



## EARLY INTERVENTION TO IMPROVE ACADEMIC OUTCOMES IN MATHEMATICS OF SECONDARY STUDENTS

JOSE BONIE C. CABEZARES <sup>1</sup> | REYNALDO C. MENDOZA, JR. <sup>2</sup> | EVANGELINE R. CANOY <sup>3</sup> | ATTY. JURIS RENIER C. MENDOZA, JD <sup>4</sup> | EMILY C. ROSAL, DPA, PH.D TM <sup>5</sup>

<sup>1</sup> NORTHWEST SAMAR STATE OF UNIVERSITY.

<sup>2</sup> NORTHWEST SAMAR STATE OF UNIVERSITY.

<sup>3</sup> NORTHWEST SAMAR STATE OF UNIVERSITY.

<sup>4</sup> NORTHWEST SAMAR STATE OF UNIVERSITY.

<sup>5</sup> NORTHWEST SAMAR STATE OF UNIVERSITY.

### ABSTRACT:

This research assessed the effects of early intervention in classes to improve academic outcomes of the modular approach among learners in Mathematics as the basis for modified supplemental activities in mathematics. Questionnaires were distributed to the randomly selected secondary students in Mathematics. The research employed a descriptive-quantitative method. 133 respondents were composed of teachers and students. The research explores the demographic profile of the teacher-respondents as to age and gender, civil status, field of specialization, highest educational attainment, position, years of teaching experience, training and seminars attended, performance rating, and common platform used while for student-respondents was as to age and gender, average household income, residential location, common gadget used, and home tutor. The result describing the level of acceptability of the modular approach was described as Disagree while the academic performance of the student-respondents in Mathematics was described as Near Mastery. The test of significance shows no relationship thus, the null hypothesis was Accepted. There were challenges and barriers identified in this research. Based on the findings of this research, it could be concluded that there were issues in the status of acceptability of the modular approach. These issues greatly affected the students' academic performance in Mathematics, resulting in near mastery levels. Accordingly, it is recommended that simplified modular instructional activities be considered to improve the acceptability of the modules about students' academic performance in Mathematics.

### KEYWORDS:

INTERVENTION PROGRAMS, MODIFIED LEARNING ACTIVITIES, INSTRUCTIONAL MATERIALS, MATHEMATICS.

### I. INTRODUCTION

The current education system is bombarded with current challenges due to the pandemic crisis that has affected the timely and mode of delivery of learning to students. The COVID-19 pandemic created a huge impact on the Philippine education system in that it made a switch from the traditional face-to-face learning modality to a blended learning modality. For learning to continue amidst the pandemic students have the option to use an online learning modality. Unfortunately, majority of the Filipino students from public schools do not have access to the internet and other facilities that carry out the online learning modality. Because of this, modular learning modality remains to be the only option for almost 90% of students in the public schools. For modular learning, self-learning modules are distributed to small communities within the Barangay called Purok through the parents or guardians. It is believed that these essential learning competencies are the basic knowledge and skills that are prerequisites for the next level of learning, (Castillo 2021).

Mathematics is one of the most studied subjects and is

considered to be one of the most difficult academic subjects, with several students, beginning in kindergarten and continuing to secondary who admittedly had challenges in understanding mathematical concepts and problem-solving. Over the years, the Philippine mathematics basic education curriculum has undergone many revisions. The Philippine education department recently implemented a significant curriculum overhaul that includes an extra two years of basic education, a k-12 curriculum. This new curriculum has three provisions that are specifically related to mathematics education. The first was the transition from English to the mother tongue as the language of instruction in early primary education. Second, a new mathematics curriculum was developed, with critical thinking and problem-solving as the primary goals of mathematics education. Third was the extended opportunity for specialization in non-academic tracks which makes it easier for students to shift to non-academic resolving their issues in difficulty in learning mathematics. Despite several curriculum revisions, the aims of mathematics education at the elementary school level have remained largely unchanged. The curriculum goal of

Mathematics is to provide opportunities for individuals to develop skills and attitudes needed for effective participation in everyday living and prepare them for further education and the world of work so that they make worthwhile contributions to society at large, according to De Corte, et al. (2000).

As far as we can tell, mathematics plays the following roles in Philippine education: encouraging participation in productive life activities, providing a means of communication, and facilitating participation in productive life activities. Educators can agree that making sense of the environment, acting as a conduit for communication, and facilitating national development are only a few goals in the Philippine curriculum design for Mathematics. The Philippine's economic progress relied heavily on the progress of science and engineering and this demand has something to do with strong foundations in mathematics, according to Ogena and Tan (2006). Mathematics is an essential subject in the curriculum, and it is seen as an essential tool for intelligent participation in the technological society.

Under the new normal perspective, the self-learning modules in mathematics have been greatly affected and have been seen by many students as an area of difficulty among all subject areas. Therefore, it is vital to investigate the results and challenges in Mathematics of secondary students to site enrichment learning activities to augment the new normal perspectives. The researcher believes that students must uphold wholesome attitudes and optimistic views about mathematics, just as they must for any other form of learning. Students should work on their level of competencies in mathematics despite the difficulty of the learning modality. Educators' commitment is critical, and that perseverance, patience, reflection, and assessment are the keys to success.

This research will focus on the issues and concerns regarding the academic performance of students in Mathematics that need to be addressed under the derived intended outcome for secondary students to provide an outline of the Philippines' curricular reforms. Considering the different challenges and academic results of secondary students in Mathematics can be based on better-simplified activities for Mathematics. A program that promises to improve mathematics education will only succeed if it continues to the most important stage: offering ongoing and realistic guidelines for implementation and management of constraints.

## II. OBJECTIVES

The research paper aims to evaluate early interventions and improved student academic results. Specifically, this seeks to understand the following points:

1. Determine the different behavior-modification intervention strategies practiced by most high school teachers.
  - a. Reinforcement Activities
  - b. Retributive Activities

2. Identify the effects of behavior-modification intervention strategies on academic outcomes in Mathematics.
3. Propose a contextualized learning plan using both reinforcement and retributive activities to be included in the intervention process.

## III. METHODOLOGY

This paper uses a descriptive approach to analyze the different methods used by most teachers in the assessment and intervention strategies practiced. This incorporates data from school data and Focused Group Discussion (FGD) data from teachers managing classes at the secondary level. To define learning plans for improving and fostering academic success for students who are struggling to meet the demands of education, especially in this time of pandemic. This further review and analyze data from existing implementation of intervention plans.

To find insights and data that fully meet this research paper's purpose, it has used relevant studies from trustworthy primary sources as well as currently available related literature. Additionally, this study suggests significant adjustments to lesson plans that will assist instructors and students in implementing the principle of Education for All in a way that promotes cultural sensitivity and diversity among students of various learning abilities.

## IV. PRESENTATION OF DATA AND ANALYSIS

### *A. Behavior Modification as an Effective Strategy for Early Intervention*

The goal of behavior modification is to change both people's choices overt and hidden behaviors. It focuses on the development of adaptive behavior from its maladaptive form. It is a specific form of intervention and is believed to be part of educational treatment. Since its inception as a discipline of scientific research, behavior modification—which comprises the subfields known as applied behavior analysis and behavior therapy—has been demonstrated to be an efficient method of altering behavior as a means of providing intervention strategies.

To evaluate and enhance behavior, systematic use of learning principles and techniques is required. It counts to making certain patterns and changes in habits to inhibit good practice that will enhance learning outcomes.

The percentage of enrolled secondary students who are struggling to make up to the satisfactory level is at 38 percent for some public schools' overall population of 498 students. There are more female than male secondary students. Students have higher levels of difficulty in academic subjects and almost high levels of difficulty in non-academic subjects.

Early intervention to augment difficulties of learners' academic performance has the potential to alter the learners' course development and enhance academic outcomes. Early intervention helps families better meet the needs of their learners from an early age and

throughout their lives. In the study of Zhang, al. (2014), the impact of early intervention on at-risk pupils' academic progress, and an intervention program is put into place by offering academically at-risk students counseling and advice. To determine if early intervention affects the likelihood of success for at-risk pupils, the performance of each student is tracked and analyzed. Preliminary findings suggested that using the matched sample approach indicates that at-risk students who receive additional advice are more likely to pass the course than those who do not. Additionally, the study discovered that a student's gender and previous GPA have a statistically significant effect on their subsequent academic success. These outcomes offer additional proof that early intervention techniques can boost student achievement.

There is a positive effect of early behavior-modification techniques in managing academic difficulties and the likelihood of increased performance. The benefits of early intervention on intellectual growth and academic achievement persisted through age 12. Treatment alone for students at school was less efficient. Results generally corroborated the intensity hypothesis, which suggested that as treatment length rose, scores on cognitive and academic success measures would rise.

Based on the estimate from the information of the United Nations Department of Economic and Social Affairs: Population Division in 2017, the Philippines between 12% to 17% of indigenous peoples all over the different regions nationwide needed intervention. This shows several Filipinos need assistance in education in a more inclusive environment and curriculum.

According to this integrated viewpoint, intensive, high-quality, environmentally widespread treatments can and do succeed when fragmented, and weak attempts in early intervention are not likely to. Six guiding principles about the effectiveness of early intervention are based on relevant research. The issue for public policy in early intervention is to control costs by more precisely focusing these interventions on those who will benefit and need them the most. The formation of federal and state policy and the distribution of resources directly related to the empirical findings on the biobehavioral consequences of early experience and early intervention.

### ***B. Types of Behavior-modification Strategies***

A view of the diversity of learners in education is a benchmark of a productive education. According to the study of Lopez (2017) students' performance and instructional interactions are derived from the different learning relationships that exist among students. It can be viewed that learners' diverse way of learning can greatly affect their academic achievement. In the current study, learners who displayed a combination of behavioral and learning issues at school were used to gradually evaluate the effects of positive reinforcement, instructional strategies, and, if necessary, negative reinforcement on both academic performance (i.e., on-task academic behavior, task accuracy, reading fluency) and problem

behavior.

Academic Benefits Positive Reinforcement. Interventions that are specific to each person are more crucial than any prescribed behavior program. Building relationships, modifying the environment, controlling sensory stimulation, altering communication techniques, giving prompts and indications, employing a teach, review, and reteach method, and fostering social skills are a few examples of effective interventions. According to the study, academic performance improved after therapy, rising to 85% from a baseline rate of about 45 percent for both behaviors. The strongest impact on academic behavior was seen in the classroom setting when primary reinforcement was combined with praise. Follow-up tests revealed that the accuracy level of the visual academic behavior was kept at over 80%. Teachers' implications are examined. Teachers who promote acceptance for diverse learners and show a positive reinforcement approach to give intervention for academic improvement are as follows:

- Materials for learning materials should represent all groups of students
- Student participation is guaranteed and interest in activities is present
- Students feel valued, and respected, despite their differences
- Students feel free to celebrate cultural and ethnic differences
- Learning activities are designed for a variety of abilities
- All students are protected from bullying or other forms of abusive language

The proportion of attending behavior as well as the number and duration of non-attending occurrences were all significantly altered by manipulating the reinforcing contingencies. Procedures were devised to program generalization and to sustain the behavior outside the experimental context once the behaviors were under experimental control. The education sector painted a different concept of way of living. Through education, the indigenous peoples learned the concept of monetary exchange and the value of money. By having education, they are more adept and more knowledgeable about trade and merchandise. In reading and evaluating, the IPed group also had better and more mastered skills that they could use in their business ventures or landing a job and employment.

The increase in the literacy rate of the community lessens the poverty rate of the nation as more people become more skilled and have better qualifications for jobs and employment. According to UNESCO Digital Library (2016), it is evident that literacy is one factor for economic improvement. Literacy interventions generally provide economic growth in society.

In a mathematics classroom, improvement of mathematics learning is closely related to development in teaching and at the same time, teaching thrives through a learning process in which teachers and students are engaged in the

practices. To make this into a reality, teachers must first acquire the knowledge and skills to teach and encourage students in their thinking processes. Students have different learning styles which makes it hard for a teacher to accommodate the learning styles of the minorities in a class. The teacher needs to have the ability to choose and apply the most suitable strategies that can suit different student backgrounds, abilities, and styles for a lesson to be deemed effective. However, Malaysia Education Blueprint, states that "a 2011 research study found that only 50% of lessons are being delivered effectively". It means that teachers do not provide lessons that sufficiently engage students in their learning yet teachers only follow a passive and traditional content delivery.

## V. CONCLUSION

During this time of pandemic, it is vital to implement behavior modification methods as an intervention to learning mathematics. Proposed simplified instructional activities were conceived to address the concerns, issues, gaps, and problems experienced by Math teachers, especially in enhancing daily practices of problem-solving and mathematical equations that will foster a habit of learning mathematics. It is expected that after undergoing a learning and development program, Math teachers will be equipped with the desired competencies and increase their proficiency level in demonstrating their tasks. It can be concluded that:

Using the reinforcement and retributive activities, Math teachers are expected to:

1. Demonstrate the desired competencies on instructional competence, curriculum development, and support services that will benefit learners in Mathematics.
2. Value the importance of modifying learner's behavior through a series of activities that enhance Mathematical abilities; and
3. Create a delightful teaching-learning environment in school through a series of conceptualized activities.
4. Foster modified behavior in learning Mathematics through simplified instructional activities.

## VI. RECOMMENDATIONS

1. Conduct a series of consultative meetings among education providers in the community and formation of consultative and advisory bodies for Mathematics subjects.
2. Outline the structure of the mathematics curriculum, which incorporates diversification in all education areas that can grow and enhance knowledge among diverse learners.
3. Integrate activities that align behavioural principles as part of the contextualized lessons for operation and curriculum.
4. Provide opportunities for behavior modification practices to build the habit and foster corrective

actions to prepare students to learn more complex Mathematics.

5. Provide services that develop collaborative co-existence where students work together in conjunction with various learning development areas.

## ACKNOWLEDGMENT

We would like to express our profound appreciation and heartfelt gratitude to the families, friends, and colleagues of the researchers for all their assistance, whether big or small, which has, in one way or another, greatly contributed to the completion and success of this undertaking.

To our mentors, Dr. Emily C. Rosal and Dr. Marilyn M. Miranda, for spending some valuable time analyzing and influencing this work and for the encouragement, tremendous assistance, and sharing of their brilliant ideas and expertise that helped a lot in the achievement of this endeavour.

For the gift of life and creation as well as the gift of talent and wisdom to God Almighty, to whom the researchers give this production of work for HIS glory.

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