Utilization of memory enhancement techniques and academic progress of grade 6 students in Bubukal Elementary School, Santa Cruz, Laguna

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Abstract

This study focused on the utilization of memorization enhancement skills as a technique in teaching Math subjects among the selected grade six students of Bubukal Elementary School during the school year 2022 – 2023. Two sections from the 6th grade were selected using random sampling method wherein all the members in the population were selected as chosen participants in the study. The study employed quantitative and (descriptive design). Mean, standard deviation, and input process output were used to determine the significant relationship between the utilization of memory enhancement techniques and the level of academic progress. Use of mnemonic devices and visual information techniques in teaching grade six students in Bubukal Elementary School were the focus of the study. The findings revealed that the effectiveness of memorization enhancement techniques, teachers may use these techniques to enhance the memorization skill of students on words and numbers and also apply graphic representation to truly analyze the concept given in different topics covered on the mathematics subject. Thus, the study recommended that the utilization of memory enhancement techniques that can be used as strategy for students to remember information and enhance their creativity and critical thinking skills. Furthermore, it helps students to easily understand and process information that is given.

Keywords: memory enhancement techniques

1. Introduction

In daily life, we take in new information and store it in our brain. Maintaining it and recalling it is depending on our needs. This happens because our brain has the capability of learning new skills and experiences, storing what has been learned, and reusing the stored knowledge. These capabilities of storing and reusing experiences and skills are informally known as the human memory system. Generally, there are two different memory types, short-term and long-term memory, that store and access information differently, and many brain regions are involved in the process. Students are persons formally engaged in learning, especially enrolled in gaining knowledge, developing professional skills, and achieving their study goals, whereas some students are identified as having special needs in studies having the problems of slow learning, forgetfulness, lack of attention, and concentration when they are at the infancy stage. But the majority of students are not identified until they enter into the college system.

Education has an effect on the human mind, learning and memory being its fundamental support. It is important to find different strategies to enhance the students' memory and performance. Strong memory is crucial for academic development as it allows learners to form and sustain connections, recalling information, and carry out duties in an effective manner. Memory enhancement can be learnt and developed with practice. There are a variety of useful strategies and techniques that can be used to improve students' memory. It helps

learners to expand their memory and apply the concepts they learned in real-life situations. Utilization of different memory enhancement techniques have a significant impact for both students and educators. Vanichvasin (2020) a graphics, colors, animations, videos, typography or any other forms of visuals for better attention, comprehension and retention, enhance memory by helping students recall, retain, and retrieve course content, and motivate learning with interest and satisfaction for better memorization and learning performance. Visualization has potential to enhance memory retention and can be implemented across various domains of learning. Suppawittaya and Yasri (2021) memory has a limited capacity of retaining information. However, this can be enhanced by dividing the information into smaller chunks. Chunking entails the decomposition of extensive information more manageable units to enhance the retention of information.

The creation of distinctive and memorable presentation of information enhances the effectiveness of memory retention. The abilities to utilize critical thinking depends heavily on the brain's ever-expanding memory. On the other hand, activities like problem solving and learning require persistence and effort, studies suggest there are ways to optimize time and increase efficiency to remember new things.

Memory enhancement techniques are crucial for students' learning. The essence of teaching and learning is storing accurate and concise information that students can recall and use whenever needed. Choosing techniques to enhance memory is a critical aspect of instructional design. Given that students automatically generate and use techniques for learning or memorizing, they still lack technique. Educators must teach a variety of technique that students can use in order to enhance their memory and encourage them to practice their techniques on a daily or regular basis.

1.1. Background of the Study

The desire to enhance and make ourselves better is not new, one and it has been a hot topic throughout the ages. Individuals have continued to seek ways to improve and enhance their well-being, some examples are through nutrition, physical exercise, education and so on. Another one is the improvement of the ability to remember. Hence, people interested in improving their well-being, are often interested in memory enhancement as well. The desire to improve one's memory is almost certainly as old as the desire to improve one's overall health. Memory is a fundamental aspect of human cognition, crucial for learning, problem-solving, and maintaining relationships. However, as life becomes increasingly complex and information-rich, many individuals struggle with memory-related challenges. By using memory enhancement techniques our overall cognitive abilities and mental agility can be enhance. It can lead to better problem-solving skills, increased creativity, and more effective decision-making. Moreover, memory enhancement techniques can significantly benefit students. They can perform better in exams and retain information more effectively. plays a critical role in preserving our quality of life as we age, as it helps counteract age-related cognitive decline and reduce the risk of conditions like Alzheimer's disease. In an information-driven world, where knowledge and data are continually expanding, memory enhancement techniques are indispensable for personal growth, academic success, and professional achievement.

Memory is a wonderful trait of human beings. Now, more than ever in history, scientists are unlocking the secrets to enhancing memory. Memory is extremely important to educators, not only for them personally, as they age and worry about failing memory, but, most important, for the role that memory plays in the teaching process.

Memory is the superior logical or intellectual cognitive process that defines the temporal dimension of our mental organization. It is our ability to encode, store, retain, and then recall information and past experiences. Memory has a fundamental role in life, reflecting the past as the past, and offering the possibility of reusing all past and present experiences, as well as helping to ensure continuity between what was and what was going to be. Memory is an active, subjective, intelligent reflection process of our previous experiences.

Furthermore, teaching math should be guided by scientific research on how the brain learns: cognitive

math. A surprising discovery when solving mathematics problems of any complexity, is reasoning does not work. Students must apply very-well-memorized facts and algorithms. The advice, we review recent discoveries of cognitive mathematics research (Johnstone's 2022). Instructional strategies are recommended that cognitive studies have shown help students learn problem solving.

1.2. Statement of the Problem

This study aimed to investigate the effectiveness of memory enhancement techniques
The following questions were addressed in this study:
1. What is the utilization of memory enhancement techniques in Math subject in terms of:
   1.1 Mnemonic device
   1. 2 Visual information
2. What is the level of the academic progress of Grade 6 students in Bubukal Elementary School in Mathematics?
3. Is there significant relationship between utilization of memory enhancement techniques and the level of the academic progress of Grade 6 students in Bubukal Elementary School in Mathematics?

1.3. Objectives of the Study

This study aims to determine the challenges encountered by Grade 6 students in Bubukal Elementary School in memorizing techniques used in Math subject.

The study specifically seeks:
1. to determine the utilization of memory enhancement techniques in Math subject in terms of:
   1.1 Mnemonic device
   1.2 Visual information
2. to determine the level of academic progress of Grade 6 students of Bubukal Elementary School in Mathematics.
3. to determine the significant relationship between utilization of memory enhancement techniques and the level of the academic progress of Grade 6 students in Bubukal Elementary School in Mathematics.

1.4. Significance of the Study

This study will be beneficial to the following:

Students: This study may raise awareness in students' academic performance in memory enhancement techniques. Selected students in Grade 6 who meet difficulties in the studies could account for the development means in a non- stressful and easy way of studying by utilizing memory enhancement techniques for their chosen subjects.

Teacher: This study can be able to identify students' strengths and weaknesses in various types of questions using effective delivery memory enhancement techniques to improve Grade 6 Math academic achievement.

School: This study will benefit the school by applying the proposed techniques that could help student to use alternative techniques to enhance memorization skills

Parents: This study can be involved in their children's learning process by becoming part of school boards, being concerned about their children's overall academic performance.

School administrators: This study could be used as a basis for the school administrators to encourage the use of memory enhancement techniques for the overall improvement of students' academic performance.

Future researchers: This study may serve as a reference for future researchers who are going to conduct a similar on utilization of memory enhancement techniques.

1.5. Hypothesis

The assumption to be tested is stated as:

There is no significant relationship between the utilization of memory enhancement techniques and academic progress of the Grade 6 student awareness in the improvement of their academic performance in math as shown by their series of quizzes.

1.6. Scope and Limitations of the Study

The study focused on the utilization of memory enhancement techniques and academic progress in math on selected Grade 6 students of Bubukal Elementary School. The data collection was conducted on the fourth quarter of school year 2022-2023. The data gathering was done through the utilization of series of quizzes and survey questionnaires to the Grade 6 students.

1.7. Definition of Terms

To facilitate the understanding of this study, different terms are defined here in.

Academic progress. It refers to the student's continuous assessment each level to receive input and give feedback on their performance, to help them improve.

Chunking words. It refers to a strategy to help the student collect and remember the information as a practice of applying this technique. This study will benefit the school by applying the proposed technique that could help them use as alternative techniques to enhance students' memorization skills.

Enhance. It shall refer to the further of improvement in memorizing information regarding Math.

Graphic Organizer. It provides a method for transferring new knowledge from short-term memory to long-term memory that aids children in translating abstract ideas into more tangible visual representations.

Intrigue. As use in this study, this refers to the interest of individual in memorization.

Memorization skills. It is a strategy that helps the student to remember the information over time. It also makes use of pictures and sounds of words to remember.

Memory enhancement. Refers to the improvement of one’s memory which the brain encodes experience and behavioral information. Also, restoring and remembering of information in math subject.

Mnemonic devices. It is defined as the strategy that individual use to improve their memory.

Songs. It reactivates areas of the brain associated with memory, reasoning, speech, emotion, and reward.

Techniques. Refers to a process of activity wherein the teacher uses to enhance the learning of students.

Visual information. It used various visual media to develop students' visual thinking as their learning styles to comprehend and retain information better by associating ideas and concepts with images.

2. Review of Related Literature

This chapter presents the related literature and studies complied after a systematized search done by the researchers. This chapter provides the outline synthesis, as well as the theoretical and conceptual framework of the research.

The Bloom’s Taxonomy provides a most important education framework that moves a student from lower-order thinking to higher-order thinking (Cummins, K. 2023). The six levels are remembering, understanding, applying, analyzing, evaluating and creating. Remembering is the act of recalling information from long-term memory, while understanding involves constructing meaning from interpreting and

summarizing data. The implementation of what was learnt in these first levels takes place at level 3, applying. Analyzing is the next level where information is broken into its constituent parts to establish its relationships. Evaluation is the process of making judgements based on criteria and standards by checking and critiquing. The last level, creating, involves putting all elements together to form a new, coherent and functioning whole.

The remembering is the act of retrieving knowledge and can be used to produce things like definitions or lists. It is the lowest of the taxonomic levels but is essential for the learning process because learners need to have knowledge in place before they can engage with it at higher cognitive levels (Shabatura, 2023). Examples of remembering include reciting the times' table, naming different parts of the human anatomy, answering true or false questions, recalling critical events on a historical timeline or even naming the six cognitive levels of Bloom's taxonomy. Remembering requires no understanding of the knowledge, only to have it accurately and thoroughly in mind.

Memory enhancement is part of a level one of blooms taxonomy. In math, teaching learners need to memorize the formulas of the given problem.

2.1. Math as a Subject

The math content is typically connected with rigid rules, phrases, and principles, and students are sometimes asked to memorize rules, principals, terms, methods for solving problems, comparison, relationships, arithmetic statements, and formulae without understanding them. Students must retain principles in order to effectively deal with math formulas; otherwise, they may struggle to proceed to the next level of this intense topic. Previous research has discovered a link between metacognition and math anxiety Mazana, M. Y., Montero, C. S., & Casmir, R. (2018). Math anxiety is a fear of math that causes avoidance or poor performance in math. Math anxiety has a negative impact on tasks that require the use of working memory. Those with high math anxiety make more errors on timed tasks than those with low math anxiety according to Khasawneh, E., Gosling, C., & Williams, B. (2021).

2.2. Mnemonic Devices

Mnemonic devices are memory aids that help us organize information for encoding. They are especially useful when we want to recall larger bits of information such as steps, stages, phases, and parts of a system Lumen Learning. (2018). A device, formula, or rhyme that helps your students remember order of operations in math is called a Math Mnemonic. They are most effective for classes may find it challenging to memorize complicated, sophisticated mathematical computations. Students may like learning a math mnemonic since it may resemble a nursery rhyme or song, which makes it enjoyable for them and sparks their interest in math. Teaching math to children can be one of the most challenging academic tasks, it's nearly like teaching them a new language when they've barely mastered the English language. A task that seemed insurmountable until you discovered a method, like these math mnemonics, to make it simpler on students. It might use a mnemonic device to help you remember someone's name, a mathematical formula, or the seven levels of Bloom's taxonomy Durant (2023).

MSEd, K. C. (2022). to improve our short-term memory capacity, a technique called chunking which is a process of grouping presented information to effectively compress the context is considered one of the most popular techniques. However, unfamiliar data, as well as complex information, may be less effectively retained even if the information is properly chunked. In addition, each chunk must be limited to an appropriate number of items to maintain its effectiveness. Otherwise, it is like not undergoing chunking because most people tend to remember information at the beginning and at the end. Sudhakar, D. (2021) Chunking is useful when trying to remember information like dates and phone numbers. Instead of trying to remember 5205550467, you remember the number as 520-555-0467. So, if you met an interesting person at a party and you wanted to remember his phone number, you would naturally chunk it, and you could repeat the

number over and over, which is the rehearsal strategy.

2.3. Chunking Words

One of people's life activities, including memorizing 11-digit phone numbers and selecting two to three words to define themselves, these are example of chunking. Chunking information could increase its effectiveness of being processed into short-term memory and eventually long-term memory Wadsworth, W. (2022). Applying chunking technique is effective to use in developing and enhancing learners critical thinking skills and problem-solving skills because it helps them to understand and remember the information easily.

2.4. Music

Familiar tune, song or jingle, used as a mnemonic device is another known technique in memory enhancement. Musical pleasure was found to influence task performance, and the direction of this effect was dependent on the individual factors. Memory and recalling information improve when tune, lyrics, or songs are integrated in the learning strategy. found that music negatively affected memory during a study or learning phase but increased mood and sports performance. Using rhythmic and musical mnemonics provides an attractive and innovative alternative instructional and learning strategy. With song, information is retrieved sequentially from memory, with fewer gaps and missing sections in the text. Bahrami, Z., Izadpanah, S., & Bijani, H. (2019).

Musical training has characteristics of a wide transfer effect, challenging training content, and time-consuming practice. In musical training, children train independently, showing interest, motivation, and pleasure in training. During the process of musical training, individuals need to pay appropriate attention to information from each sensory channel, switch between different sensory simulations in real time, integrate information from multiple sensory channels, and save this information to working memory so that it available for recall at any time, all while restraining interference of other external competitive stimuli. Furthermore, not only is musical training a comprehensive type of training, which is more complex than other types of general cognitive training, but it is also typically considered more interesting and attractive than other types of training. Additionally, if the individual is committed to training, it makes him/her less sensitive to the cognitive load, and the direct benefits gained from training further enhances the individual's intrinsic motivation to learn. Therefore, long-term, intensive musical training could improve EF, both comprehensively and effectively correlational studies, investigating whether specific EFs are associated with extent of musical training, and a handful of experimental studies, investigating whether random (or quasi-random) assignment to musical training may improve specific EFs Shen Y, Lin Y, Liu S, Fang L and Liu G (2019).

2.5. Visual Information

Younger students must develop a functioning vocabulary. It is crucial that students establish efficient comprehension skills since this will help them succeed in their courses. One such technique is using images. Visuals help kids communicate and grasp while putting a fun, strong emphasis on words Scholl, A., & Scholl, A. (2023). The student's recall and visualization are improved the sooner and longer they are exposed to the word. when toddlers first learn a word, their mental images of that word are more vivid. Maternal reading fluency is positively associated with greater functional connectivity between the child's future reading network and regions related to executive functions and language processing in preschool-age children. Through this carefully chosen selection of readings, kids will have accumulated previous knowledge that they may call upon. Educators should see this strategy as the source of knowledge rather than only the teaching of fundamental skills. Visual aids act as navigation tools and text supplements. They are useful for presenting, analyzing, and synthesizing information, but they also promote the development of visual literacy, which is

defined as the "decoding and comprehension of [visual] elements to make sense of and interpret images" Greenwood, P., Hutton, J., Dudley, J., & Horowitz-Kraus, T. (2019).

Using visual learning material such as PowerPoint presentations can enhance learning outcomes. On the basis of the opinions of some mind mapping experts, it can be inferred that the mind mapping technique is a structured activity to input information into the brain and then issue information from the brain, through diagrams and visual lines with words or the image that is placed in the middle and then spreads in the form of a network with related ideas. It encourages counseling services to enhance the use of mind maps in learning for academic success The theoretical neuromath, or mind mapping methods and the brain are related said that mind mapping is a brain-enhancing device/instrument/tool that works to improve learning outcomes through play and also that it will be easier for us to recall using mind mapping. Lastiri, L. (2022).

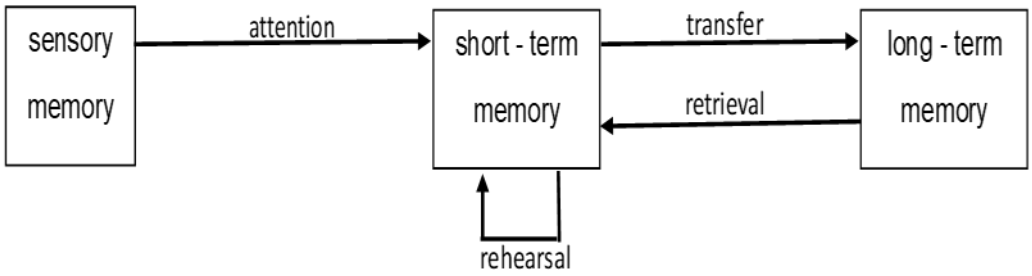
2.6. Graphic Organizer

Graphic organizers are visual elements with which readers indicate clusters of ideas or concepts in the form of words, phrases or sentences. It is tools that are designed to designed to give options for how to organize different types of information, get them thinking about connections, and help learners to study and remember information. Visually representing the material improves understanding of the content, which leads to better retention. Gardner's Theory of Multiple Intelligences indicates that learners are better able to learn internalize information when there is more than one modality use in instructional strategy and graphic organizer present visual and spatial modalities. Therefore, it helps learners to internalize there what they are learning. By choosing an effective layout for a graphic organizer, learners think critically about the type of information and how to best present it. They can create a visual study guide that reflects all the ideas they are learning and how they work together. Haddad, D. (2022)

2.7. Theoretical Framework

It is evident that students learn, and memory enhancement is a technique that is used to store knowledge. It is also a way to improve memorization skill in order to store information and to digest and remember.

MULTI-STORE MODEL

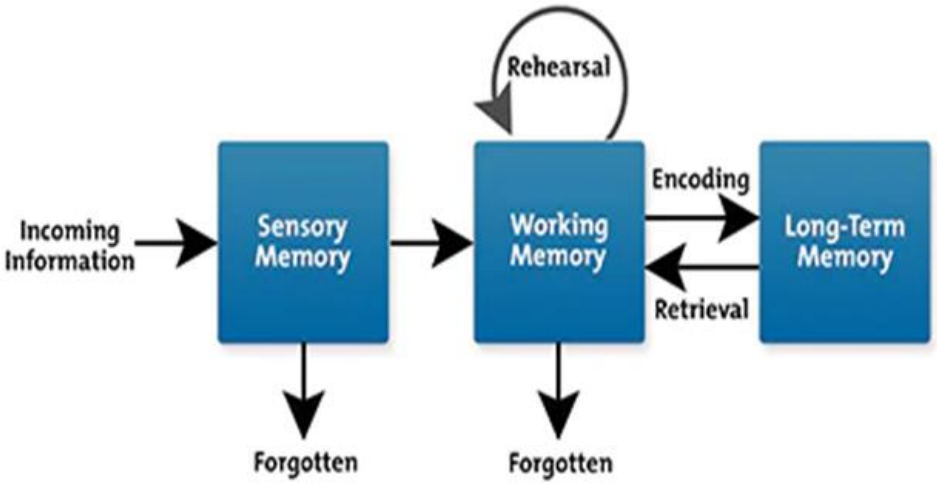


Atkinson and Shiffrin, 1986 proposed a multi-store model that divided the human memory into three distinct stores: sensory memory, short-term memory (STM), and long-term memory (LTM). Information can be retained in any memory storage system.

Sensory memory is where information from the senses is stored. It holds information rapidly and transfer only small amounts of it to short-term memory. The transferring of information can be interrupted by

attention. If individual can't pay attention, he/she won't remember it.

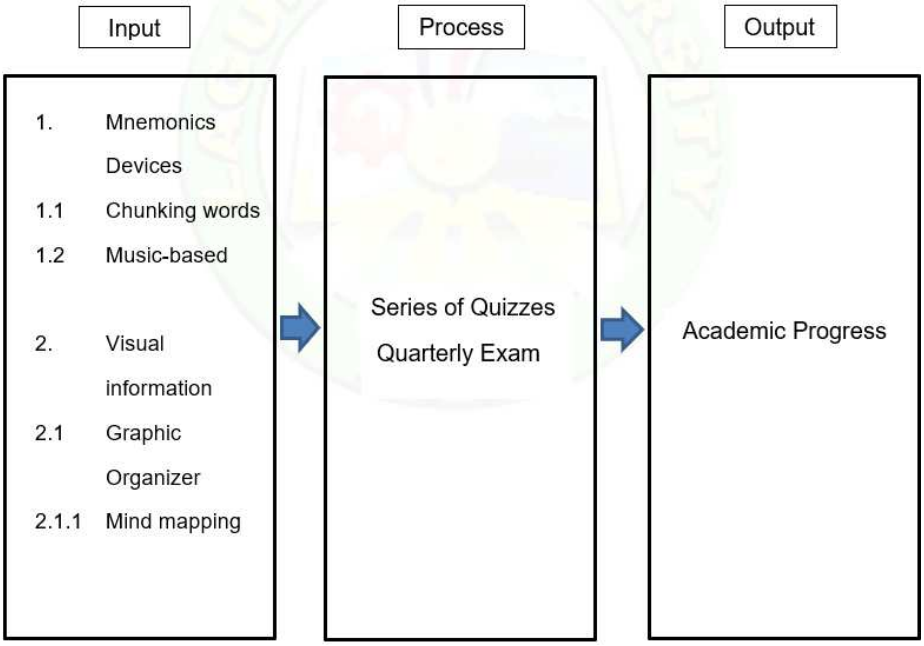
Short-term memory (working memory) holds the information that a person is currently paying attention to. Information can be transfer to STM visually, acoustically, or semantically and can retain longer through chunking words. Long-term memory allows to store information for long periods of time. This information can be retrieved consciously.



Adopted from Multi- Store Model of Atkinson and Shiffrin was the Cognitive Load of Theory of John Sweller in 1998. This theory explains how the human brain process retention of information. Short-term memory has limited capacity to hold information, therefore, instructional methods and memory enhancement techniques should avoid overloading of information. The process of retaining information in students' memory depends upon the three stages (sensory memory, short-term memory, and long-term memory) (Haron, Jamil and Ibrahim, 2014). If the execution of these stages fails, therefore information will never get to long-term memory to be stored.

2.8. Conceptual Framework

Based from the theories mentioned in the theoretical framework, this study was conceptualized in a paradigm showing the variables considered in the "Utilization of Memory Enhancement Techniques in Grade 6 and Academic Progress of Students in Bubukal Elementary School Santa Cruz Laguna"



The conceptual framework of the study that was used is the input-process-output model are shown in figure 2. It shows what is the process used in memorization enhancement.

For input, it consists of the memory enhancement techniques used by the teachers to uplift the academic performance of students.

For the process, it includes the series of quizzes that were utilized for memory enhancement and the quarterly exam.

For the output, the results of the study being utilized for improvement of academic progress of the students using the memorization techniques.

2.9. Synthesis

Mnemonic devices are commonly techniques, particularly in memory enhancement skill used in Math. These techniques challenge teachers to assess the effectiveness of memorization of student skills. To address these challenges and effectiveness for students, teachers must know how to apply these techniques for students improve memorization skills in Math. Problem solving is regarded as one challenging field of mathematics since it is merely on a conceptual and require higher level of thinking, including the ability to analyze and comprehend the information (Sirhan, 2018). The subject also receives contrary comments from secondary school that influences academic achievement and conceptual reasoning abilities of the learners (Oluwatelure, 2019). Having bad effects and attitudes on students is math subject. For instance, learning is not enjoyable, is tedious and taxing on students, and has historically been one of the courses they detested the most. By way of these negative effects, the students' academic performance in math will undoubtedly suffer, as well as their ability to think Aranes et. al. (2014) as cited by ES Siaw (2021) learning and mastery of mathematics can facilitate logical, analytical, critical, and abstract thinking among students. Mathematics offers fundamental skills such as thinking in life, establishing relationships between events, reasoning, estimating, problem-solving apart from gaining calculation skills and teaching numbers and mathematical operation.

It found out that when taking into account the various types of learners, there is a gap between the

students' level of cognitive capacities. Teaching difficulties to a wide range of students is one of the issues teachers encounter when adopting the spiral math curriculum. Math issues get more complicated as you advance in understanding and number of math concepts. Teachers also take into account each student's specific demands. To increase their enthusiasm and capacities students involves in activities that were likely to improve their cognitive skills toward the subject helped students develop mathematics process skills by integrating concepts in real-life situations Bete, A. O. (2020).

3. Methodology

This chapter includes the study's research methodology. In this part, the researchers outline the research design, research local, population of the study, research instruments, data gathering procedures, and the treatment of data that was used.

3.1. Research Design

In this study, the researchers used a quantitative method to gather the data. A descriptive design will be used to determine the utilization in memorization skill encountered by Grade 6 students of Bubukal Elementary School within the school year of 2022-2023. A survey questionnaire was used in order to collect data.

Each respondent was given the same set of questionnaires. The data is supplied in a numerical format, and can be analyzed in a quantifiable way using statistical methods. Sileyew, K.J (2019). Descriptive Design involves random selection processes, through survey questionnaire. Moreover, the observer does not intervene in this observation process or influence any of the variables of the study. Lambert, (2012) as cited by Sirisilla (2023). A descriptive research design, a topic is observed and data is gathered without an attempt to infer cause-and-effect correlations.

3.2. Research Locale

The study was conducted at Bubukal Elementary School located at Brgy. Bubukal Sta. Cruz Laguna. The study took place within the fourth quarter of the academic year 2022-2023. The institution was selected to determine the memory enhancement and academic progress in Math of Grade 6 students.

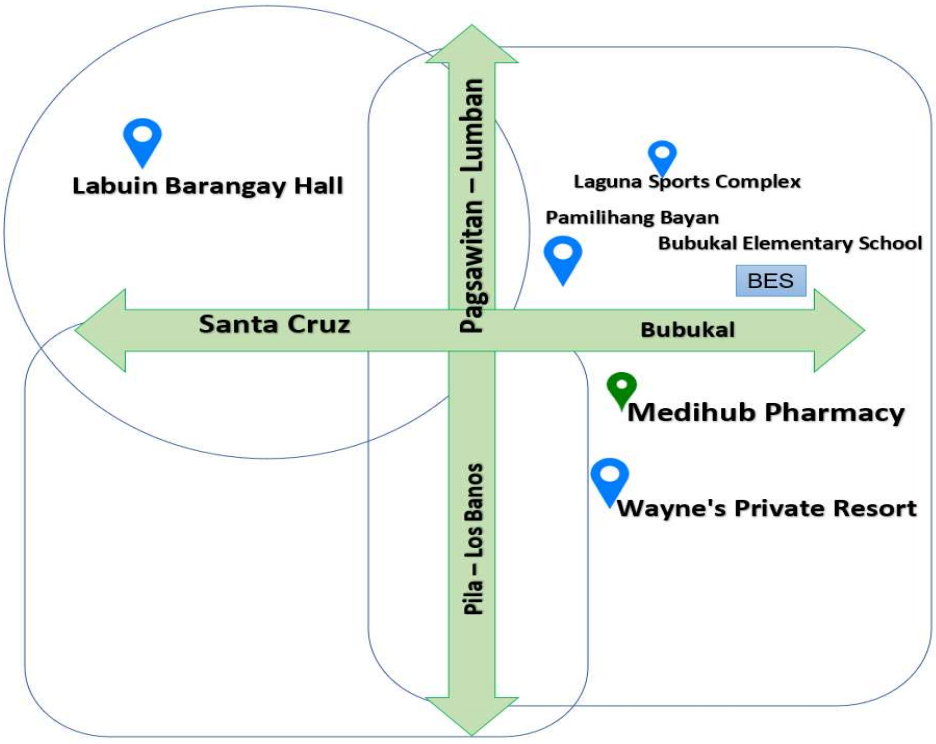


Figure 3: Map of Bubukal Elementary School located at Brgy. Bubukal, Sta. Cruz Laguna

3.3. Population of the Study/ Sampling Design

This study involved Grade 6 students of Bubukal Elementary School. The researchers selected sixty (60) students from the said population as respondents of this study. The researchers used Simple-Random Sampling method. Simple- Random Sampling referred in a type probability sampling.

3.4. Research Instrument

In order to gather all the data needed for this study, quantitative and descriptive research design were utilized. This method involves series of quizzes and quarterly exams. The techniques used by the researchers was mnemonics devices with scope of instructional techniques that designed to help students enhance their memory of important information. Acronyms and acrostics, songs and chunking words are some of the best examples of mnemonics. Acronym are powerful tool for recalling information which makes them a fantastic memory aids, it is also considered any formed from the first letters of list of words. Acrostics is another tool but in the same vein as acronyms, it is a sequence of letters that helps you remember a text or information. Both song and chunking words can be used to remember all kinds of information, it allows teachers to put the lyrics together by linking words and phrases to a tune. The rhythm acts as a great framework to which we can attach the text, making it easier to remember another time. In this way musical structures enhance our ability in memorizing and use as jingle song to engage students. Chunking is a technique that breaking information down into groups or unit, it is based on the idea that short term memory is limited in the number of things that can be retained.

The survey questionnaire was composed 10 question per technique. A total of 20 questions were answered by the respondents using the Likert scale.

3.5. Data Gathering

The researcher gave the letter of request for the sample set of questionnaires, series of quizzes and gave to their instructor in research to seek for advice and consultation regarding the details needs to improve and parts for revision. Once approved, the researchers permission from the school head and the advisor of the target section respondents. Subsequently, the researchers series of quizzes have been checked, revised and approved. The researchers soon conducted the data gathering procedures and provided a brief introduction about the topic followed by application of techniques in both section A and B. After the application, the researchers proceed to gave instructions how the quiz will be answered by the selected respondents. After the distribution of questionnaires, the researchers requested the respondents to answer their quiz properly and honestly. The respondents were guided by the researchers while answering the questionnaires. After the gathering of data, the researchers tallied and analyze the results.

3.6. Treatment of Data

The researchers chose weighted mean to measure the result from the series of quizzes and quarterly exam.

The raw scores that were gathered from the series of quizzes and quarterly exam were monitored and analyzed statistically. To determine the average and significance between two different test scores, the weighted mean was used to obtain the highest average value.

1. What is the utilization of memory enhancement techniques in Math subject in terms of:
   1. 1 Mnemonic device
   1. 2 Visual information

$$W = \frac{\sum_{i=1}^{n} w_i X_i}{\sum_{i=1}^{n} w_i}$$

W = weighted average
n = number of terms to be averaged
w_{i} = weights applied to x values
X_{i} = data values to be averaged

2. What is the level of the academic progress of Grade 6 student in Bubukal Elementary School in Mathematics?

$$\overline{X} = \frac{\sum X}{N}$$

where Σ x is sum of all data values
N is number of data items in population
n is number of data items in sample

3. Is there significant relationship between utilization of memory enhancement techniques and the level of the academic progress of Grade 6 students in Bubukal Elementary School in Mathematics?

$$r = \frac{n(\Sigma xy) - (\Sigma x)(\Sigma y)}{\sqrt{[\, n\Sigma x^2 - (\Sigma x)^2 \,][\, n\Sigma y^2 - (\Sigma y)^2 \,]}}$$

Σx = sum of x scores
Σy = sum of y scores
Σx^2 = sum of squared x scores
Σy^2 = sum of squared y scores

4. Presentation, Analysis and Interpretation of Data

This chapter present the analysis and interpretation of data in order to determine the utilization of memory enhancement techniques in Math subject using mnemonics devices and visual information. It explains the data, the researchers gathered the process, from respondents that participated in this study who

were selected Grade 6 students in Bubukal Elementary School.

The presentation of the major findings followed the order of the statement of the problem namely: the utilization of memory enhancement techniques in Math subject in terms of Mnemonic devices and Visual information; the level of the academic progress of Grade 6 student of Bubukal Elementary School in Mathematics; the significant relationship of memory enhancement skills to the academic progress of the of Grade 6 students in Bubukal Elementary School.

Table 1. Memory Enhancement Techniques in Teaching Math

	Mean	**Verbal Interpretation**
Mnemonics Devices	3.60	**Often**
Visual Information	3.79	**Often**
Standard Deviation	(1.08)	**Heterogenous**

Based on the Table 1, The overall standard deviation is higher than 1 (1.08). Meaning, it is heterogenous or the scores are not in the same range. Also, the overall mean which was 3.60 yielded an interpretation of "Often".

The data in the table and the findings of the statistical analysis, shows that utilization of memory enhancement of students' perception regarding using mnemonics devices is positive and it's helpful in terms of learning. The mnemonics devices technique means the survey, majority of the statements produced an interpretation of "Often" were used in retaining information by paraphrasing the original text through chunks in own words, using acronyms to remembered the information and with the integration of jingle song. These Likert Scale shows how often students retain information used by memorization skills presented through mnemonics device.

Legend:

Description	Scale Interval
Never	1.00-1.80
Seldom	1.81-2.60
Sometimes	2.61-3.40
Often	3.41-4.20
Always	4.21-5.00

The overall standard deviation is higher than 1 (0.96). Meaning, it is homogenous or the scores are in the same range. Also, the overall mean which was 3.79 yielded an interpretation of "Often".

Thereafter treatment of data, this study found out that Visual Information technique had significant relationship in enhancing the students' memorization skills and concept in Math subject particularly in predicting the outcomes, interpretation of problem solving and graphic representation than mnemonics devices technique.

Based on the data presented in the Table 1, and the statistical analysis results, the utilization of

memory enhancement of students' perception regarding using visual information or visual aids is impactful in terms of having it as an available tool for learning. The visual information technique means the survey, majority of the statements produced an interpretation of "Often" were used in interpretation of problem solving and graphic representation. These Likert Scale shows how often students demonstrate memorization skills presented through visual information.

Table 2. Academic Progress in terms of Quizzes and Summative Assessment

Assessment	Average	Score Interpretation
QUIZ 1	7.06	**Very Good**
QUIZ 2	7.81	**Very Good**
QUIZ 3	6.30	**Very Good**
Summative	22. 37	**Very Good**

Legend:

Interval	Score Interpretation
0-1.99	Unsatisfactory
2-3.99	Marginal
4-5.99	Satisfactory
6-7.99	Very Good
8-10	Outstanding

As specified on the Table 2, it shows that the students performed really well in terms of the quizzes given by the researchers. The computed means are 7.06, 7.81, and 6.30 which were all interpreted as "Very Good"

Based on the Table 2, the average shows the level of the academic progress of students performed really well in terms of series of quizzes given by the researchers. The average value was all interpreted as "Very Good".

Based on Table 2, it shows that the students performed really well in terms of the summative assessment given by the researchers. The computed mean is 22.37 which was interpreted as "Very Good".

Table 3. Relationship Between Memory Enhancement Techniques and the Academic Progress of Grade 8 Students

Memory Enhancement Techniques	Academic Progress				
	Critical-r value	Degrees of Freedom	Alpha Level	Computed r- value	Interpretation
Mnemonic Device	0.214	58	0.05	0.242	**Significant**
Visual Information	0.214	58	0.05	0.080	**Not significant**

Based on Table 3, it shows that "Academic Progress and Mnemonic Device" had a computed r-value of 0.242 and it was greater than the critical-r value. Therefore, its interpretation is Significant. Lastly, "Academic Progress and Visual Information" had a computed r-value of -0.080 and it was less than the critical-r value. Therefore, its interpretation is Insignificant.

5. Summary, Conclusion and Recommendation

This chapter presents the synopsis of the entire content of the study. It includes the summary, conclusions, and recommendations.

This chapter presents the summary, conclusion, and recommendation focusing on memory enhancement technique for Grade 6 students using mnemonics devices under chunking words, visual information under graphic organizer and to determine the academic progress of students through series of quizzes and result of their exam. The summary briefly presents the outline of the whole process of investigation and the findings which cover the result of data gathered and analyses concluded and arranged based on the statement of the problem. Conclusion focuses on the hypotheses as state study tested whereas recommendations provide suggestion to improve the execution of techniques to enhance the retention of information in longer period of time.

5.1. Summary of Findings

The researchers striven to determined the utilization of memory enhancement techniques in Math subject using mnemonics devices and visual information as techniques to enhance the memorization skill of students on words and numbers also applied graphic representation to truly analyze the concept given in different topics cover on mathematics subject. This study enriching the Grade 6 students of Bubukal Elementary School.

The respondents of the study were 60 Grade 6 students, each section was composed of 30 students from J.P Rizal and A.D Bonifacio from Bubukal Elementary School. The data gathering was conducted during Face-to-Face class.

The researchers used survey questionnaire method to gather the data needed. The researchers conducted a teaching method to apply the techniques covers three topics during fourth quarter followed by series of quizzes in every teaching session. Application of techniques were used to gather information from

the respondents in both mnemonics devices and visual information. In addition, researchers used survey questionnaire to determine if students apply the techniques after the teaching session. The study was conducted from October to June 2023.

5.2. Conclusion

After rigorous analyses of the gathered and treated data, the researchers arrived at the following conclusions.

This study aimed to determine the challenges encountered by Grade 6 students of Bubukal Elementary School in their memorizing techniques Math subject.

To determine the memory enhancement techniques in Math subject in terms of Mnemonic device and Visual information. To determine the level of academic progress of Grade 6 students of Bubukal Elementary School in Mathematics. Also, to determine the relationship of memory enhancement skills to the academic progress of the grade 6 students Bubukal Elementary of School.

The researchers concluded that the mean score in mnemonics devices technique is positive and helpful to support in terms of learning is somehow effective considering its statements produced an interpretation of Often. There are some difficulties that the students' experienced in retention of information and concept in problem solving. While the mean in visual information technique was more effective in enhancing the memorization skills and concept learning of students in mathematics, the majority of the statements produced an interpretation of Often. This technique is more efficient considering that it involves different learning activities that apply the concept in application to engaged and comprehend more the students.

The null hypothesis of utilization of memory enhancement technique as a tool has no significant difference in enhancing students' memorization skills has been rejected. The study has shown that the mnemonic devices as a technique is significantly effective for the students' enhancement of memorization skills. Thus, alternative null hypothesis that utilization of memory enhancement techniques as a tool has significant difference in enhancing students' memorization skills is accepted.

5.3. Recommendation

This study revealed the effectiveness of Utilization of Memory Enhancement Techniques in Teaching Math Subject. Thus, the following recommendations are hereby presented:

1. Since, the effectiveness of memory enhancement techniques has been proven, teachers may use these techniques in teaching Math

subject to help students easily understand and process information that is given.

2. Utilization of memory enhancement techniques as a strategy for students to remember information and enhance their creativity and critical thinking skills should be encouraged by administrators and teachers in an effort for an effective learning and teaching process.

3. A similar study may be conducted on a larger group of respondents to determine if the findings will be the same.

Acknowledgements

The researchers would like to take this golden opportunity to express their gratitude and sincere appreciation to those who contributed to the completion of the study:

First and foremost, the **Almighty God** for strength, wisdom, knowledge, patience, hope, and guidance. He constantly bestows the researchers;

Laguna University, for the quality education and dedicated educators who helped the researchers developed their knowledge in thesis writing;

Ms. Rose Nannette J. San Juan, Research Coordinator, for being beacon of knowledge, and for suggestions to improve their study.

Ms. Arlene L. Sandoval, their thesis adviser, for teaching and guiding the researchers;

Mr. Jan Michael Santiago, their statistician and for his advice to finish the study;

Bubukal Elementary School, for the permission granted to gather information and the kind accommodation during the conduction of the study;

Grade 6- JP Rizal and Grade 6- A. Bonifacio, selected participants from Bubukal Elementary school, for actively participating during the conduction of the study;

Their **Families**, for guiding, inspiring and unwavering support to persevere in the accomplishment of their study.

To all who contributed to make the study possible, the researchers' deepest gratitude.

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