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Research Article

A Contextualized Reinforcement and Intervention Program in Mathematics for Selected Senior High School Students

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ABSTRACT

This action research evaluates the effectiveness of a contextualized reinforcement and intervention program in Mathematics for selected Senior High School (SHS) students at Maximo L. Gatlabayan Memorial High School (MLGMNHS). The participants were students who previously scored below 75% of the highest possible score in Mathematics examinations and/or demonstrated low performance in the Learning Outcomes Assessment (LOA) or Individual Monitoring Learning Plan (ILMP). They were identified by their subject teachers and validated through a pre-test. To assess the program's impact, the participants took a teacher-designed post-test, and the results were analyzed to determine significant differences in their performance before and after the intervention. Additionally, some students were interviewed to gain insights into their experiences and the challenges they faced throughout the program. Findings indicate that implementing structured intervention programs in Mathematics significantly enhances students' mathematical knowledge and overall performance. Therefore, schools should invest more effort in sustaining and improving such programs to maximize their impact on student learning outcomes.

Keywords: *Contextualization, Intervention, Reinforcement, Action Plan, Struggling Learners*

Introduction

In order to produce graduates who are more globally competitive, the Department of Education (DepEd) began a significant curriculum transition from the Revised Basic Education Curriculum (RBEC) to the K–12 Program in 2012. With the inclusion of kindergarten as a substantial component of it, this change allowed the Philippines to satisfy the international criteria for secondary education (Okabe, 2013). This program is not merely about extending students' time in school, but more importantly, it prepares them to be more competent individuals as they enter college level or

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even the workforce, may it be domestically or abroad (Santelices et al., 2024).

With this transformation came a number of difficulties as well as new opportunities. Although these difficulties may be unavoidable, they can be utilized to advance the system's basic design, which would be advantageous to both students and teachers. In order to address these challenges, which may lead to curriculum inconsistencies and other potential implementation gaps, the government must be involved in the program's ongoing evaluation and improvement, starting with the curriculum itself up to with how it is carried out within the classroom context (Trance et al., 2019; Rivera, 2017, as cited by Combo & Ramos, 2023).

The presently implemented curriculum is well-known for the inclusion of mandatory kindergarten and an additional 2-year secondary level as part of new graduation requirements. Thus, the first four (4) years of a student's high school career will be referred to as junior high school (JHS), while the additional two (2) years are labeled to be senior high school (SHS). Subsequently, both the elementary and JHS levels utilize a spiral method or spiral progression as its curriculum cycle (DepEd Order No. 21, s. 2019), while a new set of topics was introduced for the SHS students. Republic Act 10533, otherwise known as the "Enhanced Basic Education Act of 2013", Sec. 5 (g): Curriculum Development, encapsulates that "The curriculum shall use the spiral progression approach to ensure mastery of knowledge and skills after each level." This act was the primary basis of the DepEd as they implemented the said transition all over the Philippines, as reflected in DepEd Order No. 31, s. 2012.

As previously mentioned, SHS learners ought to take a new set of subjects that are relatively different from what they had at the JHS level. These subjects were divided into groups based on the learners' selected strand and track. Since the official commencement of SHS as an additional grade level in 2016, students have had to take courses that are suitable for them. These courses are divided into three categories: (a) core, which is available to all students regardless of track; (b) specialized, or subjects that are only offered to students in a particular track and strand; and (c) applied, or core-like courses that are limited to focusing on the specific ways in which a given discipline is applied to the learners' chosen track and strand (DepEd Order No. 21, s. 2019).

In light of this, the SHS curriculum has drawn criticism for having too many courses to take (Jaudinez, 2019) as well as learning competencies to meet, most especially in Mathematics subjects. In addition, the mathematics proficiency of learners was compromised not only because of the aforementioned issue but also because of the worldwide disruption of classes caused by the COVID-19 pandemic. According to the 2020 report of the United Nations, almost 1.6 billion students in more than 190 countries around the world were disrupted by the pandemic, causing the temporary closure of educational institutions such as schools, universities, and colleges to lessen health risks among students and teachers. This setting, combined with the fact that Mathematics is a relatively abstract discipline (Mitchelmore & White, 2004), makes everything somewhat more difficult, which led many scholars, particularly mathematics teacher-researchers, to concentrate on this area (Demir et al., 2021; Contini et al., 2021; Mukuka et al., 2021).

Furthermore, as revealed by some of the international assessments for students, the Philippines landed in the lower ranking among other participating countries when it comes to mathematical competence (Bernardo et al., 2022; Orbeta et al., 2021). This concomitantly shows that the numeracy level of Filipino learners is at risk and needs to be taken into high consideration. In this regard, one of the DepEd's requirements for teachers is to incorporate activities into their teaching methodologies that primarily develop learners' numeracy skills (DepEd, 2023). Various practices and innovations have already been implemented by the department, and one of those was through enhancement and intervention programs. On the meta-analysis conducted by Filiz (2023), intervention programs could be implemented in various ways like cognitive-based, technology-based, concrete representation, abstract instruction, schema-based, peer-assisted, and explicit instruction.

All things considered, the proponents of this action research developed and

implemented a reinforcement and intervention program in Mathematics that aimed to address learning gaps identified in students' basic numeracy skills. This was supported by the assumption that Mathematics intervention programs significantly increase students' mathematical knowledge, which will eventually reflect on their Mathematics performance in general (Yazicioglu & Akdal, 2023).

Methods

To address the learning gap presented above, this 9-week program provided interventions through contextualized reinforcement to senior high school learners at MLGMNHS.

About the Program

The abovementioned program is labeled as 'contextualized' because the teaching and learning process was based on the individual needs of the learners, as revealed by the learning outcomes assessment (LOA) and quarterly assessment results prepared by the subject teachers. These results were then validated through pre-tests conducted with selected SHS learners. This program ran from after the first quarterly examination of the school year up to the week before the second quarterly examination (the process will be repeated quarterly).

The key objectives of this program were to (a) provide interventions through reinforcement activities to MLGMNHS-SHS learners who are identified as struggling in Mathematics subjects, (b) ensure that the individual mathematical needs of learners are properly identified and addressed, (c) promote Mathematics as an enjoyable subject by integrating up-to-date and appropriate teaching strategies, and (d) build camaraderie among learners and teachers through interactive teaching and learning activities.

The schedule was created by the department head based on the available time for the teachers to be in charge of the intervention activities. The mode of delivery was in person since the school location does not have a strong internet connection, making online sessions impossible. A series of formative assessments were given by the teacher after every discussion. Consequently, teachers were given the freedom, with the guidance of several master teachers, to choose the appropriate teaching strategies. At the end of the program, a quarterly learning monitoring report (QLMR) was presented by the teacher in charge of the intervention to the school head, subject coordinator, master teachers, and learners' parents.

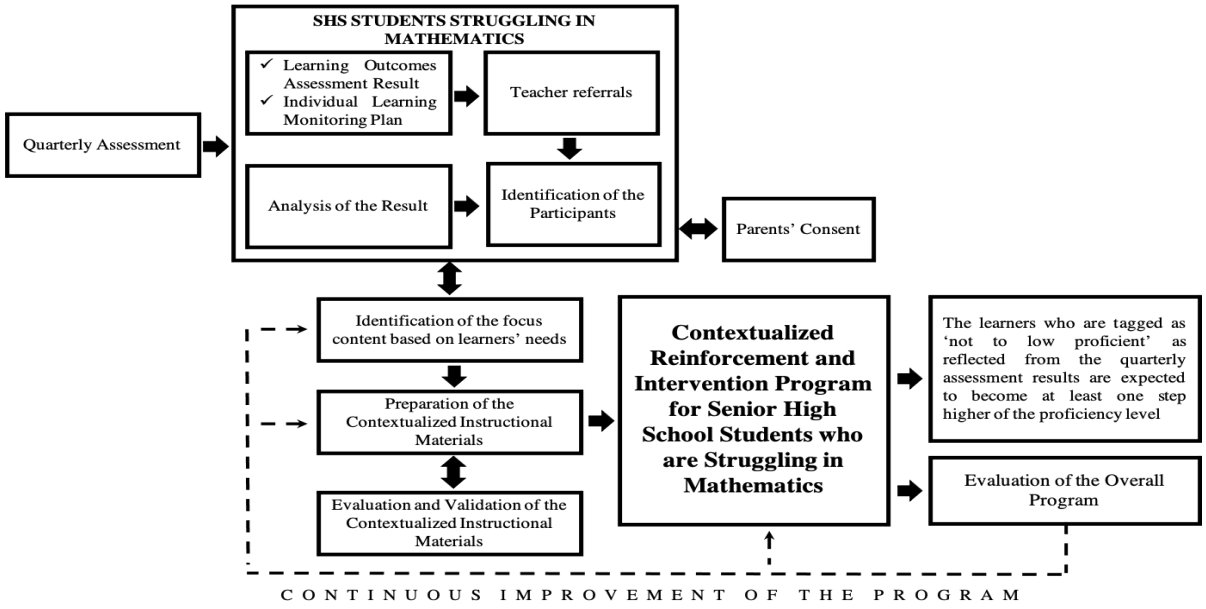

Figure 1. Framework of the Contextualized Reinforcement and Intervention Program in Mathematics for Selected Senior High School Students

Figure 1 presents an overview of the implementation of the contextualized reinforcement and intervention program in Mathematics for selected SHS students. The process started with the evaluation of the quarterly assessment results, which was one of the bases for identifying the target participants. Aside from the exam results, teachers have the authority to refer students to join the program if they have relatively high exam scores but do not perform well in the classroom. Upon the selection of the participants, parent consent forms were completed by all parents concernedAfter the identification process of the participants, focused content was identified based on their individual needs, followed by the development of contextualized instructional materials by the teachers and master teachers. The materials should be contextualized (and localized, if possible) and carefully evaluated by the respective master teachers and school learning resource personnel.

Once the necessary materials were set, the initial implementation of the program commenced. The learners were provided with contextualized activities based on their needs as reflected in the thorough assessment by the subject teachers. The program proper ran for approximately 9 weeks, featuring a series of discussions, learner-centered activities, formative assessments, and necessary feedback addressed to both learners and parents. A program evaluation was conducted at the end of the set timeline to ensure its continuous improvement.

This intervention program covered selected basic Mathematics concepts (see Table 1) taught at the JHS level of MLGMNHS. The topics and competencies included in this proposed intervention activity are considered significant and prerequisite as they deal with higher SHS Mathematics core subjects like General Mathematics and Statistics and Probability.

Table 1. Identified topics to be included in the contextualized reinforcement and intervention program

JHS Mathematics Topics
Topic 1: **Operations on Integers**
Topic 2: **Properties of Equations**
Topic 3: **Algebraic Expressions, Equations, and Inequalities**
✓ **Monomials**
✓ **Binomials**
✓ **Polynomials**
✓ **Operations on Polynomials**
Topic 4: **Special Products**
Topic 5: **Factorization**
Topic 6: **Solving Worded Problems Involving Algebraic Equations**

As mentioned above, the teachers in charge of each class had the freedom to select, develop, and utilize learning activities that best fit their learners. This is supported by Motamedi and Chosari (2013), who believe that teachers are responsible for overseeing and directing every aspect of their teaching, effectively managing the entire process. However, the said activities were still evaluated by their respective master teachers in terms of their alignment with the national standards set by the DepEd. The activities can be individual, group, written, or performance-based, depending on the topic to be discussed by the teacher. In addition, the teachers were encouraged to implement learning activities that are (1) free from gender and cultural biases, (2) learner-centered, (3) technology-based, (4) time-bound, and (5) highly interactive.

The following conditions were adhered to by the learners who were admitted to the program:

1. The learner should be a bona fide SHS student of the school.
2. The learner should have a quarterly examination result in Mathematics of 75% and below.

3. If in case the learner has a quarterly examination result in Mathematics above 75% but wants to be part of the program, a referral from the subject teacher should be provided indicating that the learner needs reinforcement and intervention.
4. The absences and tardiness of the student from the current semester should not exceed 16 hours or 20% of the total hours in a semester.
5. Once the program starts, the learner is expected to actively participate and observe complete attendance throughout the duration of the program implementation.
6. There shall be no direct changes or additional points with the final quarterly grades of the learners in any of the quarters unless they improve their class performance.
7. The intervention program will be held every Monday, Wednesday, Thursday, and Friday from 12:20 PM to 1:20 PM.
8. The learner shall secure a Parent's Consent Form before participating in the program.

Action Research Questions

This action research aimed to evaluate the implemented contextualized reinforcement and intervention program in Mathematics for selected SHS students of MLGMNHS. Specifically, answers to the following questions were sought:

1. What was the level of performance of the selected SHS students in Mathematics before the implementation of the contextualized reinforcement and intervention program as revealed by their pre-test scores?
2. What was the level of performance of the selected SHS students in Mathematics after the implementation of the contextualized reinforcement and intervention program as revealed by their post-test scores?
3. Was there a significant difference between the level of performance of the selected SHS students in Mathematics before and after the implementation of the contextualized reinforcement and intervention program in Mathematics?
4. What were the experiences and challenges faced by the selected SHS students during their participation in the contextualized reinforcement and intervention program?
5. What plan can be developed to continuously improve the implementation of the contextualized reinforcement and intervention program in Mathematics for SHS students?

In distinction to these questions, this action research hypothesized that there is no significant difference between the level of performance of the selected SHS students in Mathematics before and after the implementation of the contextualized reinforcement and intervention program, which would be tested right after the data analysis.

Action Research Methods

As this action research assessed the effectiveness of the contextualized reinforcement and intervention program in Mathematics for selected SHS students at MLGMNHS, the participants in this research were the same students who participated in the intervention program. Hence, these are the learners who:

1. had previous quarterly examination scores that were less than 75% of the highest possible score; and/or
2. had a low performance in SHS Mathematics subject/s as reflected by the Learning Outcomes Assessment (LOA) result and/or Individual Learning Monitoring Plan (ILMP) and were referred by their subject teacher, who were validated through a pre-test.

Identifying these participants is the main reason for having this key objective of the intervention program, which is to offer reinforcement activities to MLGMNHS-SHS learners who are identified as having difficulties in mathematics subjects.

The proponents of this action research ensured that the program underwent a series of evaluations from the master teachers, the department coordinator, and their school head. The selection of the participants was initiated by the mathematics subject teachers, which was followed by a brief orientation to students and parents as well as the dissemination of the consent forms.

Before the actual teaching and learning activities, the teacher-in-charge, who are the proponents, developed pre-test materials and

contextualized worksheets that were subjected to evaluation. The evaluated worksheets were distributed to the learner-participants at the start of the session and collected thereafter.

At the end of the program, the learner-participants took the teacher-designed post-test, which assessed their learning throughout the program. Some of them were interviewed regarding their experiences and the challenges they encountered during the program. In conclusion, the researcher ensured that all the data gathered were treated with strict and utmost confidentiality.

In the analysis of the collected data, the proponents of this action research utilized the following:

1. *Frequency count and percentage.* These were used to determine the scores obtained by the learners and the extent of improvement they had after the implementation of the mathematics intervention.
2. *Paired t-test.* This was utilized to determine if there exists a significant difference in the level of performance of the selected SHS students in mathematics before and after the implementation of the contextualized reinforcement and intervention program in mathematics, as revealed by their pre- and post-tests.
3. *Thematic analysis.* This analysis produced various themes and categories, which were defined and discussed in conjunction with the participants' verbatim responses.

Result and Discussion

This action research aimed to evaluate the implemented contextualized reinforcement and intervention program in mathematics for selected SHS students of MLGMNHS.

As highlighted in the previous chapter of this paper, the developed program was focused in (a) providing interventions through reinforcement activities to MLGMNHS-SHS learners who were identified to be struggling in mathematics subjects, (b) ensuring that the individual mathematical needs of learners were properly identified and addressed, (c) promoting mathematics as an enjoyable subject by integrating up-to-date and appropriate teaching strategies, and (d) building camaraderie among learners and teachers by means of interactive teaching and learning activities.

Performance of the selected SHS students in mathematics before the implementation of the contextualized reinforcement and intervention program

Table 2 shows the level of performance of the selected SHS students in mathematics before the implementation of the contextualized reinforcement and intervention program as revealed by the conducted pre-test. As revealed by Table 2, the majority of the SHS learners who took the pre-test were categorized below the proficiency level. Specifically, 4 learners, which is 6.56%, were nearly proficient, 48 learners, which is 78.89%, were low proficient, and 9 learners, which is 14.75%, were not proficient. These numerical results, including the weighted mean of 13.34 and standard deviation of 3.74, strengthen the need for an intervention program that primarily aims at improving students' performance in mathematics.

Table 2. Level of performance of the selected SHS students in mathematics before the implementation of the contextualized reinforcement and intervention program as revealed by the conducted pre-test

Scores	Verbal Interpretation	Number of SHS Learners	%
36 – 40 (100% – 90%)	Highly Proficient	0	0
35 – 30 (89% – 75%)	Proficient	0	0
29 – 20 (74% – 50%)	Nearly Proficient	4	6.56
19 – 10 (49% – 25%)	Low Proficient	48	78.69

Scores	Verbal Interpretation	Number of SHS Learners	%
9 and below (24% – 0%)	Not Proficient	9	14.75
Total		61 (100%)	
Weighted Mean		13.34	
Standard Deviation		3.74	

Notes: Scores distribution and corresponding verbal interpretation was based on Learning Outcomes Assessments (LOA)

The implementation of intervention or tutorial programs can be an effective strategy to improve learners' mathematical performance (Francisco et al., 2022). These programs can provide learners with additional opportunities to receive focused instruction, practice, and feedback on specific mathematics concepts. Through individualized attention and targeted support, learners can better understand complex topics and build their confidence in their ability to solve problems.

Performance of the selected SHS students in mathematics after the implementation of the contextualized reinforcement and intervention program

As the implementation of the developed intervention program came to an end, the facilitators consequently conducted a post-test to evaluate the overall performance of the selected SHS learners after attending the said program. Hence, Table 3 presents the level of performance of the selected SHS students in mathematics after the implementation of the contextualized reinforcement and intervention program as revealed by the conducted post-test.

Table 3. Level of performance of the selected SHS students in mathematics after the implementation of the contextualized reinforcement and intervention program as revealed by the conducted pre-test

Scores	Verbal Interpretation	Number of SHS Learners	%
36 – 40 (100% – 90%)	Highly Proficient	0	0
35 – 30 (89% – 75%)	Proficient	10	16.39
29 – 20 (74% – 50%)	Nearly Proficient	38	62.30
19 – 10 (49% – 25%)	Low Proficient	13	21.31
9 and below (24% – 0%)	Not Proficient	0	0
Total		61 (100%)	
Weighted Mean		21.20	
Standard Deviation		6.19	

Notes: Scores distribution and corresponding verbal interpretation was based on Learning Outcomes Assessments (LOA)

The results presented in Table 3 show that most of the students who underwent the mathematics intervention program had improved performance in comparison to their pre-test results. Specifically, from 0 proficient learners, there are already 10 learners, which is 16.39%, who are now tagged as proficient. As per the nearly proficient learners, from 4 learners, it becomes 38 learners, which is 62.30%. Although there are still low proficient students, it has significantly decreased from 48 learners to only 13 learners, which is 21.31%. Last but

most importantly, after the conduct of the program, no more students are tagged as not proficient as identified by the post-test results. The weighted mean of the scores supports such improvement, for it shows that from a weighted mean of 13.34 with a standard deviation of 6.19, it becomes 24.20, which is 10.86 higher than the previous one.

Intervention, considered a differentiated teaching process, enables learners to understand mathematics concepts, which also boosts their confidence as they complete the tasks given to them. Differentiated instruction was determined to be an effective way of filling in mathematical learning gaps among students, as it encourages teachers to consider the students' specific needs (Aguhayon et al., 2023).

Significant difference between the level of performance of the selected SHS students in mathematics before and after the implementation of the contextualized reinforcement and intervention program in mathematics

A paired t-test was performed to statistically verify the significant difference between the pre-test and post-test scores as shown in Table 4.

In Table 4, at 5% level of significance and 60 degrees of freedom, the critical t-values are ±2.00, and the computed t-value is -11.24. As the computed t-value is less than the critical t-value -2.00, the statistical decision is to reject the null hypothesis. Therefore, there is a significant difference between the pre-test and post-test mean scores of the students. This result, including the increase in the weighted mean of the posttest scores (Figure 2), further implies that the SHS learners' level of performance had a significant improvement after the conduct of the contextualized reinforcement and intervention program in mathematics.

This is underpinned by a study of Mbusi and Luneta (2023), which highlighted how students who are immersed in interesting and engaging activities may be more inclined to participate proactively, which may lead to a deeper comprehension of important key topics – in this case, mathematical JHS concepts.

Table 4. Significant difference between the level of performance of the selected SHS students in mathematics before and after the implementation of the contextualized reinforcement and intervention program as revealed by the pre- and post-tests

Results	Pre-test	Post-test
WM	13.34	24.20
SD	3.74	6.19
$t_{computed}$	-11.24	
$t_{critical}$	±2.00	
Decision	Reject H_0	
Interpretation	Significant	

Notes: WM: Weighted Mean; SD: Standard Deviation; α = 0.05; d.f. = 60

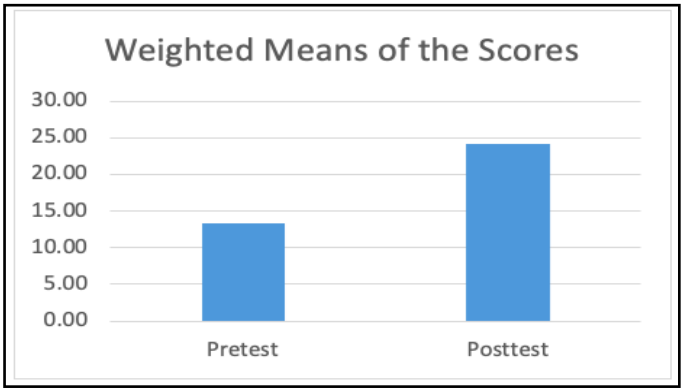

Figure 2. Weighted Means of the Pre-test and Post-test Score

Figure 2 shows the difference between the weighted means of the scores in pre-test and post-test.

Table 5 highlights the number and percentage of students who became at least one step higher from their previous proficiency level, as referenced by their pre-and post-test results.

Table 5. Students who became at least one step higher than their previous proficiency level as referenced by their pre-and post-test results

Proficiency Level **(Pre-test)**	No. of SHS Learners	Proficiency Level **(Post-test)**	No. of SHS Learners	No. of SHS students with Improved Proficiency Level
Highly Proficient	0	**Highly Proficient**	0	46 students 75.41%
Proficient	0	**Proficient**	10	
Nearly Proficient	4	**Nearly Proficient**	38	
Low Proficient	48	**Low Proficient**	13	
Not Proficient	9	**Not Proficient**	0	

Notes: Students with retained proficiency level = 15 (24.59%); Students who became at least one step lower than their previous proficiency level = 0 (0%)

As shown in Table 5, 46 SHS students, or 75.41%, participated in the contextualized intervention program in mathematics and became at least one step higher than their previous proficiency level. However, as revealed by the post-test, despite the fact that no more students were tagged as 'Not Proficient', there were still 15 SHS students, or 24.59%, with retained proficiency levels. This retention rate suggests that the program requires adjustments in implementation; hence, an action plan would be helpful in identifying the root cause of the issue. It is important to ensure that the action plan is well-defined, with clear objectives, timelines, and responsibilities assigned to each team member. Additionally, it is essential to monitor the progress of the action plan and make necessary adjustments as required to ensure the program's success.

Experiences and challenges faced by the selected SHS students during their participation in the contextualized reinforcement and intervention program in mathematics

The researchers conducted in-depth face-to-face interview sessions to understand further the experiences and challenges faced by the program participants. Participants' responses were audio-recorded and transcribed into words and underwent thematic analysis thereafter. As a result, various themes emerged that were eventually categorized into SHS students' experiences and challenges during the implementation of the contextualized reinforcement and intervention program in mathematics. The tables 6 and 7 below contain the summary of themes and their corresponding definitions that answer a particular action research question. Aside from being defined, the generated themes are supported by sample transcriptions and several literature and related studies.

Table 6. Generated themes and theme definitions on the experiences of the selected SHS students during their participation in the contextualized reinforcement and intervention program in mathematics

Generated Theme	Theme Definition	Students' Responses
1. Reviewing Junior High School (JHS) mathematics topics helps SHS students understand other mathematics concepts.	This statement emphasizes the crucial role of review sessions in ensuring the efficacy of mathematics learning for SHS students.	*"I experience again the basics of math and it helped me understand math better."* *"It was during the lesson itself po, everytime na nare-recall ko po 'yung laws and formulas na nalimutan ko, it gives me a satisfaction po and accomplishment na rin*." [Translation (T): It was during the lesson itself. Every time I am able to recall some laws and formulas, it gives me satisfaction and I feel accomplished.] *"Yung mag solve po ulit kung paano makuha ang tamang sagot kagaya ng ginagawa namin dati. Mahirap man po pero okay lang, gagawin pa rin namin 'yung best namin para makuha lang po yung tamang sagot."* [T: How to solve just like what we did before in order to get the correct answer. It might be hard, but we will still do our best just get the correct answer.]
2. Contextualized worksheets support learners in learning mathematics concepts.	This theme signifies that providing contextualized learning materials helps learners understand mathematics concepts in their own way and at their own pace.	*"In my opinion lang po ah, the worksheets that were given to me was a good idea po. If may time po na nalilito po ako sa discussion, tumitingin lang po ako sa worksheets."* [T: In my opinion, the worksheets that were given to us were a good idea. If there were times during the discussion when we got confused, I just read the provided worksheets again.] *"The worksheets were quite simple with only necessary key information on it. Enough naman po 'yung worksheets na*

Generated Theme	Theme Definition	Students' Responses
		provided to help us in the intervention program." [T: The worksheets were quite simple, containing only the necessary key information. The worksheets provided were enough to help us in the intervention program.] *"I can say that my experience when it comes to the worksheets po was very smooth because I could easily understand them since may tagalog po na kasama sa explanations."* [T: I can say that I had a smooth experience utilizing the provided worksheets because I could easily understand them since they include explanations in Filipino (Tagalog).]
3. SHS learners perform better if the teacher puts emphasis on the specific key concepts from time to time.	This experience of the SHS learners emerged on the idea that topics taught by the teachers should be tailored on students' specific needs.	*"The way [teacher] teach was very good po. Ini-emphasize niya lang po 'yung mga important parts lang ng lessons and he gives us sufficient examples for each topic po."* [T: The way the teacher taught us was good. He emphasized the important parts of the lessons and provided us with sufficient examples for each topic.] *"Kahit na maikli lang ang aming oras binibigyan kami ng teacher namin ng other way kung papaano magsolve ng isang problem sa sariling naming pagkakaintindi sa aralin."* [T: Although the time was very limited, our teacher still gave us other ways to solve problems based on how we understood the lesson.]

Conducting review sessions on the JHS mathematics topics enables learners, specifically the SHS learners, to understand other mathematics concepts. According to Salsabila (2019), mathematics concepts are arranged in a hierarchical manner. This means that each concept builds upon the one before it. Salsabila further explains that students must have the cognitive ability to understand the prerequisite concepts, including the underlying ideas and processes, in order to acquire new concepts.

Moreover, an intervention program would not be possible without intervention materials. These materials should not be the same as what learners usually have on a daily basis. They should be contextualized so that learners who have difficulties in a particular subject matter will be able to understand the lesson their own way or even at their own pace. According to the recommendation offered by Capendit (2024), educators should incorporate strategic and contextualized intervention materials in their teaching process to address problems with the least-mastered skills in mathematics.

In essence, teachers' role in these kinds of programs is non-negotiable; it is crucial. Teachers are responsible for finding other ways to encourage students who are struggling to keep on trying and re-learn mathematics concepts through intervention programs. They are also in charge of task-analyzing the mathematics competencies based on the learners' needs. Teachers are the primary sources when it comes to improving students' mathematics skills, more so, how they perceive themselves inside the classroom (Cobb & Hodge, 2002; Walshaw, 2004, as cited by Anthony & Walshaw 2009). Given the evolving role of teachers, it is crucial for educators to develop the necessary skills to adapt to these changes effectively (Tai et al., 2022).

Table 7. Generated themes and theme definitions on the challenges faced by the selected SHS students during their participation in the contextualized reinforcement and intervention program in mathematics

Generated Theme	Theme Definition	Students' Responses
1. Insufficiency of time affects SHS students' learning process	Time sufficiency is one factor contributing to students' mathematics learning. For this theme, students perceive limited time as a critical factor impeding their learning process.	*"I think ang problem lang po naming is lack of time. Kulang po ang one hour kada week."* [T: I think the only problem we had was a lack of time. The one-hour timeframe per week is not enough.] *"Time at 'yung schedule po siguro."* [T: Maybe the time and the schedule.] *"Sana po i-extend po o kaya gawing twice a week."* [T: I hope the time could be extended or that it could be conducted twice a week.]

Mathematics is a subject that demands a considerable amount of time and effort to learn. Each topic requires a specific time frame for its discussion, depending on the level of difficulty. Thus, it becomes a challenge for learners when they have limited time to devote to their studies. This can often lead to a compromised learning experience, as they may not have enough time to fully absorb and understand the provided materials. Notably, time should be properly managed, as it has been found to have a positive correlation with learners' academic performance in mathematics (Adams & Blair, 2019).

Action plan to continuously improve the implementation of the contextualized reinforcement and intervention program in mathematics for senior high school

Based on the findings provided by the conducted data analysis, Table 8 shows the action plan to continuously improve the implementation of the contextualized reinforcement and intervention program in mathematics for senior high school. This action plan is divided into three parts: Indicators, which contain the objectives of the plan; Recommended Strategies, which include the process by which the objectives will be achieved; the Timeline and Persons Responsible, which cover the people who will be in charge of the implementation of the process as well as the timeframe allocated for each process; and lastly, Challenges to be addressed, which provide the areas of opportunity that have been found and require immediate responses.

Table 8. Action plan to continuously improve the implementation of the contextualized reinforcement and intervention program in mathematics for senior high school

Indicators	Recommended Strategies	Timeline and Persons responsible	Challenges to be addressed
1. Selected JHS mathematics topics should be included in the review part of the teaching-learning process in SHS.	SHS Mathematics teachers should be encouraged to incorporate JHS mathematics concepts into their daily lesson plans as part of their review practice.	All year round SHS Mathematics teachers	Not 100% of the participants of the intervention program in mathematics became at least one step higher than their previous proficiency level.
2. Materials provided in an intervention program should be contextualized and based on the student's mathematical needs.	Teachers who will handle mathematics intervention classes should develop materials contextualized to their learners' needs. Further, such materials should undergo quality assurance from master teachers, subject coordinators, and, if possible, the school's LR administrators.	Semestral SHS Mathematics teachers Master teachers Subject coordinators LR administrators	
3. Teachers who are in charge of mathematics interventions should discuss topics in such a way that students will not be overly bombarded.	Teachers leading mathematics interventions should discuss topics in a clear and concise manner, avoiding overwhelming students with too much information at once. They can achieve this by breaking down complex concepts into smaller parts, providing clear examples, and allowing time for practice and questions.	Semestral SHS Mathematics teachers Master teachers Subject coordinators	

Indicators	Recommended Strategies	Timeline and Persons responsible	Challenges to be addressed
4. Mathematics intervention programs should have additional time to avoid compromised learning experiences.	Mathematics intervention programs could be implemented twice or three times a week. Extending time could also be a strategy to ensure that the time invested will be worthwhile.	Semestral SHS Mathematics teachers Department coordinator	Insufficiency of time allotted for the implementation of the intervention program in mathematics.

It is important to include selected JHS mathematics topics in the teaching-learning process of SHS. This is because the latter's curriculum builds upon the foundation of the former's curriculum and assumes that students already have a certain level of knowledge and skills in mathematics. By reviewing selected JHS mathematics topics, SHS students can refresh their knowledge and skills, which can help them better understand and appreciate the new mathematics topics that they will encounter in SHS.

Consequently, teachers who are in charge of the implementation of mathematics interventions should try to build students' confidence and proficiency in mathematics through a supportive learning environment. Chand et al. (2021) pointed out that learners will appreciate mathematics even more if teachers ensure that the teaching methods and technologies incorporated in their classes are innovative and can ignite the students' interest. It can also be noted that any intervention program in mathematics should be tailored to meet the specific needs of individual students. This signifies that the materials provided should be contextualized and based on each student's current level of mathematical understanding. By doing so, the program can effectively address the gaps in knowledge and skills that students may have and help them develop a stronger foundation in mathematics. Additionally, it is important to regularly evaluate the effectiveness of the program and make adjustments as necessary to ensure that students are making progress toward their goals.

As regards time allotment to these kinds of programs, it is imperative to provide ample time for mathematics intervention programs in schools. This is especially true in SHS where students are required to take a new set of subjects that may be challenging for them, including mathematics. With the current SHS curriculum drawing criticism for having too many courses to take and learning competencies to meet (Jaudinez, 2019), it becomes even more crucial to provide extra support for students who may be struggling with mathematics. By adding more time for intervention programs, schools can help students improve their numeracy skills and boost their chances of success in their academic and professional pursuits.

Figure 3 shows the revised framework of the contextualized reinforcement and intervention program in mathematics for selected senior high school students. The framework emphasizes the incorporation of action plan as a pre-requisite step towards continuously enhancing the developed program. The primary purpose of this plan is to conduct a thorough assessment of the challenges faced by both the teachers and students during the initial enforcement of the developed program. Once identified, the plan offers appropriate strategies to address these challenges and make them available for a more effective implementation.

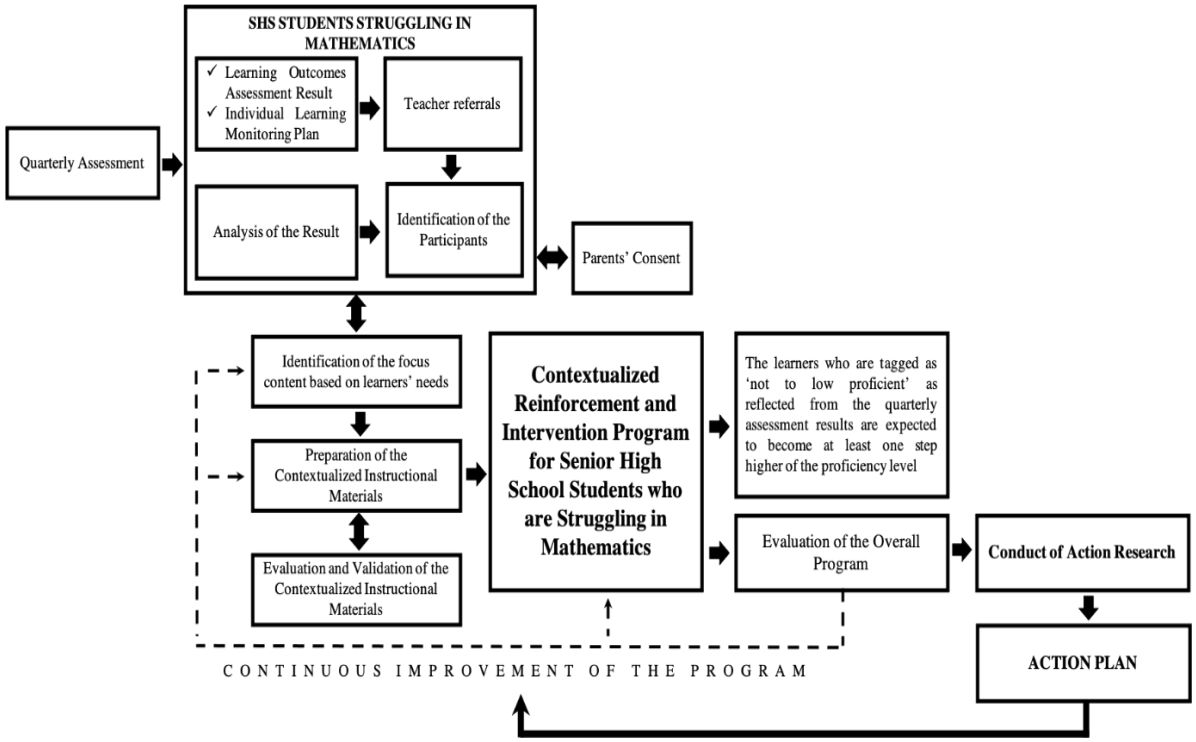

Figure 3. Revised Framework of the Contextualized Reinforcement and Intervention Program in Mathematics for Selected Senior High School Students

Conclusion

This action research aimed to evaluate the implemented contextualized reinforcement and intervention program in mathematics for selected SHS students of MLGMNHS.

After conducting a thorough analysis, the researchers have concluded and hereby recommend that schools need to devote more effort to putting their intervention programs in mathematics into practice, for it significantly increases students' mathematical knowledge, which would eventually reflect on their mathematics performance in general. More so, for other struggling learners identified by the teachers, similar intervention programs followed by action research may be implemented for different subjects, grade levels, or other learning modalities.

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