object after applying rotation about a point got the lowest mean score of 3.16 interpreted as "satisfactorily developed."

Table 3. *Extent to Which the Performance Standards were Developed by Teachers Among Grade 5 Pupils*

Performance Standards/Items	Mean	Interpretation
1. The learners can use 12- and 24- hour time; compare the time in world time zones with the time in the Philippines; use the GMDAS rules for 3 or more different operations; multiply fractions; and determine the area of a parallelogram, triangle, and trapezoid.	3.18	Satisfactorily Developed
2. The learners can divide fractions; compare, order, and round decimals to the nearest one thousandth; add and subtract decimal numbers; use divisibility rules; and distinguish prime numbers from composite numbers.	3.86	Very Satisfactorily Developed
3. The learners can identify, construct, and interpret double bar graphs and double line graphs; draw conclusions and make inferences from data represented in double bar graphs and double line graphs; calculate theoretical probability; and multiply and divide decimal numbers.	3.39	Satisfactorily Developed
4. The learners can apply the GMDAS rules with operations with fractions and decimals; illustrate and describe solid figures and their nets; determine the surface area of solid figures; distinguish between cubes and rectangular prisms, and estimate their volumes; and draw the image of an object after applying rotation about a point.	3.16	Satisfactorily Developed
Average Mean	**3.39**	**Satisfactorily Developed**

Further analysis showed that the extent to which the performance standards were developed was perceived as "satisfactorily developed," as indicated by the obtained average mean score of 3.39.

This result runs parallel to the Study of Tomas (2019), which also reported a satisfactorily development of the performance standards in General Mathematics for Grade 11.

The satisfactorily development of the performance standards implies that there is much to be done in order to move the satisfactorily development to an outstanding development in order for the students to demonstrate the standards with proficiency. Understanding and demonstrating the performance standards with proficiency would lead them to develop the lifelong skills needed in the 21st century to become job-ready in the future.

The extent to which Teachers utilized the Teaching and Learning Strategies

Table 4 presents the data on the extent to which the teaching and learning strategies were utilized by teachers in teaching Mathematics for Grade 5.

Table 4. *The Extent to Which the Teaching and Learning Strategies were Utilized by Teachers in Teaching Mathematics in Grade 5*

Learning Strategy	Mean	Interpretation
1. Learner-centered Teaching Strategy	3.43	Oftentimes Utilized
2. Performance-based Teaching and Learning Strategy	3.56	Oftentimes Utilized
3. Verbalization Learning Strategy	3.08	Sometimes Utilized
4. Concept Development Teaching Strategy	3.95	Oftentimes Utilized
5. Explorative Problem-Solving Teaching Strategy	3.13	Sometimes Utilized
Average Mean	**3.43**	**Oftentimes Utilized**

It could be gleaned that the highest mean obtained was 3.95, interpreted as "oftentimes utilized" for the item on the concept-driven teaching strategy. The second to the higher mean obtained was 3.43, interpreted as "oftentimes utilized", for the item on learner-centered teaching strategy. While the item on verbalization learning strategy got the lowest mean score of 3.08, interpreted as "sometimes utilized."

Further analysis showed that the extent to which the teaching and learning strategies were utilized by teachers in teaching Mathematics was perceived as "oftentimes utilized" as marked by the obtained average mean score of 3.43, which signals the need to develop the learner-centered teaching strategy in Mathematics, and real-life application activities for Grade 5.

The findings of this study run parallel to the Study of Babagay (2022), which also reported that sometimes utilization of the strategies in teaching Mathematics for Grade 8, which led the researcher to develop a self-initiated learning strategy in Mathematics, independent exploration of material resources and activities for Grade 8.

Extent to which the Instructional Procedures on Learner-centered Teaching Strategy were Undertaken

Table 5 presents the data on the extent to which the instructional procedures on learner-centered teaching strategy were undertaken by teachers in teaching Mathematics for Grade 5.

Table 5. *Extent to Which the Instructional on Learner-Centered Teaching Strategy*
Procedures were Undertaken

Items	Mean	Interpretation
1. Learning Objectives	3.13	Sometimes Undertaken
2. Learning Content	3.01	Sometimes Undertaken
3. Performance Standards	3.34	Sometimes Undertaken
4. Learner-Centered Teaching and Learning Activities	(3.13)	Sometimes Undertaken
4.1 Motivational Activities	3.14	Sometimes Undertaken
4.2 Developmental Activities	3.17	Sometimes Undertaken
4.3 Enrichment Activities	3.10	Sometimes Undertaken
5. Learning Assessment	(3.11)	Sometimes Undertaken
6. Real-life Application Activities	2.88	Sometimes Undertaken
7. Learning in Capsule	3.80	Oftentimes Undertaken
8. Assessment Review	3.88	Oftentimes Undertaken
9. Evaluation for Learning Adjustment	3.90	Oftentimes Undertaken
Average Mean	**3.35**	**Sometimes Undertaken**

Looking at the table, it can be seen that the items on learning in capsule, assessment review and evaluation for learning adjustment, the obtained average mean scores were 3.80, 3.88 and 3.90, all interpreted as "oftentimes undertaken," respectively. The items on learning objectives, learning content, performance standards, learner-centered teaching and learning activities, learning assessment and real-life application activities, the obtained average mean scores were 3.13, 3.01, 3.34, 3.13, 3.11, and 2.88, all interpreted as "sometimes undertaken," respectively.

Further analysis showed that the extent to which the instructional procedures on learner-centered teaching strategy were undertaken was perceived as "sometimes undertaken," as marked by the obtained average mean score of 3.35.

This implies that the teachers are wanting for the development of a learner-centered teaching strategy in Mathematics, real-life application activities for Grade 5.

The rationale behind in developing learner-centered teaching strategy in Mathematics, real-life application activities for Grade 5 is remarkably great as learner-centered teaching puts the teachers in a hot seat where they are guided to let students do more learning tasks, teach students how to think, solve problems, evaluate evidence, analyze arguments, generate hypotheses; and include assignment components in which students reflect, analyze and critique that they are learning and how they are learning it. The goal is to make students aware of themselves as learners and to make students aware of themselves as learners and to make learning skills something students want to develop.

Developing the Learner-Centered Teaching Strategy in Mathematics: Real-Life Application Activities for Grade 5

Eventually, the average performance in Mathematics, the satisfactory development of the performance standards, and the sometimes utilization of the teaching and learning strategies in teaching Mathematics led the researcher to develop the learner-centered teaching strategy in Mathematics, real-life application activities for Grade 5.

SUMMARY

This study aimed to develop the learner-centered teaching strategy in Mathematics, real-life application activities for Grade 5.

Specifically, this study sought to answer the following questions:

1. What is the performance level of the Grade 5 pupils in Mathematics?

2. To what extent do teachers develop the following performance standards among Grade 5 pupils

    2.1 The learners can use 12- and 24- hour time; compare the time in world time zones with the time in the Philippines; use the GMDAS rules for 3 or more different operations; multiply fractions; and determine the area of a parallelogram, triangle, and trapezoid 2.2 The learners can divide fractions; compare, order, and round decimals to the nearest one thousandth; add and subtract decimal numbers; use divisibility rules; and distinguish prime numbers from composite numbers

    2.3 The learners can identify, construct, and interpret double bar graphs and double line graphs; draw conclusions and make inferences from data represented in double bar graphs and double line graphs; calculate theoretical probability; and multiply and divide decimal numbers

    2.4 The learners can apply the GMDAS rules with operations with fractions and decimals; illustrate and describe solid figures and their nets; determine the surface area of solid figures; distinguish between cubes and rectangular prisms, and estimate their volumes; and draw the image of an object after applying rotation about a point

3. To what extent are the following teaching and learning strategies utilized by teachers in teaching Mathematics among Grade 5 pupils?

    3.1 Learner-centered Teaching Strategy

    3.2 Verbalization Learning Strategy

    3.3 Verbalization Learning Strategy

    3.4 Concept Development Teaching Strategy

    3.5 Explorative Problem-Solving Teaching Strategy

4. To what extent are the following instructional procedures on learner-centered strategy undertaken by teachers in teaching Mathematics among Grade 5 pupils?

    4.1 Learning Objectives

5. What real-life application activities on learner-centered teaching strategy in Mathematics for Grade 5 may be developed based on the findings of the study?

The researcher used the descriptive survey method to describe the performance level of the Grade 5 pupils in Mathematics and to describe other variables used in this study.

A total of 430 pupil-respondents, 26 teachers teaching Mathematics, 23 subject area coordinators and 23 school heads of the respondent-schools were involved in this study which was conducted during the school year 2025-2026. A 50-item achievement test and a survey questionnaire prepared by the researcher were used as instruments to gather the needed data. The data were tabulated through frequency counts, mean percentage score and weighted mean.

FINDINGS

After several computations were made on the data gathered, the following findings were revealed:

1. On the performance level of the Grade 5 pupils in Mathematics, it was revealed that the students achieved an average performance as indicated by the obtained average mean percentage score of 52.55. The findings significantly point out that the Grade 5 pupils' performance level in Mathematics needs improvement to go beyond the performance target of 75% of the division. Hence, there is a need to develop a learner-centered teaching strategy in Mathematics, with real-life application activities for Grade 5.

2. The extent to which teachers developed the performance standards was perceived as satisfactorily developed, as indicated by the obtained average mean score of 3.39, which significantly points to the development of the learner-centered teaching strategy in Mathematics, real-life application activities for Grade 5.

3. On the extent to which the teaching and learning strategies were utilized by teachers in teaching, it was revealed that the teachers were "oftentimes utilizing" as indicated by the achieved average mean of 3.43.

4. On the extent to which the instructional procedures on learner-centered teaching strategy were undertaken, it was perceived as sometimes undertaken, as marked by the obtained average of 3.35.

CONCLUSIONS

Based on the findings of the study, the following conclusions were reached.

1. The average performance of the Grade 5 pupils in Mathematics led the researcher to develop a learner-centered teaching strategy in Mathematics and real-life application activities for Grade 5.

2. The satisfactory development of the performance standards, the oftentimes utilization of the teaching and learning strategies, and the sometimes undertaking of the instructional procedure led the researcher to develop the learner-centered teaching strategy in Mathematics, real-life application activities for Grade 5.

RECOMMENDATIONS

Based on the findings of the study and the conclusions drawn, the following suggestions are hereby recommended.

1. To improve the performance level of the Grade 5 pupils in Mathematics, maximum utilization of the developed learner-centered teaching strategy in Mathematics, and real-life application activities for Grade 5 are encouraged.

2. This study should be replicated in order to compare results and come up with strategies that would certainly improve the performance level of the pupils.

REFERENCES

Aquino, G. V. (2009). *Facilitating human learning*. Rex Book Store.

Babagay, B. C. (2022). *Self-initiated learning strategy in mathematics: Independent exploration of material resources and activities for Grade 8* (Unpublished master's thesis). Asian Development Foundation College, Tacloban City.

Baustista, C. (2020). *Reflective journal and life application in teaching mathematics for Grade 10: Collaborative learning strategy* (Unpublished master's thesis). Asian Development Foundation College, Tacloban City.

Bawejan-Oberoi, M. (2015). Strategies to improve concept development. *International Journal of Science and Research*, 6(3). https://www.ijsr.net/archive/v6i3/ART20171932

Cayondong, J. Z. (2023). *Inquiry-based teaching strategy in general mathematics: Reflective learning activities for Grade 11* (Unpublished master's thesis). Asian Development Foundation College, Tacloban City.

Department of Education. (2023). *Enhanced K to 10 curriculum guide: Grade 5*. Department of Education.

Gajol, N. (2025). *Concept-driven strategy in teaching mathematics: Explorative learning activities for Grade 8* (Unpublished master's thesis). Asian Development Foundation College, Tacloban City.

Gongora, F. M. (2025). *Problem-solving teaching strategy in mathematics: Technology integration model of activities for Grade 7* (Unpublished master's thesis). Asian Development Foundation College, Tacloban City.

Gontiñas, D. R. (2023). *Explorative learning strategy in mathematics: Self-study activities for Grade 8* (Unpublished master's thesis). Asian Development Foundation College, Tacloban City.

Khosrow-Pour, M. (2018). Performance level. In *Encyclopedia of information science and technology* (4th ed.). IGI Global. https://www.igi-global.com/dictionary/performance-level

Leonard, D. (2024). Real-world activities that engage students. *Edutopia*. https://www.edutopia.org/article/making-math-tangible/

Merriam-Webster. (2014). *The Merriam-Webster dictionary* (International ed.). Merriam-Webster, Inc.

Monsanto, J. B. C. (2012). *E-self-learning modular instruction in general mathematics: Web-enhanced activities for Grade 11* (Unpublished master's thesis). Asian Development Foundation College, Tacloban City.

NTC Corporate. (2022). Real-world connections: Key factors in learning. https://ntccorporate.com/blog/real-world-connections/

Palamos, J. (2017). *Intensive interactive program in mathematics for kindergarten* (Unpublished master's thesis). Asian Development Foundation College, Tacloban City.

Paxton, E. (2023). What is the difference between content standards and learning standards? https://k12teacherstaffdevelopment.com/tlb/what-is-the-difference-between-content-standards-and-learning-standards/

Province of Southern Leyte. (n.d.). Liloan location. https://southernleyte.gov.ph/liloan/liloan-location/

SMEA. (2025). *Performance level of the Grade 5 pupils, first quarter, school year 2025–2026.*

Tomas, D. C. (2019). *Collaborative learning strategy in teaching general mathematics for Grade 11: Reflective journal and life application* (Unpublished master's thesis). Asian Development Foundation College, Tacloban City.

Tzenios, N. (2022). Learner-centered teaching. https://www.researchgate.net/publication/366411540_LEARNER-CENTERED_TEACHING

Viñas, L. A. E. (2021). *Analytical visual strategy in mathematics: Experiential-based activities for kindergarten* (Unpublished master's thesis). Asian Development Foundation College, Tacloban City.

Von Bertalanffy, L. (2008). Basic concepts of the systems approach. https://saylordotorg.github.io/text_mastering-public-relations/s07-02-systems-theory-approach.html

Weimer, M. (2013). *Learner-centered teaching: Five key changes to practice*. University of California, Merced. https://teach.ucmerced.edu/sites/g/files/ufvvjh1831/f/page/documents/book-summary-learner-centered-teaching-by-maryellen-weimer_1.pdf