Performance of Fourth Year High School Students of the Don Mariano Marcos Memorial State University South La Union Campus Laboratory High School through the Daily Relooping and Explicit Timing Strategy in Teaching

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Abstract—**Using pre-test posttest experimental design, the study focused on the Daily Relooping and Explicit Timing strategy to improve the academic performance of students of DMMMSU-SLUC-LHS students. Specifically, it looked into the profile of the 40 student-respondents, their performance in the pretest and posttest and in the different formative and summative tests and the significant differences in the performance of the two groups of students with reference to the different variables. The results in the posttest given showed that the experimental group performed better than the control group in terms of their academic performance. Significant relationships were found between the respondents' profiles; Attitude in Math, Multiple Intelligence and Third Grading Grades to their academic performance. These results were processed using SPSS software version 21. Based on the results, the researcher concluded that the daily relooping and explicit timing is an effective strategy in the teaching and learning of topics in Mathematics.**

Index Terms—Attitude towards math, Academic performance, Daily Relooping strategy, Explicit timing strategy, Mean Gain Scores, Multiple intelligence, Performance in mathematics,

1 Introduction

Mathematics is one of the major components of a holistic education of a person. It is present in all phases of life. It plays an important role from simple calculation, reasoning, abstraction and analysis to the more complex aspects of Science and Technology (Almario, 2002 cited in Albay 2009).

The teacher's teaching strategies need to be upgraded and continuously improved to suit the learning styles of the learners of this generation. This would help the learning experiences of the youth of today to be more gratifying and rewarding. That Mathematics instruction is evaluated as low, demand that there is no need for redirection in the content but in the process or methodology. Students have different levels of motivation, different attitudes about teaching and learning, and different responses to specific classroom environments and instructional practices. The more thoroughly instructors understand the differences, the better chance they have of meeting the diverse learning needs of all of their students (Felder 2005).

To address this considerations at hand, the researcher looked for new ways to improve classroom instructions. Interventions to facilitate the teaching learning practices would cater to the demand of needs of the 21st century learners. As such, the researcher ended up looking at two strategies in teaching which he combined as one.

Explicit timing is a procedure that alerts students to a time limit while they are completing an academic assignment. After students acquire a skill, the next step towards skill mastery is to improve fluency or rates of accurate responding. Independent seat work is often used to improve students' mathematics computation fluency. The explicit timing strategy aims to increase the number and speed of math word problems completed accurately by students. It is a procedure that alerts students to a time limit while they are completing an academic assignment. Researchers have shown that increasing students' rate of academic responding during independent seatwork can increase students' computation performance. Timing students is one way to increase rates of responding during independent seatwork.

Rhymer K. et.al (2002), in their study, The 1-minute explicit timing intervention: The influence of mathematics problem difficulty, concluded that explicit timing appears to have differential effects based on the complexity of the academic task. This intervention is effective in the classroom for basic skills review but not for more complex mathematics tasks.

Furthermore, explicit timing has been shown to be effective for African-American children and Caucasian children when comparing four 1-minute timing intervals to a four-minute timing interval without the explicit timing. Rhymer, Henington, Skinner, and Looby (1999) implemented the explicit timing procedure with African-American and Caucasian second-grade students.

Teachers can best promote students acquisition and fluency in a newly taught math skill by transitioning from massed to distributed practice. When students have just acquired a math skill but not yet fluent in its use, they need lots of opportunities to try out the skill under teacher supervision—a technique sometimes referred to as 'massed practice'. Once students have developed facility and independence with the new math skill, it is essential that they then be required periodically to use the skill in order to embed

and retain it—a strategy also known as 'distributed practice' or Daily Relooping. (Carnine, 1997).

As clearly seen in the foregoing studies, the daily relooping strategy and eplicit timing strategy has been validated as effective methods to facilitate students' learning and practice. However, no researchers have explored the combinative effects of these two methods.Furthermore, researches regarding the strategies especially on daily relooping were undertaken in the English subject and very few researches considered using it in the Mathematics subject. Furtheremore, daily relooping will be a good supplement to ensure the success of explicit timing since mastery should be acquired first to ensure speed and accuracy. The reason why the researcher delve into the combining the two strategies as one to see if it will have a positive effect on students learning in Mathematics.

Furthermore, as the K-12 curriculum is almost in its full bloom, and the researcher believes that the two strategies taken as one will be beneficial to teachers since Learning modules are already available for teachers to use. Different activities in the module could be relooped to the students and explicitly timed.

This study will determine whether the Daily Relooping and Explicit Timing strategy will enhance the performance of the fourth year high school students in Advanced Algebra of Don Mariano Marcos Memorial State University – South La Union Campus school year 2014-2015.

Specifically, it seeks to answer the following questions:

1. What is the profile of the respondents as to:
   a) attitude towards Math;
   b) multiple intelligence; and
   c) second grading grade in mathematics IV?
2. What is the performance of the respondents in the control group and experimental group considering their scores in the pretest and posttest?
3. What is the performance of the respondents on the different formative and summative tests?
4. Is there a significant difference between the means of the scores of the control and experimental group as to their:
   a) Third Grading Grades in Mathematics IV;
   b) Pretest Scores;
   c) Posttest Scores;
   d) Pretest- Posttest Scores; and
   e) Mean Gain Scores.

5. Is there a significant relationship between the personal profile of the respondent and their performance in Mathematics IV

Null Hypotheses:

The study will test the following null hypotheses:

1. There is no significant difference between the means of the scores of the control and experimental group as to their third grading grade in Mathematics IV.
2. There is no significant difference between the means of the scores of the control and experimental group as to their Pretest Scores.
3. There is no significant difference between the means of the scores of the control and experimental group as to their Posttest Scores.
4. There is no significant difference between the means of the scores of the control and experimental group as to their Pretest- Posttest Scores.
5. There is no significant difference between the means of the scores of the control and experimental group as to their Mean Gain Scores.
6. There is no significant relationship between the personal profile of the respondents and their performance in Mathematics IV.

2METHODOLOGY

2.1 RESEARCH DESIGN

This research study utilized the pretest-posttest experimental design. Two groups of respondents served as experimental and control groups. The experimental group was subjected to the daily relooping and explicit timing strategy in teaching Mathematics, while the control group underwent the traditional classroom strategy.

To provide this study with sufficient and necessary data, the researcher used the following tools in gathering data: Students Form 1; a questionnaire to obtain the profile of the respondents which also contained a validated 30 items to assess and identify the personal feelings and attitude of the student-respondents towards Mathematics; aprint out copy of the Birmmingham Questionnaire online and a pretest post test exam subjected to validity and reliability tests.

2.2 DATA ANALYSIS

Statistical tools were employed by the researcher to test the research hypotheses. Data management was employed from data editing, tabulation, frequency counts, percentages. Means were determined for easy interpretation and analysis of the raw data from the field.

The computation and transmutation for the academic performance (final grade) of the two groups of respondents were in accordance to the Grading System of DMMMSU SLUC – LHS as stated in the Student Handbook.

The paired sample t-test in the Statistical Package for Social Sciences (SPSS) software version 21 was used to identify the degree of difference between the respondents' Mathematics performances levels and to test if there is a significant difference between the pretest and posttest scores of the two groups, between the means of their posttest scores, and between the performance of the two groups in the formative tests and their performance.

The Pearson Correlation Coefficients on the Statistical Package for Social Sciences (SPSS) software version 21 was also used to determine if there is a significant relationship between the multiple intelligence and performance level in Mathematics IV of the respondents and between their attitude towards Mathematics and student-respondents performance level and to test if there is a significant difference between the pre-instruction and post-instruction responses of the experimental group

3 RESULTS AND DISCUSSION

3.1 FINDINGS:

Table 1. Attitude Towards Mathematics

Group	Rating	Verbal Description
Experimental Group	4.03	Favorable
Control Group	4.15	Favorable

Table 1 shows the attitude of the experimental group towards Mathematics. The table shows that the respondents in the experimental group showed a favorable attitude towards Mathematics as shown in the mean of 4.03. This explains that, while they may not have a very favorable attitude which is the highest criteria, they still have positive feeling towards learning it. The table also shows the attitude of the control group towards Mathematics. The computed general mean of 4.15 shows that the control group displayed a favorable attitude to Mathematics, which is the same as the attitude of those in the experimental group. This implies that the control group viewed the learning of Mathematics more positively than those in the experimental group.

Table 2.Multiple Intelligence

Logic-Math Intelligence	% based on the Birmingham Grid for Learning Multiple Intelligence
Experimental Group	86
Control Group	86.6

Table 2 shows the Logic-Math Intelligence of the respondents. The Logic-Math Intelligence of the control and experimental group showed only a difference of 0.6 percent, the control group having the slim edge over the experimental group. The slight difference between the ratings of the two groups means that they were paired equally in terms of the math logic. The very slim difference between the two groups affirms the equality in terms of the math logic of the respondents that serves the purpose of the study.

Table 3. Respondents' Profile as to Second Grading Grade in Mathematics IV

	Experimental Group		Control Group	
Grade	f	%	f	%
90 and above	3	15	5	25
85-89	8	40	7	35
80-84	6	30	5	25
75-79	3	15	3	15
Total	20	100	20	100

The respondents' grades during the second grading period were computed using the DMMMSU-SLUC LHS Grading System. The criteria for marking consisted of the following: Class Standing (75%) subdivided into Quizzes (40%), Recitation (10%), Seatworks (10%), Project (75%) and Assignment (5%) and the Periodical Test (25%).

Table 3 shows the respondents' profile as to second grading grade in Mathematics IV – Advanced Algebra. As seen in the table, majority of the respondents in the experimental group or 40 percent have grades which range from 85-89 percent. Out of the 20 respondents, only 3 posted a grade ranging from 90-94 percent and 3 posted a grade ranging from 75-79 percent.

Since a grade below 80 percent at DMMMSU-SLUC LHS are considered as low performers, it can be inferred from the data that 3 of the 20 respondents in the experimental group belonged to this category, while 3 were the highest performers. Generally, the experimental group are high performers.

On the other hand, three (3) of the respondents in the control group had grades from 75-79 percent. Five (5 or 25%) of the respondents posted a grade between 80-84 percent and 90 and above. Majority (7) respondents or 35% obtained a grade between 85 and above. This data further support the researcher's claim that the two groups were without any bias. This implies that as to grade in Mathematics IV, both groups share the description of being high performers.

Table 4. Respondents' Performance in the Pretest and Posttest

Group Pair	Mean of the Pre-Test	Mean of the Postest
Experimental Group	12.8	28.5
Control Group	13.7	25.75

As shown in Table 4, both the experimental and control groups had a very low average during the pretest. The control group only posted a mean of 13.5 which was slightly higher than the experimental group with 12.8. These results is due to the lack of knowledge of the two groups on the topics on Logarithmic Functions and Complex Numbers since it was administered before the lessons for the third grading period of SY 2014-2015. On the other hand a great improvement was shown by the respondents as they doubled their average during the posttest.

The control group registered an average of 25.75 while the experimental group had 28.5. This is so because the posttest was given after the duration of the study or after all the topics in Logarithmic Functions and Complex Numbers were taken. However, it is noteworthy that the experimental group is higher during the posttest even if the group posted a lesser average during the pretest. The daily relooping and explicit timing strategy may have contributed to this result.

Table 5. Performance of the Respondents on the Different Summative and Formative Tests On Respondents' Performance in Mathematics IV

Group Pair	Mean of the Different Summative and Formative Tests
Experimental Group	88.4
Control Group	83.8

As shown in the Table 5 the experimental group which was exposed to the daily relooping and explicit timing strategy performed better in the different formative and summative tests with a general mean of 88.4 while the control group only had 83.8 mean. This signifies that the daily relooping and explicit timing strategy enhanced the performance of the students in the experimental group.

Table 6. Comparative Formative Activities (Quiz, Seatwork and Assignment) Performance in Mathematics IV of the Experimental Group and the Control Group Difference between the Third Grading Grades, Pretest Scores, Posttest Scores and Pretest-Posttest scores of the Respondents

Grade	Experimental Group		Control Group	
	f	%	f	%
90 and above	7	35	5	25
85-89	8	40	6	30
80-84	4	20	6	30
75-79	1	5	3	15
Total	20	100	20	100

Table 6 indicates the performances of the two groups of respondents during the third grading period. The table further shows the computed grades based on the results of their performance in the formative tests.

The table reveals that there are more respondents in the experimental group who performed better in the formative activities than in the control group. The experimental group edged with two respondents more than in the control group who got 85-89 scale and 90 and above rating. Furthermore, while there is a respondent (1) in the experimental group who got a grade below 80 percent, three (3) students in the control group were categorized as having this rating.

These figures show an improvement in the level of performance of the experimental group. The daily relooping and explicit timing strategy may have contributed to the higher level of performance of respondents' understanding and mastery the indicated topics in Mathematics IV.

Table 7. Test of Significant Difference between the Third Grading Grades Pretest Scores, Posttest Scores and Pretest-Posttest scores of the Respondents

Group Pair	Mean Difference	T-value	Significance (2 tailed)
Third Grading Grades (Control and Experimental)			
Pretest Scores (Control and Experimental)	0.35	1.68	0.11
Posttest Scores (Control and Experimental)	-2.75	-4.9	0.000*
Posttest Scores (Control and Experimental)	-15.7	-36.53	0.000*
Pretest-Posttest Scores (Control and Experimental)	-12.6	-16.53	0.000*
Mean Gain Scores(Control and Experimental)	-3.1	-5.04	0.000*

Legend: *significant at tt (0.05, 24df)

Table 7 reveals that the Third grading grades of the experimental and control groups posted a significance lesser than 0.05, thus, the null hypothesis which states that there is no significant difference between the third grading grades of the experimental and control groups is rejected. This result may be attributed to the exposure of the two groups in different strategies with the experimental group posting higher grades in their grade as seen in the mean difference of -4.600.

The pretest scores of the experimental group as contrasted to that of the control groups which was higher by 0.05 and therefore the null hypothesis which states that there is no significant difference between the pretest scores of the experimental and control groups is accepted. This means that the control and experimental groups were of the same level in terms of their knowledge about the topics on logarithmic functions and complex numbers and affirms that respondents were paired equally for to the purpose of the study.

Meanwhile, the posttest scores of the experimental and control groups posted a significance of 0.000 which was lower than 0.05. This means that there is a significant difference between the posttest scores of the experimental and control groups. This indicates that the experimental group got a higher performance during the posttest.. This means that the daily relooping and explicit timing strategy helped the respondents understand better the topics in Mathematics IV – Advanced Algebra Topics.

Finally, the pretest-posttest scores of both the experimental and control groups posted 0.000 level of significance which was lower than 0.05. This indicates a rejection of the null hypotheses which states that there is no significant difference between the pretest-posttest scores of the experimental group and there is no significant difference between the pretest-posttest scores of the control group. This indicates the remarkable increase of the respondents' scores and achievement in the posttest as compared to their scores in the pretest. The scores of both groups in the posttest are far higher than their

scores on the pretest. It implies, then, that both groups had significantly improved in their level of performance of the topics after discussing the topics of Mathematics IV.

However, the computed mean score of the experimental group is higher than that of the control group. It can be inferred that the posttest scores of the experimental group show higher improvement as compared to the posttest scores of the control group. This result is a manifestation that the daily relooping and explicit timing strategy employed to the experimental group had contributed to the performance of the students in Mathematics IV – Advanced Algebra Topics. This could also be verified by the mean gain scores of the respondents which posted a mean difference of -3.1 with a significance level of 0.000. This rejects the null hypothesis that there is no significant difference between the mean of the scores of the respondents as to their mean gain score. Although both group increased their performances as can be seen by the small difference in their mean gain, one group performed better than the other. And since the t-value and mean difference posted a negative relationship, the experimental group performed better than the control group.

Table 8. Test of Relationship between Respondents' Profile and their Performance In Mathematics IV

Personal Profile	r-value	Conclusion	Decision on Ho
Attitude in Math	0.918**	Very Significant	Reject
Multiple Intelligence	0.966**	Very Significant	Reject
Second Grading Garde in Math IV	0.850**	Very Significant	Reject

**. Correlation is significant at the 0.01 level (2-tailed).

The finding in this study that attitude towards Math is a determinant to performance in Mathematics supports the claim of the paper of Tahar et.al. (2010) entitled Students' Attitude Toward Mathematics: The Use of Factor Analysis in Determining the Criteria that students' success in mathematics depends upon attitude towards mathematics.

Meanwhile the r-value on the Multiple Intelligence (Logical-Mathematical) and performance in Mathematics IV which is .966 shows that there is a significant relationship between the two. This showsthat the Logical-Mathematical Intelligence of the students greatly affected their performance in Mathematics IV. This supports the claim of Douglas (2008) in the paper "The Effects of the Multiple Intelligence Teaching Strategy on the Academic Achievement of Eighth Grade Math Students" which he noted that "the participants who have low academic achievement level have lower logical-mathematical ability than the students who have high academic achievement level".

Finally, the computed r-value for the relationship of their second grading grade showed high significance. This means that learners who have high grades in their previous math subjects likewise have high grades in their future math subjects. On the other hand, learners with low grades, most likely, have low grades.

The correlation coefficients of the pairs of variables above were very significant. Thus, the null hypothesis which states that there is no significant relationship between the respondents' second grading grade in Mathematics IV was rejected. This implies that the grade is directly related to the performance of the respondents. This means that a relatively high grade point average will most likely yield to a high mathematics performance, and vice versa.

This affirms the findings of Doctolero (2001) when she found out that previous Mathematics grades are strong indicators of the performance of learners in their future Mathematics subjects. Picar (2005) and de Castro (2005) and Albay (2009) also supported this finding in their studies. They concluded that previous Mathematics grades of learners are significantly related to their academic performance.

3.2 CONCLUSION:

On the basis of the results of the study, it is concluded that the use of the daily relooping and explicit timing strategy to enhance the performance of students in Advanced Algebra is effective.

3.3 RECOMMENDATIONS:

1. Teachers should take into account factors as attitudes of students towards the subject and multiple intelligences which may contribute to better performance in the subject. Should this be done, students will enhance not only their grade in the subject but also their GPA.

2. Teachers should practice giving pretest and posttest to their students so that the pretest may help them gauge their students' capacity and that the posttest may give them confirmation if the students really understood the topics they teach.

3. The use of daily relooping and explicit timing strategy in the teaching-learning process may or can be employed to improve learner's understanding and performance. Thus, teachers should consider seminars and workshops on teaching techniques to familiarize and develop the innovativeness of teachers in their teaching structures and techniques. Administrators, on the other hand, should be supportive of their teachers and display initiative in organizing or in sending teachers to in-service trainings and educational programs. This is to update them with the latest trends in education and to enhance their teaching competencies.

4. The daily relooping and explicit timing strategy can be adopted by teachers as one of their strategies in teaching Mathematics and could be used in other math classes to strengthen its reliability as a good strategy. This may also be a useful strategy in the K-12 curriculum since teacher already have materials they could reloop to the class and explicitly timed.

5. The higher performance of the experimental group accounts for the strategy employed in the Mathematics class. If teachers want their students to improve their performances, students should be exposed to this strategy continuously until both teachers and students get used to the practices entailed. This also increases students' motivation to achieve better

grades and teachers' courage to try out new practices in the Math classroom.

6. Other variables may be used to relate the role of the Daily Relooping and Explicit Timing Strategy in math performance. This will encourage future researchers to conduct studies parallel to this study.

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