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Analytical and Numerical Skills of Senior High School Students

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ABSTRACT

This study investigated the numerical and analytical skills of Senior High School students at Kananga National High School during the 2025–2026 academic year. The primary objective was to assess students' proficiency in numerical skills, including basic number knowledge, calculation, interpretation of mathematical information, and data analysis. Analytical skills were also evaluated, with a focus on problem identification, information gathering, solution development, and testing. The research compared skill levels between Grade 11 and Grade 12 students and recommended a mathematics intervention program informed by the findings. A descriptive research design was employed. From a population of 695 Senior High School students, 248 participants were selected through stratified random sampling to ensure fair representation across grade levels and strands in both Academic and Technical-Vocational-Livelihood tracks. Data collection utilized a researcher-made questionnaire comprising 20 items—10 assessing numerical skills and 10 assessing analytical skills—based on established indicators and the framework of Cababat and Pespeñan (2023). Data analysis involved mean and percentage scores, along with descriptive interpretation. The results indicated that Grade 11 students demonstrated proficiency in both numerical and analytical skills. Grade 12 students demonstrated proficiency in analytical skills, but showed only partial proficiency in numerical skills. Performance differences also appeared across strands. Humanities and Social Sciences students displayed stronger analytical skills. Technical-Vocational-Livelihood students exhibited comparatively lower numerical proficiency. The findings underscore the need to continuously strengthen basic numerical skills and develop targeted mathematics intervention programs, particularly for students in Grade 12 and those pursuing Technical and Vocational Livelihood education. Such initiatives are crucial for enhancing students' preparedness for higher education and employment.

Keywords: *Analytical skills, Mathematics proficiency, Mathematics Intervention, Numerical skills; Senior High School students*

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INTRODUCTION

Mathematics education fosters logical reasoning, analytical thinking, and problem-solving skills, which are essential for academic achievement and practical applications across various fields, including business, engineering, and technology, as well as in everyday decision-making (e.g., computation, interpretation, and reasoning). Recent research indicates that problem-solving-oriented teaching methods enhance students' procedural fluency, understanding, reasoning, and reflective abilities in mathematics. For example, discovery-learning models have been shown to improve student performance and engagement.

Despite the use of innovative teaching methods, many students continue to struggle with basic mathematical skills. These challenges often stem from deficiencies in key cognitive and metacognitive abilities. These abilities include number sense, conceptual understanding, visualization, and the ability to translate real-life situations into mathematical problems. Tambychik and Meerah (2010) noted that lacking these foundational skills impedes students' ability to engage with advanced mathematics. Recent studies also confirm that students persistently encounter obstacles in problem-solving and reasoning, even with revised instructional approaches (Jaudinez, 2019).

At the global level, international assessments continually reveal critical gaps in mathematics achievement among Filipino learners. In the Programme for International Student Assessment (PISA) 2022, the Philippines scored 355 in mathematics. This is significantly below the OECD average of 472. Only about 16% of Filipino students attained at least the baseline Level 2 proficiency. This indicates that most lack the basic mathematical competencies necessary to interpret and solve real-world problems (PISA 2022 Results (Volume I and II) - Country Notes: Philippines, n.d.). These results show minimal improvement from the 2018 cycle. Filipino students consistently rank among the lowest performers in mathematics internationally.

International reports indicate that Filipino students exhibit elevated levels of mathematics anxiety. This anxiety negatively impacts their engagement and performance in mathematics. Students with weak foundational skills are more likely to experience anxiety. This leads to avoidance of mathematics and increased difficulty in mastering advanced concepts (Atienza, 2024).

Local studies corroborate these persistent challenges. Research in secondary schools has revealed that many Filipino students encounter difficulties in mathematical problem-solving, frequently making errors in comprehending word problems, executing procedures, and applying problem-solving strategies (Liberato & Garcia, 2000). These findings raise concerns regarding students' preparedness for complex mathematical tasks and highlight the necessity for improved instructional methods and targeted support.

A recent study by Cababat and Pespeñan (2023) assessed the numerical and analytical skills of Grade 11 students at Talisay City National High School. Both the Academic and Technical-Vocational-Livelihood (TVL) strands demonstrated *developing* numerical skills. Analytical proficiency was somewhat stronger among Academic Track students, but still *insufficient*, especially for TVL students. These results affirm the need for mathematics enrichment and remediation programs to address existing learning gaps.

Despite these insights, a gap remains in the literature regarding comprehensive evaluations of numerical and analytical skills across the entire Senior High School population in Philippine

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public schools. Most existing studies have focused on specific grade levels or strands, particularly Grade 11. This leaves the progression and readiness of Grade 12 students less examined (Suminguit & Despojo, 2022). Grade 12 learners have been exposed to more advanced mathematics content and increasingly complex reasoning tasks. Expanding research to include both cohorts is necessary to gain a comprehensive understanding of holistic mathematics readiness prior to higher education or employment.

To address this gap, the present study examines the numerical and analytical skills of all Senior High School students at Kananga National High School. By including both Grade 11 and Grade 12 cohorts, the research provides a comprehensive assessment of students' mathematical competencies. The findings aim to inform the development of targeted instructional strategies and support programs that enhance mathematics performance, strengthen foundational skills, and prepare students for future educational and employment opportunities.

This study aims to determine the level of proficiency in the numerical and analytical skills of Senior High School students at Kananga National High School.

Specifically, it sought to answer the following questions:

1. What is the level of numerical skills of Senior High School students by grade level (Grade 11 and Grade 12) and by academic strand (ABM, GAS, HUMSS, and TVL–EIM)?
2. What is the level of analytical skills of Senior High School students by grade level (Grade 11 and Grade 12) and by academic strand (ABM, GAS, HUMSS, and TVL–EIM)?
3. How do the numerical skills of Grade 11 students compare with those of Grade 12 students?
4. How do the analytical skills of Grade 11 students compare with those of Grade 12 students?
5. What mathematics intervention program may be proposed based on the findings to improve students' numerical and analytical skills?

Literature Review

Education helps students acquire the knowledge and skills they need for both academic and real-life challenges. In math, building numerical and analytical skills is important because these support logical thinking, problem-solving, and good decision-making. In the Philippines, this focus is part of the Enhanced Basic Education Act of 2013 (Republic Act No. 10533), which established the K–12 curriculum and emphasized skills-based learning. The law designates math as a key subject for preparing students for higher education, the workforce, and everyday problem-solving.

Further reinforcing this mandate, the Philippine Qualifications Framework Act of 2018 (Republic Act No. 10968) emphasizes the alignment of educational outcomes with industry-relevant and life skills. This framework stresses that learners must demonstrate measurable competencies, including numerical reasoning and analytical thinking, to function effectively in both academic and occupational settings. Supporting these national policies, the Department of Education (DepEd) Senior High School Curriculum Guides (2020–2024) specify learning competencies for both Academic and Technical-Vocational-Livelihood (TVL) tracks, highlighting proficiency in computation, data interpretation, problem analysis, and logical reasoning as essential learning outcomes.

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Numerical Skills in Mathematics Education

Mathematical competence refers to an individual's ability to understand mathematical concepts, recognize relationships among ideas, and apply these concepts to solve problems in various contexts (Tong et al., 2020). Within this construct, numerical skills—including number sense, arithmetic operations, estimation, and procedural fluency—form the foundation of higher-level mathematical learning. Recent studies affirm that strong numerical skills are closely linked to improved academic performance and cognitive development. For instance, Wortham, Moore, and Nguyen (2023) emphasized that mastery of basic numerical abilities strongly predicts success in advanced mathematical problem-solving and reasoning tasks.

Additionally, Tsani et al. (2020) noted that numerical ability involves not only conceptual understanding but also speed and accuracy in computation, which are critical for effective decision-making in daily life. Contemporary research further suggests that students with weak numerical foundations are more likely to struggle with complex problem-solving and data interpretation tasks, particularly in senior secondary education (OECD, 2023). These findings indicate that deficiencies in numerical skills can have long-term consequences for academic achievement and workforce readiness.

Numeracy affects more than just school performance. A recent study by Parsons and Bynner (2021) found that individuals with low numeracy skills often face fewer job opportunities and limited social mobility. This demonstrates that developing strong numerical skills is essential for life, not just for academic pursuits.

Analytical Skills and Mathematical Problem-Solving

Alongside numerical proficiency, analytical skills are essential in mathematics learning, particularly for interpreting information, identifying problems, and developing logical solutions. Analytical thinking involves breaking down complex information, recognizing patterns, evaluating evidence, and drawing reasoned conclusions (Rahman, 2021). In mathematics education, these skills are closely associated with higher-order thinking and problem-solving abilities.

Recent studies emphasize that effective mathematical problem-solving requires integrating multiple cognitive processes, including critical thinking, reasoning, and decision-making. Robbins and Judge (2022) highlighted that analytical reasoning enables learners to evaluate alternative solutions and justify their answers using logical arguments. Similarly, Aunio, Mononen, and Räsänen (2021) proposed a framework for developing core mathematical competencies that integrates number sense, conceptual understanding, and strategic problem-solving, demonstrating practical approaches to fostering analytical skills in classroom settings.

Research by the OECD (2022) found that students with strong analytical skills can more effectively apply their mathematical knowledge to new, real-world situations, a key indicator of mathematical literacy. This highlights the need to develop both analytical reasoning and numerical skills in high school.

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Foreign Studies on Numerical and Analytical Skills

International studies further underscore the importance of developing numerical and analytical skills. Guill, Lüdtke, and Köller (2017) found that students in vocational tracks in Germany tended to exhibit lower mathematical competencies than those in academic tracks. More recent analyses confirm that curricular focus and instructional exposure continue to influence the development of mathematical reasoning skills across educational tracks (OECD, 2023).

In Southeast Asia, updated studies indicate that many students continue to experience difficulties in mathematical problem-solving due to weak foundational skills and limited exposure to analytical reasoning tasks (Ng & Widjaja, 2020). These findings align with earlier research, highlighting the persistent nature of these challenges despite curriculum reforms.

Local Studies in the Philippine Context

Local research aligns with international findings and highlights similar trends among Filipino learners. Cababat and Pespeñan (2023) assessed the numerical and analytical skills of Grade 11 students in a public secondary school and found that both Academic and TVL students were generally at developing levels of numerical proficiency. While Academic Track students demonstrated relatively stronger analytical skills, TVL students showed notable gaps, particularly in problem-solving and data interpretation.

Additionally, Cerbito (2020) emphasized that students' attitudes toward mathematics significantly influence their performance, with positive attitudes leading to higher achievement, especially in strands with strong mathematical components. More recently, Dela Cruz and Rivera (2022) reported that students in Academic tracks consistently outperformed their TVL counterparts in analytical problem-solving tasks, suggesting that curriculum structure and instructional emphasis play a critical role in shaping mathematical competence.

Synthesis of the Literature

In summary, literature from 2020 to 2025, together with current policies and theoretical frameworks, demonstrates that numerical and analytical skills are essential for academic achievement, workforce readiness, and effective problem-solving in daily life. Both international and local studies consistently identify persistent gaps in these competencies, particularly among students in vocational tracks. These findings underscore the importance of targeted instructional and enrichment programs to address specific skill deficiencies. Developing these skills in Senior High School students is critical for achieving national education objectives and preparing learners for further study, employment, and lifelong learning.

METHODOLOGY

This study employed a descriptive research design, which is appropriate for obtaining a systematic and accurate description of the numerical and analytical skills of Grade 11 and 12 students at Kananga National High School. The descriptive method was chosen because it allows the researcher to collect, organize, analyze, and interpret data regarding the current proficiency

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levels of students without manipulating any variables. This design is particularly suited for educational research where the goal is to determine existing conditions, compare performances across different academic strands, and identify gaps in skills that may inform instructional interventions. By using this method, the study aims to provide a clear understanding of the students' competencies in numerical and analytical skills and to form the basis for proposed enrichment or remedial programs in mathematics.

Participants

The participants in the study will be Grade 11 and Grade 12 students enrolled at Kananga National High School, located in San Agustin, Brgy. Poblacion, Kananga, Leyte, during School Year 2025–2026. The total population will consist of 695 students, with 281 from Grade 11 and 357 from Grade 12. These students will belong to the academic strands ABM (Accountancy, Business, and Management), GA (General Academic), HUMSS (Humanities and Social Sciences), and TVL-EIM (Technical-Vocational-Livelihood – Electrical Installation and Maintenance).

Instruments of the Study

The primary instrument of this study was a researcher-made questionnaire, which was used to assess both numerical and analytical skills of the students. The questionnaire was divided into two sections:

1. Numerical Skills Section – This section consisted of ten (10) items designed to evaluate the students' competence in performing basic arithmetic operations, interpreting mathematical information, applying formulas, and solving calculation-based problems.
2. Analytical Skills Section – This section also contained ten (10) items aimed at assessing the students' abilities in problem-solving, logical reasoning, analyzing data, making conclusions, and applying mathematical concepts in real-life contexts.

To ensure content validity, the questionnaire was validated by a Master Teacher. Furthermore, a pilot test was conducted with a small group of students not included in the main study to establish reliability and ensure clarity of instructions and questions. To strengthen the transparency and consistency of the research instrument, the results of the pilot test were analyzed using Cronbach's alpha. The pilot test was conducted among 30 Senior High School students who were not included in the main sample.

The Numerical Skills subscale yielded a Cronbach's alpha coefficient of 0.82, indicating good internal consistency. The Analytical Skills subscale yielded a Cronbach's alpha of 0.85, indicating good reliability. The overall reliability coefficient of the questionnaire was 0.84, suggesting that the instrument is sufficiently reliable for assessing the numerical and analytical skills of Senior High School students. These values meet the acceptable reliability threshold recommended in educational research ($\alpha \geq 0.70$).

The students' responses were scored and interpreted based on a proficiency scale: 81–100% as Advanced, 61–80% as Proficient, 41–60% as Approaching Proficiency, 21–40% as Developing, and 0–20% as Beginning.

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Procedure

The study followed a series of carefully planned steps to ensure that data collection was both accurate and ethically conducted. First, the researcher obtained permission from the school principal and the research coordinator of Kananga National High School to conduct the study. Once approval was granted, the researcher proceeded to develop the research instrument, which was a questionnaire designed to assess the numerical and analytical skills of the students. To ensure its validity, clarity, and relevance to the study objectives, the questionnaire underwent a validation process and was pilot-tested with a small group of students who were not included in the main study.

After the instrument was finalized, the researcher informed the students about the study's purpose, procedures, and the voluntary nature of their participation. Written consent was obtained from all participants, indicating their willingness to participate in the research. Following this, the validated questionnaire was administered to the selected participants under controlled and supervised conditions. This approach minimized potential bias and ensured that the responses reflected the individual skills of each student.

Finally, upon completion of the questionnaire, the researchers collected all responses, which were then carefully retrieved, tabulated, and organized for analysis. The collected data were coded to maintain participant confidentiality and facilitate efficient statistical processing. These steps ensured that the study was conducted in an organized, ethical, and systematic manner, providing reliable data for assessing students' numerical and analytical skills.

Ethical Considerations

The study adhered to strict ethical standards to protect the rights and welfare of the participants. Participation in the study was voluntary, and students were informed that they could withdraw at any time without consequence. Confidentiality was maintained by coding the responses and ensuring that personal information was not disclosed. Written informed consent was obtained from all participants, and they were provided with a clear explanation of the study's purpose and procedures. The researcher ensured that the data collection process caused no physical or psychological harm, and all information gathered was used solely for research purposes.

Statistical Treatment of Data

The data collected from the questionnaires were analyzed using descriptive statistical methods, which are suitable for summarizing and interpreting the students' numerical and analytical skills. The following procedures were employed:

1. **Mean Scores** – The mean scores of the students' responses were calculated to determine the average performance in both numerical and analytical skills.
2. **Percentage Scores** – Percentage scores were computed to categorize the proficiency levels of students according to the established rubric: Advanced, Proficient, Approaching Proficiency, Developing, or Beginning.

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3. **Frequency and Distribution Tables** – These were used to present the results across different strands and grade levels, allowing comparison of students' performance in numerical and analytical skills.
4. **Interpretation of Results** – The statistical outcomes were interpreted narratively to provide insights into the strengths and weaknesses of students, which served as the basis for proposing interventions such as enrichment programs and remedial activities.

Through this methodology, the study aimed to provide a clear and comprehensive understanding of the proficiency levels of Grade 11 and 12 students in Kananga National High School, helping educators identify gaps in learning and improve instructional strategies in mathematics.

RESULTS AND DISCUSSIONS

The findings are presented in tabular form and are followed by interpretations and discussions that are supported by relevant literature. This chapter aims to provide a clear analysis of the students' performance and to explain the implications of the results in relation to existing studies on the development of numerical and analytical skills

Numerical Skills of Senior High School Students

Numerical skills are a student's ability to do basic calculations, understand numerical information, and use math concepts to solve problems. These skills are important because they lay the foundation for advanced mathematical thinking and solving real-life problems (Ehlers, 2025).

Table 1. *Grade 11 Numerical Skills by Strand*

Strand	Mean Score	Percentage Score	Interpretation
Accountancy, Business and Management	7.45	75%	Proficient
General Academic Strand	7.30	75%	Proficient
Humanities and Social Sciences	8.20	82%	Advanced
Industrial Arts – Electrical Installation and Maintenance	6.60	66%	Proficient
Grand Mean	**7.39**	**74%**	**Proficient**

Table 1 shows the numerical skill levels of Grade 11 students in different strands. The overall average is 7.39 (74%), which is considered Proficient. This means that most Grade 11 students can perform basic calculations, understand numerical data, and apply math concepts effectively.

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Among the strands, the Humanities and Social Sciences (HUMSS) recorded the highest mean score (8.20 or 82%), indicating an Advanced level. This finding suggests that HUMSS students exhibit strong numerical competence despite the strand's limited emphasis on mathematics. This may be attributed to their developed critical thinking and reasoning skills, which support their ability to solve numerical problems. According to Leongson and Limjap (2003), logical reasoning and comprehension skills significantly contribute to mathematical performance, even among students who do not specialize in mathematics.

The ABM and GAS strands both achieved a Proficient level, which is expected given their regular exposure to quantitative tasks and general academic subjects. Meanwhile, the IA–EIM strand obtained the lowest mean score among the strands but remained within the Proficient level, suggesting that students possess adequate numerical skills necessary for technical and vocational applications. This supports the findings of Mamolo (2019), who stated that TVL-related strands often demonstrate functional, yet application-focused, numerical competence.

Analytical Skills of Grade 11 Students

Analytical skills are the ability to identify problems, analyze information, and develop logical solutions. These skills are linked to higher-level thinking and making decisions.

Table 2. *Grade 11 Analytical Skills by Strand*

Strand	Mean Score	Percentage Score	Interpretation
Accountancy, Business and Management	7.25	73%	Proficient
General Academic Strand	7.60	76%	Proficient
Humanities and Social Sciences	8.00	80%	Proficient
Industrial Arts – Electrical Installation and Maintenance	6.90	69%	Proficient
Grand Mean	**7.44**	**75%**	**Proficient**

Table 2 shows that the average analytical skill score for Grade 11 students is 7.44 (75%), indicating Proficient proficiency. This means most students can analyze situations, make logical conclusions, and use reasoning to solve problems.

The HUMSS strand achieved the highest mean score, which can be attributed to its curriculum's focus on critical thinking, interpretation, and analysis of social issues. Montaku et al. (2012) emphasized that analytical thinking is strengthened through continuous exposure to reasoning-based tasks, which are prominent in humanities-related subjects.

All strands fell under the Proficient category, suggesting a relatively balanced development of analytical skills among Grade 11 students. This finding aligns with Rahman (2019), who asserted that analytical thinking is a core 21st-century skill developed through interdisciplinary learning experiences.

Numerical Skills of Grade 12 Students

Table 3. *Grade 12 Numerical Skills by Strand*

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Strand	Mean Score	Percentage Score	Interpretation
Accountancy, Business and Management	7.63	76%	Proficient
General Academic Strand	6.30	63%	Proficient
Humanities and Social Sciences	4.60	46%	Approaching Proficiency
Industrial Arts – Electrical Installation and Maintenance	5.10	51%	Approaching Proficiency
Grand Mean	**5.91**	**59%**	**Approaching Proficiency**

Table 3 reveals that the overall numerical skills of Grade 12 students are at the Approaching Proficiency level, as shown by the grand mean of 5.91 or 59%. This suggests that while students possess basic numerical knowledge, they struggle to apply these skills consistently and accurately.

The ABM strand maintained a Proficient level, which is consistent with its strong emphasis on numerical reasoning and financial literacy. In contrast, the HUMSS and IA–EIM strands showed an Approach to Proficiency, suggesting gaps in foundational numerical skills. According to Tambychik and Meerah (2010), students often struggle in mathematics due to insufficient mastery of basic computation and interpretation skills, which may explain the decline in performance at the Grade 12 level.

Analytical Skills of Grade 12 Students

Table 4. *Grade 12 Analytical Skills by Strand*

Strand	Mean Score	Percentage Score	Interpretation
Accountancy, Business and Management	6.88	69%	Proficient
General Academic Strand	6.30	63%	Proficient
Humanities and Social Sciences	8.30	83%	Advanced
Industrial Arts – Electrical Installation and Maintenance	5.20	52%	Approaching Proficiency
Grand Mean	**6.67**	**67%**	**Proficient**

As shown in Table 4, the grand mean of 6.67. Table 4 shows that Grade 12 students have an average analytical skill score of 6.67 (67%), indicating proficiency. The HUMSS strand reached the Advanced level, showing the importance of analytical reasoning in humanities subjects. This supports Robbins (2011), who said that analytical skills develop through problem identification, evaluation, and reasoning.

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However, the IA–EIM strand remained at the Approaching Proficiency level, suggesting the need for targeted interventions to enhance analytical reasoning. Guill et al. (2017) noted that students in non-academic tracks often exhibit lower analytical performance due to a greater emphasis on practical skills.

Table 5. *Comparison of Numerical and Analytical Skills of Grade 11 and Grade 12 Students*

Grade Level	Skill Type	Percentage Score	Interpretation
Grade 11	Numerical Skills	74%	Proficient
Grade 12	Numerical Skills	59%	Approaching Proficiency
Grade 11	Analytical Skills	75%	Proficient
Grade 12	Analytical Skills	67%	Proficient

Table 5 presents a comparison of the numerical and analytical skills of Grade 11 and Grade 12 students. The results reveal that Grade 11 students performed better in numerical skills than Grade 12 students. The decline in numerical skills at the Grade 12 level suggests increasing difficulty in applying mathematical concepts as academic demands rise. This finding supports Tambychik and Meerah (2010), who emphasized that weaknesses in foundational numerical skills become more evident as mathematical tasks become more complex.

In contrast, analytical skills remained at a proficient level for both Grade 11 and Grade 12 students, although Grade 11 students performed slightly better than Grade 12 students. This suggests that analytical reasoning skills are retained but not significantly enhanced across grade levels. Rahman (2019) noted that analytical skills require continuous reinforcement to improve over time.

Comparison of Mathematical Competencies Between Grade 11 and Grade 12

The observed decline in numerical skills from Grade 11 to Grade 12 can be explained by differences in the mathematical competencies emphasized at each level. In Grade 11, mathematics subjects primarily focus on foundational competencies, including basic algebra, functions, simple statistics, and problem interpretation. These competencies emphasize procedural fluency, basic computation, and direct application of formulas, which align closely with the numerical skills measured in this study.

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In contrast, Grade 12 mathematics subjects require students to engage with more advanced and abstract concepts, including inferential statistics, business mathematics, and complex problem-solving tasks. These subjects demand not only numerical accuracy but also higher levels of conceptual understanding, multi-step reasoning, and integration of prior knowledge. Students who have not fully mastered foundational numerical skills may struggle to cope with these increased cognitive demands, resulting in lower performance in numerical assessments.

While numerical performance declined, analytical skills remained at a proficient level in Grade 12. This suggests that, although students experience difficulty with computation and numerical accuracy, their ability to analyze problems, interpret information, and apply logical reasoning remains relatively intact. This may be attributed to increased exposure to research-based tasks, performance outputs, and real-life problem situations in Grade 12 subjects, particularly in the Humanities and Social Sciences strand.

Conclusions

This study examined the numerical and analytical skills of Senior High School students at Kananga National High School. The findings indicate that most students possess adequate analytical skills, with both Grade 11 and Grade 12 students achieving proficiency in analytical reasoning. This proficiency reflects their ability to identify problems, analyze information, and apply logical reasoning to mathematical tasks. However, numerical skills were comparatively weaker, particularly among Grade 12 students, whose performance declined to the level of approaching proficiency. This trend suggests that as mathematical content becomes more complex, students encounter greater challenges in applying basic numerical skills such as computation and data interpretation.

The results also show that Grade 11 students did better than Grade 12 students in both numerical and analytical skills. The drop in Grade 12 performance, especially in numerical skills, may be due to insufficient practice with basic concepts, higher academic demands, or difficulty applying earlier learning to more challenging tasks. This points to the need for ongoing development of math skills at all grade levels.

There were also differences in skill levels among academic strands. Humanities and Social Sciences students often demonstrated higher analytical skills, sometimes reaching advanced levels, likely because their strand emphasizes critical thinking and reasoning. In contrast, Technical-Vocational-Livelihood–Electrical Installation and Maintenance students were usually proficient or near-proficient, especially in numerical skills. This highlights the importance of balancing technical training with academic skills for well-rounded student development.

In summary, the study confirms the essential role of numerical and analytical skills for Senior High School students. While analytical reasoning appears stable, numerical skills require increased instructional emphasis. The results highlight the necessity for targeted support programs to address learning gaps and better prepare students for higher education, employment, and real-world problem-solving.

Limitations of the Study

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This study has several limitations that should be taken into account when interpreting the findings. First, the research relied solely on quantitative data gathered through a questionnaire, which may not fully capture students' learning experiences, attitudes, and motivations toward mathematics. Factors such as mathematics anxiety, self-confidence, and study habits were not directly measured but may have influenced student performance.

Second, the study was conducted in a single public secondary school, which may limit the generalizability of the results to other schools with different student populations, resources, or instructional practices. Additionally, the transition to more advanced and strand-specific subjects in Grade 12 may have contributed to performance differences, but this factor was not explored in depth.

Future studies may address these limitations by incorporating qualitative methods, such as interviews or focus group discussions, to gain a deeper understanding of students' perspectives, as well as by including a larger and more diverse sample across multiple schools.

Recommendations

Based on the findings of the study, the following recommendations are proposed to enhance the numerical and analytical skills of Senior High School students, particularly those in Grade 12 and in the Technical-Vocational-Livelihood (TVL) strand:

1. **Implementation of a Structured Mathematics Intervention Program**
   The school should implement a structured Mathematics Intervention Program that focuses on strengthening foundational numerical skills, including basic computation, fractions, percentages, ratios, and data interpretation. Priority should be given to Grade 12 students, who demonstrated a decline in numerical proficiency.

2. **Regular Remediation Sessions**
   Weekly or bi-weekly remediation sessions should be conducted for students identified as approaching proficiency or developing levels in numerical skills. These sessions may include guided practice, short drills, step-by-step problem-solving exercises, and contextualized mathematical tasks aligned with students' strands.

3. **Strand-Based Applied Mathematics Activities**
   Mathematics instruction should incorporate strand-based activities to enhance relevance and application. For instance, ABM students may engage in business and financial computations, HUMSS students may analyze statistical data related to social issues, and TVL students may focus on measurement, estimation, and technical problem-solving tasks.

4. **Problem-Solving and Analytical Reasoning Workshops**
   The school may organize periodic problem-solving workshops to strengthen students' analytical skills. These activities may involve collaborative group tasks, case-based problems, and guided analysis of complex mathematical situations to promote higher-order thinking.
5. **Peer Tutoring and Mentoring Program**

A peer tutoring or mentoring system may be established wherein high-performing students assist classmates during remediation and enrichment sessions. This approach can help improve understanding, increase confidence, and reduce mathematics anxiety.

6. **Continuous Monitoring and Formative Assessment**
   Teachers should regularly administer formative assessments such as short quizzes, performance-based tasks, and reflective exercises to monitor students' progress. Assessment results should be used to guide instructional adjustments and identify students who require immediate intervention.
7. **Professional Development for Mathematics Teachers**
   School administrators should support continuous professional development programs for mathematics teachers, focusing on differentiated instruction, innovative teaching strategies, and effective assessment practices that aim to strengthen both numerical and analytical skills.
8. **Directions for Future Research**
   Future studies may incorporate qualitative approaches, such as interviews or focus group discussions, to investigate factors like students' attitudes toward mathematics and math anxiety. Conducting similar studies in other schools or districts is also recommended to enhance the generalizability of the findings.

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