

Memory Retention and Math Performance of Grade 6 Learners in Guimba, Nueva Ecija

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ABSTRACT

The study determined the memory retention and mathematics performance of grade 6 learners in Guimba, Nueva Ecija, during the school year 2022-2023. Data were collected from 105 randomly selected Grade 6 learners from 12 elementary schools using survey questionnaires, and descriptive and inferential statistics were used to analyze the data. Most learner-respondents were 11-year-old females whose parents were primarily high school graduates with blue-collar jobs with an average monthly income of Php 11,612.40.

Concerning memory retention, different activities in motivation practices and experiences contribute significantly to the learners' memory retention, thus contributing to their mathematics performance. Similar to goal setting and accomplishments, different activities in goal setting and achievements contribute very much to the learners' memory retention. Thus, it helps the learners' performance in mathematics.

On the other hand, findings revealed that different activities in personalized learning contributed significantly to the learners' memory retention, affecting their mathematics performance. However, the teaching strategies and learning strategies that their teachers utilized were effective and contributed to the retention factors of the learners. Educational resources and learning devices have recently been widely integrated into daily life, facilitating access to vast information.

The respondents' mathematics performance was based on their grades in the "Project All Numerates" program. Memory retention, such as motivational practices and experiences, goal setting and accomplishments, personalized learning, teaching strategies and learning activities, and educational resources and learning devices, was manifested by most respondents, who were categorized as nearly

numerates. Only the mother's occupation was significantly related to the respondents' mathematics performance. At the same time, all memory retention had a solid positive correlation with the respondents' mathematics performance. This implies that the higher the students' perceptions (based on their participation/experiences) of the mentioned factors, the better their academic performance in mathematics.

Keywords: academic performance, accomplishments, educational resources, experiences, goal setting, memory retention factors; learning activities, learning devices, motivational practices, personalized learning; teaching strategies ;

INTRODUCTION

The quality of Mathematics education in other countries has been determined through international assessment. The result of such evaluation has an impact on the national economy, as documented in the World Economic Forum (WEF) with the Global Competitiveness Index (GCI) (Nababan, 2019). Two leading large-scale international student assessments help each nation evaluate its educational systems against other economies (Sellar et al., 2017). The Program Results for International Students Assessment (PISA) assesses students' preparedness for employment in future years. At the same time, the Trends International Mathematics and Science Survey (TIMSS) is a retrospective assessment of whether learners have mastered what is taught. The PISA in 2018 and TIMSS in 2019 placed Filipino learners in disadvantaged positions. Filipino students ranked 77 out of 78 participating countries in PISA (OECD, 2021) and 58 out of 58 participating countries in TIMSS (Mullis et al., 2020). These reflect the position of Filipino learners regarding the level of mathematics literacy in the international context.

Looking back on previous international students' assessments, the Philippines was already prompted by the alarming situation that Filipino learners performed poorly in mathematics compared to other countries (Balagtas et al., 2019). Consequently, Filipino educators were on quests to find ways to resolve the problems of mathematics achievement. Thus, the government instituted initiatives such as changing the curriculum to K-12 curriculums, offering scholarships to mathematics educators, and giving additional incentives through salary leveling of science and mathematics teachers. Educators were also in a

quest to find better ways of delivering a lecture, improving the teaching-learning process, designing instructional materials, and aligning the learning contents with the international assessment.

All these initiatives hope to improve Filipino achievement in Mathematics. However, despite these efforts, the latest results of PISA 2018 and TIMSS 2019 revealed that mathematics performance problems still need to be solved. If learners can improve their learning retention, their mastery of the topics could be improved. Consequently, mathematics performance could be increased (Madu, 2018). Thus, problems in mathematics performance could be resolved.

Retention is the ability to retain information in mind. Preserving the aftereffects of experience and learning makes recall or recognition possible (Ahlam & Gaber, 2014). In education, learning retention plays a vital role for a learner to successfully learn the concepts taught inside or outside the classroom. Selecting a teaching methodology that can provide results in memory retention on the part of the students can be challenging for mentors. (Roya et al., 2014). Retention is the cognitive information processing of the learner, which involves understanding, information processing, and storing within memory (Lutz & Huitt, 2018). The learners internalize what they have retained. On the other hand, sharing knowledge with the students requires a conceptual understanding and using what they have learned (Paul & Elder, 2020).

Computational subjects are perceived as the most problematic among students, particularly those not inclined to study them (Kimberly P. et al. (2010). The subject's nature involves conceptual and procedural knowledge (Rittle-Johnson & Schneider, 2015).

As most learners experience, the time interval is vital in helping them forget what they know, especially when they do not frequently encounter the idea, process, place, or person.

METHODOLOGY

The descriptive-correlational research design was employed in this study. Data were collected from 105 grade 6 learners selected randomly from 12 schools in Guimba District, a division of Nueva Ecija, during the school year 2022-2023 using the questionnaires developed by the researcher. Descriptive statistics such as percentage, frequency counts, standard deviation, and mean were used to describe the learners' socio-demographic characteristics, memory retention factors, and math performance. Inferential statistics were also used to conclude the relationship between the respondents' socio-demographic

characteristics, memory retention factors, and mathematics performance.

RESULTS AND DISCUSSION

Socio-Demographic Characteristics of the Respondents

More than half (50.50%) of the respondents were 11-year-old females whose parents were primarily high school graduates with blue-collar jobs. The average monthly income of the respondents' parents was Php 11,612.40, with a standard deviation of Php 9,476.99.

Table 1. Socio-Demographic Characteristics of the Respondents

Statement	Frequency	Percentage
Age		
9	18	17.10
10	33	31.40
11	53	50.50
12	1	1.00
	Mean = 10.35	
	SD = 0.77	
Sex		
Male	52	49.50
Female	53	50.50
Parents Educational Attainment		
Father		
Elementary		
High School	12	11.40
College	63	60.00
Mother	30	28.60
Elementary	16	15.20
High School	53	50.50
College	36	34.30
Parents Occupation		
Father		
Blue – Collar Job	85	81.00
White - Collar Job	20	19.00
Mother		
Blue – Collar Job	82	78.10
White - Collar Job	23	21.90

Monthly Family Income		
42,001 – 55,000	3	2.90
29,001 – 42,000	5	4.80
16,001 – 29,000	7	6.70
3,000 – 16,000	90	85.60
	Mean =	
11,612.40	SD = 9,476.99	

Memory Retention of the Respondents

Tables 2, 3, 4, and 6 present the extent of learners' memory retention. As depicted in the table, the student's memory retention had an overall mean of 3.36, described as a "strongly agree." The result means that the learners knew that memory retention helped improve their mathematics performance immensely.

Motivational Practices and Experiences

The extent of learners' perception of motivational practices and experiences is presented in Table 2. As depicted in the table, the extent of learners' perception of motivational practices and experiences was described as "strongly agree" with the pooled mean of 3.30. The result means that different activities in motivation practices and experiences contributed very much to the memory retention of the learners and thus contributed to the mathematics performance of the learners.

Table 2. Motivational Practices and Experiences

Statement	Mean	Description
Motivational Practices and Experiences		
I demonstrate awareness of the lesson objectives.	3.39	Strongly Agree
I enjoy the teaching strategies employed by the teacher.	3.60	Strongly Agree
I engage myself in class discussions and motivational strategies.	3.20	Agree
I solve assigned tasks like word problems.	3.40	Strongly Agree
I communicate with my peers in collaborative group activities.	3.59	Strongly Agree
I listened to my classmates and the experiences they shared.	3.22	Agree
I connect presented concepts to real-life settings.	3.26	Strongly Agree

I answer given tests and accomplish my assignments. 3.26 Strongly Agree

Pooled Mean 3.30 Strongly Agree

Legend:

3.25 – 4.00	Strongly Agree
2.50 – 3.24	Agree
1.75 – 2.49	Disagree
1.00 – 1.74	Strongly Disagree

Goal Setting and Accomplishment

Table 3 shows the extent of learners' perceptions of goal setting and accomplishment, which is considered another factor of memory retention. This area had a pooled mean of 3.34, described as "strongly agree." The result implies that different goal-setting activities and accomplishments contributed significantly to the learners' memory retention. Thus, they contributed to the learners' performance in mathematics.

The statement, "I participate in the activities needed in goal accomplishment," obtained the highest mean of 3.53, described as "strongly agree." It was followed by "I take part in setting the learning goals and objectives," with a mean of 3.49, also described as "strongly agree." On the other hand, the statement, "Seeing the connection between the goals and its implications," got the lowest mean of 3.11, described as "agree."

Table 3. Goal Setting and Accomplishment

Statement	Mean	Description
Goal Setting and Accomplishment		
I take part in setting the learning goals and objectives.	3.49	Strongly Agree
I utilize strategies and techniques to accomplish the objectives.	3.13	Agree
I participate in the activities needed to accomplish the goal.	3.53	Strongly Agree
I review and reflect on the processes for goal achievement.	3.34	Strongly Agree
I monitor the progress I attain in the given lesson.	3.41	Strongly Agree

I demonstrate awareness of the things I must achieve and develop.	3.50	Strongly Agree
I established enhancement activities that paved the way for goal manifestation.	3.35	Strongly Disagree
I see the connection between the goals and its implications.	3.11	Agree
I employ the values I develop in my practices.	3.27	Strongly Agree
I use self-evaluation to know that set goals have been accomplished.	3.23	Agree
Pooled Mean	3.34	Strongly Agree

Legend:

3.25 – 4.00	Strongly Agree
2.50 – 3.24	Agree
1.75 – 2.49	Disagree
1.00 – 1.74	Strongly Disagree

Personalized Learning

As indicated in Table 4, the extent of students' perceptions of personalized learning obtained the pooled mean of 3.38, which is described as "strongly agree." Findings revealed that different activities in personalized learning contributed very much to the learners' memory retention, thus contributing to their mathematics performance.

The statement, "I am responsible and in control of my learning," obtained the highest mean of 3.56, described as "strongly agree." It was followed by "I use my techniques in solving a set of problems," which had a mean of 3.54 and was also described as "strongly agree." On the other hand, item 3, "I make choices depending on my strengths and weaknesses," got the lowest mean of 3.19, which is described as "agree."

Table 4. Personalized Learning

Statement	Mean	Description
Personalized Learning		
I am responsible and in control of my learning.	3.56	Strongly Agree
I demonstrate excitement when the lessons suit my interests.	3.33	Strongly Agree
I make choices depending on my strengths and weaknesses.	3.19	Agree

I work with activities that need to be individually accomplished.	3.43	Strongly Agree
I use my techniques to solve a set of problems.	3.54	Strongly Agree
I join activities that motivate me well.	3.44	Strongly Agree
I express my views and activities that address my needs.	3.34	Strongly Agree
I engage myself in exploration and discoveries.	3.29	Strongly Agree
I participate well in hands-on and motivational strategies.	3.23	Agree

Pooled Mean	3.38	Strongly Agree
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Legend:

3.25 – 4.00	Strongly Agree
2.50 – 3.24	Agree
1.75 – 2.49	Disagree
1.00 – 1.74	Strongly Disagree

Teaching Strategies and Learning Activities

The result showed that teaching strategies and learning activities resorted to a pooled mean of 3.37, described as “strongly agree.” This implies that their teachers' effective teaching and learning strategies contributed to the learners' retention factors.

The statement, “My teacher employs strategies that developed learners’ numeracy,” obtained the highest mean of 3.60, described as “strongly agree,” followed by “My teacher uses strategies that enhance learners’ achievement.” with a mean of 3.46, also described as “strongly agree.” On the other hand, the statement “My teacher relates the lesson in real-life situations and practices.” got the lowest mean of 3.17, described as “agree.”

Table 5. Teaching Strategies and Learning Activities

Statement	Mean	Description
Teaching Strategies and Learning Activities		
My teacher applies knowledge of content within and across curriculum teaching areas.	3.43	Strongly Agree
My teacher applies strategies that develop critical and creative thinking skills.	3.45	Strongly Agree

My teacher utilizes strategies that promote higher-order thinking abilities.	3.30	Strongly Agree
My teacher uses strategies that enhance learners' achievement.	3.46	Strongly Agree
My teacher employs strategies that develop learners' numeracy.	3.36	Strongly Agree
My teacher employs exciting activities that encourage me to participate in the classes.	3.29	Strongly Agree
My teacher assists and supports me to attain development and progress.	3.43	Strongly Agree
My teacher encourages me to ask questions and clarifications on the concepts presented.	3.24	Agree
My teacher allows me to collaborate with peers to help me learn better.	3.60	Strongly Agree
My teacher relates the lesson to real-life situations and practices.	3.17	Agree
Pooled Mean	3.37	Strongly Agree

Legend:

3.25 – 4.00	Strongly Agree
2.50 – 3.24	Agree
1.75 – 2.49	Disagree
1.00 – 1.74	Strongly Disagree

Educational Resources and Learning Devices

Findings revealed that educational resources and learning devices had a pooled mean of 3.41, described as "strongly agree." This means that educational resources have recently been widely integrated into daily life, where access to vast information is now readily available.

Among the indicators, the statement "The teacher uses ICT resources to present given mathematical concepts." obtained the highest mean of 3.54, described as "strongly agree," followed by "The teacher utilizes PowerPoint presentation in the delivery of the lesson." with the mean of 3.52 also described as "strongly agree." On the other hand, the statement "The teacher utilizes materials like learning workbooks" got the lowest mean of 3.25 and was described as agreeing. On the other hand, the statement "The teacher utilizes materials like learning workbooks" got the lowest mean of 3.25, which is described as "agree."

Table 6. Educational Resources and Learning Devices

Statement	Mean	Description
Educational Resources and Learning Devices		
The school has a library with accessible resources.	3.47	Strongly Agree
The school has laboratory equipment like computers.	3.30	Strongly Agree
The school has a mathematics subject center.	3.39	Strongly Agree
The teacher uses books for references.	3.47	Strongly Agree
The teacher utilizes materials like learning workbooks.	3.25	Strongly Agree
The teacher employs realia to integrate real-life concepts.	3.46	Strongly Agree
The teacher utilizes PowerPoint presentations in the delivery of the lesson.	3.52	Strongly Agree
The teacher uses videos to deepen the understanding of the concept.	3.38	Strongly Agree
The teacher utilizes educational television.	3.32	Strongly Agree
The teacher uses ICT resources to present given mathematical concepts.	3.54	Strongly Agree
Pooled Mean	3.41	Strongly Agree

Legend:

3.25 – 4.00	Strongly Agree
2.50 – 3.24	Agree
1.75 – 2.49	Disagree
1.00 – 1.74	Strongly Disagree

Mathematics Performance in Terms of Score in Project All Numerates

Table 7 shows the mathematics performance of the respondents in terms of their scores in the Project All Numerates.

As shown in Table 7, the majority (55.20%) of the respondents were categorized as “nearly numerates,” followed by 36.20 percent who were categorized as “numerates,” and the remaining, or 8.60 percent, were categorized as “non-numerates.”

The result implies that most of the respondents were approaching the proficient level, and an effective intervention program is needed so that those learners who fell under the nearly numerate and non-numerates categories will move towards the numerate category.

Table 7. Mathematics Performance in Terms of Score in Project All Numerates

Scores	Frequency	Percentage	Description
1 – 29	9	8.60	Non – Numerates
30 – 59	58	55.20	Nearly Numerates
60 – 100	38	36.20	Numerates
Mean = 57.03; SD = 15.10			

Relationship between Socio-Demographic Characteristics and Mathematics Performance of the Respondents

Table 8 shows the correlation between the respondents' socio-demographic characteristics and mathematics performance.

The correlation results show that only the mother's occupation ($r = 0.185$) was significantly related to the respondents' Mathematics performance. This means that the better the mothers' occupations were, the more likely they were to have a better income to provide more for their children's education.

Table 8. Relationship between Socio-Demographic Characteristics and Mathematics Performance of the Respondents

Socio-Demographic Characteristics	Mathematics Performance
	<i>r</i>
Age	0.059
Sex	0.011
Father's Educational Attainment	0.121
Mother's Educational Attainment	0.019
	0.128
Father's Occupation	0.185*
Mother's Occupation	0.033
Monthly Income	

*significant at 0.05 level (2-tailed)

Relationship Between Memory Retention of Learners and their Mathematics Performance

Table 9 shows the correlation between the factors influencing the memory retention and mathematics performance of grade 6 learners.

Table 9 shows that all memory retention, such as motivational practices and experiences ($r = 0.449$); goal setting and accomplishments ($r = 0.364$); personalized learning ($r = 0.384$); teaching strategies and

learning activities ($r = 0.375$); and educational resources and learning devices ($r = 0.369$) were highly significantly related to the respondents' Mathematics performance: Meaning, the higher the participation and experiences of the students on memory retention the better performance in mathematics.

Table 9. Relationship between the Memory Retention of Learners and their Mathematics Performance

Memory Retention	Mathematics Performance
	<i>r</i>
Motivational Practices and Experiences	0.449**
Goal Setting and Accomplishments	0.364**
Personalized Learning	0.384**
Teaching Strategies and Learning Activities	0.375**
Educational Resources and Learning Devices	0.369**

**significant at 0.01 level (2-tailed)

CONCLUSIONS

Concerning memory retention, different activities in motivation practices and experiences contribute significantly to the learners' memory retention, thus contributing to their mathematics performance. Similar to goal setting and accomplishments, different activities in goal setting and achievements contribute very much to the learners' memory retention. Thus, it helps the learners' performance in mathematics.

On the other hand, findings revealed that different activities in personalized learning contributed significantly to the learners' memory retention, affecting their mathematics performance. However, the teaching strategies and learning strategies that their teachers utilized were effective and contributed to the retention factors of the learners. Educational resources and learning devices have recently been widely integrated into daily life, facilitating access to vast information.

The respondents' mathematics performance was based on their grades in the “Project All Numerates” program. Memory retention, such as motivational practices and experiences, goal setting and accomplishments, personalized learning, teaching strategies and learning activities, and educational resources and learning devices, was manifested by most respondents, who were categorized as nearly numerates. Only the mother’s occupation was significantly related to the respondents' mathematics performance. At the same time, all memory retention had a solid positive correlation with the respondents’ mathematics performance.

RECOMMENDATIONS

Parents are advised to seek white-collar jobs to provide more resources for their children's education. Similarly, teachers are encouraged to increase the use of the identified memory retention activities. In addition, utilizing motivational practices and experiences, goal setting and accomplishments, personalized learning, teaching strategies, learning activities, and educational resources and learning devices may be strengthened in classroom instruction to increase memory retention. Moreover, the learners should strive to further the competencies tested in the Project All Numerates in order for them to increase the level of their proficiency and mastery. The study's findings can be incorporated into the teachers' professional activities in the school. Similar studies may be conducted on a more significant sample. Collecting qualitative data and examining more variables for a more comprehensive output is also advised.

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