Effectiveness of Vedic Mathematics in Present Scenario

Poonam Bajpai
Assistant Professor,
Deptt. of Mathematics,
MBP Govt. P.G.College,
Ashiana, Lucknow

Abstract

Vedic Maths is a boon given to this world by the ancient scholars of India. The simplicity of Vedic Mathematics or science of calculation means that calculations can be carried out mentally. As we know, Skills are very important for children in the age of competitive era; Vedic Mathematics is a skill development activity and is good for children as per their age. Vedic Maths helps in nurturing the brain, concentrating on a particular problem and in developing a spiritual blend. Apart from mental maths, Vedic Mathematics is a compilation of tricks that help in solving mathematical calculations to a certain extent easily. Vedic Mathematics is an Indian ancient system of mathematical operations or calculations techniques developed in the year of 1957. Students of age 12 years or class 6th onwards can start vedic maths. Vedic maths is limitless and is a very powerful concept, useful for entire career. There is no age bar for learning vedic maths.

The govt. approved organization AVAS is the best place for learning vedic maths. Some other organizations are also working for enhancing the knowledge of vedic maths. In this paper, some problems based on multiplications, squares and simultaneous equations were distributed to 23 students, who were appearing for competitive examinations .They had to solve questions without and with using Vedic methods techniques. This paper focuses on effectiveness of Vedic mathematics techniques which takes lesser time for solving problems and improves the speed significantly than our orthodox methods.

Keywords: Vedic Maths, Mathematics Problems, Paired T-Test, Calculations.

Introduction

One of the oldest tradition was that information were transformed orally by sacred sages (rishis) from generation to generation. Vedic mathematics, the part of the fourth Veda, Atharva-veda, is different from the others in hymns, magical incantations or spells for personal and domestic use. The terse sutras, like sutras of Vedic mathematics, were composed to ensure that information would be preserved even if written records were lost or damaged. Since many centuries, Vedic mathematics is considered as an ancient system which helps to improve calculation skills. The system is based on shortcut tricks which make it easier for complex calculations. Vedic Mathematics was rediscovered between the years in AD 1911 and 1918. The god gifted scholar, saint and Indian mathematician Jagadguru Shri Bharathi Krishna Tirthaji , born in March 1884 in Puri village of Orissa state, was very good in subjects like humanities, science and mathematics. When he was practicing meditation, he instinctively rediscovered the vedic sutras/techniques from Vedas directly or indirectly. He wrote the introductory volume of 16 sutras called as Vedic Mathematics in the year 1957 and passed away in1960.

Vedic Mathematics is a collection of Sutras / Techniques to solve mathematical numerical calculations in easy and faster way than our usual methods. It has 16 Sutras and 13 sub-sutras which can be used for problems involved in algebra, arithmetic, calculus (differential and integral), conics(geometrical and analytical) and geometry (plane and solid)etc.. Although the sutras are written in Sanskrit but are easy to remember and understand. These help to develop aptitude, encourage innovation and enhance logical thinking. Sometimes solving mathematical problems are complex and time taking by using regular mathematical steps. But using Vedic Mathematics General Techniques and Specific Techniques, numerical calculations can be done very fast and accurately. Vedic Maths Techniques/Sutras have the maths tricks for fast calculation in order to solve the questions like aptitude or reasoning problems etc. and

can be used in competitive exams like Banking Exams ,CAT, CTET, SAT,SSC, TET etc.

The Vedic mathematics has mainly 16 formulas which can solve some basic mathematical operations like subtraction, multiplication of numbers near to base, division , square, square root, cube, cube root, calendar problem, time and simultaneous equations etc..

Aim of the Study

1. To preserve our traditions through awareness programs.
2. To reduce Maths phobia completely and lead students to be self- dependent,
3. To increase accuracy, aptitude, speed, innovative ideas and logical thinking,
4. To reduce more dependency on devices like calculators, computers etc.
5. To increase mental ability and intelligence.

Review of Literature

By reviewing the related literature, the problem becomes clear and it directs the researcher to proceed in this subject. The Vedic mathematics techniques have become popular not only in India but also in abroad. Some foreign mathematicians like Andrew Nicholas ,Mark Gaskell, Jeremy Pickles and Kenneth Williams expressed their interest and delivered lectures by extending the Bharathi Krishna Thirthaji introductory book. It is usually introduced in syllabi followed at educational institutes worldwide because the system is versatile in nature. Moreover, the scientists working in NASA also use some principles in the sphere of artificial intelligence.

Need of the Study

Mathematics is very important for our children, high profile personalities and labourers. Therefore everyone should have the knowledge of mathematics upto some extent. Holistic development of the human brain (left and right side both) along with multidimensional thinking takes place through Vedic Mathematics. With the help of Vedic Maths, one can learn and become master with minimum efforts in a very short span of time and can convert into a playful and an enjoyable subject. So it is our teacher's duty to preserve our traditions. The student can save a second answering a math problem, he can attempt more questions within the stipulated time.

Ancient Indian Vedic civilizations are known for being skilled in algebra, computational mathematics and geometry, complex enough to include other topics like irrational numbers. Many schools and universities use Vedic mathematics as an alternative system of mathematics in modern mathematics today. It encourages mental calculations without the use of slate, paper, pen or pencil which develops the concentration as well as confidence abilities.

Some Sutras Used in this Paper

This study considers some Vedic mathematics techniques, which includes the following four sutras.

1. Nikhilam Navatas´Charamam Dashatah

(all from 9 and the last from 10):

\# To find the product of three digit numbers, $e.g. 996 \times 994$

The steps are as follows-

S.No.	I part	II part	Steps(Working Rule)
1.	996	-4(996-1000 =Deviation)	996 is 4 less than the base1000 (since 996 is 3 digit no. so zeros in base are 3, i.e.1000)
2.	994	-6(994-1000 =Deviation)	994 is 6 less than the base 1000 (Since 996 is 3 digit no. so zeros in base are 3, i.e.1000)
3.	996-6=990 994-4=990 (LHS)	-4×-6 (Multiply) (RHS)	Put the cross value (subtract 6 from 996 and4 from 994) on LHS, Multiply the differences on RHS
4.	**990**	Use **024** (since base is 1000)	Final Answer of $\mathbf{996 \times 994 = 990024}$

\#To find square of numbers less than the base 100, $e.g. 97^2$

The steps are as follows-

S.No.	I part	II part	Steps(Working Rule)
1.	97	-3(97-100 =Deviation)	97 is 3 less than the base100, since 97 is two digit no. ,so base is 100
2.	97-03=94	$(3)^2 = 9$	(Given number – Deviation) on LHS ,given no.=97&deviation=03 Square of Deviation on RHS
3.	94	Use 09(since base is 100)	Final Answer of $97^2 = 9409$

\#To find square of numbers more than the base 100, $e.g. 102^2$

The steps are as follows-

S.No.	I part	II part	Steps(Working Rule)
1.	102	2(102-100= Deviation)	102 is 2 more than the base100,
2.	102+02=104	$(2)^2 = 4$	(Given number +Deviation)on LHS,given no.=102&deviation=2 Square of Difference on RHS
3.	104	Use 04 (since base is 100)	Final Answer of $102^2 = 10404$

2.Ekadhikena Purvena

(by one more than the previous one):

#To find Square of numbers ending with 5,   e.g.$(25)^2$

The steps are as follows-

S.No.	Ipart	IIpart	Steps(Working Rule)
1.	2(2+1)=6	$5^2 = 25$	Previous digit is2,multiply it by 3(one more than 2is 3)on LHS last digit is 5,square of 5 on RHS for every problem
2.	**6**	**25**	Final Answer of $(25)^2 = 625$

3. Anurupye Shunyamanyat

(If one is in ratio, other is zero):

To find the solution of special type of simultaneous equations, e.g. 3 x + 5 y = 7

6 x + 4 y = 14

Here, in these equations, the ratio of coefficient of x and the constant term is same i.e.$\frac{3}{6} = \frac{7}{14} = \frac{1}{2}$

Therefore, by this method, y =0 and x=7/3

4. Sankalana Vyavakalanabhyam

(by addition and subtraction)

To find the solution of special type of simultaneous equations where coefficient of x and coefficient of y are interchanged, e.g.

5 x – 3 y = 7

3 x – 5 y = 1

By adding these equations,

8 x – 8 y = 8, i.e. x – y = 1

By subtracting these equations,

2 x + 2 y = 6, i.e. x + y = 3

Again repeating the same sutra,

We get x = 2 and y = 1

Research Question

Are Vedic Mathematics methods effective to improve speed and reduce the time?

Sample Problem

There were 23 students of undergraduate level of my college situated in Lucknow, who were preparing for competitive exams, participated in the study. They were taught vedic maths techniques for 15 days regularly.

To test the effectiveness of vedic methods, five mathematical problems based on multiplication, square near to the base and simultaneous equations were distributed to the students for 15 minutes duration. The data was collected and evaluated before and after using Vedic maths techniques, noting the time and the score of the students.

A hypothesis is developed and tested its significance using paired t-test.   The time (min.) taken by 23 students are listed as follows:

Table : Paired t-test table for before and after using Vedic Maths methods

S.No.	Before using vedic maths methods (x)	After using vedic maths methods (y)	Difference ($d = x - y$)	$d^2 = (x - y)^2$
1	12	10	2	4
2	10	7	3	9
3	10	6	4	16
4	11	9	2	4
5	15	8	7	49
6	10	6	4	16
7	12	6	6	36
8	14	7	7	49
9	15	12	3	9
10	11	8	3	9
11	15	7	8	64
12	14	9	5	25
13	10	7	3	9
14	14	6	8	64
15	12	8	4	16
16	10	8	2	4
17	11	8	3	9
18	15	9	6	36
19	12	7	5	25
20	14	10	4	16
21	10	7	3	9
22	12	8	4	16
23	13	12	1	1
	Total		$\sum d = 97$	$\sum d^2 = 495$

With paired t –test,
Let,

Null Hypothesis (H_0: μ_d= 0) , Mean score before and after using Vedic Maths Methods are equal. In other words, there is no significant difference between before and after using Vedic Maths methods while solving some basic mathematical problems.

Alternative Hypothesis (H_a: ≠   )   , (Two tailed)

H_a: There is a significant difference between before and after using Vedic Maths methods while solving some basic mathematical problems.

By using this formula, we can get calculated value of t,

$$t = \frac{(\sum d)/n}{\sqrt{\frac{\sum d^2 - ((\sum d)^2/n)}{(n-1)n}}}$$

From the above table: n (number of students) = 23, $\sum d = 97, \sum d^2 = 495$

Calculated value of t is 10.235057

Here df (degrees of freedom) = 23-1= 22,

Tabulated value of t = 2.07 (at 5% = 0.05 level of significance)

But the calculated value of t is greater than the tabulated value. So we can reject the null hypothesis and accept alternative hypothesis .From the alternative hypothesis we can conclude that Vedic mathematics techniques improve the speed of calculations and reduce the time while solving some basic mathematical problems.

Limitations and Future Scope

In this paper sample size is very small, only a few methods are discussed. This study requires more students and methods in the future.

Conclusion

The study will be helpful for those who designs the curriculum to bring the necessary changes to equip the teachers for being more competent in Vedic Mathematics. This paper statistically proved effectiveness of Vedic mathematics techniques significantly for completing basic mathematical problems for any competitive examinations.

More and more use of Vedic Mathematics, cultivates an interest for numbers without any doubts, sharpens the mind, increases mental ability, intelligence and develops the brains by increasing visualization and concentration abilities. By continuous practice of Vedic mathematics techniques, one can reduce the fear of maths and become expert to solve tedious and cumbersome mathematical operations in a simple way. Thus, Vedic Mathematics is a unique technique of calculations that is based on simple principles and rules, applying which, any kind of mathematical problems can be solved orally.

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