

Reconstructed Learning Activity Sheets (LAS): Its Effect on Students' Performance in Mathematics

Eliafie A. Hofileña¹, Francis Jose D. Bearneza²

¹Calatrava National High School, Calatrava, Negros Occidental, Philippines

²Carlos Hilado Memorial State University, Talisay City, Negros Occidental, Philippines

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Abstract

New normal education changes the usual setup of the teaching-learning process between the students and the teacher. Reconstructed Learning Activity Sheets (LAS): Their Effects on Students' Performance in Mathematics. The study tries to find the gap in the students' problems when answering their activities in the modules. The respondents of this study are the Grade 7 - Sampaguita students of Calatrava National High School enrolled during the School Year 2021 – 2022. The students were grouped by controlled and experimental through simple random sampling, in which each group was composed of 22 students. Utilizing Posttest Only Control Group Design in the whole duration of the third quarter for the School Year 2021 – 2022, wherein the students in the control group were given the Learning Activity sheets from the DepEd while the experimental group Reconstructed Learning Activity Sheets. The basis of the student's performance in this study is the Third quarter grade of the students comprising the development in their Summative Test and Performance Task. The result shows that students in the experimental group obtained a higher mean value than the control group. Based on the results, there was a significant difference in students' level of performance in Mathematics in the control group and experimental group. The study signified that Reconstructed Learning Activity Sheets (LAS) comprising activities with Interleaved Approach could increase students' performance.

Keywords— *Performance of Mathematics, Learning Activity Sheets (LAS), and Reconstructed Learning Activity Sheets (RLAS).*

I. INTRODUCTION

Mathematics plays a vital role in one's daily life. To master other areas of discipline, an individual must master the art of Mathematics. According to Mazana et. al (2019), despite explaining the importance of Mathematics, today's students still have negative attitudes toward the subject. Most students think Mathematics is a boring subject, and it is difficult to memorize and understand formulas (Scarpello, 2007). It is a common notion among those students who are mathematically declined.

The change in the form of education started when COVID – 19 pandemic became a threat to the lives of many (Ambayon, 2020). Furthermore, the absence of face-to-face learning in the educational system of the country brought many changes not only in the life of the students but also in the teachers and the administrators in the Educational sectors. In addition, the Department of Education developed Basic Education Learning Continuity Plan to ensure that education in the country will not stagnate amid the COVID-19 threat. Various learning delivery

modalities were provided, like TVI, RBI, online distance learning, modular distance learning, and blended learning.

Additionally, schools can use any of the delivery methods depending on the resources they have available and the local and institutional limits. Most of the country's schools have adopted modular distant learning as one of the modes of learning delivery. Students were also given as much responsibility as possible to study on their own, and queries and questions about the lecture received a limited number of answers. Instantaneous reinforcement excites students and piques their interest in the unconstrained self-learning approach.

At Calatrava National High School, where the researcher conducted her study, the school adopted the Modular distance learning mode of delivery. The parent or Guardian is the one who gets the modules from the teacher, and after a week, they will be retrieved from them with the expected answers from the students. The usual output of students' responses was copied from the answer key from the modules. With 3-4 modules given to the students in

Math subject only per distribution, the students had difficulty studying the module and answering all the activities and exercises without relying on the answer key. These behaviors result in students' low scores in their activities. With this usual scenario, the researcher is trying to find a way in which it will be easy for the students to learn the lesson since it was drafted in a way that multiple competencies were combined in a single LAS. The activities were designed so that all the competencies would be met.

The researcher used the Interleave Approach in making the activities in the Reconstructed Learning Activity Sheets (LAS). According to C.S. Pan, Interleaved practice is learning two or more related concepts or skills. Instead of focusing exclusively on one idea or skill at a time, it can be helpful to alternate between them. With this approach, the students will learn more than one competency. Interleaving proposes that for learning two or more related topics or concepts, it is better to alternate between them rather than focusing exclusively on one subject or idea at a time. For instance, if a student is learning about the short-term difficulties of pollution in a geography project, the student would also study how to bring improvements in energy supply on the same day by mixing the two topics or switching back and forth between them (Rohrer, 2012).

Learning Mathematics must be pleasurable and motivating (Candelario-Aplaon, 2017). Valle (2011) cited that Mathematics teachers should employ welcoming, stimulating, and empirical approaches to help students enjoy and learn the subject's content. Also, it has been an observation of the researcher that students find it hard to answer activities, especially problems in Mathematics, and it was then found out that it was rooted in their difficulties encountered in performing basic skills in Mathematics. Since Mathematics principles and concepts are precise, mathematics teachers should not only have talents in using teaching strategies. Still, they should also know that among these strategies best develop the understanding of students' mathematical thoughts, according to Castillo (2012).

In the Philippines, mathematics is a general education subject in primary and higher education where learners are expected to gain an understanding and appreciation of its principles as an applied-using appropriate technology in problem-solving, critical thinking, communicating, reasoning, making connections, representations, and decisions in real life (K to 12 Basic Education Curriculum). Aksan (2021) mentioned that the significant subject is a need that students will not only understand the concept but will be able to apply it in real-life situations. Teachers, parents, and kids all faced extreme hardships due to the COVID-19 pandemic. Additionally, the researcher thought the teaching-learning process in new

normal education impacted students' performance, especially when using a modular learning approach to mathematics due to the lack of face-to-face interaction with the teacher and the full modular learning delivery mode.

The researcher designed an activity that will help the students to lessen their burden in answering problems in Mathematics. Reconstructing the Learning Activity Sheets (LAS) using the Interleave practice of making activities is what the researcher designed. The topics on the said instrument were based on the Essential Learning Competencies (MELCs) developed by the DepEd to ensure that the students will have the essential skills that they will need.

The researcher was compelled to undertake action research to ascertain students' performance in math using rebuilt Learning Activity Sheets (LAS) with Interleave practice of activities as he is currently seeking the gap of the difficulties given earlier.

Statement of the Problem

The main purpose of this study is to determine the effect of Reconstructed Learning Activity Sheets on students' Performance in Mathematics at Calatrava National High School, S.Y. 2021-2022.

Specifically, this study sought to answer the following questions:

1. What is the level of students' Performance in Mathematics in the control group and

the experimental group in the implementation of Learning Activity Sheets?

2. Is there a significant difference in the level of students' Performance in Mathematics

in the control group and experimental group?

Hypothesis

From the statement of the problem, the null hypothesis is derived:

There is no significant difference in students' level of Performance in Mathematics in the control and experimental groups.

II. THEORETICAL FRAMEWORK

This study was anchored on Jean Piaget's Cognitive Learning Theory. Cognition refers to the mental process of absorbing and retaining knowledge. Further, it encompasses understanding through thought, experience, and sense. Cognitive learning refers to active and long-lasting learning. This type of learning is generally very engaging, immersing learners in various processes, maximizing brain productivity, and learning new things.

The cognitive learning process is based on individuals cognitively processing input to result in behavior. It has been found that mental processes include many elements, including Organizing, Interpreting, Categorizing, Attention, Observing, and Forming generalizations (McLeod, 2018).

Experts in Cognitive Psychology believe interleaving improves the brain’s ability to discriminate or differentiate between concepts and fortifies memory associations. Along with the application of spacing, schools are increasingly seeing this as an effective strategy for exam preparation. Interleaving may seem more complicated than studying a single topic for a long time, but it is more beneficial in the long run (Kornell & Bjork, 2013).

In the study conducted by Kornell & Bjork (2013), they investigated whether interleaving can be used to improve the performance of students. They compared three groups: Students who studied a single topic; students who studied two topics simultaneously; and students who studied two topics sequentially. They found that students who studied two concurrently performed significantly better than those who learned only one topic. In another study conducted by Rohrer (2012), he examined the effect of interleaving on students’ performance. He found out that students who were taught using interleaving outperformed those who were taught using blocking.

In Jerome Bruner’s Theory of Cognitive Development (1966), the concern was with how knowledge is represented and organized through different modes of thinking (McLeod, 2019). Furthermore, Cognitive psychologists believe interleaving improves the brain’s

ability to differentiate or discriminate between concepts and strengthens memory associations.

Interleaving is a teaching strategy that has pupils acquire ideas in many contexts and at various times. Since students are not only memorizing numbers and facts, this strategy aids in their information retention. They are genuinely considering the information and applying it to actual circumstances. Therefore, while teaching a concept, you should explain it before moving on to another. Later, return to your initial idea. Repeating this procedure throughout the semester provides students with numerous opportunities to comprehend the subject.

In this study, the researcher reconstructed a learning activity sheet where students were assigned to study examples and answer the activities. These activities were designed using interleaving practice.

III. CONCEPTUAL FRAMEWORK

In this study, the researchers wanted to make a learning material that may enhance students’ performance in Mathematics. Reconstructed Learning Activity Sheets (LAS) with interleaving practice will be given to students in the experimental group during the distribution of modules in the modular learning modality. While the control group will have the DepEd-released Learning Activity Sheets (LAS).

Figure 1 shows the schematic diagram of the effect of Reconstructed Learning Activity Sheets on Students’ Performance in Mathematics.

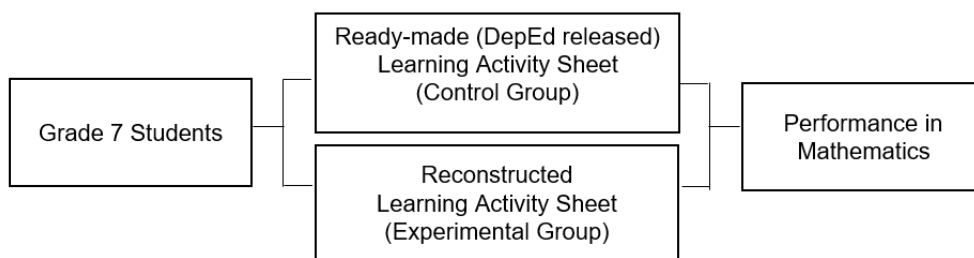


Fig.1

Research Design

The Posttest, Only Control Group Design, was utilized; according to Renbarger and Morgan (2018) that the posttest-only control group design is a research design in which there are at least two groups, one of which does not receive a treatment or intervention. Data are collected on the outcome measure after the treatment or intervention. The group that does not receive the treatment or intervention of interest is the control group.

The said research design was conducted on one section of Grade 7 students of Calatrava National High School. The control group was given the ready-made Learning Activity Sheets (LAS), while the experimental group was given the reconstructed Learning Activity Sheets (LAS). In the One-Group Posttest Only research design, specifically the posttest–only control group design, the subjects are randomly selected and assigned to 2 groups (control and experimental), and only the experimental group was treated.

Research Instrument

Learning Activity Sheets (LAS) reconstructed by the researcher were used to gather the necessary data for this study. The Learning Activity Sheets (LAS) comprised activities using the Interleave approach.

Furthermore, the Reconstructed Learning Activity Sheets (LAS) were subjected to face validity. A group of experts in the field of Mathematics were asked to evaluate the content of the Reconstructed Learning Activity Sheets (LAS), and will be rated using Good and Scates. The LAS and the evaluation sheet were sent to the evaluators through email. Moreover, the experts were asked to write their comments, suggestions, and recommendations for the improvement of the said instrument. The validity index of the tool is 3.83.

The instrument used in the study, which is the basis of the result, were the summative tests and performance tasks from the DepEd. The reliability and validity test was not administered since it is a standardized test given by the Division of Negros Occidental.

Data Gathering Procedure

A letter of permission was sent to the school head of the target school, specifically the Calatrava National High School. When the permit was granted, the researchers started conducting their study on the target participants after the parents signed the consent form allowing their child to be of the study. The researcher gave reconstructed Learning Activity Sheets (LAS) to the experimental group, and the ready-made Learning Activity Sheets (LAS) released by the DepEd to the control group. This was applied to the whole period of the third quarter, which is eight weeks.

The researcher distributed the Learning Activity Sheets (LAS) to the parent/guardian of the students in the same manner as the normal set-up during the scheduled distribution of the modules from February 7, 2022 – April 8, 2022. The participants were given four weeks to answer the Learning Activity Sheets (LAS) assigned, and there was an exchange of modules. The distribution and retrieval of modules happened for eight weeks of the third quarter. The summative test and performance task was given after the fourth week.

The researcher recorded the participants' scores after administering the summative test and performance task.

Data Analysis

The following statistical tools were used in consonance with the specific problems presented in this study.

For problem number 1, which aims to determine the level of performance of the Grade 7 students, the mean and standard deviation was used. The level of Performance in Math of the participants was categorized as “Outstanding / Very High” to “Did Not Meet Expectation / Very Low,” with varying degrees in between. Below is the guide used to interpret the level of performance in Mathematics.

Guide used to interpret the level of performance in Math

Grading	Description
90 – 100	Outstanding / Very High
85 – 89	Very Satisfactory / High
80 – 84	Satisfactory / Average
75 – 79	Fairly Satisfactory / Low
Below 75	Did Not Meet Expectations / Very Low

For problem number 2, which aims to determine the significant difference in students' Performance in Math in the control and experimental groups, the Independent Sample t-test was employed with a 0.05 significance level.

IV. RESULTS & DISCUSSIONS

Table 1 shows the level of performance in Mathematics of the grade 7 students in the controlled and experimental groups. Both controlled ($M = 91.59$, $SD = 3.948$) and experimental ($M = 94.00$, $SD = 2.878$) groups have an “Outstanding” level of mathematics performance. However, the mean average value of the experimental group is higher than the mean value of the controlled group, and the standard deviation of the experimental is lower than the standard deviation of the controlled group, which indicates that the data are clustered around the mean. This signifies that Reconstructed Learning Activity Sheets help the Grade 7 students in the improvement of their level of performance in Mathematics.

This study corroborates with Carvalho & Goldstone (2015) that using an interleaving format is more effective than blocked practice for active learning. Thus, based on the result, the experimental group that used the Reconstructed Learning Activity Sheets comprising the activities with Interleaved Approach had a positive outcome. At the same time, giving students activities with multiple lessons comprising different types of tests is more effective than the usual repetitive or blocked approach, which is the normal school setup that we mostly encounter.

Table 1 Level of performance in mathematics of controlled and experimental grouped in the implementation of learning activity sheets

Participants	N	M	SD	Interpretation
Controlled group	22	91.59	3.948	Outstanding
Experimental group	22	94.00	2.878	Outstanding

Note: 90 – 100 Outstanding/ Very high, 85 – 89 Very Satisfactory/ High, 80 – 84 Satisfactory/ Average, 75 – 79 Fairly Satisfactory/ Low and, below 75 Did Not Meet Expectation/ Very low.

Table 2 shows the significant difference between the controlled and experimental groups in the level of performance in Mathematics in the implementation of the learning activity sheets. The mean difference between the two groups is 2.41 since the average of the experimental group is 94.00 while the average of the control group is 91.59. The result shows a significant difference in the level of performance in Mathematics of controlled and experimental groups [$t(42) = -2.313, p = 0.026$] at a 0.05 significance level.

Hence the null hypothesis, “There is no significant difference in students’ level of performance in Mathematics in the control group and experimental group,” was rejected.

Table 2 Difference in the level of performance in mathematics of controlled and experimental groups in the implementation of learning activity sheets

Participants	M	df	t	p
Controlled group	91.59			
Experimental group	94.00	-2.313*	42	0.026

* $p < 0.05$

V. CONCLUSIONS

The result of the study shows that the level of performance of the controlled and experimental groups is both outstanding. However, the average of the experimental group is higher compared to the control group. The null hypothesis, “There is no significant difference in students’ level of performance in Mathematics in the control and experimental groups,” was rejected.

Reconstructed Learning Activity Sheets (LAS) have a positive impact on the mathematics performance of students in Grade 7, according to the study’s findings. This suggests that Reconstructed Learning Activity Sheets (LAS), which include exercises using the Interleaved Approach, can help students perform much better in mathematics. Critical thinking skills are more likely to be developed in students who participate in various learning activities. This shows that using different skills to execute a task can improve a student’s performance.

VI. RECOMMENDATION

In light of the findings and conclusions drawn from the study, the following recommendations are made: Curriculum planners may consider integrating Interleaved Approach in making their reference materials.

School Administrators may encourage mathematics teachers to innovate strategic plans to improve the student’s performance in Mathematics.

Mathematics teachers can maximize the use of Interleaved Approach in making their test materials so that the students will develop multiple skills.

Students may design their strategy to use the references and test materials developed by their teachers to help them improve their performance in Mathematics.

The researcher can encourage his fellow mathematics teachers to utilize Interleaved Approach in making students’ activities and exercises.

Future researchers can examine the effectiveness of Interleaved Approach when used in the teaching-learning process.

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