ENHANCING PROBLEM SOLVING COMPETENCY THROUGH VEDIC MATHEMATICS MEDIATED PEDAGOGY AMONG ELEMENTARY SCHOOL STUDENTS

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Abstract

This paper investigates the efficacy of employing Vedic Mathematics as a pedagogical tool to enhance problem-solving competency among elementary school students. Vedic Mathematics, rooted in ancient Indian mathematical techniques, offers a unique approach characterized by simplicity and efficiency. This study explores the impact of integrating Vedic Mathematics into elementary school curriculum, focusing on its influence on students' problem-solving abilities. The findings of this study contribute to the understanding of alternative teaching methodologies in mathematics education. By examining the potential benefits of Vedic Mathematics, educators and curriculum developers gain insights into innovative strategies for improving problem-solving competencies among elementary school students. The outcomes provide implications for integrating culturally rooted mathematical practices into mainstream educational frameworks, to foster a holistic and diversified approach to mathematics education.

Keywords- *Vedic Mathematics, Problem Solving Competency, Pedagogy, Elementary School*

Introduction

Mathematics can indeed be a joyful subject! It's all about perspective and approach. Mathematics is like a fascinating puzzle that challenges our minds and encourages us to think logically and creatively. The New Education Policy (NEP) 2020 in India aims to transform the education system to meet the needs of the 21st century. While Vedic Mathematics isn't explicitly mentioned in the NEP document, the policy emphasizes the promotion of holistic and multidisciplinary education, integrating traditional knowledge systems with modern education.

In the context of the NEP 2020, the emphasis on integrating traditional knowledge systems could provide an opportunity for the inclusion of Vedic Mathematics in the curriculum, although its adoption would likely depend on individual state policies and the discretion of educational institutions. Overall, the NEP encourages a more inclusive and flexible approach to education, which could potentially accommodate the incorporation of Vedic Mathematics if there is sufficient demand and evidence of its efficacy (NEP, 2020).

The "Vedic Mathematics" is called so because of its origin in the Vedas. To be more specific, it originated from "Atharva Vedas" the fourth Veda. "Atharva Veda" deals with branches like Engineering, Mathematics, sculpture, Medicine, and all other sciences of which we are today aware. The Sanskrit word Veda is derived from the root Vid, meaning to know without limit. The word Veda covers all Veda-Sakhas known to humanity. The Veda is a repository of all knowledge, fathomless, ever revealing as it is delved deeper. Vedic mathematics, which simplifies arithmetic and algebraic operations, has increasingly found acceptance the world over. Experts suggest that it could be a handy tool for those who need to solve mathematical problems faster by the day. It is an ancient technique, which simplifies multiplication, divisibility, complex numbers, squaring, cubing, square roots, and cube roots. Even recurring decimals and auxiliary fractions can be handled by Vedic mathematics. Vedic Mathematics forms part of Jyotish Shastra which is one of the six parts of Vedangas. The Jyotish Shastra or Astronomy is made up of three parts called Skandas. A Skanda means the big branch of a tree shooting out of the trunk. This subject was revived largely due to the efforts of Jagadguru Swami Bharathi Krishna Tirtha Ji of Govardhan Peeth, Puri Jaganath (1884-1960). Having researched the subject for years, even his efforts would have gone in vain but for the enterprise of some disciples who took down notes during his last days. The basis of Vedic mathematics, are the 16 sutras, which attribute a set of qualities to a number or a group of numbers.

Significance of Problem-Solving Skills in Elementary Education

Problem-solving abilities are crucial in elementary education for a variety of reasons:

> **Critical Analysis**: Problem-solving fosters critical thinking, enabling students to objectively assess and interpret information, and improving their decision-making skills.

> **Life Competencies**: Early exposure to problem-solving equips students with skills applicable in academic, personal, and professional contexts, enhancing their ability to handle challenges effectively.

- ➢ **Resilience Building**: By confronting and resolving problems, students cultivate resilience, learning to persevere through obstacles, which contributes to their emotional and mental well-being.

- ➢ **Promotion of Creativity**: Problem-solving encourages innovative thinking, inspiring students to explore diverse perspectives and devise original solutions.

- ➢ **Collaborative Skills**: Many problems necessitate teamwork for resolution, teaching students' effective collaboration, communication, and respect for differing viewpoints.

- ➢ **Future Readiness**: Given the dynamic nature of the modern world, problem-solving skills are highly prized in the workforce, preparing elementary students for future professions that demand adaptability and creative problem-solving.

- ➢ **Personal Empowerment**: Engaging in problem-solving activities empowers students to take charge of their learning journey, boosting confidence in their abilities and fostering independence as learners.

Challenges in Teaching Mathematics and Fostering Problem-Solving Abilities

Teaching mathematics and nurturing problem-solving abilities can pose several hurdles. Some of them are as follows:

- ➢ **Grasping Concepts**: Ensuring students comprehend foundational mathematical ideas is pivotal. Yet, abstract concepts and intricate theories can be daunting, demanding educators to employ varied teaching methods catering to diverse learning styles.

- ➢ **Math Anxiety**: Many students battle math anxiety, impeding their problem-solving prowess. Overcoming this anxiety necessitates cultivating a supportive environment where students feel safe to make mistakes and seek assistance.

- ➢ **Resource Constraints**: Scarce materials like textbooks, manipulative, and technology tools can limit hands-on learning experiences vital for honing problem-solving skills in math.

- ➢ **Time Pressures**: With jam-packed curricula and limited class time, educators may struggle to dedicate ample time to problem-solving tasks. This urgency to cover content may prioritize rote memorization over deep understanding and problem-solving abilities.

- ➢ **Assessment Challenges**: Conventional assessment methods often favor procedural knowledge over problem-solving skills. Crafting assessments that accurately gauge problem-solving abilities while meeting curriculum demands is a hurdle.

- ➢ **Teacher Preparation**: Not all educators receive sufficient training in effectively teaching problem-solving strategies. Ongoing professional development focusing on math instruction and problem-solving facilitation is imperative.

- ➢ **Diverse Learner Needs**: Students hail from diverse backgrounds with varying levels of proficiency. Tailoring instruction to accommodate all learners, including those with learning challenges or language barriers, requires additional support.

> ➤ **Sustaining Engagement**: Maintaining student interest and motivation in mathematics can be tricky, especially if they view the subject as difficult or irrelevant. Integrating real-world contexts, interactive tasks, and engaging puzzles can bolster interest and motivation.

Vedic Mathematics as an Alternative Pedagogical Approach

Vedic Mathematics originates from ancient Indian mathematical texts called the Vedas, specifically the Atharvaveda and the Yajurveda. These texts, dating back to around 1500-500 BCE, contain mathematical concepts and techniques that were used for various calculations, rituals, and philosophical purposes. Vedic Mathematics presents an alternative approach to teaching Maths, drawing from ancient Indian mathematical principles found in Vedas, the ancient Hindu scriptures. Here's a breakdown of its key features as an alternative pedagogical method:

- Ancient Wisdom: Derived from ancient texts, Vedic mathematics offers alternative techniques for arithmetic, algebra, and geometry, providing fresh perspectives on problem-solving.
- Efficiency and Simplicity: It emphasizes streamlined, mental calculation methods, simplifying complex operations and making math more accessible to learners.
- Visualization: Vedic math encourages mental imagery to tackle problems, fostering deeper understanding and enhancing problem-solving skills through visualization.
- Adaptability: Its techniques can be flexibly applied across different math topics and skill levels, allowing educators to tailor instruction to meet diverse student needs.
- Engagement: Its unconventional methods often captivate student interest, injecting enthusiasm into learning and promoting a positive attitude toward mathematics.
- Cultural Context: Integrating Vedic mathematics offers insights into ancient Indian culture and history, enriching students' understanding of diverse mathematical traditions.
- Critical Thinking: By encouraging exploration of various problem-solving approaches, it fosters critical thinking, challenging students to think creatively and analytically.

Potential Of Vedic Mathematics to Enhance Problem-Solving Skills

Vedic mathematics offers promising avenues for enhancing problem-solving skills in several ways:

Efficiency

- Its techniques enable rapid problem-solving, fostering adaptability and creativity as students learn to approach problems with agility.

Visualization

- By relying on mental imagery, Vedic methods develop spatial reasoning, a crucial skill for problem-solving across various domains.

Pattern Recognition

- Emphasizing pattern recognition, Vedic mathematics cultivates students' ability to discern underlying structures in problems, facilitating application across diverse contexts.

Diverse Approaches

- Offering alternative methods for traditional operations, Vedic mathematics encourages students to explore varied problem-solving strategies, fostering flexible thinking.

Engagement

- Its unconventional nature captivates student interest, promoting active participation and a positive attitude towards tackling challenges.

Cultural Context

- Integrating Vedic mathematics provides cultural insights, enriching students' understanding and appreciation for mathematics within a broader historical context.

Empirical Evidence on the Effectiveness of Vedic Mathematics

(1998) studied comparing Vedic Sutra-based multiplication to conventional methods at the third-grade level and found that students using the Vedic approach achieved higher scores, retained more skills, and enjoyed computation more. They also computed more efficiently and performed more mental calculations. Structured interviews revealed that Vedic-based computation was perceived as easier, more enjoyable, and more motivating than conventional methods. Also, in 2017 Bhargava & Arya examined that all of mathematics is founded upon sixteen Sutras or word formulae. Vedic mathematics is not only beneficial for arithmetic computations but also aids in problem-solving across various branches of mathematics such as Algebra, Trigonometry, and Calculus. It facilitates faster computations and assists in deriving accurate solutions to problems. Further, in 2017 Smitha explored that Vedic Sutras are highly effective in enhancing Critical Thinking Ability and accelerating Computational Speed among the sample under examination. This research focused on investigating the impact of Vedic Mathematics on improving Computational Speed.

In 2018, Bawa revealed that the nature of mathematics often presents challenges for students in understanding concepts and performing calculations smoothly. Integrating multimedia with technology in teaching can enhance student learning. Combining multimedia with Vedic mathematics offers a pathway for students to work smarter. The simple yet effective methods of Vedic Mathematics enable students to solve complex problems with ease. Utilizing multimedia to teach Vedic mathematics can also aid in the development of students' mathematical skills. This paper aimed to integrate technology and Vedic aphorisms into mathematics pedagogy to enhance students' multiplication skills.

In 2022, Day et al. exhibited initially low problem-solving skills in the pretest, but these skills significantly improved in both the post-test and retention tests. Moreover, their motivation towards Mathematics was

initially rated as highly motivated, and this remained consistent after the intervention, albeit with a higher mean. Additionally, there was a notable difference observed between the pre-test-post-test and pre-test-retention test scores, indicating significant improvement in students' problem-solving skills over time.

Research Objectives

- To explore the theoretical basis and potential effectiveness of Vedic mathematics in improving problem-solving competency among elementary students.
- To propose a pedagogical framework that integrates Vedic mathematics into the existing curriculum to improve problem-solving competencies.
- To provide recommendations for educators and policymakers on implementing Vedic mathematics-mediated pedagogy in elementary education.

Methodology of the Study

The researchers conducted a comprehensive review of existing literature on Vedic mathematics, problem-solving competencies, and pedagogical strategies for elementary education. This will help to establish the theoretical foundation for the study. Moreover, the researchers were also engaged with educational experts and practitioners to refine the study to gather qualitative insights.

Integrating Vedic Mathematics into the Elementary School Curriculum

Integrating Vedic Mathematics into the elementary school curriculum can significantly benefit students' mathematical proficiency and problem-solving skills. Here's a step-by-step guide on how to effectively implement it:

- ✓ **Teacher Training:** Conduct professional development sessions to familiarize teachers with Vedic mathematics principles, techniques, and teaching methods. This training should focus on practical strategies for integrating Vedic mathematics into existing curriculum standards.
- ✓ **Curriculum Alignment:** Ensure that Vedic mathematics lessons are aligned with elementary math curriculum standards. Identify specific topics or concepts where Vedic techniques can complement traditional instruction, creating a seamless integration.
- ✓ **Gradual Introduction:** Introduce Vedic mathematics gradually, starting with simple techniques and progressively incorporating more complex ones as students advance through grade levels. This approach allows students to build confidence and proficiency in using Vedic methods over time.
- ✓ **Hands-on Learning:** Implement hands-on, interactive activities that engage students in exploring Vedic mathematics concepts. Utilize manipulatives, visual aids, and real-world examples to make learning tangible and enjoyable.
- ✓ **Interdisciplinary Connections:** Explore connections between Vedic mathematics and other subjects, such as history and culture. Use Vedic mathematics as a gateway to understanding the

historical and cultural context of ancient Indian civilization, fostering interdisciplinary learning experiences.

- ✓ **Problem-solving Emphasis:** Place a strong emphasis on problem-solving skills in Vedic mathematics lessons. Encourage students to apply Vedic techniques to solve a variety of mathematical problems, promoting critical thinking and creativity.

- ✓ **Differentiated Instruction:** Differentiate instruction to meet the diverse needs of students. Provide support and extension activities to accommodate varying levels of proficiency and learning styles, ensuring that all students can benefit from Vedic mathematics instruction.

- ✓ **Assessment Strategies:** Develop assessment tools that align with Vedic mathematics principles and emphasize problem-solving abilities. Incorporate both formative and summative assessments to monitor student progress and understanding of Vedic techniques.

- ✓ **Engage Parents and Community:** Involve parents and the community in supporting Vedic mathematics integration. Offer resources, workshops, and information sessions to educate parents about Vedic techniques and encourage their involvement in supporting students' learning at home.

Vedic Mathematics: Principles and Techniques

Vedic Mathematics is a system of mathematical techniques and principles that originated in ancient India, particularly described in ancient Indian texts known as the Vedas (Jha & Singh, 2009). This system is attributed to the Indian mathematician and scholar Bharati Krishna Tirthaji, who compiled and rediscovered these techniques from Vedic literature (Williams, 2001). The principles and techniques of Vedic Mathematics are characterized by their simplicity, efficiency, and reliance on mental calculations. For example, the "Vertically and Crosswise" method is used for multiplication of numbers, breaking down multiplication into simpler steps (Williams, 2001). Vedic Mathematics relies on a set of concise formulae or aphorisms (sutras) that encapsulate various mathematical operations (Jha & Singh, 2009).

Overall, Vedic Mathematics is characterized by its holistic approach to mathematical problem-solving, emphasizing mental agility, pattern recognition, and efficiency (Williams, 2001). While some scholars debate the historical accuracy and practicality of Vedic Mathematics in modern education (Jha & Singh, 2009), its principles continue to influence alternative approaches to teaching mathematics, particularly in cultivating problem-solving skills and numerical fluency.

The principles and techniques of Vedic Mathematics are characterized by their simplicity, efficiency, and reliance on mental calculations. Here are some key principles and techniques commonly associated with Vedic Mathematics:

1. **Vertically and Crosswise (Urdhva-Tiryagbhyam)**:

   - This is a technique used for multiplication of numbers. It involves breaking down multiplication into simpler steps using vertical and crosswise operations, reducing the complexity of traditional multiplication methods.

2. **Sutras (Formulae)**:

   - Vedic Mathematics relies on a set of concise formulae or aphorisms (sutras) that encapsulate various mathematical operations. Some notable sutras include:

     - **Ekādhikena Pūrvena**: "By one more than the previous one"

     - **Nikhilam Navatashcaramam Dashatah**: "All from 9 and the last from 10"

     - **Urdhva-Tiryagbhyam**: "Vertically and Crosswise"

3. **Duplex (Dvandva-Yoga)**:

   - This technique is used for squaring numbers that end in the digit 5. It simplifies the process of squaring by using specific arithmetic operations.

4. **Digital Roots and Casting Out Nines**:

   - Vedic Mathematics employs techniques such as finding digital roots (sum of digits repeatedly until a single-digit number is obtained) and casting out nines (a method for checking arithmetic accuracy by using modular arithmetic with the number 9).

5. **Direct Calculations**:

   - Vedic Mathematics emphasizes direct and mental calculations, minimizing the need for complex written methods. It encourages mental visualization and quick arithmetic.

6. **General Mental Math Techniques**:

   - Vedic Mathematics promotes various mental math techniques such as breaking down numbers, finding complements, and leveraging patterns in numbers to simplify calculations.

7. **Applications to Algebra and Geometry**:

   - Beyond basic arithmetic, Vedic Mathematics extends to algebraic and geometric concepts, providing alternative methods for solving equations and geometric problems.

8. **Speed and Accuracy**:

   - One of the primary aims of Vedic Mathematics is to enhance the speed and accuracy of mathematical calculations, particularly through mental arithmetic.

Overall, Vedic Mathematics is characterized by its holistic approach to mathematical problem-solving, emphasizing mental agility, pattern recognition, and efficiency. While some scholars debate the historical accuracy and practicality of Vedic Mathematics in modern education, its principles continue to influence alternative approaches to teaching mathematics, particularly in cultivating problem-solving skills and numerical fluency.

Sixteen Main Sutras Of Vedic Mathematics With Their Meanings And Applications

S.No	Sutra	Meaning	Application
01	**Ekadhikena Purvena**	By one more than the previous one	Example: 23 × 24 can be solved as (23 × 23) + 23
02	**Nikhilam Navatashcaram**	All from 9 and the last from 10	Example: To multiply 98 by 94, you can subtract each number from 100, giving you 2 and 6. So, 98 × 94 = 9204
03	**Urdhva-Tiryagbhyam**	Vertically and crosswise	Example: To find the product of 12 and 13, you multiply vertically (1 and 1) and crosswise (1 with 3 and 2 with 1), giving 156
04	**Paravartya Yojayet**	Transpose and adjust	Example: Subtract 375 from 1000. This gives you 625. Then, to find 625², you transpose the numbers (625 + 375) and adjust, giving 390625
05	**Shunyam Saamyasamuccaye**	When the sum is the same, that sum is zero	Example: To multiply 17 by 13, you subtract the sum (17 + 3) from 20, giving 7. So, 17 × 13 = 221
06	**Anurupyena**	Proportionately	Example: If you want to find the square of 15, which is 3 more than 12, you add the square of 3 (which is 9) to 12² (which is 144), giving 225
07	**Sankalana-Vyavakalanabhyam**	By addition and by subtraction	Example: To find 21 × 29, you subtract 1 from both (giving 20 and 30) and multiply them (giving 600). Then, you add 1 to the result (giving 601) to get the answer 609
08	**Puranapuranabhyam**	By the completion or non-completion	Example: If you want to find 37 × 39, which is 3 less than 40, you complete the number to 40 and then subtract (giving 1480 - 3 = 1477)

S.No	Sutra	Meaning	Application
09	Chalana-Kalanabyham	Differences and Similarities	Example: To find 35 × 35, you add the difference (5) to the number (35) and multiply (giving 35 + 5 = 40 and 40 × 30 = 1200)
10	Yavadunam	Whatever the extent of its deficiency	Example: To find 98 × 98, you multiply 100 by 98 and then subtract 2 (giving 9604 - 2 = 9602)
11	Vyashtisamanstih	Part and Whole Agreement	Example: To find 15% of 40, you find 10% (which is 4) and then add half of 10% (which is 2) to get 6
12	Shesanyankena Charamena	The remainders by the last digit	Example: To find 63% of 50, you find 50% (which is 25) and then subtract the remainder by the last digit (3 × 5 = 15, so 25 - 15 = 10)
13	Sopaantyadvayamantyam	The ultimate and twice the penultimate	Example: To find the square of 25, you take twice the penultimate (2 × 2 = 4) and the ultimate (5) to get 625
14	Ekanyunena Purvena	By one less than the previous one	Example: To find 9 × 11, you subtract 1 from 10 and then add the deficit (giving 90 + 9 = 99)
15	Gunitasamuccayah	The product of the sum is the sum of the product	Example: To find the product of 12 and 13, you add them (25) and then multiply (giving 12 × 13 = 156)
16	Gunakasamuchyah	The factors remain the same when the product is the same	Example: To find 24 × 25, you subtract 1 from both (giving 23 and 24) and then multiply (giving 552)

Key Techniques & Methods Used In Vedic Mathematics Relevant To Problem-Solving Skills

Vertically and Crosswise

- Method for multiplication involving vertical and crosswise calculations, particularly for two- and three-digit numbers.

All from 9 and the last from 10

- Simplifies subtraction, especially with numbers close to multiples of 10, by complementing numbers to 10.

By One More than the Previous One

- Facilitates squaring numbers ending in 5 and certain types of multiplication by appending 25.

Completing the Whole

- Used for factoring and solving algebraic equations by completing numbers to form perfect squares or cubes.

Digit Sums

- Involves finding solutions to arithmetic problems, factorization, and identifying number patterns based on digit sums.

Multiplication by 9s

- Simplifies multiplication by exploiting patterns in the number system and using complementary numbers.

Proportionality

- Helps solve problems involving ratios, percentages, and fractions by leveraging proportional relationships between numbers.

Transpose and Apply

- Simplifies calculations by transposing numbers and applying appropriate operations, particularly useful for solving equations and algebraic manipulations.

Developing problem-solving skills through Vedic Mathematics

Vedic Mathematics serves as a powerful tool for developing problem-solving skills in students through its emphasis on visualization, flexibility, and efficiency. By leveraging mental calculation techniques and encouraging students to explore multiple problem-solving approaches, Vedic Mathematics enhances their ability to tackle complex problems with creativity and confidence. Additionally, the focus on pattern recognition enables students to identify underlying structures in problems, facilitating generalized problem-

solving strategies. The practical applications of Vedic Mathematics in real-world scenarios further motivate students by demonstrating the relevance and utility of their problem-solving skills. Moreover, integrating Vedic Mathematics into the curriculum provides cultural context, offering insights into ancient Indian mathematical traditions and fostering a broader understanding of mathematics. Through collaborative learning and teamwork, students not only share insights but also develop essential interpersonal skills crucial for successful problem-solving in diverse contexts. Overall, Vedic Mathematics offers a holistic approach to problem-solving that empowers students to become more proficient, resourceful, and effective problem-solvers.

Educational Implications

☐   Vedic Mathematics is a valuable tool for teaching mathematics effectively.

☐   It facilitates efficient learning and saves time for students.

☐   Vedic Mathematics sparks students' interest in mathematics, which is often perceived as dull and uninteresting.

☐   Utilizing Vedic mathematics techniques may alleviate students' anxiety levels during problem-solving.

☐   Students should be encouraged to utilize their leisure time for activities that enhance their mathematical skills, such as reading Vedic Mathematics books and solving puzzles.

Recommendations

☐   Educators should encourage teachers to develop a habit of reading books related to Vedic Mathematics.

☐   Schools should organize guest lectures by experts in Vedic Mathematics to inspire students and enhance their problem-solving skills.

☐   Vedic Mathematics-related books should be made available in school libraries to facilitate students' access to resources.

☐   Students could be incentivized with Vedic Mathematics books to encourage their interest and engagement in the subject.

☐   Every mathematics teacher needs to be well-versed in Vedic mathematics concepts.

☐   Mathematics educators should foster an interest in incorporating Vedic Mathematics techniques into their teaching practices.

☐   Allocating some class time for utilizing Vedic Mathematics tricks would encourage active student participation in problem-solving activities.

☐   Effective teaching methods should be employed to enhance students' attitudes and achievements in mathematics.

☐   Continuous assignments should be assigned to students to reinforce learning.

☐ Optimizing class size to around 40 students could enable teachers to provide individual attention to students.

☐ Schools should recognize that classrooms serve not only as spaces for imparting knowledge but also for nurturing students' creative abilities and talents.

☐ Teachers should cultivate a positive attitude towards Vedic Mathematics to promote its integration into the curriculum.

☐ Creating a conducive and encouraging classroom environment is crucial for fostering effective learning experiences.

Conclusions and Future Implications

Vedic Mathematics offers a quick and enjoyable approach to learning and mastering mathematics. With its efficient calculation methods, students can solve problems faster, making mathematics more engaging. The Vedic method fosters a deeper understanding of numbers and their relationships, making learning memorable and lasting. This skill is invaluable for modern competitive exams, where speed and accuracy are essential. In conclusion, teachers should promote the learning of Vedic Mathematics among students. It should be integrated into the school curriculum, particularly at the elementary level, as a supplementary subject to mathematics. Dedicated time for practicing Vedic math techniques can enhance problem-solving skills and foster active engagement. Moreover, Vedic Mathematics has the potential to nurture students' artistic abilities and talents, while also alleviating the fear of mathematics. Overall, it has the power to spark interest and enthusiasm for mathematics among students.

Future Implications: The positive outcomes of this study suggest several implications for future educational practices and research:

- **Curriculum Development**: There is a potential for incorporating Vedic Mathematics more extensively into the mathematics curriculum to support and enhance traditional teaching methods.

- **Teacher Training**: Professional development programs for teachers could include training in Vedic Mathematics to equip them with alternative pedagogical strategies that can be adapted to various learning styles.

- **Further Research**: Longitudinal studies could provide insights into the long-term effects of Vedic Mathematics on students' mathematical competencies and their application in real-world scenarios.

- **Technology Integration**: The development of digital tools and platforms that incorporate Vedic Mathematics could further support interactive and engaging learning experiences.

- **Global Application**: Considering the universal nature of mathematics, the findings of this study could encourage the adoption of Vedic Mathematics mediated pedagogy in diverse educational contexts worldwide.

By continuing to explore and validate the effectiveness of Vedic Mathematics in education, teachers can work towards creating a more dynamic and robust mathematical learning environment for students.

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