ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25jul570

Enhancing Calculation Speed Through Vedic Mathematics Techniques

Sandeep Kumar

IIMT University, Meerut, U.P., India

Publication Date: 2025/07/21

Abstract: Vedic Mathematics is an ancient Indian system that simplifies mathematical calculations using 16 Sutras (formulas) and 13 sub-Sutras (sub-formulas). This system, introduced formally in 1957, is known for enhancing speed and accuracy in solving mathematical problems. In this study, 26 students preparing for competitive examinations were given arithmetic tasks involving multiplication, square roots, cube roots, and operations with fractional decimals. These tasks were completed first using conventional methods and later with Vedic techniques. The time taken in both cases was recorded and analyzed using a paired t-test. Results showed a significant improvement in speed when Vedic methods were applied. The study concludes that incorporating Vedic Mathematics into preparation strategies can be highly effective in improving calculation efficiency, especially in time-bound competitive exams. These findings contribute to the growing evidence that Vedic techniques are not only historically valuable but also practically beneficial for modern learners aiming to excel in quantitative reasoning sections.

Keywords*: Vedic Mathematics, Multiplications (Vedic Formulas), T-Test, Quantitative Aptitude.*

How to Cite: Sandeep Kumar (2025) Enhancing Calculation Speed Through Vedic Mathematics Techniques. *International Journal of Innovative Science and Research Technology,* 10(7), 1335-1345. https://doi.org/10.38124/ijisrt/25jul570

I. INTRODUCTION

The term "Veda" stems from the ancient Sanskrit language, signifying "Knowledge." Vedic Mathematics is an extraordinary ancient Indian framework of mathematical techniques drawn from the Vedas, mainly the Atharva Veda. It presents an elegant, unified system to tackle diverse problems in arithmetic, algebra, geometry, and trigonometry with exceptional ease and speed. Built upon 16 fundamental Sutras and 13 sub-sutras—short, powerful statements that succinctly convey mathematical principles—this system was meticulously revived and structured by Jagadguru Sri Bharathi Krishna Thirthaji Maharaja in the early 20th century. His profound command over Sanskrit and classical texts enabled him to reveal these timeless mathematical treasures, making mathematics both intuitive and stimulating.

Many students preparing for competitive exams in India, such as SSC, Railway Recruitment, CAT, or various banking exams like IBPS, SBI PO, and Clerk tests, often find it challenging to solve intricate quantitative and reasoning problems within tight time limits. Vedic Mathematics, rooted in 16 concise sutras, provides ingenious techniques to swiftly tackle operations like multiplying large numbers, finding squares and square roots, division, and even handling tricky calendar problems. These methods serve as powerful shortcuts, making calculations remarkably quick and straightforward. By mastering Vedic approaches, students can significantly cut down on time, enhance their calculation speed, and reduce careless mistakes. This enables them to attempt a higher number of questions confidently, thereby maximizing their chances of success. Moreover, the elegant simplicity of these techniques turns learning mathematics into a fun, stress-free experience, easing the mental strain of conventional methods.

This study conducts a practical investigation into the impact of Vedic Mathematics on improving the speed of fundamental mathematical operations. A cohort of students preparing for competitive examinations participated by solving a series of mathematical problems before and after being introduced to selected Vedic techniques. The operations examined included extracting square roots and cube roots, multiplying large numbers, performing calculations near base values, and applying the “all from nine and last from ten” subtraction rule. The findings reveal a clear enhancement in both speed and computational efficiency following the adoption of these Vedic methods.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25jul570

In this research, the duration required by students to complete mathematical problems was measured in minutes, both prior to and after learning Vedic Mathematics techniques. A hypothesis was established to examine whether the observed difference was statistically significant, which was then tested using a paired t-test. The analysis demonstrated that the use of Vedic methods led to a substantial reduction in the time taken for basic calculations. This confirms that Vedic Mathematics effectively boosts computational speed and enhances overall efficiency among students.

II. RELATED RESEARCH

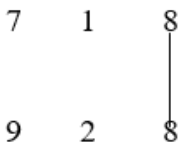
Existing literature provides only limited empirical studies on the impact of Vedic Mathematics in accelerating basic mathematical operations. Nonetheless, Vedic Mathematics continues to gain international acclaim for its clarity and efficiency. Since the early 1980s, British scholars like Kenneth Williams, Andrew Nicholas, and Jeremy Pickles have explored this ancient system extensively, delivering lectures across London and helping to spread the insightful techniques articulated by Bharathi Krishna Thirthaji. Vedic methods prove especially beneficial for quick computations, making them highly suitable for aspirants of competitive exams. These techniques not only boost calculation speed but also foster sharper logical reasoning and heightened concentration—essential attributes for tackling quantitative and reasoning sections. Alongside Vedic Mathematics, methods like the Trachtenberg Speed System and Lester Meyers' rapid arithmetic further aid in mastering swift computations. Together, these systems empower students to build robust arithmetic skills and excel under the strict time constraints of competitive examinations.

III. TECHNIQUES OF VEDIC MATHEMATICS APPLIED IN THE PRESENT STUDY

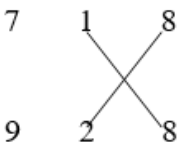
This research delves into a variety of Vedic Mathematics techniques that significantly boost both calculation speed and mental sharpness. Prominent among these is the 'Urdhva Tiryakbhyam Sutra,' or the Vertical and Crosswise method, which offers a versatile approach for multiplying numbers of any size with remarkable ease. The study also highlights the 'Nikhilam Navatashcaramam Dashatah' Sutra, particularly useful for swiftly multiplying numbers that are near powers of ten. Techniques for quickly determining square roots of perfect squares and cube roots of perfect cubes are explored as well. The elegant subtraction method using "all from 9 and last from 10" minimizes errors and saves time. Moreover, the study examines clever multiplication shortcuts for handling numbers with repeating digits like 9's, 1's, or identical figures, drastically reducing the need for elaborate written calculations. Collectively, these methods nurture a robust numerical instinct, enabling learners to tackle challenging problems confidently and efficiently.

A. Urdhva Tiryak Sutra (Upward and Cross Multiplication Technique)

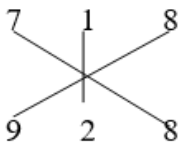
By mastering this general multiplication rule, learners can tackle not only three-digit examples like 718 × 928 but also extend the same logic to even larger numbers. This technique fosters quicker calculations, sharpens mental processing, and greatly reduces calculation errors, making it an invaluable tool for academic and competitive success.



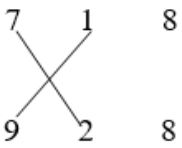
Step 1: (8 x 8)



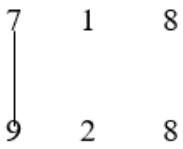
Step 2: (8 x 1) + (2 x 8)



Step 3: (7 x 8) +
(9 x 8) + (1 x 2)



Step 4: (7 x 2) + (9 x 1)



Step 5: (7 x 9)

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25jul570

Step 1: (8 x 8) = 64 (6 carry) = 4

Step 2: (8 x 1) + (2 x 8) = 24, (24 + 6 = 30)(3 carry) = 0

Step 3: (7 x 8) + (9 x 8) + (1x 2) = 130, (130 + 3 = 133),(13 carry) = 3

Step 4: (7 x 2) + (9 x 1) = 23, (23 +13 = 36), (3 carry) = 6

Step 5: (7 x 9) = 63, 63 + 3 = 66

Final Answer = 666304

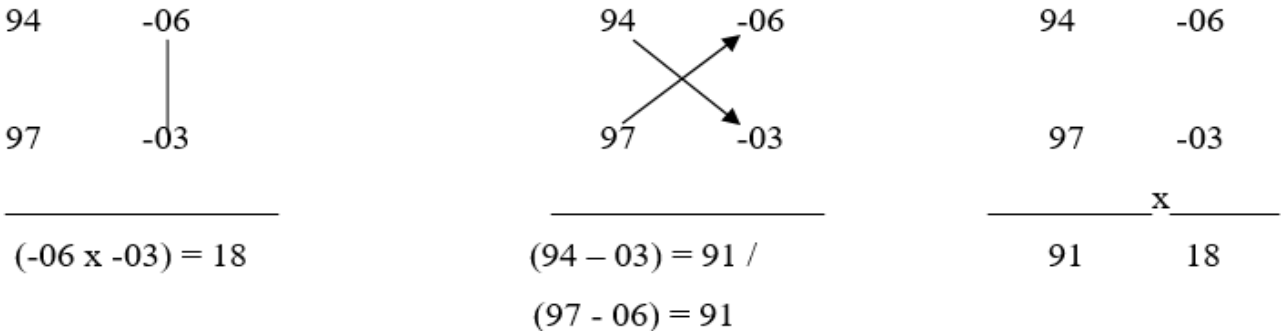
B. Nikhilam Sutra (Subtract All From 9, Last From 10 Technique)

This method is highly effective for multiplying numbers that are close to base values such as 10, 100, 1000 — in other words, powers of 10. The procedure involves the following steps:

- Select the Base: Choose a convenient base (like 10, 100, or 1000) that is close to the numbers being multiplied, and find how much each number exceeds or falls short of this base.
- Note the Zeros: Count the zeros in your chosen base. This count tells you how many digits will appear on the Right-Hand Side (RHS) of your final answer.
- Compute the Product of Deviations: Multiply the differences (the excess or shortfall amounts) to get the RHS of the answer.
- Apply Cross Subtraction: Subtract one number's deviation from the other original number (or vice versa) to get the Left-Hand Side (LHS), completing the multiplication swiftly and accurately.

When Base is 100.

Multiply 94 by 97 i.e. (94 x 97).



Final Answer = **9118**

C. Cube Root of Perfect Cube

Number (N)	Cube of Number (N^3)	Unit digit of N^3
1	1	1
2	8	8
3	27	7
4	64	4
5	125	5
6	216	6
7	343	3
8	512	2
9	729	9
10	1000	0

Example: Find the cube root of 912673

Step 1:

We represent the number as

912 | 673

(Separate the last **three** digits on the right. The digits on the left are 912.)

Step 2:

Look at the last digit (units digit) of the number 912673, which is **3**.

From cube endings, we know that a cube ending in **3** has a cube root ending in **7** (since $7^3 = 343$, which ends in 3).

So, the **units digit** of the cube root is **7**.

Step 3:

Now consider the number to the left of the slash, which is **912**.

Step 4:

Find two perfect cubes between which 912 lies.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25jul570

We know that:

9^3=729

10^3=1000

So, 729 < 912 < 1000. Thus, the number lies between the cubes of 9 and 10.

Step 5:

Take the smaller number, which is **9**, as the tens digit.

Final Answer:

Combine both digits: **97** is the cube root of **912673**.

D. Method Subtracting All Digits from Nine, Last from Ten.:

Example: Subtract 832.76 from 100000

Step 1:

Start with the number: **100000.00**

Subtract: **832.76**

Step 2:

Use the rule:
- Subtract **each digit** from **9** (starting from the left),
- Subtract the **last digit** (i.e., the last digit after decimal) from **10**

Step 3:

Write it step by step:

100000.00

- 832.76

_____

99167.24

Explanation:
- 9 − 8 = 1
- 9 − 3 = 6
- 9 − 2 = 7
- 9 − 7 = 2
- 9 − 6 = 3
- 10 − 6 = 4 (last digit rule)

So, **100000 − 832.76 = 99167.24**

E. Square Root of Perfect Square

Number (N)	Square of Number (N^2)	Unit digit of N^2
1	1	1
2	4	4
3	9	9
4	16	6
5	25	5
6	36	6
7	49	9
8	64	4
9	81	1
10	100	0

Example: Find the square root of 4489

Step 1:

The number **4489** ends with **9**.

Therefore, the square root must end with **3** or **7**

(because 3^2=9 and 7^2=49 both ending in 9).

Step 2:

Take the complete number: **4489**

Step 3:

4489 lies between **4225** (which is 65^2 = 4225) and **4624** (which is 68^2 = 4624).

So the square root is between 65 and 68.

Step 4:

From Step 1, we know the square root ends in **3 or 7**.

So out of the numbers between 65 and 68, possible roots are **67** and **63**.

But only **67** lies in the range [65, 68].

Step 5:

Check whether 4489 is closer to 4225 or 4624.

Since 4489 is closer to 4624, the correct square root is **67**.

Final Answer: 67

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25jul570

➢ *Multiplying Numbers by Multipliers Consisting of Repeated 9's*

7654 X 9999

7654 9999 76532346	Decrease 7654 by one and position it to the left side in the solution.	Find the complement of each digit in 7653 with respect to 9: (9–7), (9–6), (9–5), (9–3).

F. Multiplying a Number by a Multiplier Composed of Repeated 1's-

➢ *Multiplying a Number by a Multiplier Composed of Repeated 1's-*

MULTIPLY 3825 BY 1111

We multiply 3825 × 1111 using a step-by-step vertical addition method:

Step 1: Write down the unit digit as it is:

→ **5**

Step 2: Add last two digits:

5 + 2 = 7

→ **7**

Step 3: Add last three digits:

5 + 2 + 8 = 15

→ **5**, carry **1**

Step 4: Add all four digits:

5 + 2 + 8 + 3 = 18 + 1 (carry) = 19

→ **9**, carry **1**

Step 5: Add first three digits:

2 + 8 + 3 = 13 + 1 (carry) = 14

→ **4**, carry **1**

Step 6: Add first two digits:

8 + 3 = 11 + 1 (carry) = 12

→ **2**, carry **1**

Step 7: Add first digit and carry:

3 + 1 = 4

Final Answer: 4249575

So, **3825 × 1111 = 4249575**

➢ *Techniques For Multiplication with Same-Digit Multipliers*

Multiply 555 by 222

Break it as:

555 × 2 × 111 = (555 × 2 = 1110) × 111

Now multiply **1110 × 111** step-by-step:

Step 1: Write down unit digit as it is:

→ **0**

Step 2: Add (0 + 1) = **1**

→ **1**

Step 3: Add (0 + 1 + 1) = **2**

→ **2**

Step 4: Add (1 + 1 + 1) = **3**

→ **3**

Step 5: Add (1 + 1) = **2**

→ **2**

Step 6: Write 1 as it is

→ **1**

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25jul570

Final Answer = 123210

So, **555 × 222 = 123210**

IV. OBJECTIVE AND METHODOLOGY OF THE STUDY

- The primary goal is to determine whether Vedic Mathematics methods contribute to faster completion of basic mathematical tasks.
- The secondary goal is to study the extent of time reduction (recorded in minutes) in solving simple operations after introducing Vedic Mathematics techniques.

This study draws upon both primary and secondary sources of data. Primary data has been collected from students preparing for competitive examinations such as BANK PO, BANK Clerks, and IBPS, who are currently enrolled in a well-established coaching institute located in Mangalore City, Karnataka. Secondary data is derived from a variety of sources, including newspapers, academic journals, magazines, research publications, and credible online platforms. Furthermore, focus group discussions were conducted to gain deeper qualitative insights. Based on the findings from these interactions, a research hypothesis was developed and subsequently tested using the paired t-test to assess the effect of Vedic Mathematics on enhancing the speed of mathematical calculations.

The sample for this study comprises 26 students selected from a competitive examination coaching center based in Batala City, Punjab, India. Participants were provided with a structured set of mathematical problems involving fundamental operations such as square roots, cube roots, multiplication of four-digit numbers, multiplication of numbers close to a base, and subtraction using the "all from nine and the last from ten" technique. The time taken by each student to complete these problems was measured both prior to and after the introduction of Vedic Mathematics techniques. A research hypothesis was developed to evaluate the effectiveness of these methods, and its statistical significance was tested using the paired t-test. The results confirmed that Vedic Mathematics positively contributes to improving both speed and accuracy in mathematical computations.

V. TESTING HYPOTHESES USING THE PAIRED T-TEST METH

Table-1 provides the performance data of 26 individuals. It records each participant's serial number, the time (in minutes) taken to complete a set of mathematical operations before and after implementing Vedic Mathematics techniques, the time difference, and the square of the difference.

Table 1 : Comparison Table Using Paired t-Test Before and After Vedic Math.

S. No.	Before Adopting Vedic Mathematics Techniques (x)	After Adopting Vedic Mathematics Techniques (y)	Difference (d = x-y)	d^2
1	12	9	3	9
2	14	10	4	16
3	16	11	5	25
4	11	8	3	9
5	17	13	4	16
6	13	10	3	9
7	15	12	3	9
8	18	14	4	16
9	19	15	4	16
10	12	9	3	9
11	14	11	3	9
12	13	9	4	16
13	16	11	5	25
14	11	9	2	4
15	17	14	3	9
16	14	10	4	16
17	10	8	2	4
18	15	10	5	25
19	13	11	2	4
20	12	9	3	9
21	14	12	2	4
22	15	13	2	4
23	11	9	2	4
24	13	10	3	9

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25jul570

25	16	13	3	9
26	15	11	4	16
	Total		88	374

A. Null Hypothesis (H_0): $\mu_x = \mu_y$

The mean scores before and after the application of Vedic Mathematics techniques are equal. In other words, the use of Vedic Mathematics does not lead to a statistically significant improvement in performance while solving basic mathematical problems.

$\frac{\sum d}{n}$ = 88

B. Alternative Hypothesis (H_1): $\mu_x \neq \mu_y$, (Two tailed)

H_1: A notable difference exists in the time taken to solve basic mathematical problems before and after applying Vedic mathematics techniques.

Test statistic- Assuming **H_0** is true, the relevant test statistic employed to evaluate this hypothesis is calculated using the paired t-test formula, comparing mean differences.

Step 1: Mean of the differences ($\bar{d}$)

$$\mathbf{d} = \frac{\sum d}{n} = \frac{88}{26} = 3.3846$$

Step 2: Variance (s^2)

(after using $\Sigma d = 88$, $\Sigma d^2 = 374$, n = 26)

$$S^2 = \frac{1}{(n-1)}\left(\sum d^2 - \frac{(\sum d)^2}{n}\right)$$

$$S^2 = \frac{1}{(25)}\left(374 - \frac{(88)^2}{26}\right)$$

$$S^2 = 3.046$$

$$S = 1.746$$

Step 3: t-statistic (|t|)

$$|t| = \frac{d}{\sqrt{\frac{s^2}{n}}}$$

$$= \frac{3.3846}{\sqrt{\frac{3.046}{26}}}$$

= 9.89

➢ *Degrees of Freedom:*

Df = n−1

= 25

➢ *Calculated t Value:*

t = 9.89

This is **very high**, meaning the improvement after adopting Vedic Mathematics techniques is **statistically significant** at usual significance levels (like 0.05).

Table 2- Test Statistic Summary

Parameter	Value
Number of pairs (n)	26
Mean difference ($\bar{d}$)	3.385
Std. deviation (s_n)	1.746
Std. error ($\bar{s}_n$)	0.342
t-statistic	9.89
Degrees of freedom (df)	25

▪ *Decision*

The **calculated t = 9.89** is **much higher** than the critical t-value for 25 degrees of freedom at 5% significance (one-tailed), which is approximately:

$t_{(0.05, 25)} \approx 1.708$

so,

$t_{cal} > t_{tab}$

We **reject the null hypothesis H_0**.

The critical (tabulated) value of the t-statistic for 25 degrees of freedom at a 5% significance level (two-tailed) is $t_{0.025} = 2.064$. Given that the calculated t-value (9.6795) is substantially higher than this threshold, the outcome is statistically significant, leading to the rejection of the null hypothesis in favor of the alternative. When applying a one-tailed t-test (right-tailed), with the alternative hypothesis stating $\mu_x > \mu_y$, the critical t-value at the 5% level is $t_{0.05} = 2.064$. The calculated t-value again exceeds this, reaffirming the significance of the results. Thus, findings from both the two-tailed and one-tailed analyses consistently demonstrate that incorporating Vedic Mathematics techniques markedly improves the speed of carrying out fundamental mathematical operations. This underscores the practical effectiveness of Vedic methods in enhancing computational efficiency, which is

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25jul570

particularly beneficial for students facing time-constrained competitive examinations.

- *Key Inquiry of the Study:- Can Vedic Mathematics Significantly Improve Speed in Basic Mathematical Calculations?*

Out of a total of 26 respondents, approximately 98% reported that the use of Vedic Mathematics significantly improves their calculation speed, while only 2% indicated that they did not observe any improvement in their speed. This suggests a strong positive perception regarding the effectiveness of Vedic techniques in enhancing computational efficiency.

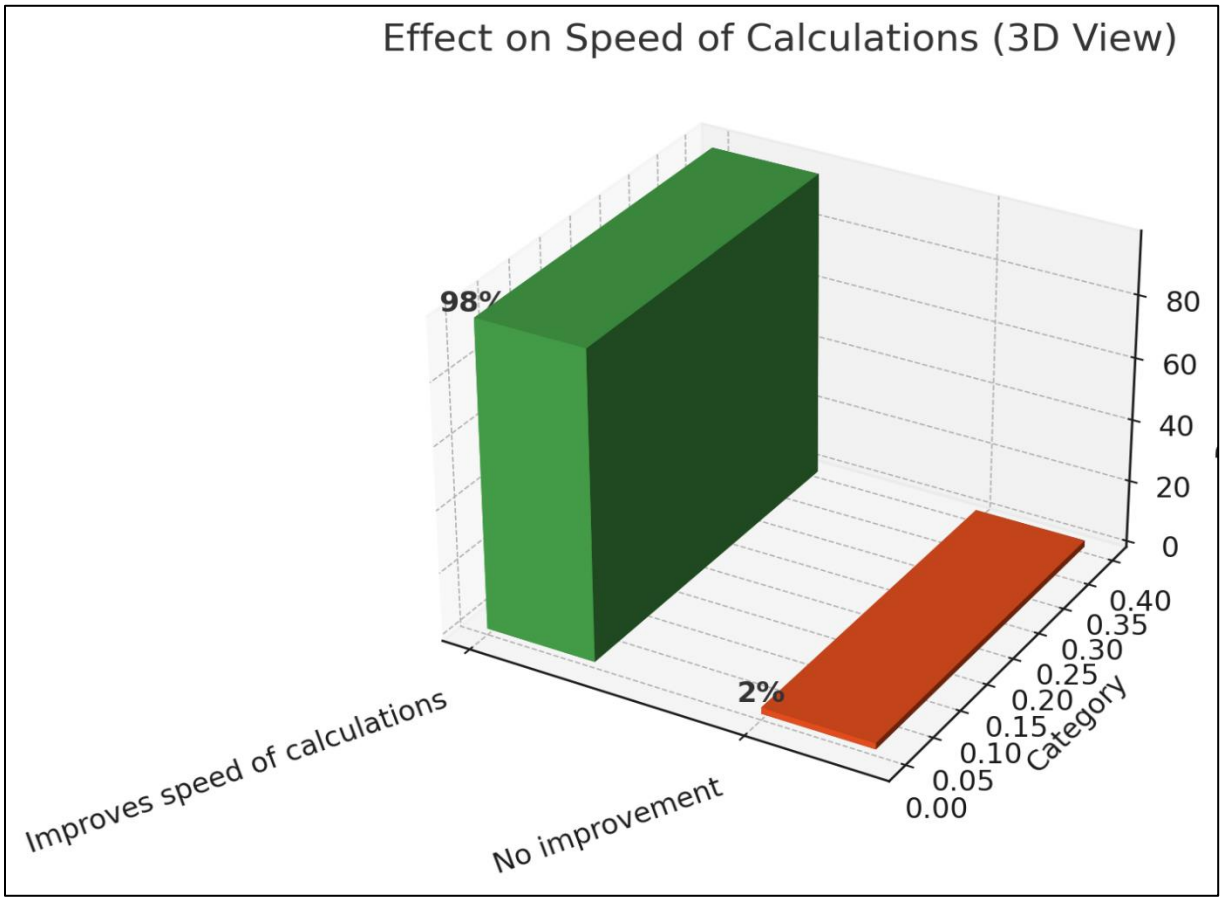


Fig.-1: Percentage Graph Illustrating Improvement Versus Non-Improvement in Arithmetic Speed by Vedic Mathematics.

- *Key Inquiry of the Study :- Can Learning Vedic Mathematics Effectively Improve Focus and Mental Concentration Levels?*

Among the 26 respondents, approximately 84% agreed that practicing Vedic Mathematics helps in improving concentration, while the remaining 16% felt that it does not contribute significantly to enhancing concentration power. This indicates that a majority of participants perceive a positive impact of Vedic techniques on mental focus.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25jul570

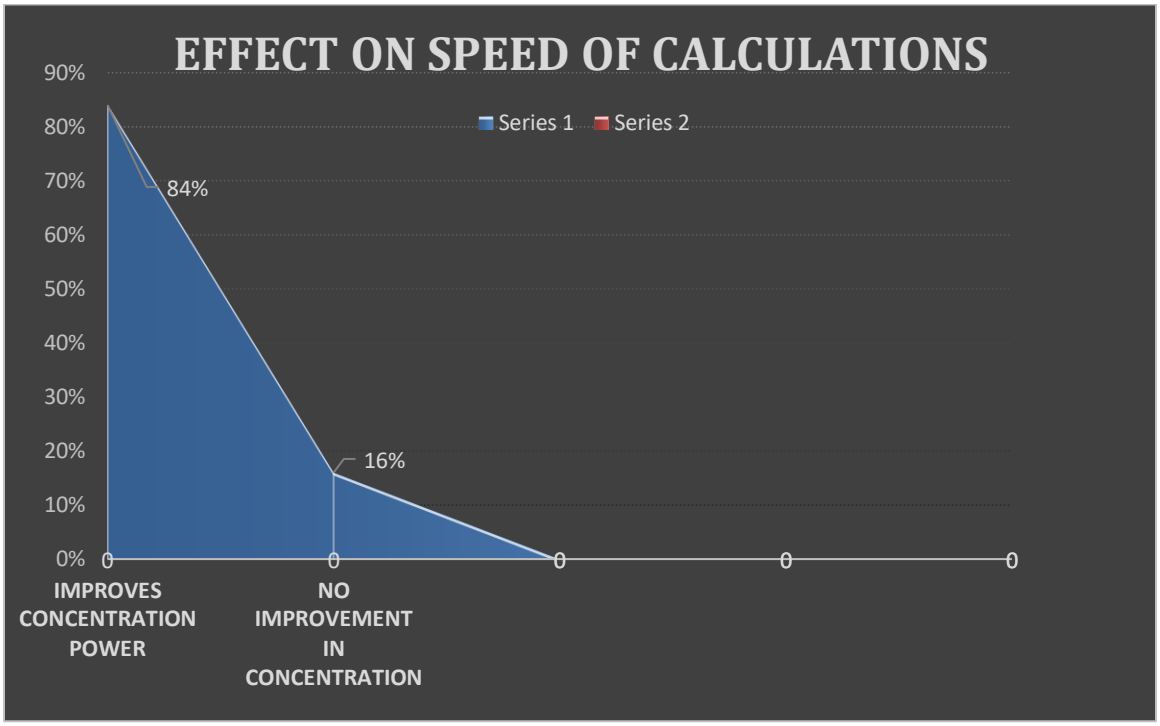


Fig.- 2: Percentage Chart of Concentration Improvement and Stagnation Using Vedic Math Techniques.

- *Key Inquiry of the Study:- Can Practicing Vedic Mathematics Techniques Significantly Strengthen Logical Reasoning Abilities?*

Out of 26 respondents, nearly 80% agreed that Vedic Mathematics contributes to the improvement of logical thinking skills, while 20% reported no noticeable improvement in their logical reasoning abilities. This reflects a generally favorable view of Vedic methods in supportig logical development.

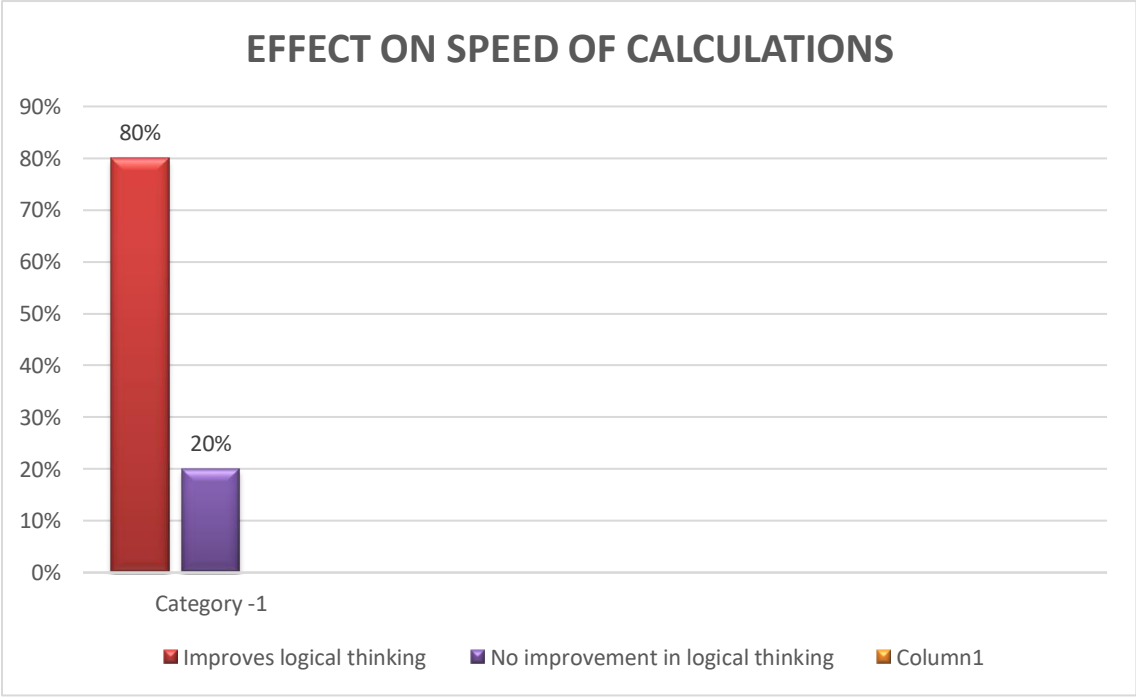


Fig.- 3: Graph Comparing Logical Thinking Progress Against no Improvement from Vedic Math.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25jul570

- *Key Inquiry of the Study:- Does Regular and Consistent Practice Help Fully Master Vedic Mathematics Techniques?*

All 100% of the 26 respondents unanimously agreed that regular and consistent practice is essential for effectively understanding, retaining, and applying Vedic Mathematics techniques. This highlights the importance of practice in gaining proficiency in these meth

VI. LIMITATIONS AND SCOPE OF RESEARCH

- The sample size used in this study was relatively small, consisting of only 26 participants, which limits the generalizability and reliability of the conclusions drawn. A larger sample size is recommended for future research.
- Only a few basic mathematical operations were included in the study, such as square root, cube root, and simple multiplications. Future studies should cover a wider range of mathematical tasks to better evaluate the effectiveness of Vedic techniques.
- Time was measured only in minutes, which may not reflect precise improvements. Future research should use more accurate time-tracking tools, ideally recording in seconds or milliseconds.
- The study population may not represent all educational backgrounds or age groups. Future research should involve participants from varied academic levels and disciplines.

VII. CONCLUSION

Vedic Mathematics is an ancient Indian system derived from 16 main sutras and various sub-sutras, originally composed in Sanskrit. This system offers a set of simple yet highly effective techniques for performing fast calculations, and with regular practice and genuine interest, anyone can master these methods. This study investigates the impact of Vedic Mathematics on improving the speed of solving basic arithmetic operations. A range of operations was analyzed, including square roots, cube roots, multiplication of four-digit numbers, multiplication of numbers close to a base, and subtraction using the "all from nine and the last from ten" rule. The results demonstrate that Vedic Mathematics significantly shortens the time needed to perform such operations. Statistical analysis using the paired t-test rejected the null hypothesis, confirming that Vedic techniques help in saving time — at least one minute per problem in many cases. This paper supports integrating Vedic Mathematics into training programs for competitive exams, as it provides time-saving shortcuts and enhances numerical efficiency. The findings could contribute meaningfully to further research and practical application of Vedic methods in modern education.

REFERENCES

[1]. A. Chatterjee, "Integration of Vedic Mathematics in school curriculum", Jan 2022.
[2]. Ashish Kumar & V. P. Joshith, "Vedic mathematics for sustainable knowledge: a systematic literature review", Int. J. Comparative Education & Development, 26(3):247–269, 2024.
[3]. C. R. Suthikshn Kumar, "Applications of Vedic Mathematics for Machine Learning", Mar 2024.
[4]. C. R. Suthikshn Kumar, "Applications of Vedic Mathematics to Cryptography", Mar 2024.
[5]. Dhaval B., Vedic Mathematics Made Easy, Jaico, 2015.
[6]. Dr. S. K. Kapoor, "Vedic Mathematics", May 2015.
[7]. K. Das, "Teaching mathematics through alternative methodologies: Vedic focus", Jan 2019.
[8]. K. Sarma, "A case study on student perception towards Vedic Mathematics", Jan 2022.
[9]. K. Williams, "Polynomial Osculation", VedicMaths.Org Journal, 2023.
[10]. Kalaiselvi C M & R. S. Sabeenian, "Design of area–speed efficient Anurupyena Vedic multiplier for deep learning", Feb 2024.
[11]. Kenneth Williams, "Solution of Triangles" (2017 conference).
[12]. Kenneth Williams, "Swami Tirtha's Crowning Gem", 2016.
[13]. Kenneth Williams, "Teaching Calculus", Bangkok Conference 2015.
[14]. M. Agarwal, "The role of Vedic Mathematics in improving student performance", Jan 2019.
[15]. M. Gandhi, "Exploring the benefits of Vedic Mathematics in contemporary education", Jan 2021.
[16]. Nathan Annenberg, "Base Division", Nov 2015.
[17]. Nava Vision, Vedic Mathematics for Students, Level 4 (and Levels 3, 5), ~2023.
[18]. Noble Saji Mathews et al., "VedicViz: Towards Visualizing Vedic Principles in Mental Arithmetic", 2022.
[19]. P. Mishra, "Theoretical foundations of Vedic Mathematics: A historical perspective", Jan 2019.
[20]. Pietro Nolasco, "Multiplying numbers nearing multiples of different bases", Nov 2016.
[21]. Pratibha Goplani & Pragya Jha, "Comparative Study of Mathematical Attitude… Vedic & Non-Vedic", Jan 2024.
[22]. Rajesh Kumar Thakur, Advanced Vedic Mathematics, Rupa, Feb 26 2025.
[23]. Ranjeet Kumar et al., "Proof of Nikhilam Sutra by using modular arithmetic", 2023.
[24]. Riddhiman & Shreyansh Jain, "Generality & Applicability of Vedic Polynomial Factorization…", 2024 .
[25]. Rohan Chandra, "Cube Roots", Dec 2016 .
[26]. Romith Rao, "General Formula for Multiplication", April 2017.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25jul570

[27]. S. Arish & R.K. Sharma, "Efficient floating-point multiplier design using Karatsuba & Urdhva-Tiryagbhyam", Oct 2019.
[28]. S. Chakrabarti, "Impact of Vedic Mathematics on computational fluency…", Jan 2021.
[29]. S. Kumar, "Alternative teaching strategies in modern education", Jan 2019.
[30]. S. Pillai, "The role of Vedic Mathematics in digital learning environments", 2020.
[31]. Sameer Mittal, "Multiplying Numbers with Different Bases", June 2015.
[32]. Sanjay Dixit, "Power of Numbers", May 2015.
[33]. Srivas Krishna Das Brahmacari, "Revisiting Vedic Mathematical Insights: Exploring Pi…", Jan 2024.
[34]. V. Nair, "Investigation into applicability of Vedic Mathematics in school education", Jan 2021.
[35]. Vitthal B. Jadhav, "Complement Method", VedicMaths.Org Conference, Nov 2017.