



Republic of the Philippines
Department of Education
REGION IV-A CALABARZON
CITY SCHOOLS DIVISION OF BIÑAN CITY

The Effectiveness of Project ADAMS in Enhancing the MATH Fact Fluency of Grade 11 Students of Binan City Senior High School – San Antonio Campus



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ABSTRACT

Math is a challenging subject, but teachers adapt strategies for comprehensive learning. Experience allows for the development of project teaching materials for students with less mastered abilities. This action research aims to improve Grade 11 student's Mathematics achievement among Biñan City Senior High School students by addressing the four fundamental operations that complicate their computation through understanding students' mastery of data using these operations and comparing pre- and post-test results. The researcher primarily used quasi-experimental research specifically a single-group interrupted time-series design, in determining the improvement of the students' academic performance after administering the intervention of activity sheets. Then, a t-test of correlated means was applied. To identify thinking skills, creativity, problem solving and analysis, towards the use of Project ADAMS, the proponent employed questionnaires using the likert scale. The research findings revealed significant improvements in General Mathematics performance from the pre-test to the post-test. Project ADAMS proved to be a valuable tool in assisting students when solving mathematical problems. Additionally, Project ADAMS resulted in positive outcomes across various domains, including thinking skills, creativity, problem-solving, and analysis, signifying its effectiveness in enhancing students' cognitive abilities and overall thinking skills. Importantly, the null hypothesis was rejected, affirming that a significant difference existed between the pre-test and post-test scores, thus confirming the efficacy of Project ADAMS in bolstering math fact fluency among Grade 11 students. This research underscores the importance of structured intervention strategies like Project ADAMS in addressing math fact fluency challenges and enhancing mathematical skills among high school students.

Keywords: *math fact fluency, Project ADAMS, problem solving, fundamental operations, integers, exponential, numerates, thinking skills, Math*

INTRODUCTION

Mathematics is a crucial subject in education, and mastery of basic operations like addition, subtraction, multiplication, and division is crucial for students to become proficient. This knowledge not only supports complex mathematical concepts but also aids in problem-solving, critical thinking, and success. Mastery of mathematical knowledge directly impacts student performance in math and related subjects. Mastering these operations enables students to tackle complex math challenges confidently and effectively. However, many students struggle with achieving math fact fluency, especially in higher grades, which can hinder their ability to grasp advanced mathematical concepts. Project ADAMS (Division, Addition, Multiplication and Subtraction Activity Sheet) was developed as an intervention strategy to address this issue. The activity sheets offer a structured and engaging way for students to practice and improve their mastery of mathematical knowledge in key areas of division, addition, multiply, and subtract.

METHODOLOGY

This study focuses on Grade 11 students in the Statistics and Probability subject last second semester SY: 2022-2023, who were identified as non-numerates from the first semester. Out of the total enrolment of 368, 30 or 7% of the intervention was used. However, due to the summative results, only 25 non-numerates were included as respondents. Data was collected through a self-made questionnaire, pre-test, and post-test to determine the significant difference in performance before and after using Project ADAMS. The effectiveness of the study was assessed using a descriptive research method, using the Likert Scale. Data was collected using hard copy forms after permission and parent consent. The researcher summarized the collected data using a suitable statistical method and compared the performance before and

after using activity sheets. In the conduct of this study the following procedures were followed by the researcher:

Phase I. Preparation Stage

During this phase, the researcher sought permission from the school's principal to conduct the study. She also devised the necessary tools and instruments.

Phase II. Data Gathering Stage

In this stage, the researcher created a pretest consisting of problem-solving items, which they administered to the students before the implementation of Project ADAMS. Following that, a post-test was given.

Phase III. Data Analysis Stage

Upon collecting all the required data, the researcher organized, tabulated, evaluated, and interpreted the information. They, then, formulated conclusions and generalizations.

The researcher primarily used quasi-experimental research specifically a single-group interrupted time-series design, in determining the improvement of the students' academic performance after administering the intervention of activity sheets. Then, a t-test of correlated means was applied. To identify thinking skills, creativity, problem solving and analysis, towards the use of Project ADAMS, the proponent employed a Likert Scale questionnaire and analyzed it with descriptive statistics. The weighted mean was used to determine the average weighted mean for grade 6 students' performance. The Likert scale was used to determine attitudes, values, and views, as respondents expressed their perception on the perception of the respondents, what is the impact/s of Project ADAMS in terms of thinking skills, creativity, problem solving, and analysis. Thus,

<u>Scale</u>	<u>Range</u>	<u>Description</u>
1	4:20 – 5:00	Always (Highly Competent)
2	3:40 – 4:19	Often (Moderately Competent)

3	2.60 – 3:39	Sometimes (Competent)
4	1:80 – 2:59	Rarely (Slightly Competent)
5	1:00 – 1:79	Never (Not Competent)

RESULTS

- The Pre-Test and Post-Test mean scores of Grade 11 students in General Mathematics. The Pre-Test mean score was 6.64 with a standard deviation of 3.15, indicating a moderate level of performance with considerable variance among individual scores. However, after the instructional period, the Post-Test mean score remarkably increased to 14.76, showcasing a significant improvement in the students' understanding and grasp of the subject matter. The standard deviation for the Post-Test scores also expanded to 4.67, indicating a wider range of scores among the students but with an overall elevation in performance. The finding revealed that Project ADAMS provides significant assistance to students in overcoming challenges while solving math problems.
- Project ADAMS significantly improved participants' cognitive abilities, particularly in thinking skills, creativity, problem-solving abilities, and analysis skills. The mean score for thinking skills was 3.97, while the mean score for creativity was 3.92. The study also revealed a substantial positive impact on analysis skills, indicating a positive impact on mathematical performance.
- The null hypothesis was rejected. Therefore, there was a significant difference in students' performance after the implementation of Project ADAMS, with a Pre-Test mean score of 6.64 and a Post-Test mean score of 14.76, indicating a positive impact on their academic performance in mathematics.

DISCUSSION

The study's main findings and conclusions provide compelling insights into the effectiveness of Project ADAMS in enhancing math fact fluency and overall cognitive development among Grade 11 students. Firstly, the research demonstrated a significant increase in the performance of Grade 11 students in General Mathematics, as evidenced by their progress from the Pre-Test to the Post-Test. This highlights the tangible impact of Project ADAMS in improving students' mathematical proficiency, providing valuable evidence of its effectiveness.

Project ADAMS emerged as a valuable resource, particularly for students facing challenges in math problem-solving. It played a substantial role in assisting students in overcoming these challenges, emphasizing its crucial role in bridging gaps in math fact fluency and problem-solving skills. Moreover, the study unveiled positive outcomes in crucial cognitive domains, including Thinking Skills, Creativity, Problem Solving, and Analysis. These improvements underscore the project's capacity to enhance various facets of students' cognitive development.

The rejection of the null hypothesis signifies a significant difference between the Pre-Test and Post-Test results. Post-Test scores were consistently higher, reaffirming the efficacy of Project ADAMS in bolstering math fact fluency and overall mathematical performance.

These findings have significant policy and practice implications for mathematics education. Teachers and educators can benefit from utilizing the activity sheets of Project ADAMS in General Mathematics to improve mathematical proficiency and cognitive skills among Grade 11 students. Allocating time before lessons for students to engage with these activity sheets as a preparatory exercise can further enhance their effectiveness. Furthermore, schools and educational leaders should recognize the importance of aligning programs, projects, and activities with factors that influence student performance. This study underscores the potential for structured

interventions like Project ADAMS to address math fact fluency challenges and enhance the overall mathematical skills of high school students.

The impact of this study extends beyond the confines of the research itself. It serves as an inspiration for educators to develop self-made activity sheets similar to Project ADAMS to enhance students' academic performance in Mathematics. The use of integers and exponentials, coupled with the four fundamental operations, was employed in all Grade 11 sections, serving as a valuable tool for reinforcing and improving students' grasp of these fundamental operations. As a result, many students experienced reduced difficulty and confusion when solving mathematical problems, underscoring the positive impact of this approach on their learning outcomes. This study demonstrates how innovative teaching strategies can yield positive outcomes in math education, benefiting both teachers and students alike.

ACKNOWLEDGMENTS

The lead proponent would like to extend the sincerest gratitude to the School Principals Leslie V. Denosta and Julie Ann D. Natividad, for sharing their expertise and constant motivation.

I would like to thank my colleagues Lyndjoy O. Martin and Lean Dennis Roldan, our School Research Coordinator Jie Ann B. Otila and our Senior Education Program Specialist Edward Manuel, School Principal of Mampalsan Elementary School, Albert Escuvania, Education Program Supervisor in Mathematics, Violeta Umel, for their comprehensive technical assistance,

To all the parents and students who exerted their extra time and effort in participating in the study, thank you for supporting this school-related activity and for believing that the result will improve the teaching and learning process. Also extending my appreciation to all Grade 11 teachers for encouraging them to advise them to participate. Unending thankfulness to all our

family members and friends for understanding and sharing their words of wisdom that keep us inspired. Above all, to God be the glory.

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