Vedic Mathematics: Its impact on Children with Special Needs

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Abstract

Vedic Mathematics is a method applied in the field of mathematics, which solves the tricky mathematical problems in no time. It is a tool which used by some teachers of mathematics to lower down the long calculations and make mathematics an interesting subject. One who has good grip on this can do extremely well in the field of Mathematics. It is a branch of Mathematics which was not commonly known by the people, but Late *Jagadguru Sri Bharati Krishan Tirthaji Maharaj* made it familiar to the people. This branch can help any student who wants to shine in the field of Mathematics. Children with Special Needs can also be taught through Vedic Mathematics. As these children face problems in solving long mathematical sums, Vedic Mathematics can do wonders for them. Through Vedic Mathematics the long process of calculations will be minimized and these children will be able to understand how to solve the mathematical problems. The present paper is an attempt to know to what extent Vedic Mathematics can improve the Mathematical skills of Children with Special Needs. Thirty (30) Children with Special Needs of Grade IX were taken as sample form Government Schools of Chandigarh. After providing twenty (20) days intervention to the experimental group and twenty (20) days intervention to the control group, improvement was seen in the marks scored by Children with Special Needs (experimental group) in post-test as compared to the pre-test.

Introduction

Mathematics is an important subject for all the students until the grade X. It has been seen that students usually score better in other subjects as compared to Mathematics. They find mathematical calculations very long and complicated. There can be many reasons for this, for example, lack of practice, poor understanding of problems, non-clarity of basic and other mathematical concepts, etc. When the normal children find it difficult to understand the Mathematical calculations then it can be very well imagined how complex it is for Children with Special Needs. To make the Children with Special Needs compatible in learning Mathematics, ways are required to be found which may help these children to understand Mathematics in an interesting manner. Vedic Mathematics is one of such methods which can help these students to learn Mathematics without any falling prey to any complicated calculations.

The term Vedic Mathematics is made up to two words respectively Vedic and Mathematics. The term Vedic is derived from the Sanskrit word "Veda" which means knowledge, and Mathematics is cited as *'Ganita'* in Hindu Methodology which implied as the 'Science of Calculations'.

“Vedic Mathematics" refers to a procedure of calculation based on a set of 16 Sutras, or aphorisms, as algorithms and their upa-sutras or corollaries derived from these Sutras. Its enthusiasts advance the claim that any mathematical problem can be solved mentally with these sutras.

According to A.P. Nicholas (1984) Vedic Mathematics system is ‘one of the most delightful chapters of the 20th century Mathematical history'.

Prof. J.N. Kapur described Vedic Mathematics as a tool which can be used to remove the Mathematical phobia, and can be taught to school going children as fortification material along with other high speed methods.

In the words of J.T. Glover (London, 1995), the experience of teaching Vedic Mathematics' methods to children has shown that a high degree of Mathematical ability can be attained from an early stage while the subject is enjoyed for its own merits.

Vedic Mathematics is been used in India from the ancient times but is forgotten in the modern time. It was *Swami Sri Bharati Krishan Tirthaji Maharaj* who rediscovered the Vedic Mathematics in the present time. He reconstructed Vedic Mathematics in between 1911 to 1918 and confined all the sixteen sutras of Vedic Mathematics in one ample volume. These sutras not only help in easy understanding of Mathematical long calculations but also enhance one’s logical thinking and spatial ability.

By giving proper practice of Vedic Mathematics to Children with Special Needs, it can enhance their calculation power and can give better knowledge about Mathematics.

Need of Vedic Mathematics for Children with Special Needs

Today’s world is continuously becoming more and more competitive. In this world of competition where most of the competitive exams contain Mathematics questions, many students lag behind due to Mathematical imprecision. Children with Special Needs are also not able to cope up with this competitive world. To make Children with Special Needs compatible with the changing world it is essential to give them knowledge about 16 Vedic Mathematics sutras, which will help them to prepare themselves for competing in different competitive examinations. The need of the Vedic Mathematics is due to the following reasons:

a) Concentration power of the child increases by using this method.
b) Long calculations can be done in no time thus it saves the time.
c) Burden of complicated calculations is reduced.

16 Sutras of Vedic Mathematics

The word sutra means a thread of knowledge. The English word “suture” derived from sutra and suture is a thread which a doctor uses to stitch a wound. The Vedic Mathematical sutras are simple methods which can help to calculate long and complicated sums in no time. Below are the names of 16 Vedic sutras:

1) Ekādhikena Pūrvena means: “By one more than the previous one”.
2) Nikhilam Navatascaramam Dasatah The formula simply means : “all from 9 and the last from 10”
3) Urdhva – Tiryagbhyam is the general formula applicable to all cases of multiplication and also in the division of a large number by another large number.
4) Sunyam Samya Samuccaye ' i.e., it should be equated to zero.
5) Paravartya yojayet means 'transpose and apply
6) Anurupye Sunyamanyat says : 'If one is in ratio, the other one is zero'.
7) Sankalana - Vyavakalanabhyam : means 'by addition and by subtraction'.
8) Purana - Apuranabhyam which means by the completion or non – completion
9) Calana – Kalanabhyam: ‘Sequential motion'.
10) Gunita Samuccayah : The product of the sum of coefficients in the factors
11) Ydvadunam : By the deficiency
12) Vyastisamastih : Specific and General (Use the average)
13) Sesanyankena caramena : The remainders by the last digit
14) Sopantyadvayamatyam : The ultimate and twice the penultimate
15) Ekanyunena purvenya : By one less than the previous one
16) Gunakasamuccayah : Set of Multipliers

These 16 sutras cover almost each branch of Mathematics. They provide solution of lengthy Mathematical problems in one line thus avoid long calculations. The knowledge of these sutras helps a teacher to create interest among the students about Mathematics.

In this present paper the following four sutras and two upa-sutras were selected according to the different needs of the special children.

1. Ekadhikena Purvena- ‘squaring of number ending in 5’

   e.g. 25*25- last digit 5 is same. Multiply first digit (which is same at both the places) with ‘one more than previous one’, that is 2+1=3 i.e. 2*3=6 thus answer is 625.

2. Nikhilam navtascaramam

   98*95 base will be 100

The working will be

98	-2
95	-5
93	10

Answer is 9310.

3. Urdhav- Tiryabhyam of 2*2 digit matric or we can say this 1*1(one cross one) method, i.e.

56*74 solution

a) 6*4=24 write 4, 2 will be carry forward
b) 5*4+6*7 (in cross or 'X' position)
   20+42= 62+2 (carry forward digit) = 64 again write 4 and 6 will be carry forward
c) Last 5*7=35+6 (carry forward digit) =41

5	6
7	4
41	44

Thus answer is 4144.

4. Ekanyunena Purvena (sub-sutra of Nikhilam navtascaramam) used for the sums ending with 9
   e.g. 763*999 one less than the one before i.e. (763-1) (999-762) =762237

5. Yavadunam Tavadunikriya Vargance Yojayet means 'whatever the deficiency subtract that deficit from the number and write alongside the square of the deficit.'
   This sutra is applicable to obtain squares of numbers close to base of powers of 10.
   e.g. square of 94, base will be 100.
   Since the deficit is 100-94=6, square of six is 36.
   36 and the deficiency subtracted from the numbers 94 gives 94-6=88, we get the answer 88/36 thus square of 94 is 8836.
6. Anurupyena
   The upa-sutra 'anurupyena' means 'proportionality'.
   e.g. 46*43
   take the nearest higher multiple of 10 i.e. 50.

46	-04
43	-07
39	28

46-07=39 and 43-04=39

-07*-04=28

39*5=195
2 will be added in 5
Thus the answer will be 1978

Significance of the problem

As technology is advancing day by day, students are more and more depending on the gadgets made thorough advanced technology. They are not able to do even simple Mathematical calculations. They need one or the other type of the gadget to do calculation of simple nature. Children with Special Needs are not the exception. It is difficult for them to understand the lengthy process of calculating the sums. Vedic Mathematics can help each individual child according to the different needs. If proper training and practice of Vedic Mathematics is given to Children with Special Needs they can also compete with the changing world and can have better understanding of the Mathematics. Through Vedic Mathematics they can excel in the field of Mathematics.

Objectives

1. To study the four sutras and two upa-sutras of Vedic Mathematics.
2. To study the effect of four sutras and two upa-sutras of Vedic Mathematics on Children with Special Needs.
3. To compare the Mean scores of Control and Experimental group after the intervention.

Hypotheses

1. There will be no effect of four sutras and two upa-sutras of Vedic Mathematics on Children with Special Needs.
2. There will be no difference in the Mean scores of Control and Experimental group after the intervention.

Delimitations

1. Thirty (30) Children with Special Needs of Grade IX from different Government Schools of Chandigarh were selected as sample.
2. Four sutras and two upa-sutras of Vedic Mathematics were chosen to teach Mathematics to Children with Special Needs.

Sample

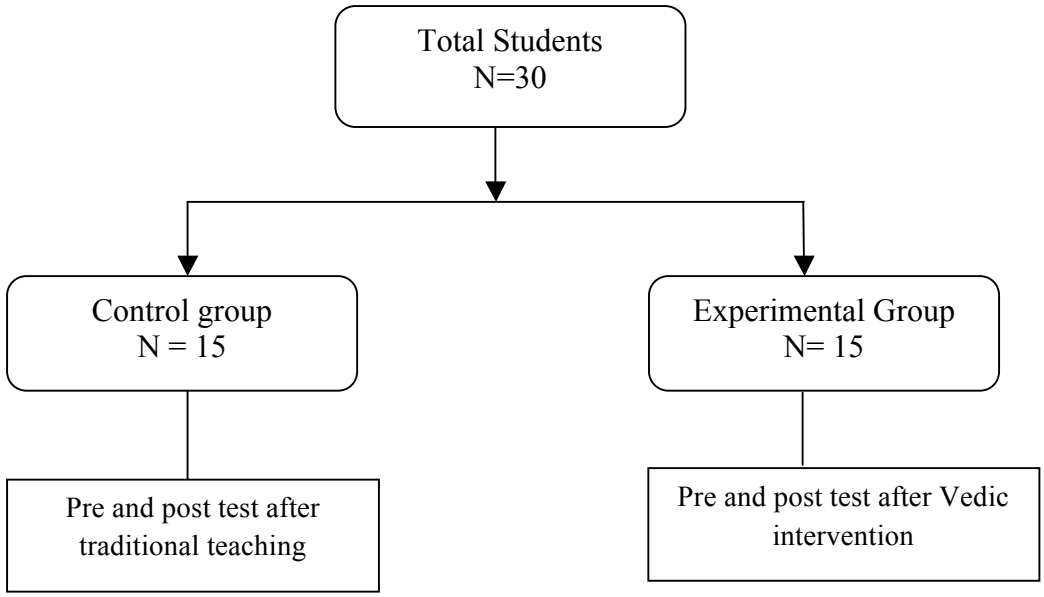
The researchers selected Chandigarh city for the experiment. The researchers talked to the different school authorities and then thirty (30) Children with Special Needs of Grade IX, identified by the Chandigarh School's Administration were taken as sample.

Basic information about the Sample

Sr. No.	Category of students	No. of students
1.	Speech impaired	3
2.	Slow learner	17
3.	Physically handicap	4
4.	Mildly mentally retarded	2
5.	Hyper active	4

Experimental Design

Two group experimental designs were taken in the paper, one is control and another is experimental group.



Tool

Self prepared Vedic Mathematics Achievement Test was used for the present study.

Collection of Data

A learner friendly rapport was created with the students followed by the conductance of pre-test with the sample Children with Special Needs. Then, twenty (20) days intervention to the experimental group (minimum three days to each sutra) for teaching four sutras and two upa-sutras of Vedic Mathematics and twenty (20) days intervention to the control group teaching with traditional method was given by the researchers. After completion, the intervention post-test was conducted with the sample.

Analysis of Data

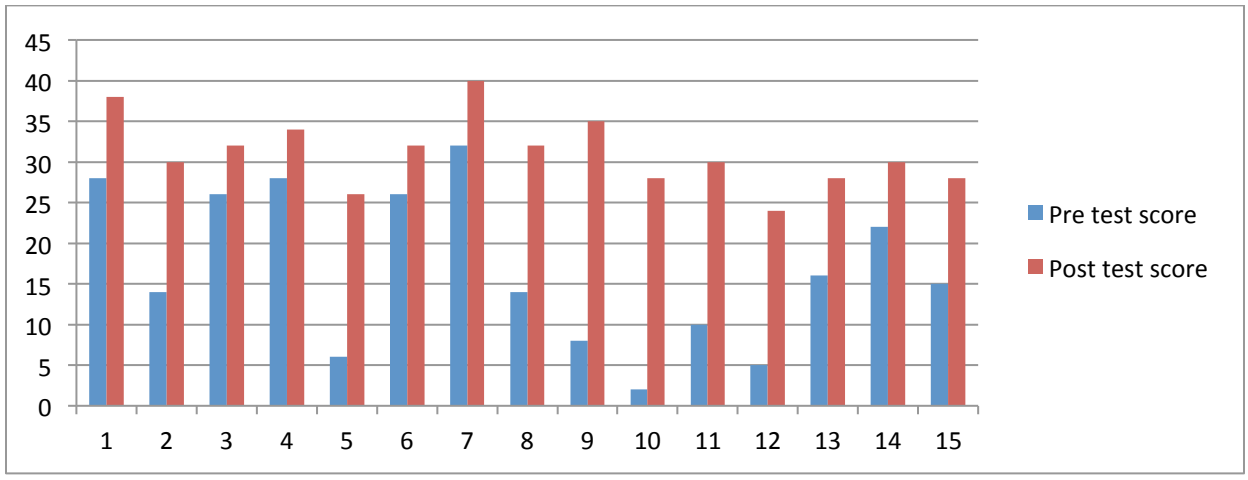
Response sheets of Experimental and Control group were checked and Mean, standard deviation and 't'-value was calculated. Comparison of pre and post test was done and graphs and tables were made accordingly.

Results and Discussion

After conducting the experiment on Experimental and Control group the following results were found:

Graph I

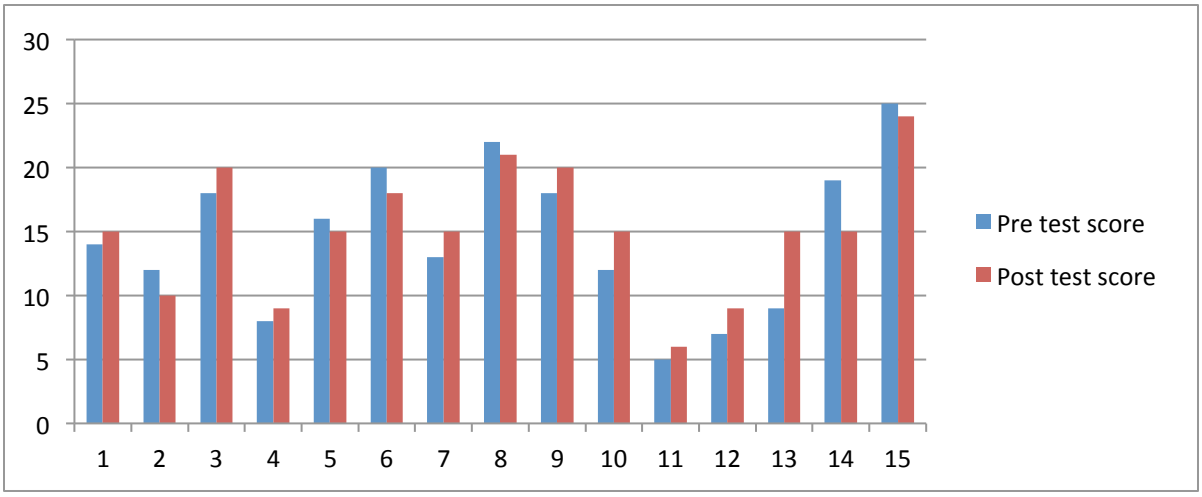
Comparison of Individual Scores of Students Scored in Pre and Post Test (Experimental Group)



From the above graph it is clearly visible that before the intervention Children with Special Needs scored less as compared to the scores they achieved after the Vedic Mathematics intervention. Each child's score increased after the intervention.

Graph II

Comparison of Individual Scores of Students Scored in Pre and Post Test (Control Group)



From the above graph it is clearly visible that there is not much difference in the individual scores scored by the control group.

Table I

Mean, Standard Deviation and t-value of Experimental Group

Test	N	Mean	S.D.	't'	Level of Significance
Pre-test	15	16.8	9.62	-5.262	0.05
Post-test	15	31.13	4.32		Significant

The above table shows the Mean, Standard Deviation and t-value of Experimental Group. It is clearly visible from the table that at the pre test stage the mean score of the 15 students was 16.8 and the post test stage it was raised to 31.13 with an average gain of 14.33. 't' value was found to be -5.262, which is significant at 0.05 level. Thus the hypothesis "There will be no effect of four sutras and two upa-sutras of Vedic Mathematics on Children with Special Needs" has been rejected which means there is effect of four sutras and two upa-sutras of Vedic Mathematics on Children with Special Needs.

Table II

Mean, Standard Deviation and t-value of Control Group

Test	N	Mean	S.D.	't'	Level of Significance
Pre-test	15	14.53	5.84	-0.312	0.05
Post-test	15	15.13	5.02		Not Significant

The above table shows the Mean, Standard Deviation and T-value of Control Group. At the pre test stage the mean score of the 15 students was 14.53 and the post test stage it was raised to 15.13 with an average gain of 0.6. 't' value was found to be -0.312, which is not significant at 0.05 level.

Table III

Comparison of Mean, Standard Deviation and t-value of Experimental and Control Group

Group	N	Mean	S.D.	't'	Level of Significance
Control group	15	15.13	5.02	-5.47	0.05
Experimental group	15	31.13	4.32		Significant

The above table reveals the Mean, Standard Deviation and T-value of Experimental and Control Group. Mean score of the Experimental group after the intervention come out to be 31.13 where as mean score of the Control group was calculated 15.13. Standard Deviation of Experimental and Control group was calculated respectively 4.32 and 5.02. t- value come out to be -5.47which is higher than the table value i.e. significant at 0.05 level of significance. Thus the hypothesis "There will be no difference in the Mean scores of Control and Experimental group after the intervention" was rejected, which further means that Vedic Mathematics intervention has improved the Mathematical scores of the Children with Special Needs.

Conclusion

Vedic Mathematics can help any child or adult to be efficient in Mathematical field. Children with Special Needs can be benefitted through Vedic Mathematics if given proper practice.

The following conclusion can be drawn from the above research:

- Vedic Mathematics enhanced the Mathematical calculations of Children with Special Needs.
- Vedic Mathematics can improve the spatial and logical thinking of Children with Special Needs.
- It can decrease the burden of long calculations, thus can make Mathematics an interesting subject.

- If proper training of Vedic Mathematics is given to the Children with Special Needs at initial stage then these students can achieve the high standards of Mathematics.

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