



Republic of the Philippines
Department of Education

REGION IV-A – CALABARZON
SCHOOLS DIVISION OF RIZAL

ENGAGE, PRACTICE, EXCEL:
BOOSTING MATH 10 EXAMINATION RESULTS through
REPETITION and HANDS-ON ACTIVITIES

Action Research

Presented to

Department of Education

Division of Rizal

San Mateo, Rizal

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Abstract

This research probed the efficiency of the Engage, Practice, Excel intervention program in enhancing Grade 10 students' mathematical performance, especially in their readiness for their quarterly exams. The initial pretest results indicated that 80% of the respondents were at low mastery, showing a wide gap in basic skills. Following a series of specific hands-on exercises and timed practice drills, post-test results indicated significant improvement. More than half of the sample resulted in above-average levels of mastery, with some even reaching mastery level. Statistical evaluation affirmed that the improvement was both significant and substantial ($t = 8.24$, $p < 0.05$, Cohen's $d = 1.43$).

In addition to test scores, the intervention also had a positive impact on students' confidence, time management skills, and preparedness for examinations. Survey responses based on a 4-point Likert scale indicated an overwhelming consensus that the program enabled them to learn concepts more clearly, manage time well, and feel prepared.

Qualitative reflections also identified four major themes: better understanding, enhanced confidence, reduced anxiety, and a more positive learning experience. The learners valued the systematic reviews and interactive strategies that enabled them to break their math phobia.

The findings indicate that the integration of repetition with purposeful hands-on activity not only boosts academic achievement but also promotes a positive learning culture. Further continuation and extension of the intervention are encouraged to maintain its effect and support more learners.

Keywords: Mathematics intervention, student performance, hands-on learning, confidence building



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— The Researcher



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Context and Rationale

Many students still find mathematics to be one of the most difficult subjects, especially in the Philippine educational system. A number of Grade 10 students at Guinayang National High School perform exceptionally well in class discussions and activities, but fall short on their quarterly tests, as reflected in the MPS and examination results. This is a typical occurrence that reveals more serious problems with stress, retention, and readiness for a certain test.

Guinayang National High School is not the only institution dealing with this issue. There have been reports of grade 10 students performing below the proficient level on this year's NAT, particularly in core topics like science and math. According to international assessments such as the 2018 Program for International Student Assessment (PISA), out of 79 participating nations, Filipino pupils performed the worst in math. The average arithmetic results of Filipino children were significantly lower than the OECD norm, suggesting a deficit with idea application and problem-solving abilities.

These findings highlight systemic issues in mathematics education, such as poor study habits, a lack of exposure to exam-like scenarios, difficulty remembering important topics, and a lack of emphasis on honing problem-solving techniques under pressure.

The following are some of the initiatives that the Department of Education (DepEd) has undertaken:

- Section 21 of DepEd Order No. 2019: The goal of a balanced curriculum that encourages higher-order thinking skills, particularly in STEM-related disciplines like mathematics, is strengthened by this policy. The policy promotes the use of instructional strategies in schools that foster critical thinking and mastery of fundamental skills.
- Section 39 of DepEd Order No. 2016: This directive relates to the "Adoption of the Basic Education Research Agenda," which encourages educators and educational institutions to carry out action research with an emphasis on improving instructional strategies and addressing knowledge gaps.

The intervention program at Guinayang National High School aligns closely with the Department of Education's MATATAG agenda. The MATATAG agenda, focused on strengthening foundational skills, enhancing learner performance, and creating a robust support system for quality education, resonates with the goals of



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the HUB program, which aims to address the students' difficulties in mastering essential mathematical skills.

The HUB intervention aims to solidify students' understanding of core math concepts by engaging them in repeated practice and structured activities. This directly supports the MATATAG agenda's goal of reinforcing foundational learning skills, ensuring students can progress with confidence through increasingly complex mathematical topics.

The program goes beyond traditional lectures by incorporating hands-on activities and simulated test conditions that mimic quarterly exams, encouraging students to apply math concepts in realistic scenarios. These approaches align with the MATATAG agenda's emphasis on performance-enhancing strategies and quality instructional practices.

By implementing a research-based intervention that targets areas of weakness in math, the program demonstrates an adaptable, student-centered approach. This reflects MATATAG's vision of creating a responsive education system that adapts to learners' unique needs, addressing both academic and emotional challenges like test anxiety.

Teachers in Guinayang National High School have observed that most students can do lessons, participate in activities and solve problems but fail when it comes to timed examinations. In many cases, the deficiency has been traced to lack of exposure to exam-like conditions. While students may understand the material, they are not used to applying their knowledge in a high-pressure, time-limited environment, leading to anxiety and poor time management during exams.

Innovation, Intervention, and Strategy

Engage, Practice, Excel is an innovative intervention program designed to improve students' chances of passing exams by providing structured and focused review sessions which combine active engagement, repetitive practice, and skill building activities to help build understanding, increase confidence and pass tests.

Its innovation goes beyond conventional review practices by being specifically designed to help students who are actively participating in class but continue to perform below expectations on exams. It integrates three critical strategies: active engagement, repeated practice, and replicated testing conditions to address specific knowledge deficits. The program applies daily, intensive sessions with aligned actual exam material, utilizes diversified question types, and progressively develops time management and test-taking competencies through real timed drills. This integrated,



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student-focused approach addresses both mental and emotional hurdles to exam success, leading to a practical and forward-thinking solution.

The intervention was conducted for a two-week duration before the Math quarterly test. It was aimed at students who were very active during class but performed poorly in exams. Every session, the respondents participated in guided review sessions on particular math concepts that had been found to be problematic from past exam performance. The activities included repeated practice, with students working on sets of similar problems in order to reinforce their knowledge and skills. Active learning was prioritized through realistic problem-solving exercises and group work that fostered critical thinking, peer cooperation, and interactive learning with the material. To ensure that the students learned how to manage time and decrease test anxiety, there were timed drills in place, replicating real exam scenarios. These practice sessions progressed in levels of difficulty and pressure of time so that students developed speed and confidence. The intervention was monitored closely, and necessary modifications were incorporated to suit the learners' requirements so that the revision was effective and focused.

The strategy was evidence-based in its techniques to ensure maximum retention of learning and maximized test preparedness. It focused on three main pillars: repetition for mastery, active hands-on learning, and exam simulation. By repeated exposure to problems of the same context, the respondents enhanced their grasp of essential math concepts and developed confidence in solving them. This repetition facilitated better recall and enabled the respondents to tackle more advanced problems with ease.

The program also focused on active learning by using hands-on computational exercises instead of passive review techniques. By using math to solve real-life problems, the respondents built better problem-solving skills and a better understanding of abstract concepts, making the lessons more relevant and easier to recall.

Lastly, respondents did timed exercises that simulated actual exam environments. These exercises allowed them to practice under pressure, maintain a good pace, and alleviate anxiety. Through repetition, they became increasingly adept at controlling their time and remaining focused during high-pressure situations, preparing them more for real exam performance.



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Action Research Questions

This study looked into the efficiency of the intervention program ENGAGE, PRACTICE, EXCEL to enhance the Grade 10 students' mathematical performance at Guinayang National High School, San Mateo, Rizal, during the school year 2024–2025.

Particularly, this study aimed to respond to the following questions:

1. What are the respondents' pretest scores before they underwent the implementation of the intervention?
2. What are the respondents' post-test scores after undergoing the intervention?
3. Is there a significant improvement between the pretest and post-test scores of the respondents?
4. How do respondents perceive the effectiveness of hands-on activities and timed problem-solving sessions in enhancing their confidence, time management, and readiness for exams in the Math intervention program?

Action Research Methods

This research employed a mixed-methods experimental design to assess the effectiveness of the Engage, Practice, Excel intervention. Using quantitative and qualitative methods, the study sought to measure both the tangible outcomes and the richer learning experiences of the students. Quantitative measurement was achieved through administering a pre-test and post-test to measure the change in performance of students in mathematics, generating tangible proof of academic gain (Creswell, 2014). The qualitative component involved student reflection and teacher journals that provided insightful information on students' engagement, problem-solving behavior, and general reaction to the intervention (Merriam & Tisdell, 2016). For Johnson and Onwuegbuzie (2004), mixed-methods research closes the gap between statistics and narratives, which, in education, is particularly crucial, given that student outcomes are influenced by a combination of cognitive, emotional, and social elements.

This mixed-methods strategy is in accordance with the creed of action research, in which not only is data collection aimed at, but so is reflection on practice and decision-making to enhance teaching (Mills, 2017). With both approaches being utilized, the research ensured a better overall understanding of why and how the intervention was effective.



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Participants or other Sources of Data and Information

This action research utilized purposive sampling and involved 30 Grade 10 students from Guinayang National High School. These were the students who were known to be active participants in class activities but consistently failed to pass the quarterly math exams. Purposive sampling was used as it enables the researcher to deliberately choose participants who best suit the study's area of interest, such that the gathered data is rich, meaningful, and closely connected to the purpose of the research (Palinkas et al., 2015; Etikan, Musa, & Alkassim, 2016).

Data Gathering Methods

Before the intervention, the respondents were given a researcher-made pretest, which served as a benchmark to measure improvement after the post-test. The pretest allowed the respondents to assess their current understanding of mathematical concepts and problem-solving skills within the second grading period.

After the two-week intervention, the respondents took the actual quarterly exam. Their performance was then compared to their pretest results to determine the effectiveness of the review program in improving test outcomes. This comparison provided a quantitative measure of the program's impact.

A reflective session followed the exam, during which students shared how the intervention supported their preparation and identified areas where they still faced challenges. Feedback was also collected through surveys and interviews to gain insights into students' perceptions of the program's effectiveness.

The pretest and post-test results were statistically analyzed using T-test (since the data satisfy the normality assumptions) to evaluate whether the intervention significantly enhanced the students' mastery of math competencies (Gopalan et al., 2020).

The instrument for the pretest was drafted by the researcher and was checked for validity and reliability by the Math coordinator and a Teacher III in English for grammar and construction. The material was pilot tested to performing students who did not participate in the study to check its readability and comprehensibility. The quarterly exam served as the post-test which was validated and approved by experts before the reproduction and distribution to the students.



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Discussion of Results and Reflection

This section discusses the changes observed in the students' scores, their perceptions, and reflections, offering deeper insight into how the intervention shaped their learning experience and contributed to their academic growth.

Table 1. Pretest Scores of the Respondents

Low Mastery		Average Mastery		Moving Towards Mastery		Closely Approaching Mastery		Mastered
(15% to 34%)		(35% to 65%)		66% to 85%		86% to 95%		96% to 100%
No.	%	No.	%	No.	%	No.	%	No.
24	80.00	6	20.00	0	0.00	0	0.00	0

Table 1 yields the pretest results. It can be seen that a high percentage of the respondents are having difficulty with the foundational concepts of the lesson. Out of 30 respondents tested, 80% or 24 of them have Low Mastery level, with scores between 15% to 34%. This indicates the majority of the respondents have little understanding and would require extensive remediation and support.

Only 6 respondents (about 20%) achieved the Average Mastery level (35% to 49%), with some understanding of the lesson but far from proficient. None of them have yet achieved higher mastery levels—Moving Towards Mastery, Closely Approaching Mastery, or Mastered that normally indicate stronger understanding and readiness to advance.

Table 2. Posttest Scores of the Respondents

Average Mastery		Moving Towards Mastery		Closely Approaching Mastery		Mastered	
(35% to 49%)		66% to 85%		86% to 95%		96% to 100%	
No.	%	No.	%	No.	%	No.	%
10	36.14	14	46.67	4	13.33	2	6.67

The post-test results in table 2 show a promising improvement in the respondents' performance where 36.14% or 10 of them reached the Average Mastery level, showing a basic understanding of the concepts. Fourteen respondents (46.67%) are now Moving Towards Mastery, indicating they have gained a solid grasp of the lessons and are on track to achieving full proficiency. Four respondents (13.33%) are Closely Approaching Mastery, and 2 students (6.67%) have Mastered



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the competencies, demonstrating strong comprehension and readiness for more advanced learning.

Overall, the results reflect significant progress, with more than half of the respondents showing above-average mastery. Continued support and enrichment activities can help sustain this growth and move more students toward full mastery.

Table 3 presents the results of a paired t-test employed to determine if there is a significant improvement between the pre-test and post-test scores of the respondents, assessing the effectiveness of the instructional strategies. Since the pretest and post test satisfied the normality assumption, a dependent samples t-test was appropriate, as it compares the same group's performance before and after the intervention.

Table 3. Comparison of the Pretest and Posttest Results

Tests	N	$\bar{X}$	SD	df	Effect Size	Computed t Value	Critical t-Value	Interpretation
Pre-test	30	11.50	1.89	29	1.43	8.24	2.045	Significant
Post test	30	27.67	5.72					

It could be seen that the computed t-value of 8.24 went above the 5% critical value which was 2.045. Such results clearly indicate that there is a significant improvement in the levels of performance of the respondents right after the intervention was implemented. The effect size (Cohen's $d = 1.43$) is considered large, showing that the intervention that caused the change had a strong impact. With 95% confidence interval, the true average difference lies between 9.74 and 16.14. This confirms that the improvement is not only statistically significant but also practically meaningful.

To assess the effectiveness of Engage, Practice, Excel program on the respondents' confidence, time management, and exam preparedness, a survey was conducted utilizing a 4-point Likert scale (1 – Strongly Disagree, 2 – Disagree, 3 – Agree, 4 – Strongly Agree). The scale permitted respondents to respond to the extent to which they perceived the efficacy of hands-on exercises and timed exercises in enhancing their skills. The application of a Likert scale is a widely accepted tool for attitude and perception measurement in educational research (Joshi et al., 2015). Table 4 presents respondents' comments on how these approaches added to their learning process and preparation for math exam.



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Table 4 Respondents’ Perception on the Effectiveness of Engage, Practice, Excel

A. Confidence in Solving Math Problems	Weighted Mean	Verbal Description
1. The hands-on activities helped me better understand math concepts.	4.0	Strongly Agree
2. I feel more confident answering math problems after joining the hands-on activities.	3.6	Strongly Agree
3. Timed problem-solving sessions improved my confidence in answering exam questions.	3.3	Agree
4. I feel less anxious during math exams because of the intervention sessions.	3.4	Agree
Overall Weighted Mean	3.6	Strongly Agree
B. Time Management Skills		
5. Timed problem-solving sessions helped me manage my time better during exams.	3.4	Agree
6. I became more aware of how to allocate time for each math problem.	4	Strongly Agree
7. The regular practice during the sessions helped me improve my pacing in tests.	3.9	Strongly Agree
8. I am now able to finish math assessments within the time limit.	3.4	Agree
Overall Weighted Mean	3.7	Strongly Agree
C. Readiness for Math Exams		
9. The activities in the intervention program helped me prepare better for exams.	3.6	Strongly Agree
10. The format of the sessions closely resembled our actual exams.	3.7	Strongly Agree
11. I feel more ready to take the quarterly math exams after the intervention.	3.6	Strongly Agree
12. The combination of hands-on and timed problem-	3.6	Strongly



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solving made review sessions more effective.		Agree
Overall Weighted Mean	3.6	Strongly Agree

Legend: 4-point Likert scale (1 – Strongly Disagree, 2 – Disagree, 3 – Agree, 4 – Strongly Agree)

With a weighted mean of 3.6 (Strongly Agree), the majority of respondents indicated increased confidence in doing math problems. They were particularly fond of the hands-on activity, which they believed helped them comprehend math concepts better (4.0). Although the timed sessions were less effective in generating confidence (3.3), they were still helpful in preparing the respondents for the exams.

The respondents rated Timed Management Skills 3.7 (Strongly Agree) on average. They appreciated how the timed practice sessions and frequent practice allowed them to better pace themselves on exams and improve their time management. One exceptional response was their higher sense of awareness to allocate time per problem (4.0).

Readiness for Math Exams also gained a high rating of 3.6 (Strongly Agree). The respondents were more confident during exams and enjoyed that the format of the sessions was similar to the real test format. The incorporation of hands-on activities and timed practice enhanced the effectiveness and interest of review sessions.

To gain a deeper understanding of the students' experiences and perceptions of the *Engage, Practice, Excel* intervention, a qualitative approach was employed alongside the quantitative data. This involved collecting open-ended responses and reflections from selected participants who took part in the hands-on and repetition-based activities. These answers were able to bring life to the figures by illustrating how the activities influenced their confidence, concentration, and attitude towards solving mathematical problems. Through their own words, the study was able to get hold of the true effect of the intervention beyond ratings and scores.

Qualitative Findings: Students' Reflections on the Engage, Practice, Excel Intervention

The feedback from students who took part in the Engage, Practice, Excel program provided useful information regarding how the intervention facilitated their learning experience in mathematics. Their comments were categorized into four main themes:



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Improved Understanding

Most students shared that the intervention helped in enhancing their understanding of math lessons. One of them said, "The quarterly exam reviews helped me refresh and have a deeper understanding of our lessons." This indicates that the regular and concentrated review sessions permitted them to recollect and strengthen concepts learned earlier.

Increased Confidence

A common theme across reflections was a boost in self-confidence. One student noted, "Faith in math problem-solving most helped me because I have faith and am able to overcome fear of doing mistakes." Another stated, "The practice prior to the exam most helped me, as I sometimes used to struggle to perform calculations because I lack faith in my solution." These quotes point out how the organized practice and support enabled learners to have faith in themselves being capable of solving problems.

Reduced Anxiety

The students also indicated a significant reduction in exam anxiety. One of them said, "I would say the whole program helps me the most 'cause I manage to pass my exam after the intervention program." The above statement indicates that passing the exam not only confirmed their effort but also reduced the stress they had earlier.

Positive Learning Experience

Overall, the students found the intervention to be a valuable and beneficial experience. As one of them commented, "The review sessions helped me the most because they prepared me for the exam." This indicates that the learning environment provided by the program was interactive and encouraging, resulting in a positive attitude towards math.

The reflections of the students showed that the Engage, Practice, Excel intervention not only worked to increase test performance but also helped the students better comprehend mathematical concepts, increased their confidence, relieved exam stress, and provided a positive learning environment. These findings show how repetition, practicing with guidance, and emotional support were crucial in assisting the students to overcome their difficulties with math and achieve academic success.



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To maximize the impact of ENGAGE, PRACTICE, EXCEL and ensure its sustainability and adaptability for the benefit of more learners, it is recommended to continue the implementation of the intervention as a continuous support program in Mathematics. Its effectiveness could enable more students to be better prepared and confident. Adopt the hands-on and timed problem-solving approach to other grade levels and even across other subjects such as Science or English to support broader academic enhancement. Because some students found the timed sessions to be slightly less effective than hands-on exercises, further enhance these sessions by introducing guided approaches on pacing and prioritizing problems. Organize professional growth sessions or LACs for Math teachers to exchange best practices for delivering effective, time-conscious, and confidence-building activities.

Encourage cooperative learning by incorporating peer tutoring or group review sessions in the lessons to enhance learner participation and minimize math anxiety. Integrate pieces of the intervention such as real-world problem-solving, manipulatives, and timed activities into regular lessons to maintain the skills across the year. Offer take-home activities or brief problem sets replicating the intervention format to engage parents in assisting with math review and time management practice at home. Gather frequent feedback from students and monitor their performance to further refine the intervention design and make sure that it still addresses their learning needs.

Action Plan

DISSEMINATION ACTIVITIES	Month 1	Month 2	Month 3	Month 4
1. Presentation of the study to GNHS Research Committee and the faculties interested with the study.				
2. Presentation of the study to GNHS Math Department.				
3. Presentation of the study to the district of San Mateo in preparation for the 12 th DRC.				
4. Presentation of the study to the 12 th Division Research Conference.				



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Department of Education

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Financial Report

Activity	Eligible Expenditures	Quantity	Cost in PHP	Source
For the printing of materials and manuscripts	Bondpapers	3 rims	900	MOOE
	Printer's Ink	1 set	1,000	MOOE
Research dissemination expenses	Food	For Math Teachers and Research Committee members/ other faculty members	1,000	MOOE
Research presentation in the district and international conferences	Registration	1 Researcher	2,000	MOOE
Total			4,900	



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