



Project SAYON (Student Aid Yielding Outstanding Numeracy): Enhancing Students' Mathematical Proficiency

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ABSTRACT

This study examined the effect of Project SAYON on the math proficiency of Grade 10 students at Luna National High School. Using a pre-experimental design, the study measured students' mathematical proficiency before and after the implementation of the project. The pre-test results showed a satisfactory level of proficiency, while the post-test results indicated a very satisfactory improvement. The findings revealed a significant difference between the pre-test and post-test scores, confirming the effectiveness of Project SAYON. The study concludes that Project SAYON is a valuable tool for enhancing math skills and recommends its adoption and expansion in the school curriculum. Additionally, it suggests regular teacher training, resource provision, and parental involvement to support the program's success. These findings highlight the potential of structured educational programs to significantly improve student performance in mathematics.

INTRODUCTION

In the last few years, learning and teaching have come to depend on having a solid grasp of mathematical proficiency. Research has high significance, particularly in global educational reforms over the past 15 year despite its growing importance, mathematical proficiency remains somewhat vague and is not fully grasped by educators. Further exploration into how to better define and communicate the concept of mathematical proficiency can enhance teachers' ability to foster this essential skill among students (Sa'dijah et al., 2023).

In an Indonesian study, researchers investigated the mathematical proficiency of students. One analysis revealed that the students did not meet established standards for mathematical proficiency. Specifically, none of the students demonstrated proficiency at high or medium levels. Among male students, there was a notable weakness in formulating and planning strategies, although they showed relative strength in communication and utilization of mathematical symbols, formal language, techniques, and operations. Similarly, female students exhibited low proficiency in formulating and planning strategies but excelled in communication and utilization of mathematical symbols, formal

language, techniques, and operations. Furthermore, the study delved into the reasons behind the low mathematical proficiency observed among eighth-grade students at SMP Negeri 9 Kendari Junior High School (Salim et al., 2018).

In the Philippines, many junior high school students struggle with mathematical proficiency, encountering difficulties that extend beyond rote memorization of formulas. These challenges often stem from a lack of foundational understanding of mathematical principles, making problem-solving tasks daunting and fostering negative attitudes towards the subject. This widespread struggle underscores systemic issues within math education (Faustino, 2022).

In Tagum City, Davao del Norte, a study found that students struggled with mathematical proficiency. Common challenges included difficulty in analyzing problems, understanding concepts, identifying correct solutions, and simplifying expressions. Students also faced issues with self-perseverance, seeking expert help, studying, practicing regularly, and building confidence in their mathematical abilities. The study recommended that teachers teach problem-solving procedures and apply concepts to real-life situations in word problems to demonstrate their relevance. Additionally, incorporating fun and engaging elements into teaching methods and encouraging open communication between teachers and students could help address these challenges (Velez et al., 2023).

The urgency of conducting this study lies in addressing the critical need to help struggling students at Luna National High School improve their mathematical proficiency. In today's fast-paced world, being good at math is really important for personal growth, getting a job, and making society better. By trying out different methods to teach math better, we hope to help these students do better in school. This study is important because it could help close the gap in education, make sure everyone gets a fair chance, and give students the skills they need to succeed in a world where math and data are becoming more and more important.

METHODS

Research Design

The study used a pre-experimental design to assess the impact of Project SAYON on the math skills of Grade 10 students at Luna National High School. An experimental design investigates the effects of a variable, ensuring the design fits the study's hypothesis. It sets the framework for the experiment's execution. The design's suitability for testing the specific study hypothesis is crucial (Ary et al., 2021).

In this study, an experimental design was used to conduct action research. The researchers studied whether there was an effect of using Project SAYON as an intervention on the problem-solving skills of students in math problems. The researchers identified a group of participants consisting of 65 students who took a pretest and then received the newly designed intervention over one month. After a month of intervention, the same participants took a post-test.

Research Locale

This study was conducted at Luna National High School, a secondary public school located in Luna, Kapalong, Davao del Norte. In this school, many students have experience with low mathematical proficiency.

Sample and Population

Purposive sampling refers to a group of non-probability sampling techniques in which units are selected because they have characteristics that you need in your sample. In other words, units are selected "on purpose" in purposive sampling (Nikolopoulou, 2023). Also called judgmental sampling, this sampling method relies on the researcher's judgment when identifying and selecting the individuals, cases, or events that can provide the best information to achieve the study's objectives. In this case, the research respondents for this study were 65 students from grade 10, who were enrolled in the Academic Year 2023-2024 at Luna National High School.

Data Collection

The researchers followed a series of procedures to collect the required information for the investigation. They crafted pretest and post-test questionnaires through group planning sessions, carefully considering relevant questions to assess students' mathematical proficiency. These questionnaires were tailored to the respondents' needs using an adapted format. The researchers then validated the questionnaire with experts to ensure its validity and reliability. Permission was sought from the school principal to distribute the questionnaires and implement the intervention in the

identified class group. A pretest was administered to gauge students' baseline performance before implementing the Project SAYON intervention during Independent/Collaborative Learning (ICL) of Mathematics for one month. After the intervention, a post-test was given to assess students' progress. Data from the pretest and post-test were tabulated, entered into a Microsoft Excel spreadsheet, and analyzed by a statistician to evaluate the intervention's effectiveness in enhancing polynomial problem-solving skills and guide potential improvements in teaching practices.

Statistical Tool

The study utilized the Weighted Mean and Two-tailed T-test using the Statistical Package for the Social Sciences (SPSS).

Mean. The weighted mean was utilized to describe the pre-test and post-test results.

Paired t-test. Alternatively referred to as a dependent or correlated t-test, this is a powerful analytical method designed to assess the mean and standard deviation differences between two interrelated groups (Gleichmann, 2020). This particular statistical test is especially well-suited for investigations where the relationship between the two sets of data is essential, such as in pretest and post-test scenarios.

The paired t-test was utilized to discern whether there existed a statistically significant difference between the averages of a pretest and a post-test. This application of the paired t-test enabled the researcher to evaluate whether any observed variations in the mean scores were beyond what could be attributed to random chance. By focusing on the comparison of the pretest and post-test data, the paired t-test became a valuable tool for identifying and quantifying any changes or developments that may have arisen over the course of the research intervention.

RESULTS

Level of Math Proficiency

Table 1. Pre-test

Pre-Test Scores	Frequency	Percentage
3	3	4.62%
4	2	3.08%
5	3	4.62%
6	6	9.23%
7	1	1.54%
8	4	6.15%
9	6	9.23%
10	6	9.23%
11	10	15.38%
12	8	12.31%
13	7	10.77%
14	3	4.62%
15	3	4.62%
16	1	1.54%
17	1	1.54%
18	1	1.54%
Total	65	100.00%
Overall Mean		10.09
Description		MODERATE

The pre-test results show that the overall mean score is 10.09, indicating that, on average, students have a moderate level of math proficiency. The highest score recorded on the pre-test is 18,

achieved by only one student, representing 1.54% of the total. This suggests that very few students have reached the highest level of proficiency. Conversely, the lowest score is 3, obtained by three students, accounting for 4.62% of the total, indicating a small number of students at the lower end of proficiency. The most frequent score is 11, achieved by ten students, making up 15.38% of the total. This implies that a significant number of students are slightly above the average proficiency level while the average score indicates moderate proficiency, the range of scores shows a distribution with both high and low achievers, and a notable cluster around the score of 11.

Table 2. Post-test

Post-Test Scores	Frequency	Percentage
8	1	1.54%
9	1	1.54%
10	6	9.23%
11	5	7.69%
12	8	12.31%
13	14	21.54%
14	11	16.92%
15	8	12.31%
16	6	9.23%
19	1	1.54%
20	4	6.15%
Total	65	100.00%
Overall Mean		13.52
Description		HIGH

The overall mean score of the post-test is 13.52, indicating that, on average, students scored around 13.52 out of the maximum possible score. This suggests a generally high level of performance across the group. The highest score achieved was 20, with four students attaining this mark, representing 6.15% of the total number of students. This demonstrates that a small percentage of students achieved a perfect score, showcasing excellent performance. On the other end, the lowest scores were 8 and 9, with one student each scoring these marks, each accounting for 1.54% of the total. This indicates that very few students scored at the lower end of the scale, suggesting that most students performed reasonably well. The most frequent score was 13, with fourteen students scoring this mark, which is 21.54% of the total number of students. This high frequency suggests that the score of 13 was the most common among the students, indicating a central tendency around this score.

Table 2. Significant Difference between Pre-test and Post-test

Type of Test	N	df	Mean	SD	t-value	P-value	Decision $\alpha = 0.05$
Pre-Test	65	64	10.09	3.53	10.902	< .001	Significant
Post-Test	65		13.52	2.61			

Presented in table 3 is the significant difference between pre-test and post-test, $t(64) = -10.902$, $p < .001$. Since the p-value ($< .001$) is less than the level of significance ($d=0.05$), the null hypothesis is being rejected in the context. The significant difference observed in the pre-test and post-test scores indicates a positive outcome resulting from the intervention utilized. This discrepancy suggests an improvement in students' math skills consequent to the implemented approach. The favorable change underscores the efficacy of the intervention, validating its capacity to enhance students' comprehension and proficiency in mathematics.

DISCUSSION

Level of Math Proficiency

Pre-Test

The pre-test data on the level of math proficiency among Grade 10 students at Luna National High School is illustrated in Table 1. The result stipulates that the math proficiency of Grade 10 students was satisfactory. This signifies that students have a moderate ability to take time to understand and identify the problem, as well as figure out all the possible solutions to solve the problem. This observation aligns with findings by Fülöp (2021), who noted that problem-solving skills in mathematics develop gradually and that students often need structured support and practice to improve their proficiency. Fülöp's research suggests that while students may initially demonstrate satisfactory performance, their skills can be significantly enhanced with targeted interventions and practice.

Post-Test

The post-test data on the level of math proficiency among Grade 10 students at Luna National High School is illustrated in Table 2. The result stipulates that the math proficiency of Grade 10 students was very satisfactory. This represents an almost fourfold increase from their pretest performance, demonstrating that the students now possess very satisfactory skills in solving math problems. This suggests that the intervention positively impacted their mathematical proficiency.

Supporting studies have shown that targeted interventions can significantly enhance students' mathematical proficiency. For instance, a study by Swan (2022) in "Visible Learning Theory" found that feedback, effective teaching strategies, and clear learning goals greatly impact students' academic achievements, including math proficiency. Similarly, research by Sholihah and Lastariwati (2020) highlighted that instructional strategies that encourage problem-solving and critical thinking skills can lead to substantial improvements in students' performance.

Significant difference between the pretest and post-test

The study showed a clear boost in students' math skills, as seen in the substantial difference between their pretest and post-test scores. This improvement underscores the success of the Project SAYON intervention in enhancing students' mathematical proficiency. This finding aligns with prior research by Eli (2021), which emphasizes the efficacy of interactive learning approaches in improving academic performance. Their study suggests that students are more engaged and motivated when learning through participatory methods, like those employed in Project SAYON.

Furthermore, recent research by Son and Fatimah (2020) corroborates the positive impact of interactive interventions on students' math abilities. Their analysis indicates that hands-on learning experiences, such as those offered by Project SAYON, not only enhance mathematical proficiency but also foster a deeper understanding of concepts. By actively engaging with mathematical problems in a supportive environment, students develop problem-solving skills and confidence in their abilities.

Additionally, the study's findings align with the research conducted by Malik and Zhu (2023), which emphasizes the importance of incorporating hands-on activities in educational interventions. Their work suggests that experiential learning approaches, such as those implemented in Project SAYON, offer avenues for personalized instruction and timely feedback, resulting in enhanced learning outcomes. Through the utilization of interactive workshops and real-world simulations, educators can cultivate engaging learning atmospheres that accommodate various learning preferences and foster continuous academic progress.

CONCLUSION

Based on the foregoing results of the study, the following conclusions were drawn:

First, the pre-test results indicated that students had a satisfactory level of math proficiency before the project started. This means they had an acceptable understanding of math concepts but were not excelling. Their performance was good enough to meet basic standards, but they could still improve in areas like problem-solving and complex calculations. The satisfactory rating showed that while they understood some math topics, there were gaps in their knowledge that needed to be addressed.

Second, the post-test results revealed that the students' math proficiency improved to a very satisfactory level after participating in Project SAYON. This significant improvement suggests that the project helped the students enhance their math skills more effectively than their previous learning methods. The students showed a much better understanding of math concepts and were able to solve problems more accurately and quickly. Project SAYON provided the extra support and practice they needed to excel in math.

Third, the study tested the null hypothesis at a 0.05 level of significance and found a significant difference between the pre-test and post-test results. This means that the improvement in the students' math proficiency was not due to chance, but to the intervention of Project SAYON. The significant difference shows that Project SAYON had a real and measurable effect on the students' math proficiency, proving its success as an educational tool.

Hence, the result implies that using structured programs like Project SAYON can greatly improve students' math proficiency. Schools should consider adopting similar methods to help students achieve better academic success. This project shows that targeted interventions can make a significant difference in learning outcomes. Teachers and administrators can use these findings to support and enhance their math teaching strategies, ultimately helping students perform better in their studies.

RECOMMENDATIONS

On the light of the aforementioned findings of the study, the following recommendations were drawn:

Given the significant improvement in math proficiency among Grade 10 students, it is recommended that Project SAYON be adopted and expanded to include all grade levels at Luna National High School. This program should be integrated into the regular curriculum to ensure that students at different stages of their education benefit from its structured approach to math learning.

Also, school administrators and policymakers should support the implementation of Project SAYON by providing clear guidelines and policies. This includes setting realistic goals, providing necessary resources, and ensuring that the program aligns with the overall educational objectives of the school. Continuous support from the administration is crucial for the program's sustainability.

In addition, it is hereby recommended that teachers should receive specialized training to effectively implement Project SAYON. Professional development workshops and continuous training sessions should be conducted to familiarize teachers with the project's methods and materials. This will ensure that teachers are well-equipped to deliver the program and support students' learning effectively.

Also, parents and guardians play a crucial role in students' academic success. It is recommended to engage them in the process by providing information about Project SAYON and its benefits. Workshops or meetings can be organized to help parents understand how they can support their children's learning at home.

Lastly, while the results of this study are promising, further research should be conducted to explore the long-term effects of Project SAYON on students' math proficiency. Comparative studies involving different schools and regions can provide a broader understanding of the program's impact and help refine its implementation.

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