



A STUDY OF COMPARING TRADITIONAL MATHEMATICAL METHODS WITH VEDIC METHODS

CANDIDATE NAME = THAKKAR DHANRAJBHAI KANTILAL

DESIGNATION= RESEARCH SCHOLAR SUNRISE UNIVERSITY ALWAR

GUIDE NAME= DR. AMARESH KUMAR PANDEY

DESIGNATION = ASSOCIATE PROFESSOR

SUNRISE UNIVERSITY ALWAR

ABSTRACT

The effectiveness of Vedic mathematics in comparison to traditional mathematical procedures has been a subject of significant interest and research in the field of education. Vedic mathematics, rooted in ancient Indian mathematical techniques found in the Vedas, offers an alternative approach to solving mathematical problems. This abstract aims to explore the impact of implementing Vedic mathematics on the learning outcomes of students when compared to the traditional methods. Vedic mathematics is known for its simplicity, efficiency, and ability to facilitate mental calculations. Traditional mathematical education, on the other hand, often relies heavily on memorization and step-by-step procedures. Several studies have sought to evaluate the advantages of incorporating Vedic mathematics into the curriculum. These studies typically assess the performance of students who receive Vedic mathematical instruction alongside those who follow traditional methods. The result of this research will be useful to the students and teachers as this is comparative study between Conventional Mathematics Technique and Vedic Mathematics Technique.

KEYWORDS: education system, Mathematics Technique, Conventional, Vedic Mathematics Technique

INTRODUCTION

Vedic Ganit methods came to us as boon for all competitions. Present Mathematics requires many efforts in learning. O.P. Sahwney (2005) conducted free Vedic Mathematics classes for two weeks at the Habitat Learning Centre. The students were given individual attention and were also evaluated on the basis of their performance. He found that the students feel thrilled to know the time saving devices and have started preferring the Vedic way for solving the sums involving big numbers and checking the corrections of the answers

within a couple of seconds. Further, Dr. Ramesh Kollure (2011)ii conducted a study and found that Vedic Mathematics offers an entirely different approach to Mathematics. It can help overcome “math anxiety“ being faced by many kids today. Through its amazingly easy methods, ordinary people with little Mathematical skills can solve complex problems relative ease. Calculations can be conducted at a very rapid pace, irrespective of age. The method does not involve memorizing many complex formulas; only 16 Sutras, or shortcut formulas, cover the entire field mathematics.



Learning Vedic Mathematics takes substantially less time and effort as compared to other mathematical systems. So there is a need of using different methods in the classroom which can boost the interest of the students in Mathematics. i.e., Vedic Mental or one or two line methods can be used effectively for solving divisions, reciprocals, factorization, HCF, squares and square roots, cubes and cube roots, algebraic equations, multiple simultaneous equations, quadratic equations, cubic equations, biquadratic equations, higher degree equations, differential calculus, Partial fractions, Integrations, Pythagoras theorem, Apollonius Theorem, Analytical Conics and so on. Whole Vedic Mathematics is one method of teaching Mathematics which makes the teaching of Mathematics interesting and will boost the interest of the students. The moment some findings are put in the form of formulae and sutras, unless the basic assumptions are also explained, one does not get a feeling that everything is perfect and beyond questioning. As Lindsay remarked, "Mathematics is language of sciences and certainly no more marvelous language was ever created in the mind of man. Ancient Indian Vedic civilizations are known for being skilled in geometry, algebra and computational mathematics complex enough to incorporate things like irrational numbers.

Education is the integral part of one's life. Education teaches the human being how to live life and how to be happy in life. In the teaching learning process child is at the centre and the teacher is just facilitator, guide. But in the present education system,

teachers are at the centre and students are taught using normal methods. Sometimes students are getting bored by this normal method and so many students are giving disrespect to Mathematics and they don't have interest in Mathematics subject just only due to the Conventional Mathematics teaching in classroom. In the modern age of science and technology, the role of mathematics is the supreme one. In the other branches of science, it is visible to everybody that one goes on changing the theories as discoveries are made one after another. It is not different in mathematics. Furthermore, all ancient Indian mathematics literature is composed completely in verse, these sutras, to ensure that information would be preserved even if written records were damaged or lost. Vedic mathematics was presented by Jagadguru Swami Sri Bharti Krishna Tirthaji. Vedic mathematics deals with various Vedic mathematics formulae and their application for carrying out tedious and cumbersome arithmetic operations, and to a large extent, executing them mentally. A regular practice of the multiple choices Vedic Mathematics system shall help in the following ways: Mathematics, a dreadful subject, is converted into playful and blissful subject which we keep on learning with smiles on the face and joy in the heart. We are living in the age of competitions.

Concept of Mathematics

The term 'Mathematics' may be defined in a number of ways. It is an exact science which is related to measurements, calculations, discovering relationships and dealing with the problems of space. According to new



English dictionary, “Mathematics- in a strict sense – is the abstract science which investigates deductively the conclusions implicit in the elementary conception of spatial and numerical relation”. In Hindi we call mathematics as ‘Ganita’ which means the science of calculations. It is a systematized, organised and exact branch of science. In the beginning our knowledge of mathematics is based on our observations of physical and social environment i.e. it arises out of practical applications. We form certain intuitive ideas or notions known as axioms and postulates. These are self-evident truths. Mathematics is also called the science of reasoning. According to Locke, “Mathematics is a way to settle in mind a habit of reasoning. There are only a few premises on which we base our reasoning. Reasoning in mathematics is of two types (i) inductive reasoning and (ii) deductive reasoning. Problems should be linked with every topic and subject. These problems would have bearing not only on the subject but also on life. The practice in solving problems helps in developing speed, accuracy and ability to apply mathematical facts in different solutions. Problem solving trains the student in attacking and solving problems. Selection of problems is quite important because all types of problem do not help in development of problem-solving skills, broadly speaking following four types of problems are found in Mathematics.

1. Puzzle problems are those problems which may puzzle the minds of the students. This type of problems is generally used as a sort of pastime.

2. Catch Problems are those which catch on trick and they involve jugglery of words. Such problems are quite useful to test mental alertness of the students.

3. Unreal Problems which have no relationship to real life situations. They give a false idea of what happens in life e.g. an aeroplane is flying at the speed of 5 km/hour.

4. Real problems which are taken from life. The solving of real problems helps in training the child to grapple with new situations in his real life. Real problems occupy an important place in Mathematics. This type of problems helps in the achievement of the aims of subject and they should form an integral part of Mathematics curriculum.

The following points should be kept in view while selecting problems of Mathematics:

1. It should have some practical and social value.
2. It should be in accordance with the level of the pupils.
3. It should be related to the general interests and achievements of pupils.
4. It should be selected from common life situations.
5. It should be worked in simple and understandable language.
6. The problems from other school subjects at a particular stage may also be included in the curriculum.
7. The problem should pose a challenge to the intellect of student but it should be capable of being solved with reasonable amount of effort.
8. The problems that develop skills and attitudes required for preparing a sound base



for higher studies and for vocations in life should also be included.

Mathematics Education in India

The review of empirical research on learners' assessment shows that there are two distinct phases. The period up to 1990 is characterized as the first phase and the researches and empirical studies undertaken after 1990 fall into the other category. A main characteristic of the empirical studies in the first phase was that these were mainly academic in nature and the administrators did not use their findings for policy reforms. The focus on learning has its roots in the world roots in the world conference on Education For All (EFA) held in Justine Thailand in March 1990 as "focusing on learning" as one of the five components of an "Expanded Vision". This was followed by Dhakar after a decade in 2000 with affirmation that quality is a fundamental determinant of enrolment, retention and achievement. The level of achievement of children considered as a major indicator of the quality in EFA and MDGs, so attempts were made to assess the standards actually achieved by learners and tests were developed to measure learner achievement through surveys and empirical studies. In India the government's concern with educational achievement took a concrete shape as late as in the 90s with the formulation of the MLL document, which specified the standards that all children had to achieve at the primary stage. The Minimum Levels of Learning (MLLs) had to be followed by all schools across the country, and were an attempt to bring education of a comparable quality to all

children. DPEP to assess the level of achievement of children as a major component of their intervention and it was conducted in more than 46 districts in 1993/94 as a baseline where a total of 24,504 student of class IV/V, 23,056 student of class II and 5114 teachers were covered. In 1997/98 the tests were conducted in the 42 phase one district as a mid-term assessment and 66,831 students, 6,221 teachers and 2068 schools were assessed. Most comprehensive evidence on the children's learning levels come from ASER report of Pratham. The Annual Status of Education Report (ASER) 2005 presents dismal picture with regard to basic competencies of a substantial percentage of children. If we see at all India level about 40 per cent of children of grade V do not possess competencies commensurate with grade II in reading. Similarly over 53 per cent of children do not have competencies of grade II, in mathematical abilities (division and subtraction).vi In a recent survey done by NCERT to assess the achievement of class V students in EVS, mathematics and language showed that the distribution of scores covered the entire range from 0 to 100 percent. However, the overall average performance of students in EVS, mathematics and language was 50.3%, 46.5% and 58.6% respectively. The average achievement in EVS was 50.3% with standard deviation 20.67. Although there are very few studies done in India to assess the achievement level of children in India but the results are very common for all the studies. These studies basically try to assess the children's achievement on the basis of



their scores in the subjects, so most of the studies talk about the average or mean score of the students where in this study we are critically trying to reflect upon the ability of the children in the form of can and cannot, means whether a child has this competency or not.

Present Scenario of Mathematics Education

Formulate some possible alternatives for mathematics education around the year 2020 and to raise discussions about the future of teaching the subject. Keeping in mind that mathematics education is a sub-system of many supra systems and that there is no direct study in the area, some prospective analyses at different levels - whether global, regional or national - were reviewed. Three major scenarios were suggested for mathematics education to take place in the year 2020; the progressive, reformatory and conservative scenarios. A comparison has been carried out among the components of mathematics curriculum in each of these in that year. Although any of these alternative conceptions might not become a reality, it is hoped that the process of prospective analysis itself will contribute to "making the future". By prospective scenarios for mathematics education, the writer means different major trends in scenarios of mathematics education around the year 2020 in different countries, in which each of these is supposed to be implemented in some different forms according to the particular socio-economic, cultural and educational conditions of each country at that time. The same thing is applicable in the same country with regard to the variety in the quality of

education provided in different kinds of schools, with different methods of teaching, facilities, educational activities and the like. Needless to say, mathematics education is a sub-system of the education system in a country, which -in its turn - is a sub-system of the societal as well as the regional and the world (human) systems. But, however, in such general terms, as dealt with in this paper, some kind of high level of abstraction is needed across some prospective analyses at the global, regional or national perspectives, whether they are dealing directly or indirectly with education. Globalization seems to be the most important core resulting from global prospective analyses. Concerning human resources development, the OECD report has pointed out that: "Reform priorities often include improved access to early childhood education and revitalizing schools. They include better linkages between work and learning and creating incentives to invest more in lifelong learning". The study of the Arab Thought Forum suggested that mathematics must constitute one group among four integrated groups of subjects, in the framework of the "outbreak" scenario.

Mathematical Techniques of Teaching

There are many techniques which can be effectively used for the teaching of mathematics. Some of these are oral work, homework, assignments, self-study, group work, review and supervised study etc.

Oral Work

Oral work is done orally without the help of pen and paper, Oral work occupies a special



place in life and in mathematics. Mathematics is science of figures and written work. Major part of mathematics has to be covered in written form, but its application lies in oral form. If the principle of mathematics can be discussed orally it is more helpful. The importance of oral work in mathematics is discussed below:

Importance of oral work

1. It trains the pupils in solving day-to-day problems of life. Oral calculations have to be done in life at many a occasions because we are not excepted to carry pen and paper all the times with us.
2. It develops mental alertness and quick thinking.
3. It develops speed in solving problems.
4. It helps the quicken wits and sharpen intelligence.
5. It keeps students attentive and alert in the class.
6. It helps in maintenance of discipline in the class.
7. It helps it appeals to the eyes and ear so it is liked by the pupils.

Precautions to be observed in Regard to Oral Mathematics

1. Oral Work is based on the Previous Knowledge of the Students.
2. Oral Work is used as a Means of Revision and Test.
3. Proper Gradation of the Oral Work.
4. As far as possible this method should not be used in fractional and decimal work and such other works.
5. The teacher should not reach to any conclusion about students on the basis of the oral Mathematics. He should try to give

some practice of this form of Mathematics every day in the class.

Written Work

The figures and other things put into black and white and most of these have to be done on the paper. Written work has an important place in mathematics and it is only in written work that the concentration of attention can be maintained. Purpose of Written work

1. Written work helps in testing the knowledge imparted orally.
2. Written work helps in conduct of bigger classes.
3. In written work we can make the students to work in accordance with proper rules and processes.
4. It enables the teacher to know the amount of work done by the students.

Importance of Written Work

1. Written work helps to make clear the thoughts and proper reasoning. It is quite helpful in mental development of the student.
2. Using written mathematics we solve the problems correctly without any fault and flaw.
3. In future life we have to make use of written mathematics.
4. The chances of mistakes are diminished to the minimum in written Mathematics.
5. Written work is quite helpful in solving lengthy problems and complicated sums which are a bit difficult to be solved orally.

Precautions about Written Work

1. Instructions about the Process of Actual Work.
2. Written work must keep in Mind the Mental needs of the Students.



3. Written work should be such that it keeps the entire class busy. 4. The written work should be examined thoroughly and properly.

Drill Work

Drill is a way to revise a lesson that has already been taught. Thus it is a means to strengthen the knowledge already acquired. Drill work is based on the principle of learning by doing and on the law of exercises.

Importance of Drill Work

1. It is the most effective means of fixing the impression of learned facts in mind.
2. It helps in development of communicational skills. Such skills are quite helpful in learning of Algebra, Arithmetic and Geometry.
3. It helps in developing speed and accuracy in learning of mathematics.
4. It helps in clarifying even the minutest details of the topic.
5. It has been found quite useful particularly in case of average or below average students.
6. Drill is quite helpful in revision and review work/
7. Drill provides an opportunity to the student to work independently.
8. It helps the teacher to know the weakness of the students and provide individual attention to them.

Effectiveness of Speed and Accuracy on Experiment through Observation Schedule

From the observation schedule it is noted that throughout the experimentation of the study students are taking interest and the majority of the students take part in the class

room activities as well as the students those who have mastery to solve the mathematical work found frequently co-relates with the accuracy.

- It has been noted that as high speed of solving the mathematical problems, students found very less mistakes and it is frequently co-relates with the accuracy with the speed during the class room teaching in the Experimental group comparing with the conventional class room teaching.
- It has been noted that as medium speed of solving the mathematical problems, students found less mistakes and it is frequently co-relates with the accuracy with the speed during the class room teaching in the Experimental group comparing with the conventional class room teaching.
- It has been noted that as low speed of solving the mathematical problems, students found making mistakes frequently and it is frequently co-relates with the accuracy with the speed during the class room teaching in the Experimental group comparing with the conventional class room teaching.

CONCLUSION

The use of Vedic mathematics as a pedagogical approach for instructional planning. The purpose of this study was to investigate the efficacy of using the Vedic mathematics aided teaching approach in the instruction of secondary school students. A specific topic within the secondary school mathematics curriculum was selected to include the use of Vedic mathematics as a teaching aid. Various sections from the 9th and 10th standard curriculum were chosen, and a meticulously designed 30-day teaching plan using Vedic mathematics was



developed as the resultant product of this research. The Vedic Mathematics Achievement Test. In the current study, the researcher assessed the efficacy of the Vedic Method as a teaching approach by measuring the academic performance of learners using an accomplishment exam after the deployment of the independent variable. In light of this matter, the researcher devised an assessment tool to measure academic performance. There are obviously many advantages of using a flexible, refined and efficient mental system like Vedic Mathematics. Students can come out of the confinement of the 'only one correct' easy, and make their own methods under the Vedic Mathematical Techniques. Thus, it can induce creativity in intelligent students, while helping slow-learners grasp the basic concepts of Mathematics. A wider use of Vedic Mathematics can undoubtedly generate interest in a subject that is generally dreaded by children.

REFERENCES

Agrawala V. S. (2019). Vedic Mathematics, 2nd Edition, Motilal Banarasidass Publishers Private Limited, Delhi.

Ambasana, Anil. Construction and Standardization of Geometrical Instrument Development Programme. Ph. D. (Edu.), Saurashtra University, Rajkot. Bathiya Dhaval. (2016). Saral Vedic Ganit, Jayco Publishing House, Mumbai.

Best J.W, Kanh J.V. (2014). Research in Education. Seventh Edition, Prentice Hall of India Private Limited, New Delhi. P. 137,151.

Bhattacharya, M. (1989). Educational Technology. Fifth

Survey of Educational Research, NCERT, New Delhi. Vol. 1. p. 326.

Biswas and Aggarwal (2015). Encyclopaedic Dictionary & Directory of Education. New Delhi: Arya Book Depot.

Borg. W. R. & Gall, M. D. (2018). Education in Research: An introduction. (Sixth Ed.). New York. Longman.

Buch M.B. (2016). Third survey of educational research. New Delhi. NCERT.

Chandra S.S. & Sharma R.K. (2002). Research in Education. Atlantic Publishers and Distributors, New Delhi, P.381

Coulso, J. and Carr, C. (2015). The Oxford Illustrated Dictionary. (Second Edition). Oxford: clarendon press.

Dave P.N. (2017). A Study of achievement test of mathematics subject of Standard -9 with reference to main and supportive assignment method of self study, literature, tap-slide programme and educational game. Ph.

D. (Edu.), Saurashtra University, Rajkot.

Dhand, H. (2015). Techniques of Teaching. New Delhi: Ashish Publishing House.

Dr. Kailash. (2015). Vedic Ganit. 2nd Edition, Shiksha Sanskriti Utthan Nyas, New Delhi. Educational Research: Different Types of Studies in Educational Research, MES-016, IGNOU, New Delhi. Educational Research: Research Design, MES-016, IGNOU, New Delhi.