COMPETITIVE EXAMS: WHAT VEDIC MATHEMATICS HAS TO OFFER?

Varish

M.Ed. Scholar

Department of Education

University of Delhi

Deepak Sharma

Faculty Biology

BLS International School

Hathras, Aligarh

Abstract

Vedic mathematics is much discussed and researched area nowadays. In today's scenario where students are struggling with fear of mathematics, there are many hopes attached to this approach. Today every competitive exam tests aspirant's quantitative aptitude. This research tried to look at the present atmosphere of competitive exams where mathematics is considered as an important and scoring area. It also investigated how Vedic mathematics is being used as a medium by coaching institutes to ensure success to their students through their books. The content analysis of the material or booklets for quantitative aptitude provided by four popular coaching institution revealed that there is prominent use of sutras in calculation part of different types of mathematical problems from the themes such as area & volume, profit & loss, percentage, discount, simplification, etc.. Heavy reliance of these institutes on these Vedic mathematics sutras is self-evident to prove their relevance in competitive exams. There is a need to work for a mechanism through which students in school can have the flavor of this type of mathematics but they should be provided with proper reason and logic behind these tricks or sutras of Vedic mathematics.

Key Words: *Competitive exams, Content analysis, Coaching Institutes, fear of mathematics, Quantitative aptitude, Sutras, Vedic Mathematics.*

INTRODUCTION

Mathematics as a discipline is full of opportunities and provide its learner a scope to discover and explore. These discoveries and exploration are unique to every individual and of great importance to them and to mathematics as a discipline for its growth. But over the time mathematics is losing its essence and is under the target of many on reasons of being monotonous and dry. Some people who are unaware of this discipline and its true nature call for its elimination from the school sphere.

Today's mathematics curriculum in school is very much disappointing and has created a sense of fear of failure in them (NCERT, 2006). This fear is also resulting in dropouts and students lacking interest in students. So there is a need for bringing a pedagogical shift in the classroom for their students. There are hopes of many with the Vedic mathematical concepts for bringing this change in our mathematics classroom and make the learner more interested in this meaningful mathematics. Research is being done to see the effect or any relation between Vedic mathematics and students' success (Hankey et.al. 2016).

Today competitive exams are of very much importance to the students. All students who are seeking a job whether in private or public sector has to go through the initial process of screening and filtration is through a test or examinations. These examinations try to test some of the cognitive learning areas of applicants such as quantitative aptitude, reasoning, language, etc. Now a day's even initial screening of huge applications for many higher education courses or programs uses this approach of conducting the entrance examination. These entrance examinations apart from looking for the subject content-specific knowledge, it also looks into the dimension of quantitative aptitude in its applicants. It is very much evident that quantitative aptitude is very crucial to students for clearing any exam or taking admission in higher educational courses.

One can see that quantitative aptitude has become very essential part today of every competitive exam. We see the trends of different entrance exam today we see a substantiate amount of mathematical concept asked under different categories. For example, if we take par say Staff Selection Commission's combined graduate level examination which is conducted for recruiting applicants for various Group-B and C jobs in public sectors. This examination comprises of three tiers i.e. three phases namely preliminary examination, mains examination and descriptive examination. Amongst which two-tier majorly focus on mathematical concepts under the theme quantitative aptitude. It carries around 250 marks out of a total of 600marks. This trend is not unique to this exam only, one can see these patterns in other competitive exams too such as SSC CHSL, IBPS Bank PO, SBI Bank PO, Various entrance exams, etc.

Keeping these ideas and relative importance of mathematics or quantitative aptitude the researcher tried to look for what Vedic mathematics can offer or is offering to the aspirants or to the students who are taking these exams. This research study focuses on what topics are there under the umbrella of quantitative aptitude testing of students and the scope of Vedic mathematics in it.

OBJECTIVES OF THE STUDY

The main objectives were:

- To explore the idea of Vedic mathematics in study material of competitive exams.
- To examine the sutras being used in the study materials.
- To identify the core mathematical areas and concepts where it is being used.

METHOD AND PROCEDURE

For the purpose of the study the researcher relied on the content analysis of study materials and books being published by some of the renowned coaching institutes. The books and class notes of these coaching institutes were studied at length to understand where and what sutras of Vedic mathematics are being used by them in order to make their learner quick in solving the mathematical problems.

SAMPLE AND SAMPLING TECHNIQUE

The study material and class notes of four renowned coaching institute situated in G.T.B Nagar and Mukherjee Nagar in Delhi. This sampling was purposive in nature as these coaching institutes were easy to access.

THE PROCEDURE OF DATA COLLECTION

This study relied on textbook content analysis. The process of content analysis was followed by researchers to look for any Vedic mathematics being used. The content analysis of these documents worked as a major methodology of the whole process.

KEY TERMS AND CONCEPTS

Here in this study, some of the concepts were considered in a different way based on different available researches.

- **Vedic Mathematics'** is meant the system outlined by Sri Bharati Krsna Tirthaji in his book of that title, initially published by Banaras Hindu University in 1965 and then by Motilal Banarsidass.
- **Sutras** are those techniques or algorithms which can be used to solve any problem or issue. These were mentioned in the work of Sri Bharti Krsna Tirthaji. The sixteen sutras as follow By One More than the One Before, All from 9 and the Last from 10, Vertically and Crosswise, Transpose and Apply, If the Samuccaya is the Same it is Zero, If One is in Ratio the Other is Zero, By Addition and by Subtraction, By the Completion or Non-Completion, Differential Calculus, By

the Deficiency, Specific and General, The Remainders by the Last Digit, The Ultimate and Twice the Penultimate, By One Less than the One Before, The Product of the Sums, All the Multipliers (Williams, 2000).

RESULTS AND DISCUSSION

As this study tried to look for possible usage of Vedic mathematics by coaching institutes in their materials on quantitative aptitude and to look for the mathematical areas in which it is being used.

1. Vedic Mathematics(Sutras) in Study material

While studying these books and study materials we found that coaching institutes heavily rely on the basic sutras and sub-sutras of Vedic mathematics. It was further noticed that there is hardly any claim that the method which they have mentioned in their books or using for the purpose of the calculation is part of Vedic mathematics or not. These material project these sutras and mechanism of Vedic mathematics by mentioning them with different names such as Short-cut tricks, quick calculations, Fast solving strategies, etc. in between the main text as fillers.

Around 100% of books under study used vertically and crosswise sutra for multiplication of two digits and three-digit numbers. There was hardly any material which avoided this sutra. It was further being used while solving algebraic expressions.

All from 9 and the last from 10 was used in around 50% of materials under study while dealing with the questions of simplifications and final answer calculations.

Nearly 75% of the material used the sutra by the deficiency while using any of the mathematical operations like addition and multiplication.

We found that the coaching materials also relied on other sub sutras such as while dividing converting divisor to the base of 10 etc. So in all e found not all but some of the Vedic mathematics as part of these coaching materials and in the class notes of the students. The coaching institutes from which this material was taken claims a huge success rate of their students. We cannot assign the whole credit of attaining this success in competitive exams to the usage of Vedic mathematics in their classes only. There can be many factors behind the success of their student's parts from the good quantitative approach. But we cannot discard its role completely. There is some role of Vedic mathematics in this for sure.

2.   Mathematical Area in which Vedic Mathematics is being used.

This study revealed that the concepts and idea of this mentally done calculation are used by coaching institutes to prepare their students for competitive exams. Quantitative aptitude covers different mathematical concepts majorly taken up to secondary school mathematics.

Here are the trends of mathematical areas in which Vedic mathematics was used by coaching institutes in their materials.

S.No	Mathematical Area	Institutes using Vedic Mathematics (Sample size = 4)
1.	Simplification (using BODMAS)	100%
2.	Number system	75%
3.	Ratio and Proportion	50%
4.	Percentage, Profit and loss	50%
5.	Square and Square roots	100%
6.	Cube and Cube roots	100%
7.	Algebraic Expressions	100%
8.	Word problems related to work, power, boat streams, area & volume, etc.	50%
9.	Simple interest and compound interest	50%
10.	Average	25%

This list of mathematical topics doesn't end here. There are many topics under which these coaching institutes use Vedic mathematics by claiming them as short-cuts to reach a quick answer. The major focus in any competitive exams is to reach the correct answer from the given options. Here what matter are the quicker calculations? So the majority of mathematical areas where students deal with calculations, the coaching material has emphasized on the usage of the short-cut tricks (resemble Vedic mathematics) for faster completion of the task and completing the questions in a given time.

CONCLUSION

This study has brought that quantitative aptitude is a major part of the selection process whether it is a job or admission in higher education. It covers many mathematical areas. Out of these mathematical areas, the majority relies on accurate and quick calculation. We know that in a competitive exam it is a race with time. So using Vedic mathematics saves the time of students and allow them to score well in exams.

But the usage of Vedic mathematics as terms is very much controversial in itself. Many have opposed to the idea of using the term Vedic to it as they find it as false propaganda that this idea originally belongs to Vedas (Dani,1993). Raju (2014) find nothing Vedic in Vedic mathematics. Still, there are some who says that here in the terms Vedic doesn't correspond to the Vedas it is much more than that. Veda should not be taken in a very restricted sense. Veda corresponds to universal knowledge (Glover, 2014). This debate is of very much important but we cannot neglect the very importance of this so-called Vedic or short-cut methods of solving a mathematical problem.

Today its utilitarian aspect is proving to be an asset. Empirical studies are done and showing positive results too. Hankey et.al (2016) found through their study that there was a significant improvement in the students score when they were taught through Vedic mathematics rather than the traditional approach. They further point that use of Vedic mathematics method and visual aids will greatly improve university entrance results and numbers qualifying to enter college courses in science and engineering. This stands seems to be very much relevant to our study when we see the usage of Vedic mathematics by these renowned coaching and their success rate altogether.

Employability is a major challenge today. Everyone wants to attain a good job. Mathematics as a discipline aims to fulfill both the narrow aims, that of turning out employable adults who (eventually) contribute to social and economic development; and a higher aim, that of developing the inner resources of the growing child (NCERT,2006).

School by exposing their students to Vedic mathematics can prepare them for both to deal with the upcoming hurdle of attaining job by cracking competitive exams and developing in them the mental ability to face the same with a positive attitude and with great confidence.

But the caution which one should keep in mind that the Vedic mathematics is simple algorithms which when presented to students without any logic and rational discussion can lead to a misconception about mathematics. So the exposure of Vedic mathematics should come with proper explanation and rationality in front of the students also they should be made aware about the major debate related to the same to develop criticality in them.

We know that our vision of mathematics is to mathematization the child's thought process (Wheeler,1983). This can be done by engaging students in an active mental process which can be done through the exposure of Vedic mathematics to our students.

Rather saying Vedic mathematics we should say that this mathematics which has its roots in our ancient past has a lot to offer to our students and youth.

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