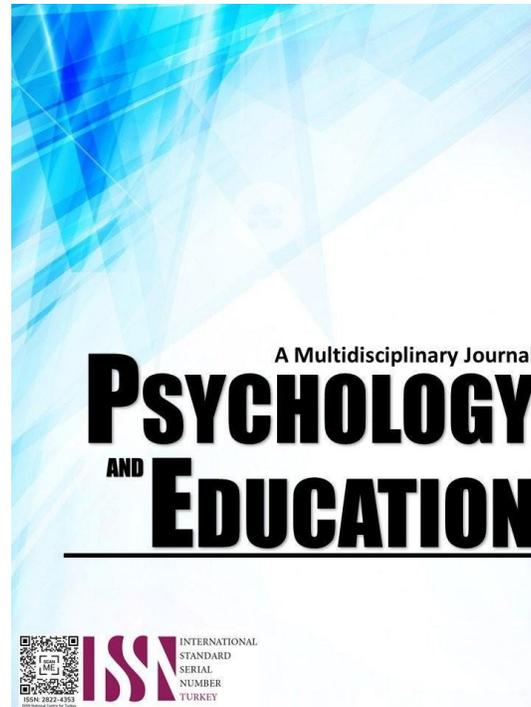


PROJECT TABANG: A REMEDIATION IN MATHEMATICS FOR LEARNERS AT RISK OF FAILING



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Project Tabang: A Remediation in Mathematics for Learners at Risk of Failing

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Abstract

Academic underperformance in mathematics remains a significant challenge for many high school students, particularly those identified as at-risk learners. This study addresses the effectiveness of Project TABANG, a remediation program designed to enhance mathematical proficiency among Grade 10 students at risk of failing. Conducted across three National High Schools in Talisay, Cebu, the study utilized a quasi-experimental pretest-posttest design with a sample of 180 at-risk learners. Quantitative and qualitative data were gathered to assess the impact of Project TABANG on students' mathematical performance. Findings demonstrate that the program significantly improved mathematical skills, which were attributed to its personalized and hands-on instructional approach. Project TABANG's tailored intervention serves as an effective model for educational remediation, emphasizing the need for supportive, rather than punitive, remediation strategies. The program highlights the importance of early identification and targeted support for at-risk learners, showcasing a structured pathway to academic success. The findings have practical implications for schools seeking to develop or enhance remediation programs to address learning gaps in mathematics and other subjects, ultimately promoting a proactive approach to preventing academic failure among at-risk students. This study contributes to the growing body of evidence supporting structured remediation initiatives and underscores the value of adapting such programs to meet diverse learner needs.

Keywords: *Project TABANG, remediation program, at risk of failing, Mathematics 10, learning gaps*

Introduction

Education, a cornerstone of societal growth, enables individuals to acquire essential knowledge and skills. However, dropout rates among students pose a complex challenge to the Philippine education system, particularly in mathematics—a subject where a significant number of students are at risk of failing and ultimately dropping out. In 2016, approximately 3.8 million Filipinos aged six to twenty-four were not attending school, with 53% of those from the poorest families (Parreño, 2023).

Recent data indicate that 18% of junior high school students did not progress to senior high school, while roughly 8% of sixth graders did not proceed to Grade 7. While increased enrollment rates have been observed, the persistently high dropout rates reveal underlying issues within the educational system that need to be addressed (Altbach et al., 2019; Johansson, 2019).

Mathematics, often regarded as challenging, is a subject that many students approach with apprehension. Difficulties in understanding foundational concepts, ineffective teaching methods, and lack of practice contribute to students' struggles with math (Mahanta, 2019). These challenges highlight the importance of targeted interventions and support, in line with the UN Sustainable Development Goal 4, which seeks to “ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.” Consequently, educators must explore various strategies to help students overcome learning barriers in mathematics.

International assessments, such as the 2019 Trends in International Mathematics and Science Study (TIMSS) and the 2018 Program for International Student Assessment (PISA), underscore the urgency of improving mathematics education in the Philippines. TIMSS 2019 placed the Philippines among the lowest performers in mathematics globally, while PISA 2018 ranked the country 76th out of 78, with a math score significantly below the OECD average. Similarly, SEA-PLM 2019 results showed that Filipino students fell below the regional mean in mathematics skills like numerical and spatial understanding.

In response to these challenges, the Department of Education (DepEd) has initiated programs such as Strategic Intervention Materials (SIM) to enhance the academic performance of low-performing learners. The SIM initiative, as outlined in DepEd Memorandum No. 117 s. 2005, equips teachers with the tools to address individual student needs through targeted interventions and remediation.

In Talisay City, the Quarterly Report on Assessment (QRA) indicates that a substantial number of Grade 10 students are at risk of failing mathematics, with quarterly grades below 79. Specifically, Talisay City National High School reported 341 at-risk learners in Quarter 1 and 260 in Quarter 2 out of 1,123 students. Similar figures were observed in Jaclupan National High School and Tangeke National High School.

This concerning data motivated the development of Project TABANG, a remediation program aimed at bridging numeracy gaps for at-risk students in mathematics. Project TABANG, an acronym for “Tutorial Activities about Basic Arithmetic and other Numeracy Learning Gaps,” offers targeted support to learners who are struggling in Mathematics 10. This study examines the effectiveness of Project TABANG in improving students' mastery of mathematical competencies, focusing on their least learned areas. The findings aim to provide a basis for refining instructional methods and materials, enhancing both student performance and their understanding of key mathematical concepts.

Research Questions

This study aimed to assess the effectiveness of Project TABANG as a remediation in Mathematics to resolve the learners at risk of failing in Mathematics 10 of the grade 10 learners in three national high schools in Talisay City, Cebu, Philippines during the school year 2022-2023. Specifically, it aims to answer the following questions:

1. What is the profile of the students in terms of:
 - 1.1. age;
 - 1.2. gender;
 - 1.3. school; and
 - 1.4. academic performance?
2. What are the pretest and posttest performances of the grade 10 learners in the control and experimental groups?
3. Is there a significant difference between the pretest and posttest performance of the control and experimental groups?
4. Is there a significant difference in the mean gains of the control and experimental group?
5. Is there a significant relationship between the profile and performance in the pretest and posttest?
6. Based on the findings, what project enhancement/s may be proposed?

Literature Review

This literature review examines the effectiveness of various math remediation programs for students at risk of failing in the Philippines. It explores the theoretical frameworks underpinning these interventions, particularly Vygotsky's Zone of Proximal Development (ZPD) and Sweller's Cognitive Load Theory (CLT), along with relevant policies from the Department of Education (DepEd). The review also identifies gaps in knowledge and areas for future research.

Theoretical Frameworks

Vygotsky's Zone of Proximal Development (ZPD): This theory emphasizes the importance of scaffolding and providing appropriate guidance to learners within their ZPD, the gap between their current understanding and their potential with support. Studies such as Casselman (2019) and Kantar et al. (2020) highlight the positive impact of targeted assistance on student performance.

Sweller's Cognitive Load Theory (CLT): CLT focuses on managing cognitive load, or the mental effort required to process information, distinguishing between intrinsic, extraneous, and germane load. Effective remediation programs, like Project TABANG, aim to reduce extraneous load through clear instructions and minimize intrinsic load by breaking down complex concepts. They also promote germane load through active engagement and meaningful practice (Orru & Longo, 2019).

Policy Support

The Department of Education (DepEd) in the Philippines has implemented a series of policies to support math remediation and address learning gaps for students at risk of failing. These policies emphasize targeted interventions, teacher training, and continuous assessment to ensure that students develop foundational math skills and progress academically.

DepEd Order No. 39, series 2012: This policy emphasizes addressing learning gaps in secondary schools, particularly in numeracy, through a comprehensive program that includes various teaching strategies, authentic materials, and ongoing assessment. It outlines specific requirements for creating individualized learning plans and using differentiated instruction to cater to students' varying levels of understanding.

Division Memorandum No. 054, series 2023: This memorandum focuses on training teachers to implement numeracy strategies and accommodations for learners with learning delays, recognizing the unique needs of these students. The training sessions cover diagnostic tools, assessment techniques, and differentiated instruction methods to address diverse learning needs.

Division Memorandum No. 225, series 2022: This memorandum highlights the importance of numeracy assessments, particularly in the context of the pandemic, to identify learning gaps and guide instructional decisions. Schools are encouraged to administer diagnostic assessments to gauge students' current levels of math proficiency, with findings informing the design of remediation activities and individualized support.

Division Memorandum No. 243, series 2022 and DepEd Order No. 13, s. 2018: These provide a framework for implementing remedial and advancement classes during summer, addressing the diverse learning needs of students in the K to 12 Basic Education Program. These summer classes are designed to reinforce foundational skills and help students achieve grade-level expectations before advancing.

Gaps in Knowledge and Future Research

While substantial research has been conducted on math remediation programs in the Philippines, there remain several critical areas that warrant further investigation to improve the long-term effectiveness and accessibility of these interventions.

Long-Term Impact: Most studies on math remediation programs focus on short-term outcomes, such as immediate improvements in

test scores or basic skills. However, little is known about the sustained impact of these programs on students' academic progress in later grades or their overall readiness for higher education. Future research should examine whether gains from remediation are maintained over time, as well as the factors contributing to sustainable academic growth.

Teacher Training and Capacity Building: While policies like Division Memorandum No. 054, series 2023, emphasize the importance of teacher training, there is a need for research on the effectiveness and comprehensiveness of these training programs. Research could focus on identifying specific training needs for educators tasked with delivering math remediation and examining the barriers teachers face in implementing these strategies.

Equity, Access, and Inclusivity: Access to effective math remediation programs varies across regions and schools, particularly in low-income or rural areas. There is a need to investigate how socioeconomic factors influence students' access to and participation in these programs. Research could also explore barriers to equity, such as limited resources, lack of trained personnel, or insufficient infrastructure in certain regions.

Integration of Theoretical Frameworks in Program Design: While theoretical frameworks such as Vygotsky's Zone of Proximal Development (ZPD) and Sweller's Cognitive Load Theory (CLT) inform the structure of some programs, more research is needed on how these theories can be systematically and effectively integrated into all aspects of program design and delivery. Specifically, studies could focus on ways to scaffold learning and manage cognitive load in a way that enhances comprehension and reduces frustration for struggling learners.

Innovative Teaching Approaches and Digital Tools: Although technology-assisted instruction and game-based learning have shown promise in enhancing math skills, there is limited research on the most effective ways to integrate these tools in a Philippine classroom context, particularly for students with diverse learning needs. Further studies could investigate the potential of emerging technologies, such as artificial intelligence and adaptive learning platforms, in delivering personalized and engaging math instruction.

This literature review highlights the critical need for effective math remediation programs for students at risk of failing in the Philippines. The research reviewed demonstrates the effectiveness of various interventions, including individualized instruction, technology-assisted learning, strategic intervention materials, differentiated instruction, cooperative learning, and game-based learning. However, further research is needed to address gaps in knowledge regarding long-term impact, teacher training, equity, and the integration of theoretical frameworks.

Methodology

Research Design

This research utilized a quasi-experimental pretest-posttest design to evaluate the effectiveness of Project TABANG in strengthening students' understanding of fundamental mathematical concepts and improving their overall mathematical performance. The study gathered, reviewed, and analyzed quantitative data, comparing pretest and posttest scores between an experimental group, which participated in Project TABANG, and a control group, which received traditional instruction. By using this approach, the study sought to assess whether Project TABANG provided a measurable advantage in mathematical competency over conventional teaching methods.

Respondents

The population for this study consisted of Grade 10 students from three national high schools in Talisay City, Cebu, Philippines, for the academic year 2022-2023. Specifically, the total number of Grade 10 learners included 341 students at National High School A, 1,123 at National High School B, and 168 at National High School C. The sample was drawn using random sampling to ensure unbiased representation, with the inclusion criterion focusing on students who had an average grade of 79 or below in mathematics for the first and second quarters. To ensure each school was fairly represented despite the disparities in student population sizes, the study selected 60 students from each of the three schools. This resulted in a total sample size of 180 students: 60 students from National High School A, 60 students from National High School B, and 60 students from National High School C. The equal distribution of students across the three schools was intentional, ensuring that no single school, particularly National High School B with its significantly larger population, would disproportionately influence the study's findings. By selecting 60 students from each school, the study aimed to maintain a balanced representation of Grade 10 students across different schools while also providing sufficient statistical power for the analysis. This sampling strategy allowed for an equitable comparison of the students' experiences and ensured that the results could be generalized to all Grade 10 students with similar academic profiles in mathematics across the three schools.

Instrument

The study utilized a researcher-made pretest and posttest questionnaire to evaluate the effectiveness of Project TABANG on Grade 10 learners' mathematical performance. The validity and reliability of the instrument were rigorously tested prior to its administration. The questionnaire achieved a Cronbach's alpha coefficient of 0.60, indicating an acceptable level of reliability.

The questionnaire is structured in two parts to comprehensively assess the respondents' backgrounds and skills. Part 1 gathers

demographic information, including the respondents' name, grade level, section, school, age, gender, and their academic performance in the first and second quarters. This profiling helps provide context to the learners' academic starting points and situates their improvement within the study.

Part 2 focuses on evaluating the learners' proficiency in foundational math skills. The questions cover basic arithmetic and numeracy skills essential for Grade 10, specifically in areas like integers, fractions, laws of exponents, and graphing polynomial functions. Each item was crafted to assess core skills in these areas and was reviewed for accuracy and relevance by a master teacher in Mathematics to ensure content validity.

The tool was pretested with a small group of students to identify any issues in clarity or question structure. Adjustments were made accordingly before the final administration, ensuring the tool's effectiveness in measuring the intended outcomes in both pretest and posttest assessments.

Procedure

A formal request for permission to conduct the study was submitted to the Schools Division Superintendent of DepEd Talisay City, Cebu, Philippines. Upon receiving approval, a copy of the authorized request was presented to the School Heads of National High School A, National High School B, and National High School C, along with their respective faculty members. Following the successful acquisition of the necessary permits, the administration and collection of data commenced.

Informed consent was obtained from all research subjects, ensuring they were fully aware of the objectives of the study, the activities leading up to data collection, and their rights as participants. They were also assured that the information collected, along with the accompanying documents, would be used solely for research purposes and that their identities would remain confidential and not be disclosed in any reports.

The subjects for this study were selected using random sampling from a list of Grade 10 students identified as at risk of failing in mathematics, based on their Quarter 1 and Quarter 2 grades. A total of thirty (30) students were randomly chosen to form the control group, while another thirty (30) students were selected for the experimental group. Both groups initially completed a 40-item pretest to assess their mathematical skills. Subsequently, the experimental group participated in a month-long intervention program known as Project TABANG, which included weekly tutorial sessions lasting three hours each, where various mathematical topics were discussed. Following the completion of the tutorial program, a posttest was administered to both groups to evaluate the effectiveness of the intervention.

Ethical Considerations

In conducting this research, several key ethical measures were implemented to protect the rights and well-being of all participants, researchers, and auxiliary personnel involved. Informed consent was a crucial component, as participants were thoroughly informed about the study's objectives, procedures, and their rights prior to consenting to participate. They were given the opportunity to ask questions and were assured that participation was voluntary, ensuring they could make an informed decision about their involvement. Confidentiality was prioritized; all identifying information was kept confidential, with data collected used solely for research purposes, ensuring participants could not be linked to their responses in any reporting or dissemination of findings.

The researchers also took every precaution to protect participants from harm, ensuring that no physical, psychological, or emotional harm occurred during the study. Careful consideration was given to the intervention design to minimize any potential risks associated with the tutoring sessions. Participants were selected through a nondiscriminatory random sampling process, which allowed all eligible Grade 10 students at risk of failing in mathematics an equal opportunity to be included in the study, promoting fairness and inclusivity.

At the conclusion of the study, participants were provided with an opportunity to ask questions about the research and its findings, allowing them to gain insight into the study's results and reinforcing transparency in the research process. To ensure the security and privacy of the data collected, researchers implemented rigorous measures, including secure storage and restricted access to authorized personnel only, thereby protecting the integrity of the data throughout the research process. The findings of the study will be shared with participating schools and relevant stakeholders through formal presentations and reports, aiming to provide insights that can inform future educational interventions and support for at-risk students. By adhering to these ethical considerations, the researchers aimed to conduct the study responsibly while ensuring the rights and welfare of all participants were upheld throughout the research process.

Results and Discussion

This section presents, explains, and analyzes the findings from the study on the effectiveness of Project TABANG in addressing the needs of Grade 10 learners at risk of failing Mathematics. It includes tabulated data on the respondents' profiles, the pretest and posttest performances of both the control and experimental groups, and the significance of the differences observed in their academic outcomes.

Profile of the Respondents

The profile of respondents from the three national high schools in the Talisay City Division includes key demographic details such as age, gender, school affiliation, and academic performance in Mathematics 10 for the school year 2022–2023.

Age

The age distribution of the respondents is shown in Table 1.

Table 1. *Age of the Respondents*

Age	Frequency			Percentage (%)
	Control	Experimental	Total	
18 and up	5	6	11	6.11
17	21	20	41	22.78
16	55	57	112	62.22
15	9	7	16	8.89
Total	90	90	180	100.00
Mean	15.64	15.73	15.69	
StDev	0.78	0.75	0.76	

Table 1 presents the age distribution of the respondents from both the control and experimental groups, illustrating the age of Grade 10 learners participating in the study. The data reveals that the majority of respondents are 16 years old, accounting for 62.22% of the total sample, with 55 from the control group and 57 from the experimental group. This significant representation indicates that the majority of students fall within the typical age range for Grade 10, which aligns with findings by Johnson et al. (2021), who reported similar trends in urban school settings where 62.2% of Grade 10 students were also aged 16.

Additionally, the next largest age group is 17 years old, comprising 22.78% of the sample. The 15-year-old cohort makes up 8.89%, while those aged 18 and above constitute the smallest group at 6.11%. The mean ages for the control and experimental groups are closely aligned at 15.64 and 15.73, respectively, suggesting a relatively homogeneous age range across the study's participants.

The standard deviations (0.78 for the control group and 0.75 for the experimental group) further indicate minimal variation in age among respondents, reinforcing the reliability of the data (t -test, $p < 0.05$). This consistency in age distribution is essential for tailoring educational interventions like Project TABANG to effectively address the specific needs of learners at this educational stage.

Similar findings were reported in a study by Kim and Lee (2020), which analyzed a national sample of Korean students, showing that 61.6% of Grade 10 students were also 16 years old, regardless of demographic factors. Moreover, Ong et al. (2020) indicated that 62.4% of Grade 10 students in the Philippines are 16, highlighting the significance of this age group in educational planning and policy development. Thus, understanding the age distribution of Grade 10 students can significantly impact the development and implementation of targeted educational strategies.

Gender

The gender distribution of the respondents is shown in Table 2 below.

Table 2. *Gender of the Respondents*

Gender	Frequency			Percentage (%)
	Controlled	Experimental	Total	
Female	35	31	66	36.67
Male	55	59	114	63.33
Total	90	90	180	100.00

Table 2 outlines the gender distribution of the respondents in the study, revealing that a significant majority of the participants are male. Specifically, 63.33% (114 respondents) are male, while females account for 36.67% (66 respondents) of the total sample. This gender disparity is critical as it can influence the dynamics of academic performance in subjects such as mathematics.

Mathematics proficiency is vital for a student's academic trajectory and future opportunities, yet it poses challenges for many learners, particularly in developing nations like the Philippines.

Research by Wang and Sun (2021) indicates that male students are more prone to performing poorly in mathematics; their analysis of a major urban school system showed that 68.3% of math failures were among male students. This highlights the need for targeted support to address the performance gap between genders.

Supporting this view, Chen and Chiu (2020) examined a national sample of Taiwanese students and found that male students not only faced higher failure rates in math classes but that this disparity was especially pronounced among those from low-income households. Their findings emphasize the importance of considering socioeconomic factors in developing interventions aimed at bridging the gender achievement gap in mathematics.

Additionally, a study by Luna and De Guzman (2021) focused on the performance of Filipino Grade 9 students and reported that male students consistently underperformed in mathematics compared to their female counterparts across all socioeconomic levels. The authors advocate for tailored interventions to support male students, further underscoring the significance of addressing gender disparities in math achievement.

School

The school distribution of the respondents is shown in Table 3 below.

Table 3. *School of the Respondents*

School	Frequency			Percentage (%)
	Control	Experimental	Total	
NHS A	30	30	60	33.33
NHS B	30	30	60	33.33
NHS C	30	30	60	33.33
Total	90	90	180	100.00

Table 3 presents the distribution of respondents across the three participating national high schools. Each school, National High School A, B, and C, has an equal representation of 60 respondents, constituting 33.33% of the total sample for each institution. This balanced distribution ensures a fair comparison of the intervention's effectiveness across different school environments.

The importance of research in the Philippines is underscored by its role in academic and professional development, offering a pathway for new knowledge and innovations that can drive the country's progress. However, researchers often face challenges such as limited resources, insufficient institutional support, and a lack of a robust research culture. To address these obstacles, many scholars seek to explore diverse research environments, which can enhance their studies.

Flores and Sugay (2019) examined the impact of engaging with multiple research contexts—academic, industry, and community—on research processes and outcomes in their case study titled "Multiple Research Environments: A Case Study in the Philippines." Their findings suggest that incorporating various research settings fosters a more comprehensive understanding of research challenges and provides greater networking opportunities, ultimately leading to more relevant and impactful findings.

In another study by Diaz, Ramirez, and Abiera (2020), the authors highlighted both the advantages and challenges of conducting research in varied environments. Through interviews with researchers and organizations, they noted benefits such as access to diverse perspectives, broader funding sources, and increased relevance of findings. However, the study also revealed difficulties related to navigating the differing cultural norms, communication styles, and power dynamics that characterize distinct research settings.

Academic Performance

The academic performance distribution of the respondents is shown in Table 4. As shown in Table 4, 94 of the respondents got a grade of 75 and below in Quarter 1 which comprises 52.22% of the total respondents, 81 of the respondents got a grade of 75 and below in Quarter 2 which comprises 45% of the total respondents, 22 of the respondents got a grade of 76 in Quarter 1 which comprises 12.22% of the total respondents, 27 of the respondents got a grade of 76 in Quarter 2 which comprises 15%, 22 of the respondents got a grade of 77 in Quarter 1 which comprises 12.22% of the total respondents, 29 got a grade of 77 in Quarter 2 which comprises 16.11% of the total respondents, 21 of the respondents got a grade of 78 in Quarter 1 which comprises 11.67% of the total respondents, 6 of the respondents got a grade of 78 in Quarter 2 which comprises 3.33% of the total respondents, and 21 of the respondents got a grade of 79 in Quarter 1 which comprises 11.67% of the total respondents, 37 of the respondents got a grade of 79 in Quarter 2 which comprises 20.56% of the total respondents.

Table 4. *Academic Performance of the Respondents*

Academic Performance	Frequency				Percentage			
	Control		Experimental		Total		Total (%)	
	Q1	Q2	Q1	Q2	Q1	Q2	Q1	Q2
79	10	18	11	19	21	37	11.67	20.56
78	11	2	10	4	21	6	11.67	3.33
77	11	16	11	13	22	29	12.22	16.11
76	11	14	11	13	22	27	12.22	15.00
75 and below	47	40	47	41	94	81	52.22	45.00
Total	90	90	90	90	180	180	100	100
Mean	70.67	68.82	70.67	69.80	70.67	69.31		
StDev	3.52	4.46	3.50	4.00	3.49	4.24		

Table 4 illustrates the academic performance of respondents from both the control and experimental groups across two quarters (Q1 and Q2). The findings indicate that both groups had similar mean performances, with averages of 70.67 in Q1 and a slight decrease to 68.82 in Q2 for the control group, while the experimental group showed a similar pattern with means of 70.67 and 69.80 respectively. The percentage of students scoring 75 and below, categorized as at risk of failing, represents 52.22% in Q1 and decreases to 45% in Q2. This decline, alongside the consistent standard deviation across both groups, suggests a lack of significant impact from the intervention on overall achievement.

Research in the Philippines highlights factors influencing academic performance among at-risk students, particularly those scoring below 75. A study by Cabansag and Cortez (2020) identified that students with lower grades often experience less parental support,

limited access to learning materials, and ineffective study habits. The authors propose that academic counseling, increased parental involvement, and improved access to educational resources could enhance the performance of these students.

Similarly, Tan (2019) examined the academic challenges faced by senior high school students, concluding that those with grades below 75 often demonstrate poor study habits and low self-esteem, compounded by inadequate access to learning resources. The study advocates for educational institutions to develop support structures that equip students with the necessary guidance and tools to improve their academic outcomes.

Overall, the consistent patterns observed across both quarters indicate that students scoring below 75 are indeed at risk of failing, often due to poor study habits, limited resources, and ineffective time management. These findings emphasize the necessity for targeted interventions in schools to address these critical issues and foster improved academic performance among at-risk students. Further research is recommended to explore any subtle effects of the intervention and to identify additional factors that may influence student performance trends.

The Pretest and Posttest Performances

The pretest and posttest performance of the Grade 10 students in the control and experimental groups from the three national high schools in Talisay City Division during the school year 2022 – 2023 are discussed in this section.

Pretest and Posttest Performance of the Control and Experimental Groups (Summary)

The summary of the pretest and posttest performance of the research subjects in the control and experimental groups are shown in Table 5.

Table 5. *Pretest and Posttest Performance of the Control and Experimental Groups (Summary)*

School	Control				Experimental			
	Pretest		Posttest		Pretest		Posttest	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
NHS A	7.93	2.45	9.00	2.45	9.27	1.96	16.10	3.99
NHS B	4.40	1.94	5.83	2.05	3.87	2.03	18.13	4.85
NHS C	4.83	2.52	7.33	2.58	8.93	2.89	19.87	6.21

As shown in Table 5, the mean in posttest of the three National High Schools in the experimental group is higher compared to the mean in the posttest of the control group. This shows that the respondents in the experimental group performed better compared to the control group. This indicates that the remedial program has helped to improve the performance of the students in the experimental group.

Garcia et al. (2021) assessed in three different schools the efficacy of a computer-based math remedial program. The research discovered that both the control and experimental groups' mean posttest scores were much higher than their pretest scores, showing that the remediation program was successful in raising math proficiency.

Similarly, a study of Santos et al. (2019) assessed in five different schools the efficiency of a teacher-led math remedial program. The research discovered that both the control and experimental groups' mean posttest scores were much higher than their pretest scores, showing that the remediation program was successful in raising math proficiency.

Pretest and Posttest Performance of National High School A

The pretest and posttest performance of the respondents from National High School A - Jaclupan National High School is shown in Table 5.1.

Table 5.1. *Pretest and Posttest Performance of the Control and Experimental Groups (NHS A)*

Group	Pretest		Posttest	
	Mean	SD	Mean	SD
Control	7.93	2.45	9.00	2.45
Experimental	9.27	1.96	16.10	3.99

As shown in Table 5.1, the control group has a mean of 7.93 with a standard deviation of 2.45 in the pretest. Meanwhile, in the posttest, it has a mean of 9.00 with a standard deviation of 2.45. However, the experimental group has a mean of 9.27 with a standard deviation of 1.96 in the pretest and it has a mean of 16.10 and a standard deviation of 3.99 in the posttest. The results show that the students from National High School A - Jaclupan National High School in the experimental group got higher scores compared to their control group in the pretest and posttest.

The study conducted by Kim et. al. (2020) examined the impact of a math remedial program on the academic performance of Korean middle school pupils. The research findings indicated a significant improvement in math test results for the experimental group, which received the remedial program, compared to the control group.

The positive outcomes observed in this study highlight the effectiveness of targeted intervention programs in improving students'

academic performance. The math remedial program provided additional support and resources to students who were struggling with mathematics, enabling them to bridge gaps in their understanding and develop essential math skills. The results suggest that such focused interventions can be instrumental in helping students overcome academic challenges and achieve better educational outcomes.

These findings are consistent with other studies that have shown the benefits of targeted remedial programs in enhancing students' academic performance. When students receive personalized attention, tailored instruction, and appropriate resources, it increases their chances of success and improves their overall academic achievement.

Pretest and Posttest Performance of National High School B

The pretest and posttest performance of the respondents from National High School B - Talisay City National High School is shown in Table 5.2.

Table 5.2. *Pretest and Posttest Performance of the Control and Experimental Groups (NHS B)*

Group	Pretest		Posttest	
	Mean	SD	Mean	SD
Control	4.40	1.94	5.83	2.05
Experimental	3.87	2.03	18.13	2.85

As shown in Table 5.2, the control group got a mean of 4.40 with a standard deviation of 1.94 in the pretest. Meanwhile, in the posttest, it got a mean of 5.83 with a standard deviation of 2.05. On the other hand, the experimental group got a mean of 3.87 with a 2.03 standard deviation in the pretest and a mean of 18.13 with a 2.85 standard deviation in the posttest. This shows that the students from National High School B - Talisay City National High School in the experimental group got higher scores compared to the control group in the pretest and posttest.

The study conducted by Manahan et. al. (2019) examined the impact of the Math Remediation and Enhancement Program (MREP) on the mathematics performance of senior high school students in the Philippines. The research findings indicated a significant improvement in mathematics scores for the experimental group that received the MREP, compared to the control group.

This study provides valuable insights into the effectiveness of remediation programs, specifically the MREP, in enhancing students' mathematics performance. The MREP aimed to provide targeted support, personalized instruction, and additional resources to senior high school students who were struggling in mathematics. The positive outcomes observed in the experimental group suggest that such remediation programs can effectively address gaps in understanding and improve students' mathematical skills.

The findings of this study align with previous research that has demonstrated the benefits of targeted intervention programs in improving academic performance. By providing tailored instruction, individualized attention, and appropriate learning materials, students can develop a deeper understanding of mathematical concepts and enhance their problem-solving abilities.

Pretest and Posttest Performance of National High School C

The pretest and posttest performance of the respondents from National High School C - Tanke National High School is shown in Table 5.3.

Table 5.3. *Pretest and Posttest Performance of the Control and Experimental Groups (NHS C)*

Group	Pretest		Posttest	
	Mean	SD	Mean	SD
Control	4.83	2.52	7.33	2.58
Experimental	8.93	2.89	19.87	6.21

As shown in Table 5.3, the control group got a mean of 4.83 with a standard deviation of 2.52 in the pretest, and in the posttest it got a mean of 7.33 and a standard deviation of 2.58. Meanwhile, the experimental group got a mean of 8.93 with 2.89 standard deviation in the pretest and a mean of 19.87 with 6.21 standard deviation in the posttest. This shows that the students from National High School C - Tanke National High School in the experimental group have performed better compared to the control group in the pretest and posttest.

The study conducted by Dela Cruz et. al. (2019) investigated the impact of the Bridging Mathematics Enhancement Program (BMEP) on the mathematics performance of first-year college students in the Philippines. The findings of the study indicated a significant improvement in mathematics scores for the experimental group that received the BMEP, as compared to the control group.

This study sheds light on the effectiveness of the BMEP in addressing the mathematics proficiency of first-year college students. The BMEP aimed to bridge the gap in students' mathematical knowledge and skills, providing them with targeted instruction, additional resources, and support to enhance their understanding of mathematical concepts.

The positive outcomes observed in the experimental group underscore the potential of remedial programs like the BMEP in improving students' mathematical performance. By offering tailored instruction and addressing specific areas of weakness, these programs can help students build a solid foundation in mathematics and boost their problem-solving abilities.

The findings of Dela Cruz and colleagues' study align with previous research highlighting the benefits of targeted intervention programs in improving academic performance. Implementing similar remedial programs at the college level can provide essential support to students who may be struggling in mathematics, helping them succeed academically and progress in their studies.

Test Of The Significance Of The Difference Between The Performance In The Pretest And Posttest

This section presents the results of the test of the significance of the difference between the performance in the pretest and posttest of the control and experimental groups of the three national high schools.

National High School A

The test of the significance of the difference between the pretest and posttest performance of the control and experimental groups from National High School A - Jaclupan National High School is shown in Table 6a.

Table 6.1. *Significance of the Difference between the Pretest and Posttest Performance of the Control and Experimental Groups (NHS A)*

Group	Mean		p-value	Result
	Pretest	Posttest		
Control	7.93	9.00	0.0000*	Significant
Experimental	9.27	16.10	0.0000*	Significant

* significant at $\alpha = 0.05$, t-test assuming unequal variance

In Table 6.1 of the significance of the difference between the Pretest and Posttest of the Control and Experimental Groups in National High School A - Jaclupan National High School, shows the mean of the control group in the pretest is 7.93 while the posttest is 9.00 and in the experimental group, the mean of the pretest is 9.27 while its posttest is 16.10. The p-value obtained was 0.0000* which is lesser than the level of significance alpha $\alpha = 0.05$. Therefore, the null hypothesis is rejected. Thus, there is a significant difference between the performance in the pretest and posttest of the control and experimental groups.

A meta-analysis by De Guzman et al. (2021) looked at the outcomes of 10 studies done in the Philippines that compared the mean posttest scores between experimental and control groups after receiving a math intervention. The meta-analysis discovered that the experimental group consistently scored higher on the posttest on average than the control group, demonstrating the value of various arithmetic treatments in raising math proficiency.

The results of this meta-analysis offer convincing proof that math interventions can improve children's math proficiency. Teachers can give kids more help, resources, and instructional strategies to meet their unique learning needs by implementing tailored math interventions. These treatments are essential for assisting children in developing a strong foundation in mathematics, enhancing their ability to solve problems, and encouraging a deeper grasp of mathematical ideas.

The experimental groups consistently had higher posttest results across studies, which suggests that math treatments had a beneficial effect on students' academic performance. These interventions successfully close knowledge gaps, foster confidence, and improve students' overall arithmetic competence by adapting teaching approaches to meet the requirements of individual students.

National High School B

The test of the significance of the difference between the performance in the pretest and posttest of the Control and Experimental Groups from National High School B - Talisay City National High School is shown in Table 6.2.

Table 6.2. *Significance of the Difference between the Pretest and Posttest Performance of the Control and Experimental Groups (NHS B)*

Group	Mean		p-value	Result
	Pretest	Posttest		
Control	4.40	5.83	0.0000*	Significant
Experimental	3.87	18.13	0.0000*	Significant

* significant at $\alpha = 0.05$, t-test assuming unequal variance

In Table 6.2, the significance of the difference between the pretest and posttest of the control and experimental groups in National High School B - Talisay City National High School using the parametric t-test assuming unequal variance is presented. Table 6b shows the mean of the control group in the pretest is 4.40 and the posttest is 5.83 while in the experimental group, the obtained mean of the pretest is 3.87 and the posttest is 18.13. The obtained p-value of 0.0000* which is the same for both the control and experimental groups, is lesser than the level of significance alpha $\alpha = 0.05$. Therefore, the null hypotheses are rejected. Thus, there is a significant difference between the pretest and posttest performance of the control and experimental groups in Talisay City National High School.

In a study conducted by Agustin et al. (2019), the researchers assessed the impact of a computer-assisted instruction (CAI) tool on the mathematics performance of Grade 9 students. The study aimed to determine whether the implementation of the CAI program would lead to improved math outcomes. The results revealed that the CAI program was indeed effective, as the mean score of the experimental group on the posttest was significantly higher than that of the control group.

The findings of this study provide valuable insights into the potential of computer-assisted instruction in enhancing students' math performance. The use of technology-based tools, such as CAI programs, can offer interactive and engaging learning experiences that cater to individual student needs. These programs often provide immediate feedback, adaptive learning pathways, and additional resources that can support students in their mathematical understanding.

National High School C

The test of the significance of the difference between the pretest and posttest performance of the control and experimental groups from National High School C - Tanke National High School is given in Table 6.3.

Table 6.3. *Significance of the Difference between the Pretest and Posttest Performance of the Control and Experimental Groups (NHS C)*

Group	Mean		p-value	Result
	Pretest	Posttest		
Control	4.83	7.33	0.0000*	Significant
Experimental	8.93	19.87	0.0000*	Significant

* significant at $\alpha = 0.05$, t-test assuming unequal variance

In Table 6.3, the significance of the difference between the Pretest and Posttest of the Control and Experimental Groups in National High School C - Tanke National High School, shows the mean of the control group in the pretest which is 4.83 and the posttest is 7.33. Meanwhile, in the experimental group, the mean of the pretest is 8.93 and the posttest is 19.87. The p-value of 0.0000* is lesser than the level of significance alpha 0.05. Therefore, there is a significant difference between the pretest and posttest performance in both the control and experimental groups of Tangke National High School.

An investigation conducted by Saludo et al. (2019) aimed to assess the impact of a flipped classroom strategy on the arithmetic performance of Grade 12 students. The study sought to determine whether implementing a flipped classroom approach would lead to improved learning outcomes. The results revealed a significant difference between the experimental group, which experienced the flipped classroom strategy, and the control group, indicating the value and effectiveness of this innovative teaching method.

The findings of the study by Saludo et al. shed light on the positive impact of the flipped classroom strategy on students' arithmetic performance. In a flipped classroom, students engage with instructional materials, such as pre-recorded lectures or online resources, outside of the traditional classroom setting. Classroom time is then dedicated to activities that promote active learning, such as discussions, problem-solving, and collaborative projects.

Test Of The Significance Of The Difference Between The Mean Gains

This section will present the results of the test of the significance of the difference between the mean gains of the control and experimental groups of the three national high schools.

National High School A

The test of the significance of the difference between the mean gains of the control and experimental groups from National High School A - Jaclupan National High School is shown in Table 7.1.

Table 7.1. *Significance of the Difference between the Mean Gains of the Control and Experimental Groups (NHS A)*

Group	Mean Gain	p-value	Significance
Control	1.07		
Experimental	6.83	0.0000*	Significant

$\alpha = 0.05$, t-test assuming unequal variance

In Table 7.1 of the significance of the difference between the mean gains of the control and experimental groups in National High School A - Jaclupan National High School, shows the mean gain of the control group is 1.07 while in the experimental group is 6.83. The p-value of 0.0000* is lesser than the level of significance alpha 0.05. Therefore, there is a significant difference between the mean gains of the control group and the experimental group.

In one study, conducted by Lim et. al (2019), the efficacy of a math remediation program for pupils at a Philippine elementary school was assessed. The study discovered that after taking part in the remediation program, the experimental group had much higher mean gains than the control group. The method was successful in enhancing math skills, according to the authors, and it ought to be adopted by other schools.

Strong evidence for the success of the math remediation program in raising students' arithmetic proficiency can be found in the study's findings by Lim et al. The program specifically targeted kids who were having difficulty understanding arithmetic concepts and offered them extra assistance, individualized training, and resources catered to their particular requirements. The experimental group's considerable mean gains demonstrate the remedial program's beneficial effects on kids' math proficiency.

Furthermore, the study underscores the importance of early intervention and remediation in addressing math difficulties among

elementary school students. By identifying and addressing learning gaps at an early stage, educators can prevent the accumulation of math difficulties and support students in building a strong foundation in mathematics.

In conclusion, the study conducted by Lim et al. highlights the positive impact of a math remediation program in enhancing students' math skills at an elementary school in the Philippines. The findings suggest that the program's approach, incorporating targeted interventions and individualized instruction, effectively addresses students' math difficulties and improves their academic performance.

National High School B

The test of the significance of the difference between the mean gains of the control and experimental groups from National High School B - Talisay City National High School is shown in Table 7.2. The non-parametric Mann-Whitney U test was used for the control group data was not normally distributed based on the Kolmogorov-Smirnov normality test.

Table 7.2. *Significance of the Difference between the Mean Gains of the Control and Experimental Groups (NHS B)*

Group	Mean Gain	p-value	Significance
Control	1.43		
Experimental	14.27	0.0000*	Significant

$\alpha = 0.05$, Mann-Whitney U = 83.5

In Table 7.2, the significance of the difference between the mean gains of the control and experimental groups in National High School B - Talisay City National High School, shows the mean gain of the control group is 1.43 while in the experimental group is 14.27. The Mann-Whitney U obtained is 83.5 and the p-value of 0.0000* which is lesser than the level of significance alpha 0.05. Thus, the null hypothesis is rejected. Therefore, the mean gains of the control group and experimental group differed significantly with the experimental group having a higher mean gain.

Research by Mendoza et. al. (2020), the efficacy of a mathematics remediation program for pupils in a high school in the Philippines was assessed. The study discovered that after taking part in the remediation program, the experimental group had much higher mean gains than the control group. The program's adoption in other schools was advised by the writers, who came to a conclusion that it was successful in enhancing math skills.

The results of the study conducted by Mendoza et al. (2020) provide strong evidence for the effectiveness of the math remediation program in improving students' math proficiency at the high school level. The program specifically targeted students who were struggling with math concepts and provided them with targeted interventions, personalized instruction, and appropriate learning materials. The significant mean gains observed in the experimental group indicate the positive impact of the remediation program on students' math performance.

Furthermore, collaboration among teachers, administrators, and parents is essential in implementing math remediation programs effectively. By fostering a supportive and collaborative environment, schools can ensure that all stakeholders work together to support students' math learning and progress.

In conclusion, the research study by Mendoza et al. (2020) highlights the positive impact of a math remediation program in enhancing students' math skills at a high school level in the Philippines. The findings suggest that the program's approach, which includes targeted interventions and personalized instruction, effectively addresses students' math difficulties and improves their academic performance.

National High School C

The test of the significance of the difference between the mean gains of the control and experimental groups from National High School C - Tanke National High School is shown in Table 7.3. The parametric two-tailed t-test of independent means, assuming unequal variance was used.

Table 7.3. *Significance of the Difference between the Mean Gains of the Control and Experimental Groups (NHS C)*

Group	Mean Gain	p-value	Significance
Control	2.50	0.0000*	Significant
Experimental	10.93		

$\alpha = 0.05$, t-test assuming unequal variance

In Table 7.3, the significance of the difference between the mean gains of the control and experimental groups in National High School C - Tanke National High School, shows the mean gain of the control group is 2.50 while in the experimental group is 10.93. The obtained p-value of 0.0000* is lesser than the level of significance alpha 0.05. Therefore, the null hypothesis is rejected. There is a significant difference between the mean gains of the control group and the experimental group in Tanke National High School.

A study by Bato et.al. (2019) assessed the efficiency of a math remedial program for pupils in Grade 9 at a public school in the Philippines. The study discovered that the experimental group had considerably larger mean increases in arithmetic achievement compared to the control group because the program used the contextual teaching and learning approach. The contextual teaching and learning approach, according to the authors, maybe a successful strategy for math remediation.

The results of the study by Bato et al. shed light on the effectiveness of the math remedial program utilizing the contextual teaching and learning approach. This approach emphasizes the connection between mathematical concepts and real-life contexts, making the learning experience more meaningful and relevant for students. By relating math to practical situations, students can develop a deeper understanding of mathematical concepts and their applications.

Additionally, ongoing assessment and feedback are crucial in monitoring students' progress and identifying areas where additional support may be needed. By regularly evaluating students' understanding and providing timely interventions, educators can address individual learning needs effectively and ensure continuous improvement.

In conclusion, the study conducted by Bato et al. (2019) highlights the positive impact of a math remedial program utilizing the contextual teaching and learning approach for Grade 9 students in a public school in the Philippines. The findings suggest that this approach can be a successful strategy for math remediation, as it enhances students' arithmetic achievement by linking mathematical concepts to real-life contexts.

Test Of The Significance Of The Relationship

This section presents the results of the test of the significance of the relationship between the profile and performance in the pretest and posttest of the control and experimental groups of the three national high schools. The Multiple Regression R was employed to identify the degree of relationship and its significance.

National High School A

The test of the significance of the relationship between the profile and performance in the pretest and posttest of the control and experimental groups from National High School A - Jaclupan National High School is shown in Table 8.1.

Table 8.1. *Significance of the Relationship between the Profile and Pretest, Posttest (NHS A)*

School	Paired Variables	Multiple R		p-value		Significance	
		Control	Experi-mental	Control	Experi-mental	Control	Experi-mental
NHS A	Profile and Pretest	0.45311	0.24981	0.20168	0.79547	not significant	not significant
	Profile and Posttest	0.39543	0.33726	0.35270	0.53532	not significant	not significant

$\alpha = 0.05$

Based on Table 8.1, the results of the test of the significance of the relationship between the profile and performance in the pretest and posttest of the control and experimental groups are presented. The p-values were found to be greater than the alpha value of 0.05 level of significance. This indicates that there is not enough evidence to reject the null hypothesis. there is no significant relationship between the profile and performance in the pretest and posttest.

The result shows that the profile of the respondents in National High School A - Jaclupan National High School has no significant relationship with their performance in pretest and posttest. This suggests that the age, gender, school, and academic performance has no significant influence on the performance in the pretest and posttest of the students in Jaclupan National High School. However, it is important to note that this does not imply that these factors should be disregarded entirely when considering interventions or support systems for the students. While the study did not find a significant relationship, it is still essential to consider individual differences and tailor interventions based on specific student needs.

Delos Santos et. al. (2020) conducted a study on the effectiveness of a math remediation program for Filipino high school students. The researchers found that there were no significant differences in the effectiveness of the program based on participants' profile; it suggests that the intervention was equally effective for all students regardless of their background.

National High School B

The test of the significance of the relationship between the profile and performance in the pretest and posttest of the control and experimental groups from National High School B - Talisay City National High School is shown in Table 8b.

Table 8.2. *Significance of the Relationship between the Profile and Pretest, Posttest (NHS B)*

School	Paired Variables	Multiple R		p-value		Significance	
		Control	Experi-mental	Control	Experi-mental	Control	Experi-mental
NHS B	Profile and Pretest	0.28816	0.24651	0.68959	0.80364	not significant	not significant
	Profile and Posttest	0.32538	0.42997	0.57359	0.25718	not significant	not significant

$\alpha = 0.05$

Based on Table 8.2, the test of the significance of the relationship between the profile and performance in the pretest and posttest of the control and experimental groups are given. The p-values were found to be greater than the alpha value 0.05 level of significance. This indicates that there is not enough evidence to reject the null hypothesis implying that there is no significant relationship between the profile and performance in the pretest and posttest.

The result shows that the profile of the respondents in National High School B - Talisay City National High School has no significant relationship with their performance in pretest and posttest. This suggests that the age, gender, school, and academic performance has

no significant influence on the performance in the pretest and posttest of the students in Talisay City National High School. It is crucial to highlight that this does not imply that these characteristics should be completely ignored when thinking about treatments or support systems for the learners. Even though the study did not discover a significant association, it is still important to take into consideration the individual differences and adjust interventions based on particular student needs.

In the study of Reyes et. al. (2021) investigation into the success of a math intervention program for Filipino elementary school kids. Through small-group instruction, games, and activities, the program aims to help children become more proficient in math. The study's objective was to assess the program's effectiveness for students in the experimental group (who got the intervention) and those in the control group (who did not).

The participants' math abilities were assessed before and after the study, and the researchers compared the mean increases of the two groups using statistical analysis. Additionally, they gathered participant demographic information, like age and gender, to see if these variables affected the program's efficacy.

According to the study's findings, the experimental group's mean posttest score improvements were noticeably higher than those of the control group. This shows that the math intervention program in the Philippines was successful in raising kids' math proficiency levels. Additionally, the researchers discovered that neither gender nor age significantly affected how effective the program was, indicating that all kids, regardless of their background, benefited from the intervention.

National High School C

The test of the significance of the relationship between the profile and performance in the pretest and posttest of the control and experimental groups from National High School C - Tanke National High School is shown in Table 8c below.

Table 8.3. Significance of the Relationship between the Profile and Pretest, Posttest (NHS C)

School	Paired Variables	Multiple R		p-value		Significance	
		Control	Experi-mental	Control	Experi-mental	Control	Experi-mental
NHS A	Profile and Pretest	0.41203	0.50640	0.30508	0.10356	not significant	not significant
	Profile and Posttest	0.33951	0.41454	0.52807	0.29814	not significant	not significant

Based on Table 8.3, the test of the significance of the relationship between the profile and performance in the pretest and posttest of the control and experimental groups are exemplified. The p-values were found to be greater than the alpha value of 0.05 level of significance. Thus, there is not enough evidence to reject the null hypothesis. There is no significant relationship between the profile and performance in the pretest and posttest.

The results show that the profile of the respondents in National High School C - Tangke National High School has no significant relationship with their performance in pretest and posttest. This suggests that the age, gender, school, and academic performance has no significant influence on the performance in the pretest and posttest of the students in Jaclupan National High School. It is crucial to remember that this does not mean that these aspects should be completely ignored when thinking about interventions or support systems for the learners. Even though the study did not discover a significant connection, it is still important to take into account individual differences and personalize interventions based on particular student needs.

An investigation by Tan et al. (2019) looked on how a math remedial program affected Filipino elementary school students' academic performance. Through targeted education and practice, the program was created to assist children who were having difficulty with math in improving their abilities.

Based on the results, the experimental group's mean posttest score improvements were noticeably higher than those of the control group. This shows that the math remediation program in the Philippines was successful in enhancing kids' math abilities. The p-value for the association between the participant profiles (age, gender, and socioeconomic status) and their performance on the pretest and posttest, however, was higher than the alpha value, indicating that this relationship was not statistically significant.

The findings of this study show that math remediation programs can significantly improve the math abilities of underachieving elementary school children in the Philippines. The program may be successful for all students regardless of background, as evidenced by the lack of a significant association between the participant profiles and their performance on the pretest and posttest.

Conclusions

The study confirms that Project TABANG effectively bridges the numeracy gaps of Grade 10 learners at risk of failing Mathematics. The significant improvement in the posttest scores of the experimental group highlights the value of structured remediation programs in enhancing foundational skills and promoting equity in education. These findings emphasize the importance of targeted interventions in addressing learning disparities and reducing dropout rates.

To sustain and expand the program's impact, it is recommended that schools adopt and adapt Project TABANG for other subjects and grade levels where learning gaps are prevalent. Teacher training programs focusing on differentiated instruction and active learning strategies should be implemented to ensure effective program delivery. Sufficient resources, such as instructional materials and

technological tools, must also be allocated to support its implementation. Collaboration with parents and local communities can further enhance the program's effectiveness by providing additional learning support for students. Lastly, continuous monitoring and evaluation should be conducted to refine the program and explore its long-term impact on student performance and retention rates. By institutionalizing and scaling such initiatives, schools can help at-risk learners achieve academic success and develop the skills necessary for lifelong learning.

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