

Vedic Mathematics Techniques (VMT) Towards Students' Involvement and Performance in Mathematics

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Abstract—This study determined the effects of Vedic Mathematics Techniques (VMTs) on the students' involvement and performance in Mathematics. Specifically, it sought to identify the levels of VMTs in terms of mental computation, pattern recognition, and sutras/simplified problem-solving; students' involvement in mathematics in terms of participation, engagement, and active problem solving; their performance in mathematics covering performance task, examinations, and grades; the significant relationship between the implementation of VMTs and students' involvement; and the significant effect of the implementation of VMTs and students' performance. It used a descriptive, predictive-correlational research design involving 70 Grade 7 students from Mary Help of Christians College-Salesians Sisters, Inc., selected through purposive sampling. The findings revealed a very high level of proficiency in Vedic Mathematics Techniques, including mental computation, pattern recognition, and the use of sutras (simplified problem-solving methods). The students' involvement in Mathematics was also very high in terms of participation, engagement, and active problem-solving. Their performance in Mathematics was very satisfactory across performance tasks, examinations, and overall grades. Moreover, no significant relationship between VMTs and students' involvement in Mathematics, nor any significant effect on students' performance in Mathematics, was found, leading to the acceptance of the null hypotheses. It may therefore be concluded that while Vedic Mathematics Techniques may serve as an alternative and engaging approach to learning Mathematics, students' performance may still depend on other contributing factors, such as study habits, prior knowledge, instructional methods, and assessment practices. Finally, it is recommended that teachers utilize the Vedic Mathematics Techniques with proper training and support to effectively deliver Mathematics instruction.

Keywords— Vedic Mathematics Techniques, Students' Involvement, Students' Performance.

I. INTRODUCTION

Vedic Mathematics Techniques (VMT) have become popular as a new educational approach that offers simplified and cognitively efficient methods for number calculations. Drawing on ideas from ancient Indian mathematics, VMT uses sutras and sub-sutras to guide students in performing operations in arithmetic and algebra with flexible and structured thinking (Gupta, 2020). VMT has been shown to improve speed, accuracy, and innovative problem solving by training students to recognize numerical patterns and connections (Sharma & Devi, 2018). Educators and researchers have explored it as a supplementary method to traditional math instruction, especially for enhancing mental

agility and computational fluency (Rashid & Prakash, 2022). With the increasing focus on innovative, learner-centered teaching methods in educational institutions, VMT presents an exciting option for teaching mathematics (Saxena, 2024).

Students' involvement is a crucial dimension of effective mathematics instruction. It refers to the degree of learners' active participation, motivation, attention, and engagement during classroom activities. Educational research describes involvement as encompassing behavioral engagement (participation in tasks), emotional engagement (interest and enthusiasm), and cognitive engagement (investment in understanding concepts) (Lopez & Chua, 2020). When students are actively involved, they demonstrate persistence in solving problems, willingness to collaborate, and openness to exploring multiple solution strategies.

On the other hand, student performance is the students' capacity to use mathematical ideas and skills in classroom activities, problem-solving assignments, and formal assessments. It evaluates the accuracy, efficiency, and consistency of students' performance in mathematical operations and reasoning processes (Ahmed, 2019). Performance is affected by the clarity of instruction, the use of strategies, and the opportunities to practice and receive feedback. Research that techniques that promote mental processing and conceptual understanding can improve students' performance in tasks and procedural fluency (Kaur & Mehta, 2021).

Thus, performance offers concrete evidence of the extent to which students translate teaching into observable results in mathematics. Alternative instructional techniques, such as VMT, may influence both involvement and performance by fostering active engagement and efficient problem-solving (Gupta, 2020; Rashid & Prakash, 2022). By integrating structured yet flexible computational techniques, VMT may encourage learners to participate more confidently and enhance their ability to perform mathematical tasks accurately. As efforts to enhance students' learning involvement and performance in mathematics continue, it is worth exploring innovations in education that deepen understanding of complex issues and support active thinking. Inclusion of additional techniques such as Vedic Mathematics may provide a route for learners to connect more profoundly with mathematical information and cope with common challenges linked with anxiety, indifference and cognitive overload. With

the above aspects in mind, the present study is entitled as “Vedic Mathematics Techniques (VMT) Towards Students’ Involvement and Performance”.

1.1 Statement of the Problem

Problem/s which were addressed by the research

This study aimed to determine the effects of Vedic Mathematics Techniques (VMT) on the involvement and performance of Junior High School students.

Specifically, it sought to answer the following questions:

1. What is the level of use of Vedic Mathematics Techniques in terms of:
 - 1.1 mental computation?
 - 1.2 pattern recognition? and
 - 1.3 sutras/simplified problem-solving?
2. What is the level of students’ involvement in mathematics in terms of:
 - 2.1 participation?
 - 2.2 engagement? and
 - 2.3 active problem solving?
3. What is the level of students’ performance in mathematics in terms of:
 - 3.1 performance task?
 - 3.2 exam? and
 - 3.3 grades?
4. Is there a significant relationship between the use of Vedic Mathematics Techniques and Students’ Involvement?
5. Is there a significant effect between the use of Vedic Mathematics Techniques and Students’ Performance?

II. METHODOLOGY

The study used a descriptive, predictive-correlational research design involving 70 Grade 7 students from Mary Help of Christians College-Salesians Sisters, Inc., selected through purposive sampling.

III. RESULTS AND DISCUSSION

This chapter presents, analyzes, and interprets the data gathered.

Level of use of Vedic Mathematics

In this study, it refers to a system of mental calculation techniques derived from ancient Indian texts, emphasizing efficiency, pattern recognition, and simplification (Rashid & Prakash, 2022). It refers to the teaching and use of Vedic Mathematics Techniques in selected Junior High School mathematics classes to enhance students’ involvement and performance.

The level of use of Vedic Mathematics in mental computation, pattern recognition, and sutras/simplified problem-solving was analyzed statistically using mean and standard deviation.

Table 1 presents the level of use of Vedic Mathematics for mental computation, including several indicators with their corresponding means, standard deviations, and remarks.

The results revealed that Vedic Mathematics is highly effective in enhancing students’ mental computation skills. Teachers strengthen students’ recall of Vedic Mathematics

formulas during timed exercises, facilitate their application in performing calculations, and develop students’ ability to analyze numbers and patterns. They also enhance students’ evaluation of the accuracy of their answers and encourage them to create new ways of calculating using Vedic Mathematics principles. The weighted mean of 4.66 with an SD of 0.52 indicates a very high level of implementation of Vedic Mathematics in terms of mental computation, reflecting its effectiveness in improving students’ computational abilities.

Table 1. Level of Use of Vedic Mathematics in Terms of Mental Computation

Statements	MEAN	SD	REMARKS
My teacher...			
...strengthens our recall of Vedic Mathematics formulas during timed exercises	4.64	0.51	Strongly Agree
...facilitates our application of Vedic Mathematics in performing calculations.	4.51	0.54	Strongly Agree
...develops our analysis of numbers and patterns to find answers.	4.60	0.55	Strongly Agree
...enhances our evaluation of the accuracy of our answers.	4.66	0.54	Strongly Agree
...encourages us to create new ways to calculate using Vedic Mathematics principles.	4.74	0.44	Strongly Agree
Weighted Mean	4.66		
SD	0.52		
Verbal Interpretation	Very High		

In summary, this implies that the use of Vedic Mathematics significantly improves students’ mental computation skills. The consistently high ratings across all indicators suggest that this approach enhances students’ speed, accuracy, and flexibility in solving mathematical problems, while also encouraging critical and creative thinking in mathematics.

Table 2. Level of Use of Vedic Mathematics in Terms of Pattern Recognition

Statements	MEAN	SD	REMARKS
My teacher...			
...facilitates the process in noticing number patterns.	4.57	0.55	Strongly Agree
...illustrates place-value patterns.	4.63	0.54	Strongly Agree
...demonstrates number decomposition to us.	4.53	0.58	Strongly Agree
...shows us symmetry or cancellations in numbers.	4.59	0.58	Strongly Agree
...prompts us to recognize patterns before procedures.	4.71	0.49	Strongly Agree
Weighted Mean	4.61		
SD	0.55		
Verbal Interpretation	Very High		

Table 2 shows the level of use of Vedic Mathematics in terms of pattern recognition, including several indicators with their corresponding mean, standard deviation, and remarks.

The weighted mean of 4.61 with an SD of 0.55 indicates a very high level of implementation of Vedic Mathematics in terms of pattern recognition.

In summary, the findings clearly stated that the teacher facilitates lessons using Vedic Mathematics, particularly in pattern recognition.

Table 3. Level of Use of Vedic Mathematics in Terms of Sutras/Simplified Problem-Solving

Statements	MEAN	SD	REMARKS
My teacher...			
...teaches the Vedic Mathematics Technique explicitly.	4.73	0.48	Strongly
...encourages us to apply the Vedic Mathematics Technique for faster multiplication.	4.73	0.51	Strongly Agree
...models the use of the Vedic Mathematics Technique to factor or expand algebraic expressions quickly.	4.64	0.54	Strongly Agree
...clarifies the time and reason the Vedic Mathematics Technique is appropriate for a problem.	4.73	0.51	Strongly Agree
...reduces multi-step procedures for us using the Vedic Mathematics Technique.	4.86	0.35	Strongly Agree
Weighted Mean	4.74		
SD	0.48		
Verbal Interpretation	Very High		

Table 3 shows the level of use of Vedic Mathematics in terms of Sutras/Simplified Problem-Solving, including several indicators with their corresponding mean, standard deviation, and remarks. The weighted mean of 4.74 with an SD of 0.48 indicates a very high level of implementation of Vedic Mathematics, particularly in Sutras/Simplified Problem-Solving.

Students' Involvement

The level of students' involvement in terms of participation, engagement and active problem solving was treated statistically using mean and standard deviation.

Table 4. Level of Students' Involvement in Terms of Participation

Statements	MEAN	SD	REMARKS
Through the Vedic Mathematics Techniques, I...			
...complete in-class tasks on time.	4.73	0.48	Strongly Agree
...follow Vedic Mathematics Technique demonstrated during lessons.	4.70	0.49	Strongly Agree
...share Vedic Mathematics approaches during class discussions.	4.63	0.54	Strongly Agree
...volunteer answers during math class.	4.74	0.47	Strongly Agree
...collaborate with classmates on tasks.	4.86	0.35	Strongly Agree
Weighted Mean	4.73		
SD	0.47		
Verbal Interpretation	Very High		

Table 4 shows the level of students' involvement in terms of participation, including several indicators with their corresponding mean, standard deviation, and remarks.

The weighted mean of 4.73 with an SD of 0.47 indicates a very high level of student participation. This implies that through the Vedic Mathematics Techniques, students completed in-class tasks on time, followed the procedure demonstrated during lessons, shared techniques during class discussions, volunteered answers, and collaborated with classmates on tasks.

Table 5 shows the level of students' involvement in terms of engagement, including several indicators with their corresponding mean, standard deviation, and remarks.

Table 5. Level of Students' Involvement in Terms of Engagement

Statements	MEAN	SD	REMARKS
Through the Vedic Mathematics Techniques, I...			
...pay attention throughout the math lesson.	4.77	0.42	Strongly Agree
...feel interested in mathematics activities.	4.79	0.45	Strongly Agree
...try to connect new lessons to prior knowledge.	4.70	0.49	Strongly Agree
...stay focused even when problems are challenging.	4.77	0.46	Strongly Agree
...gain motivation to improve in mathematics.	4.89	0.32	Strongly Agree
Weighted Mean	4.78		
SD	0.43		
Verbal Interpretation	Very High		

The weighted mean of 4.78 with an SD of 0.43 indicates a very high level of student engagement.

This implies that through the Vedic Mathematics Techniques, students pay attention throughout the math lesson, feel interested in mathematics activities, try to connect new lessons to prior knowledge, stay focused even when problems are challenging, and gain motivation to improve in mathematics.

Table 6. Level of Students' Involvement in Terms of Active Problem Solving

Statements	MEAN	SD	REMARKS
Through the Vedic Mathematics Techniques, I...			
...try to solve problems before the solution is shown.	4.24	0.65	Strongly Agree
...check my work using different techniques.	4.37	0.57	Strongly Agree
...choose efficient strategies in solving problems.	4.30	0.62	Strongly Agree
...manage to explain my answers to others.	4.30	0.67	Strongly Agree
...reflect on my errors and correct them.	4.39	0.62	Strongly Agree
Weighted Mean	4.32		
SD	0.63		
Verbal Interpretation	Very High		

Table 6 presents the level of students' involvement in active problem-solving, including several indicators with their corresponding means, standard deviations, and remarks.

The weighted mean of 4.32 with an SD of 0.63 indicates a very high level of students' involvement in active problem-solving.

This implies that through the Vedic Mathematics Techniques, students try to solve problems before the solution is shown, check works using different techniques, choose efficient strategies in solving problems, manage to explain answers to others, and reflect on their errors and correct them.

Students' Performance

In this study, student performance is demonstrated through tasks or assessments (Biggs & Tang, 2016). It is measured

through students' scores on performance tasks, quarterly exams, and overall class grades in mathematics.

The level of students' performance in terms of performance task, exam and grades was treated statistically using the frequency and percentage. This approach allows for a clear, systematic description of students' performance levels.

Table 7. Level of Students' Performance in Terms of Performance Task

Grades	Frequency	Percentage	Descriptive Equivalent
21-25	37	52.86%	Outstanding
16-20	31	44.29%	Very Satisfactory
11-15	2	2.86%	Satisfactory
6-10	0	0.00%	Fairly Satisfactory
1-5	0	0.00%	Did Not Meet Expectation
Total	70	100%	

Weighted Mean = 20.26
SD=2.74

Table 7 presents the level of students' performance in terms of performance task, including the distribution of grades with their corresponding frequency, percentage, and descriptive remarks.

The result shows that the majority of the participating students were successful at the performance tasks, with over half of the students (52.8610%) achieving outstanding results and 44.29% obtaining very satisfactory results. Only 2.86% of students achieved satisfactory performance levels. There were no students in either the fairly satisfactory or did not meet expectations categories, indicating that all students were successful at or above the expected level of performance in both mathematical applications and skills.

The mean of 20.2610 and a standard deviation of 42.7410 clearly indicate that the participants exhibited very satisfactory levels of skill application in the performance tasks; therefore, indicating a comparatively high level of skill application by the students.

In summary, this suggests that students achieve high levels in mathematics activities based on performance tasks. Further, there were no students with low performance levels; therefore, demonstrating a high degree of competency in the subject area, coupled with a large number of students with outstanding and very satisfactory result levels, indicating that a majority of the participants possessed a high level of skills and understanding of the mathematical applications and skills. higher-order thinking and complex problem-solving activities.

Table 8. Level of Students' Performance in Terms of Exam

Grades	Frequency	Percentage	Descriptive Equivalent
37-45	38	54.29%	Outstanding
28-36	32	45.71%	Very Satisfactory
19-27	0	0.00%	Satisfactory
10-18	0	0.00%	Fairly Satisfactory
1-9	0	0.00%	Did Not Meet Expectation
Total	70	100%	

Weighted Mean = 37.16
SD=4.08

Table 8 presents the level of students' performance in terms of examination, including the distribution of scores with their corresponding frequency, percentage, and descriptive remarks.

The result shows that majority of the participating students were successful at the examination, with over half of the students (54.29%) achieving outstanding results and 45.71% obtaining very satisfactory results. There were no students in either the satisfactory, fairly satisfactory or did not meet expectations categories, indicating that all students were successful at or above the expected level of performance in both mathematical applications and skills.

The mean of 37.16 and a standard deviation of 40.08 clearly indicate that the participants exhibited very satisfactory levels of skill application in the examination; therefore, indicating a comparatively high level of skill application by the students.

In summary, this implies that the students show strong levels of achievement in mathematics activities based on examination. Further, there were no students with low performance levels indicating that participants or students possessed a high level of skills and understanding in mathematics.

Table 9. Level of Students' Performance in Terms of Grades

Grades	Frequency	Percentage	Descriptive Equivalent
90-100	34	48.57%	Outstanding
85-89	24	34.29%	Very Satisfactory
80-84	12	17.14%	Satisfactory
75-79	0	0.00%	Fairly Satisfactory
Below 75	0	0.00%	Did Not Meet Expectation
Total	70	100%	

Weighted Mean = 89.06
SD=3.90

Table 9 presents the level of students' performance in terms of grades, including the distribution of grades with their corresponding frequency, percentage, and descriptive remarks.

The result shows that majority of the participating students got passing grades, with almost half of the students (48.57%) achieving outstanding results and 34.29% obtaining very satisfactory results. Moreover, 17.14% got satisfactory results. There were no students in either the fairly satisfactory or did not meet expectations categories, indicating that all students passed their grade in mathematics. The mean of 89.06 and a standard deviation of 3.90 clearly indicate that the participants exhibited very satisfactory levels of skill application in their grades.

In summary, this implies that the students perform well, as evidenced by their grades. Further, there were no students with failing grades, indicating that participants and students have a high level of understanding of mathematics.

Significant Relationship between the Use of Vedic Mathematics Techniques and Students' Involvement in Mathematics

To test the significant relationship between the use of Vedic Mathematics Techniques and Students' Involvement in terms of participation, engagement and active problem solving, was treated statistically using Jamovi 2.3.28 using the Pearson correlation coefficient.

Table 10 presents the relationship between the use of Vedic Mathematics techniques and students' involvement in

terms of participation, engagement, and active problem solving using the Pearson correlation coefficient.

Table 10. The Use of Vedic Mathematics Techniques and Students' Involvement

Use of Vedic Mathematics Techniques	Students' Involvement		
	Participation	Engagement	Active Problem Solving
Mental: Pearson Correlation	0.01	0.11	0.16
Computation Significance(2-Tailed)	0.941	0.349	0.183
N	70	70	70
Pattern: Pearson Correlation	-0.01	-0.02	0.15
Recognition Significance(2-Tailed)	0.931	0.845	0.211
N	70	70	70
Sutras/Simplified: Pearson Correlation	0.23	-0.17	0.30*
Problem-Solving Significance(2-Tailed)	0.057	0.151	0.013
N	70	70	70

Note: * $p < .05$, ** $p < .01$, *** $p < .001$

The results revealed that mental computation is not statistically related to a student's level of involvement. Thus, the degree of mental computation alone does not appear to affect the level of involvement in a statistically significant manner.

Pattern recognition and level of participation ($r = -0.01$, $p = 0.931$) or level of engagement ($r = -0.02$, $p = 0.845$) are not significantly correlated to level of active problem solving ($r = 0.15$, $p = 0.211$). This suggests that pattern recognition in Vedic Mathematics does not correlate with students' level of involvement in class activities.

Sutras/Simplified problem solving shows no correlation with students' level of participation ($r = 0.23$, $p = 0.057$) or their level of engagement ($r = -0.17$, $p = 0.151$), both of which are not statistically significant. On the other hand, the results indicate that the use of sutras is among the most effective aspects of Vedic Mathematics for helping students become actively involved in solving mathematical problems.

In summary, this implies that using Vedic Mathematics techniques is unrelated to overall levels of involvement in learning through participation and engagement. However, results from using sutras appear to have a statistically significant effect on active problem-solving and indicate that some components of Vedic Mathematics may improve certain aspects of students' involvement in mathematics.

Significant Effect of the Use of Vedic Mathematics Techniques on the Students' Performance

The significant effect of the use of Vedic Mathematics Techniques on students' performance in terms of performance tasks, exams, and grades was statistically analyzed using Real Statistics Data Analysis Tools and multiple regression.

Table 11a presents the use of Vedic Mathematics Techniques on the students' performance in terms of performance tasks.

A multiple regression analysis was conducted to determine whether the use of Vedic Mathematics techniques in terms of mental computation, pattern recognition, and sutras or simplified problem-solving could significantly predict students' performance in terms of performance tasks.

According to the statistical analysis carried out ($F(3, 66) = 0.82$, $p = 0.487$) found that the entire model was not

statistically significant; the introduction of the Vedic Mathematics teaching strategy as a whole was not a significant predictor of the students' performance in the performance tasks.

Table 11a. The Use of Vedic Mathematics Techniques on the Students' Performance in Terms of Performance Task

ANOVA ^a					
Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	0.77	3	0.26	0.82	0.487
Residual	20.73	66	0.31		
Total	21.50	69			

a. Dependent Variable: Performance Task

b. Predictors: Mental Computation, Pattern Recognition and Sutras/Simplified Problem-Solving

Additionally, each of the components of Vedic Mathematics, such as mental computations ($B = -0.27$, $t = -1.37$, $p = 0.176$), pattern recognition ($B = -0.02$, $t = -0.12$, $p = 0.905$), and sutras ($B = 0.05$, $t = 0.26$, $p = 0.793$), failed to make a significant effect on the students' performance because their p-value's were larger than the 0.05 significance level.

In summary, Vedic Mathematics techniques do not show to be significant predictors contributing to students' performance on the performance tasks, either as a collective unit or as individual variables. Other factors that are unrelated to Vedic Mathematics may be more relevant to the assessment of students' performance when completing mathematics tasks.

Table 11b. The Use of Vedic Mathematics Techniques on the Students' Performance in Terms of Exam

ANOVA ^a					
Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	1.74	3	0.58	2.46	0.071
Residual	15.63	66	0.24		
Total	17.37	69			

a. Dependent Variable: Exam

b. Predictors: Mental Computation, Pattern Recognition, and Sutras/Simplified Problem-Solving

Table 11b presents the use of Vedic Mathematics Techniques on students' exam performance.

A multiple regression analysis was conducted to determine whether the use of Vedic Mathematics techniques in terms of mental computation, pattern recognition, and sutras or simplified problem-solving could significantly predict students' performance in terms of the exam.

According to the statistical analysis carried out ($F(3, 66) = 2.46$, $p = 0.071$) found that the entire model was not statistically significant; the introduction of the Vedic Mathematics teaching techniques as a whole was not a significant predictor of the students' performance in the exam scores.

In summary, Vedic Mathematics techniques do not appear to be significant predictors of students' exam scores, either as a collective unit or as individual variables.

Table 11c presents the use of Vedic Mathematics Techniques on the students' performance in terms of grades.

Table 11c. The Use of Vedic Mathematics Techniques on the Students' Performance in Terms of Grades

ANOVA ^a					
Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	1.86	3	0.62	1.10	0.355
Residual	37.22	66	0.56		
Total	39.08	69			

a. Dependent Variable: Grades

b. Predictors: Mental Computation, Pattern Recognition and Sutras/Simplified Problem-Solving

A multiple regression analysis was conducted to determine whether the use of Vedic Mathematics techniques in terms of mental computation, pattern recognition, and sutras or simplified problem-solving could significantly predict students' performance in terms of grades.

According to the statistical analysis ($F(3, 66) = 1.10, p = 0.355$), the entire model was not statistically significant; the introduction of Vedic Mathematics teaching techniques as a whole was not a significant predictor of students' grades.

In summary, Vedic Mathematics techniques do not appear to be significant predictors of students' grades, either as a collective unit or as individual variables.

IV. CONCLUSION AND RECOMMENDATIONS

The study found that there is no significant relationship between Vedic Mathematics Techniques and students' involvement in Mathematics, leading to the acceptance of the null hypothesis. This implies that students' involvement in Mathematics may be affected by other factors, such as teaching strategies, classroom environment, motivation, and individual learning preferences, rather than solely by the use of Vedic Mathematics Techniques.

The findings also revealed that there was no significant effect of Vedic Mathematics Techniques on students' performance in Mathematics, leading to the acceptance of the null hypothesis. It implies that while Vedic Mathematics Techniques may serve as an alternative and engaging approach to learning Mathematics, students' performance may still depend on other factors, such as study habits, prior knowledge, instructional methods, and assessment practices.

In this, the study revealed that students demonstrated a very high level of exposure to Vedic Mathematics Techniques in mental computation, pattern recognition, and the use of sutras for simplified problem-solving. Likewise, students showed a very high level of involvement in Mathematics, particularly in participation, engagement, and active problem-

solving, and attained a Very Satisfactory level of performance across performance tasks, examinations, and overall grades. However, despite these positive levels, the findings further indicated that there was no significant relationship between Vedic Mathematics Techniques and students' involvement in Mathematics, nor was there a significant effect of Vedic Mathematics Techniques on students' performance in Mathematics.

Overall, this suggests that while Vedic Mathematics Techniques may contribute to an engaging learning experience, they do not significantly determine students' involvement and academic performance in Mathematics.

Based on the conclusions drawn, the following recommendations are advanced:

Teachers might need to guide students on when and how to properly use mental computation together with written solutions to prevent errors.

The students may be given extended practice of the Vedic Mathematics Techniques.

Future researchers can use a longer intervention period to enhance the use of Vedic Mathematics Techniques.

School administrators may conduct support training programs for the teachers to enhance their skills in the use of Vedic Mathematics Techniques and improve mathematics instruction.

Curriculum planners may integrate and use Vedic Mathematics Techniques with other teaching strategies in the mathematics curriculum.

REFERENCE

- [1]. Ahmed, S. (2019). The impact of cognitive strategies on students' mathematics performance. New Delhi: Academic Press.
- [2]. Gupta, V. (2020). Vedic mathematics: Principles and applications. Jaipur, India: Shree Publishers.
- [3]. Kaur, S., & Mehta, P. (2021). Enhancing mental computation through alternative strategies: A study of Indian secondary students. *International Journal of Mathematics Education*, 12(2), 115–129.
- [4]. Lopez, C., & Chua, M. (2020). Dimensions of student involvement in junior high mathematics. *Asia-Pacific Journal of Educational Research*, 23(1), 12–25.
- [5]. Rashid, M., & Prakash, S. (2022). Vedic mathematics and student learning outcomes: A systematic review. *International Journal of Educational Research*, 115, 101–125.
- [6]. Saxena, S. (2024). Comparative study of Vedic and conventional method for arithmetic operation. *ShodhKosh: Journal of Visual and Performing Arts*, 5(6). <https://doi.org/10.29121/shodhkosh.v5.i6.2024.3888>
- [7]. Sharma, R., & Devi, P. (2018). Enhancing arithmetic skills through Vedic Mathematics techniques. *Journal of Indian Education Research*