From Tradition to Transformation Vedic Mathematics as a Bridge to Equitable Education

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ABSTRACT

The integration of Vedic Mathematics (VM) into India's education system creates major opportunities while also posing a few hurdles to widespread implementation, particularly in light of the National Education Policy (NEP 2020). The current study aims to completely explore the possible benefits as well as the problems in incorporating Urdhva Tiryaghbhyam, a vertically and crosswise multiplication method, into both the elementary and higher education systems. I conducted an activity with fifty students of various ages as part of the study's methodology. Existing related papers, literature, and case studies were also examined to identify the significant gaps and issues in the current educational structure. The findings primarily highlight similar aspects such as resistance to change, a lack of expertise about the issue, and a lack of resources for the study materials. Furthermore, the success of the profitable adoption of Vedic mathematics at the primary and higher education levels depends equally on the roles played by policymakers, educators/mentors, and the students' families, or parents. The study continues by offering solutions for overcoming these gaps and assuring the long-term integration of Vedic Mathematics, thereby contributing to students' holistic development in accordance with the NEP's goals.

Keywords: Urdhva Tiryaghbhyam, National Education Policy (NEP)

INTRODUCTION

Swami Bharati Krishna Tirtha, also known as Jagadguru Shankaracharya, discovered Vedic Mathematics from the sacred Vedas between 1911 and 1918. On March 14, 1884, Jagadguru was born in Tamil Nadu. Later, in 1925, he rose to the rank of Shankaracharya of Govardhan Matha in Puri, Odisha, where he resided until his death in 1960. The book "Vedic Mathematics," which contains the 16 major sutras and 13 sub-sutras, is the result of Swamiji compiling all of his findings. These formulas provide straightforward and efficient approaches to addressing all mathematical problems, even those involving complicated concepts, in all fields of study.Sutra 3 is the vertical and crosswise approach that we are employing in this instance to multiply. This method may be used from both the left and the right side. Modern mathematics requires several stages, but the Vedic technique makes it simple to get the solution in a single line. We can go from right to left or left to right. We go from right to left in contemporary maths. This approach is also helpful for improving comprehension of the decimal place value system. It helps pupils to rapidly and easily locate answers. They can perform multiplication mentally without a pen and paper after sufficient practice.

Urdhva Tiryagbhyam sutra

A very versatile and effective multiplication technique from Vedic mathematics is the Urdhva Tiryagbhyam Sutra, which translates to "vertically and crosswise." It is particularly useful for quicker mental computations and may be applied to any amount of numbers. It is important to note that this methodology starts from the left, allowing the students to identify the most significant digits of the solution first, in contrast to the traditional

method, which starts multiplication from the rightmost digits and moves leftward. Mental computations are proven to benefit greatly from this, especially when making fast estimates.This approach can be used for any multiplication problem, regardless of the numbers involved, and is generally shorter than the standard school-taught algorithm, even though it is a little longer than the special-case "Nikhilam" method. This opens the door to quicker and simpler computations.

How It Works

The Urdhva Tiryagbhyam technique breaks the multiplication process into three directions:

Vertically – multiplying digits in the same column.

Crosswise – multiplying digits diagonally and adding the results.

Left to right summation – assembling the final result from the leftmost digits to the right.

This approach works with algebraic expressions and may be easily modified for two-, three-, or even bigger numbers.

Advantages

This approach is quite effective and frequently offers a quicker process than conventional methods. Because it can be used to solve any multiplication-related mathematical issue, it exhibits universality. The left-to-right calculating method, which facilitates quicker computation and early insight into the solution, is one of its main benefits. Even without paper, it is very helpful for rapid thinking and problem-solving since it is mental math-friendly. This method's logical arrangement adheres to an organized pattern that is simple to understand with a little effort.

"Urdhva Tiryagbhyam" is one of the most powerful and widely used sutras in Vedic Mathematics. The name is Sanskrit for "Vertically and Crosswise," and it is primarily used for multiplication of numbers—both small and large—quickly and mentally.

Meaning of the Sutra:

Urdhva (ऊर्ध्व) = Vertically

Tiryagbhyam (तिर्यग्भ्याम्) =

Crosswise

So, the method involves multiplying digits vertically and crosswise to get the final result.

Question 1: 27 x 24

Break both numbers into digits:

2 7 ← 27

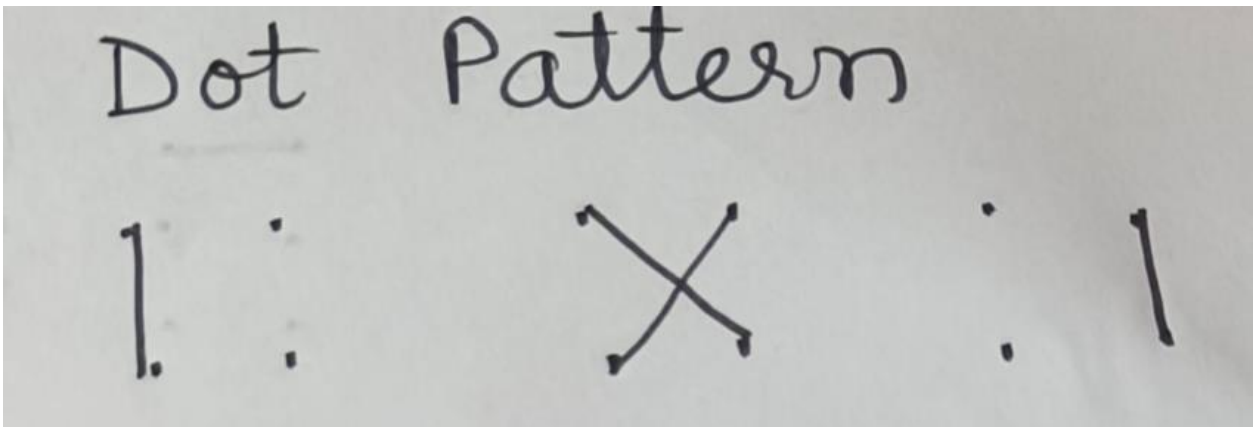
× 2 4 ← 24

Now follow the steps vertically and crosswise:

Rightmost digits (7 × 4): 7 × 4 = 28 → write 8, carry 2

Cross-multiplication & addition (2x4 + 7x2): (2×4) + (7×2) = 8 + 14 = 22 → Add 2 (carried over from 1.) = 23 → write 3, carry 2

Leftmost digits (2 × 2): 2 × 2 = 4 → Add carried over from 2. = 4 + 2 = 6



As per their decimal place value (from step 3 to 1), answer = 6 3 8

Final Answer = 6 3 8

Question 2: 123 x 321

1 2 3 (number A: 123) × 3 2 1 (number B: 321)

Each step involves multiplying digits vertically and crosswise, starting from the left and moving toward the right. The process generates partial results that we sum with carry-over.

Step 1: Leftmost digit (only one pair)

Multiply the leftmost digits:

1×3=31 × 3 = 31×3=3

Write down 3

Step 2: Next crosswise pair

Cross-multiply and add:

1×2+2×3=2+6=81 × 2 + 2 × 3 = 2 + 6 = 81×2+2×3=2+6=8

Write down 8

Step 3: Middle digits (includes vertical and crosswise)

1×1+2×2+3×3=1+4+9=141 × 1 + 2 × 2 + 3 × 3 = 1 + 4 + 9 = 141×1+2×2+3×3=1+4+9=14

Write 4, carry 1

Step 4: Next crosswise pair

2×1+3×2=2+6=82 × 1 + 3 × 2 = 2 + 6 = 82×1+3×2=2+6=8

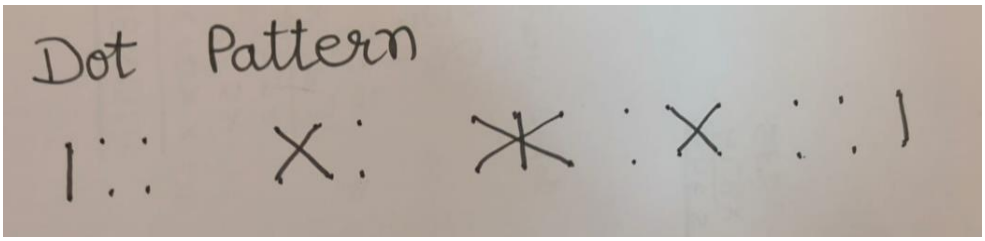
Add carry: 8+1=98 + 1 = 98+1=9

Write down 9

Step 5: Rightmost digits

3×1=33 × 1 = 33×1=3

Write down 3



Now, putting it all together:

We wrote: 3 (then 8) → 4 (with carry 1) → 9 → 3

So, the answer is: 3 8 4 9 3

→ 39483

✓ 123 × 321 = 3948

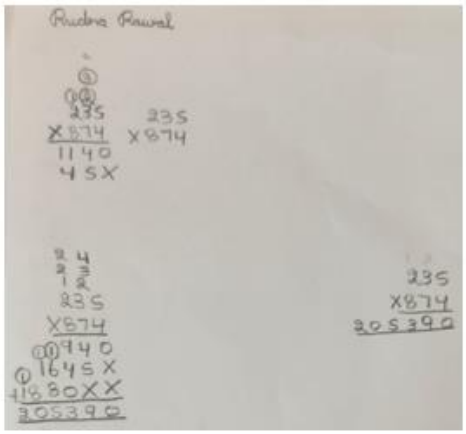
1.This method is universal method and also shorter than the conventional method.

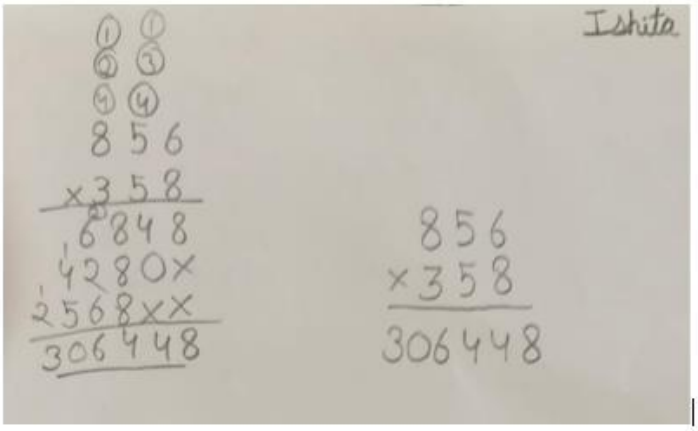
2.The calculation can also be done from left to right, thus enhancing the left-brain stimulation of the students.

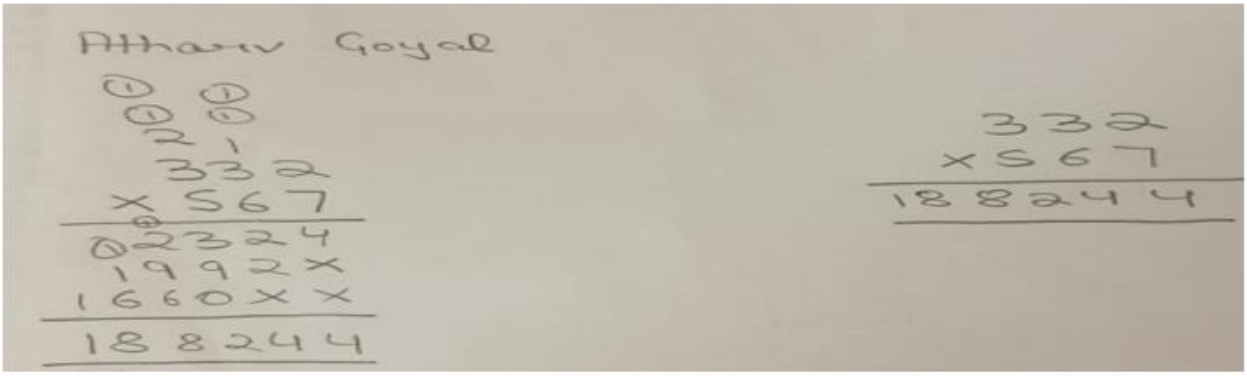
3.The left-brain is responsible for analysis and critical thinking. We are aware that all mathematical calculations are associated with the left-brain of the human being.

4.This technique can also be used to find product of two 4-digits number or two 5-digits number and more. The product will consist of 7-parts while 5-digits number will consist of 9 parts and so on.

Name of Student	**Modern-Method (Min)**	**Vedic Method (Min)**
Aarav Mehta	1.45	0.42
Atharv Goyal	2.25	0.58
Rohan Sharma	1.10	0.59
Ishita	1.95	0.55
Devika Singh	2.80	1.15
Rudra Rawal	1.65	0.48
Isha Thakur	1.90	0.52
Nikhil Bansal	1.70	0.49
Tanya Kapoor	2.10	0.57
Priya Desai	1.55	0.61
Rahul Joshi	2.85	1.18
Sneha Iyer	1.05	0.60
Anaya Dubey	1.20	0.57







The New Education Policy

To ascertain how education is approached in India, the National Education Policy (NEP) 2020 represents a significant shift in the educational system. The policy's intended focus is on fostering pupils' critical thinking, creativity, and general development. It promotes comprehensive understanding of India's rich cultural past, stresses learning based on real-world experiences, and encourages learning by doing. Vedic mathematics, a collection of age-old techniques for rapidly and simply resolving mathematical problems, is one such more promising field. These methods, which originate from ancient Indian writings such as the Atharvaveda, provide a straightforward and efficient means of improving one's understanding of mathematics. In addition to helping students become more proficient in mathematics, Vedic mathematics can help them develop mental discipline and confidence in their ability to solve issues using simple calculation procedures. Vedic mathematics has not yet been able to realise its full potential despite all the good and ongoing efforts in this area since it is not generally acknowledged in all Indian schools and educational institutions. Since it is only included in the official school curriculum, there are no resources or clear teaching standards for teachers. The majority of people still think that Vedic mathematics is out of date or incompatible with contemporary teaching techniques since they are unaware of this.The possibility of implementing Vedic mathematics in India's educational system in a way that complies with the National Education Policy 2020 is examined in this paper, along with the obstacles that must be addressed, the roles of various stakeholders, including parents, legislators, and mentors/teachers, and how we can ensure that the implementation of Vedic mathematics is successful and long-lasting for the benefit of our students' overall development.

FINDINGS AND DISCUSSION

Lack of Awareness Among Educational Stakeholders

The lack of knowledge about Vedic mathematics among those involved in education, such as parents, instructors, and students, is one of the common obstacles to integrating it into the common educational system, which includes schools. Most people don't know how Vedic mathematics operates or how much it can help students. However, there are occasionally a lot of misunderstandings. While some consider Vedi mathematics to be

excessively archaic, others think it has something to do with religion or possibly has nothing to do with contemporary schooling.Such misunderstandings occur because there are insufficient formal training programs for instructors and little debate about the subject in the public school system. People are less inclined to support its adoption or use in educational institutions such as schools as a result of the lack of acceptance. To get past this, we need education campaigns that raise awareness and provide a clear explanation of Vedic mathematics to all parties engaged in the educational process, including parents, teachers, mentors, and the community. Without such initiatives, the general public might not be properly informed about Vedic mathematics and might not prioritise or press for its inclusion in our educational system.

Shortage of Resources, Training, and Institutional Support

The absence of qualified instructors and appropriate teaching resources in the subject of Vedic mathematics is another significant barrier to its introduction. Since the majority of teacher training programs do not contain the curriculum of Vedic Mathematics, very few teachers are currently qualified to teach Vedic Mathematics. It has been noted that there are insufficient teaching resources, such as books, worksheets, or digital tools, to help teachers properly teach Vedic practices. It is challenging to introduce Vedic mathematics consistently throughout many schools and educational institutions in the face of such paucity and ignorance. This challenge is particularly challenging in rural areas, where people are still developing and already dealing with issues related to fundamental elementary education. Since these institutions frequently lack the fundamental teaching resources needed to fulfil the standards, implementing a novel approach like Vedic Mathematics would necessitate a large financial outlay for teacher training and the development of appropriate resources.

Resistance to Pedagogical Innovation and Curriculum Inertia

The emphasis on exam preparation in our current educational system has always resulted in strong opposition to the introduction of novel teaching strategies. Something is sometimes viewed as redundant or useless if it is not formally included in the national curriculum or board-level exams. However, many educators and school administrators may be reluctant to promote and teach Vedic Mathematics because they see it as an extra topic that is not necessary to the core curriculum. Another reason for reluctance is that teachers are accustomed to the conventional methods of instruction, and it takes time to change them. It can be challenging to implement new techniques without legislative support and teacher incentives since they call for training, rewriting instructional objectives, and altering attitudes.

The Role of Stakeholder Engagement

The study highlights that the key to overcoming these obstacles is including everyone in the educational process. Teachers are crucial to this process since they are the ones who will instruct pupils in Vedic mathematics and provide knowledge. They must be trained through a variety of workshops and professional development programs to assist them become accustomed to this approach. Teachers will feel more competent and equipped to teach Vedic mathematics to pupils if they are provided with the necessary information, teaching resources, and instructional techniques.At the same time, policymakers and curriculum developers must provide necessary support by developing clear guidelines that allow Vedic Mathematics to be included in the official curriculum, which may entail adding Vedic Mathematics as a separate additional subject or as an enrichment activity alongside regular maths lessons. Parents, who are also heavily involved in their children's education, need to know how learning Vedic mathematics helps build their child's cognitive and problem-solving capabilities for learning that will lead to a successful profession. We can establish a framework that encourages the integration of Vedic mathematics into the school curriculum by uniting all relevant communities, including educators, parents, legislators, and educational leaders.

Strategic Recommendations for Long-Term Integration

The following tactics are recommended to ensure that Vedic Mathematics is successfully and sustainably incorporated into schools in accordance with the NEP 2020 goals:

Awareness Programs

The importance of launching multiple activities to raise awareness about Vedic Mathematics, such as community presentations, teacher workshops, webinars, and seminars for parents, school shows, and displays. People will become more aware of and confident in the advantages of introducing Vedic mathematics for our children's and students' general development as a result of this.

Curriculum Integration and Resource Development

Provide tools such as worksheets, interactive materials, textbooks, and digital content that are age-appropriate and easy to understand so that Vedic Mathematics can be seamlessly included into the standard school curriculum.

Mentor/Teacher Training

Establish specialised training courses to give educators the know-how to instruct Vedic mathematics. To help train teachers and offer certification in teaching Vedic mathematics, schools, educational institutions, and non-governmental organisations can collaborate.

Pilot Programs and Research

Implement experimental initiatives to introduce Vedic Mathematics in a few schools. We can obtain important information about how well Vedic Mathematics functions in actual classrooms by monitoring student participation, performance, and feedback. Long-term research will assist in improving these tactics for broader application and removing the noted obstacles.

Policy and Financial Support

Promote Vedic mathematics' official inclusion in school curricula at the policy level. For the sake of the students' overall education, the government must provide funds for teacher preparation, the creation of instructional materials, and assistance to schools that wish to implement it.

CONCLUSION

According to this study, Vedic mathematics has the power to revolutionise how kids learn, especially when it comes to maths. Its approaches support NEP 2020's objectives, which include enhancing pupils' critical thinking, problem-solving, and holistic development. Nevertheless, there are obstacles to incorporating Vedic mathematics into the classroom, including a lack of knowledge, a lack of funding, and opposition to change. However, if educators, legislators, parents, and leaders in education collaborate, these obstacles can be surmounted.

By focussing on awareness, teacher training, curriculum integration, and policy support, Vedic Mathematics can be successfully and permanently integrated into the school education process. In addition to enhancing pupils' mathematical abilities, this will foster a deeper understanding of India's rich cultural legacy. Finally, integrating Vedic Mathematics into education can help create a more inclusive, empowered, and innovative educational system that not only supports students' entire mental growth but also prepares them for future problems.

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