An Empirical Study of Cognitive, Intellectual and Problem Solving Capacities Enhanced by Vedic Mathematics Techniques

Jaswinder Kaur (Assistant Professor)

B.A.M. Khalsa College Garhshankar, Panjab University Chandigarh, Punjab, India

__Abstract:__ The present study is designed to highlight that how Vedic mathematical techniques canhelp improve the achievement score of students. This experiment is performed to assess the effectiveness of vedic mathematics. The objective of the study was to find out significant difference in mean achievement score of experimental group (trained in Vedic mathematics techniques) and controlled group (trained in conventional mathematics techniques). Both the groups were trained with their respective techniques for a period of 4 weeks. Researcher pre-test the groups to find out whether there is a significant difference in the group before the experiment. After training, researcher prepare achievement test for both the groups. Then t -ratio test analysis is done. Which revealed that the result is statistically significant. The students trained in Vedic mathematics techniques got higher achievement mean score that suggests future expansion and exploration of Vedic mathematics to build a successful foundation of mathematics.

__Keywords__: Controlled Group, Experimental group, 16 Sutras, Achievement Mean score, t-ratio test,Vedic Mathematic.

I.   Introduction:-

Mathematics is one of the most Vital field of study which is mandatory for expansion and of different disciplines and professions. The modern or conventional mathematics is the synthesis of different techniques and concepts developed over thousand year of civilization and is evolving each day. Although it is an indispensible part of curriculum in school in the whole world, still it has been a taboo to many students. With the advancement in technology, the cognitive and intellectual capacity of our students has further decreased. Mathematics is a subjects that is based on reason and mental exercise which is an unpleasant experience for many students. Contemporary Researchers and studies have revealed that Vedic Mathematics techniques attract students and create passion to learn and solve huge calculations, in seconds. Vedic mathematics provide us an alternative approach for computational aspects of mathematics.

Vedic Mathematics

Vedic mathematics is the system of mathematics which is a part 'Atharva Veda' one of the four sacred scripture of ancient Indra. It was reconstructed by Sri Bharati Krishna Tirth ji (1884 -1960) between 1911 to 1918. It includes arithmetic, Algebra, Geometry, trigonometry, factorization, calculation etc. Vedic Mathematics techniques are based on 16 sutras (formula) and 13 up sutras (corollaries) these techniquesare very coherent, flexible, easy and promote memory and creativity. This can be a supplement to the conventional methods of teaching.

1. Ekadhikena Purvena
2. Nikhilam navatascaraman Dasatah
3. Urdhva Tiryagbhyam
4. Paravartya Yojayet
5.   Shunyan Saamyasa nyccaye
6. Anurupye- Shunyamanget
7. Sankalana- Vyavakalanabhyem
8. Puranapuranabhyem
9. Calana Kalanabhyam
10. Yavadunam
11. Vyastisamastih
12. Sesantyadvayamantyam
13. Sopantyadvayamantyam
14. Ekanyunena
15. Gunitasamuccayah

16. Gunakasamuccayah

In the present paper students were assessed in four areas of mathematics arithmetic, algebra, trigonometry and calculus.

Aims and Objectives
1. To study the effectiveness of Vedic mathematics on performance of students in 4 selected areas of mathematics over the conventional mathematics.
2. To study the difference in learning outcomes of students using Vedic mathematics and conventional mathematics.
3. To study the addictiveness of Vedic mathematics for enhancing the time taken by students using Vedic mathematics and conventional mathematics.
4. To Study comparatively effectiveness of Vedic mathematics techniques and repular methematics techniques in four areas arithmetic,algebra,trigonometry and calculus.

Study Area
The present study is conducted in K.V.M. school, city campus,Ludhiana, Punjab which is between $30.9010^{\circ}N, 75.8573^{\circ}E$ latitude and longitude. The investigator prepared and standardize mathematics achievement teston the selected topics. Students in the age group of 11 to 14 are considered as population of study.The investigator selected 50 students. Students were then divided into two groups of 25 students each. Onegroup is treated with Vedic mathematics Techniques and the other treated in regular conventional mathematics techniques for 4 weeks.

Materials and Methods:-
This study is an experimental approach to the problem. This is designed to find the effectiveness of Vedic mathematics on the achievement in relation to intelligence of the students. There was no such standardized test or tool available investigate constructed the achievement tests which were employed for pre and post experiment.
The experiment group was taught in Vedic methods and the other groups (controlled groups) taught in conventional regular methods for four weeks.

Statistical Analysis
The data is extracted and evaluated noting the lime and scores of the students. The measure of central tendency, dispersion are used to measure the nature of data, T-ration test us used to find the significant difference between the mean achievement pretest and post -test scores.

Hypothesis 1:-There is no significant difference between the achievement mean scores of pre-testexperimental group and controlled groups.

	No. of Student's	Mean	S.D.	T-value
Experimental group	25	18.114	4.519	
Controlled group	25	20.025	5.062	1.039

For sample size 50 the degree of freedom 50-2=40. Thus t $_{0.01}$=2.682 and t$_{0.05}$= 2.011 and the calculated t-value is 1.037 which is not significant at 0.01 act 0.05 level. There Hypothesis is accepted that there is no significant difference between the achievement mean score of pretest experimental group and controlled group.

Hypothesis 2:There is no significant difference in post-test achievements scores of students treated withVedic mathematics and conventional mathematics techniques.

Table -2 Mean ,SD, t-value of post-test achievement scores of experimental group and controlled group.

	No. of Student's	Mean	S.D.	T-value
Experimental group	25	31.850	5.631	
Controlled group	25	25.116	4.619	4.586

For sample size 50, the degree of freedom is 50-2 i.e 48, $t_{0.01}=2.682$ and $t_{0.05}=2.011$ the calculated t-value is 4.586 which is significant at 0.01 and 0.05 level. Therefore difference between the achievement score of experimental group and controlled group in significant, which proved the effectiveness of Veidc mathematics over conventional mathematics.

Limitation of study:
Due to limitation of time, present study was limited in the following aspects.
1. Small sample size
2. Research tool has been developed by the researcher himself.
3. Research tool/project is experimental restricted to PMT Hoshiarpur of Punjab.
4. Research is restricted only to age group of 11 to 14 years in year 2018.

Scope of Study
Mathematics is queen of sciences.According to famous Philosopher Kent "A science is exact only in so far as it employ mathematics". It is the way of thinking logically and rationally. So the curriculum mathematics should very carefully be designed in different level of educations. The present experiment definitely give us hope that Vedic mathematics can be the part of curriculum of mathematics.

II.   Results and Discussions
Results are inspiring and hopeful. Vedic Mathematics' techniques can give a new dimension in solving high school mathematics problems. It adds fun elements and increase students enthusiasm. Vedic mathematics techniques are helpful in diminishing the fear of mathematics and encouraging innovation. These techniques are easy and fast. Having less number of steps,it reduces error, sharpen mind and increases mental ability. In the present era, overexposure to technology has reduced the charm of rapid calculation which can be rekindled using Vedic mathematics Vedic mathematics may not replace the present system of teaching mathematics but it can definitely add value in the learning process at school levels.

References
[1].   Swami Bharti Krishna Tirthaji, Vedic mathematics(Motilal Banarasidas publishers private limited, New Delhi, 2004).Lester Meyers, high speed mathematics (Van Nostrand, New York, 1947).
[2].   Durban, B, & Nealis, W (2011) Vedic math: assessing staff learning experiences to refine and anticipated in instructional needs for math.
[3].   William, K, and Gaskell, M. (2010a) the, cosmic calculator: A Vedic mathematics course for schools
[4].   Book one Kensglen: Inspirations Books.
[5].   William, K & Gaskell, M. (2010 b) the cosmic calculator: A Vedic mathematics course for school
[6].   Book two Kensglen: Inspiration books.
[7].   William, K, & Gaskell, M. (2010 c) The cosmic calculator: A Vedic mathematics course for schools,
[8].   Book three Kensglen: Inspitation books.
[9].   Vasant, V. (2016): Efficacy of Vedic mathematics and yogic breathing in school children a pilot study.
[10].   William, K& Gaskell, M. (2010 d) Teacher's guide, The cosmic calculator; A Vedic mathematics course forschool. Kenesglen: Inspiration Books.
[11].   Nocholas, A, William, K, Pickles,(2010)vertically and crosswise Kensglen :inspiration books
[12].   Sen ,S.N. and Bag A.K. the subsutras Indian National Science Academy,New Delhi, 1983