

Chapter – I

Statement of the Problem and Terms defined

1.1 INTRODUCTION

This century is known as the age of science and technology. The technology is developing very rapidly and the construction and machinery is based on principle of science and mathematics. Mathematics is in the base of modern invention. However the man is rich or poor, Mathematics thoughts are on the top of all the process of life of a man. From beggar to businessman, everyone uses mathematics in their life. It is very important in everyone's life. Without the use of mathematics, it is very difficult to survive in life. Everyone uses mathematics in one or other way in his / her daily life. We cannot imagine a life without mathematics. 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.

Ancient Indian Vedic civilizations are known for being skilled in geometry, algebra and computational mathematics complex enough to incorporate things like irrational numbers. 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. The whole world also believes that India is the origin of Mathematicians. The very old book "*Kodex Vigilance*" is kept in museum of Spain which is capital of Europe. It is mentioned in this book that ancient Hindus were very intellectual then the people of other countries in calculation, geometry or other scientific knowledge. Scholars of all over the world praised India's number invention and journey or that is indicated in Vedic Mathematics of Shankracharya Bharti Krishna Tirthji Maharaja (1984 – 1960) of Puri.

1.1.1 Mathematics – Meaning and Definitions

The term 'Mathematics' may be defined in a number of ways. The dictionary meaning of mathematics is that "*it is either the science of number and space or the science of measurement, quantity and magnitude*". Bacon said "*Mathematics is the gateway and key to all sciences*". All the above definitions emphasize mathematics as a tool especially suited for dealing with scientific concepts. According to Lindsay, "*Mathematics is the language of physical sciences and certainly no more marvelous language with its signs, symbols, terms and operations, which can handle ideas with a precision and conciseness that is unknown to other languages*".

Mathematics – A science of Discovery: The expression of mathematical relationships are in symbolic form-in words, in letters, by diagrams or by graphs. Initially a child's discoveries may be observational. But, later, when its

power of abstraction is adequately developed, it will be able to appreciate the certitude of the mathematical conclusions that it has drawn. This will give it the joy of discovering mathematical truths and concepts. Mathematics gives an easy and early opportunity to make independent discoveries.

Mathematics – An intellectual Game: Mathematics can be treated as an intellectual game with its own rules and without any relation to external criteria. From this viewpoint, mathematics is mainly a matter of puzzles, paradoxes and problem solving – a sort of healthy mental exercise.

Mathematics- The Art of Drawing Conclusions: One of the important functions of the school is to familiarize children with a mode of thought which helps them in drawing right conclusions and inferences.

Mathematics- As a Tool Subject: Mathematics established its own goals to pursue. Its mentors of the past engineering, physical science and commerce – now became no more than its peers. According to Howard F. Fehr (1996), *“If mathematics had not been useful, it would long ago have disappeared from our school curriculum as required study”*.

Mathematics- An Intuitive Method: Intuition when applied to mathematics involves the concretization of an idea not yet stated in the form of some sort of operations or example. A child forms an internalized set of structures for representing the world around him.

1.1.2 Characteristics of Mathematics

Mathematics has certain unique features which one could hardly find in other disciplines. The following are the important characteristics of mathematics

Precision and Accuracy: Mathematics is known as ‘exact’ science because of its precision. It is perhaps the only subject which can claim certainty of results. In Mathematics the results are either right or wrong, accepted or rejected. Mathematics can decide whether or not its conclusions are right.

Logical Sequence: Mathematics also possesses the characteristics namely logical sequence. The study of mathematics begins with few well-known uncomplicated definitions and postulates and proceeds, step by step, to quite elaborate steps. It would be difficult to find a subject, in which a better gradation is possible, in which work can be adapted to the needs of the pupil at each stage, than in mathematics.

Applicability: Knowledge is power only when it is applied. The study of mathematics requires the learners to apply the skill acquired to new situations. The knowledge acquired by the students is greatly used for solving problems. The

students can always verify the validity of the mathematical rules and relationships by applying them to novel situations.

Generalization and classification: Mathematics gives exercises in widening and generalizing conceptions, in combining various results under one head, in making schematic arrangements and classifications. It is easy to find instances of successive generalizations.

Mathematical Language and Symbolism: The language for communication of mathematical ideas is largely in terms of symbols and words which everybody cannot understand. There is no popular terminology for talking about mathematics. In arithmetic and algebra, the students deal not with facts, but with symbols. The use of symbols makes the mathematical language more elegant and precise than any other language. Almost all mathematical statements, relations and operations are expressed using mathematical symbols such as $+$, $-$, \times , \div , $>$, $<$, Σ , \pm , \neq , ∞ and so on.

Abstractions: Mathematics is abstract in the sense that mathematics does not deal with actual objects in much the same way as physics. But, in fact, mathematical questions, as a rule, cannot be settled by direct appeal to experiment. For example, Euclid's Lines are supposed to have no width and his points no size. No such objects can be found in the physical world.

1.1.3 Aims of teaching mathematics

Utilitarian Aim: We will remain too much handicapped in our life in case we remain ignorant of mathematics. Utilitarian aim includes practical utility of mathematical concepts in the life of every individual. Now-a-days with the advent of automation and information technology, there is a need to have mathematically literate workforce that have "belief in the utility and value of mathematics" (Pollak,1987). Students need to possess knowledge, skills, flexibility and attitude to change, manage and develop jobs in the present and in the future. Thus utilitarian aim of mathematics education must be reflected in instructional material, teaching process and in assessment.

Disciplinary Aim: The chief characteristics of the discipline are simplicity, accuracy, certainty of results, originality, reasoning and correlation of the teaching of the subject with the problems of life. All these characteristics are developed to a large extent by the teaching of mathematics so teaching of mathematics fulfils this aim of education. Accordingly to Locke: "Mathematics is a way to settle in the mind a habit of reasoning. Knowledge follows as a consequence of reasoning power".

Cultural aim: Mathematics has a lot of cultural values. It helps in the formation of certain habits in the students and helps them to grow as cultured citizens. For any

cultured person the development of power of reasoning and judgment is the basic requirement and mathematics develops these qualities in a student. In addition to development of power of reasoning and judgment mathematics also helps to develop in the child the qualities of concentration, thinking, precision, accuracy, self-confidence, expression etc. Thus mathematics teaching develops all those qualities in a student so that he/she will become a helpful individual of the society.

Vocational aim: The chief aim of education is to felicitate the children to earn their living and to make them self dependent. To achieve this aim, mathematics is the most important subject than any other. Any individual who take up any of the vocations for his livelihood, must have at least workable knowledge of mathematics, otherwise he cannot lead his vocation and life peacefully and successfully.

Knowledge Aim: Every person must acquire knowledge and he must become a knowledgeable person. Though knowledge is unity, every branch of science or arts, becomes full-fledged only with the application of mathematics. Mathematics gives precision to them. Thus knowledge of mathematics is a must to any person who studies sciences or social science. Thus mathematics fulfills the knowledge aim.

Character Aim: The most important aims of education is the formation of character. Mathematics education is not an exception for this. So the study/ teaching of mathematics must fulfill this aim also. A person who has honesty, accepting his mistakes unhesitatingly, tolerance to others, impartiality, patient hearing of others and taking decisions after careful analysis of the situation and thinking in a critical manner and rationally etc. are the characteristics of a person who possesses good character. All these characteristics are imbibed by the study of mathematics. Thus mathematics fulfills this aim. There is considerable amount of dependence on mathematics in every field of technological development. Modern life makes use of the scientific contributions in all walks of life.

1.1.4 The Place of Mathematics in Everyday Life

A little reflection will show what predominant role mathematics plays in our everyday life and how it has become an indispensable factor for the progress of our present day world. It is the pivot of all civilization. Everybody has to calculate his income and balance his family, budget, although only a few of them undergo any of the university courses. This is the subject which indisputably forms the very basis of entire world's commercial system. It is a contributory factor in the prosperity of the human race. There is no science, no art and no profession where mathematics does not hold a key position. The accuracy and exactness of a science is determined to a major extent by the amount of mathematics utilized in it. Even social sciences like economics, psychology, geography etc make abundant use of mathematics. The gigantic works of construction of dams, bridges, other works of architect, building of ships, aero planes etc are possible only because of the

quantitative science. Even medical men have to measure the doses, the blood pressure, the beat of pulse, the bodily temperature etc. most of the natural sciences and philosophy are to be studied on mathematical lines and without the study of mathematics there would be no improvement in them.

In the universe it is commonly seen that even uneducated people use mental mathematics in their day-to-day life activities. Most of the people appreciate the richness of mathematics. And many students are trying to relate the knowledge of mathematics knowledge in their life It helps the students to get inspired and be motivated. In Southern part of India, women draw kolams (complex figures drawn on the floor in front of their houses every day with the help of white powder or rice powder. These kolams are same like the rangolis in the northern part of India, but usually they use without colors. Each and every day they draw a new kolams. A great variety of kolams have been created and drawn daily in front of their houses. Even often they conducted kolams competitions also. The structure of these kolams, like symmetries, closed curves etc are based on mathematics. Also, art, architecture like Taj mahal, temples etc and music also some of the examples of cultural development of mathematics.

Even nature also embraces mathematics completely. The sun rises and sets at the specified moment. The stars appear at fixed time. Mathematics runs in the veins of natural sciences like physics and astronomy. This subject is inextricably incorporated with world and the natural phenomena.

Arithmetic, the language of commercial activity: algebra which gives the idea of functional dependence and generalization: geometry which teaches logical thinking and natural design, all these combine to produce a very valuable literature of interpretation, control and progress. We understand the world better. Graphical representation of numbers is becoming very common. Mathematics is home decoration designs: measurement and contraction: in banking and business” in protection of life and property; in painting and art, is playing a vital role.

1.1.5 Issues of mathematics learning in the present day

Teaching of Mathematics: 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 center and the teacher is just facilitator, guide. But in the present education system, teachers are at the center 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.

It should be frankly admitted that the mathematics teaching in today's life is far from the conventional teaching. A literate person fails to calculate while making payments to a shopkeeper for the articles purchased by him. Everybody has a complaint against the teaching of mathematics. It is dull, boring, difficult and useless from the point of view of the learner. "It is too remote from life to interest the students." The teachers complain of excessive workload and lack of facilities in the form of aids and equipment.

Teachers' Qualifications: Now-a-days most of the private school teachers are not sufficiently capable in the subjects apprehensive. Without proper qualifications and proper training, they fail to do justice to the subject. This is not a sufficient criterion to allow him to continue with the teaching of his subject. An adequate, high qualification with proper training, the teacher develops self-confidence in him and serves as a source of inspiration to his students. The teacher must be mature in his subject. Professional training should equip him to attain desirable standards in teaching. He must possess real knowledge and insight into, the processes of mathematics and their effective teaching.

Teacher's burden: Now-a-days many teachers are overburdened on all sides like teaching, assigning the students' work, paper checking, etc. He cannot adopt new techniques of teaching, and prepare for effective methods, as he has no spare time. His burden does not allow him time to remove individual difficulties. It should be reduced to enable him to show his originality and innovative.

Teacher's attitude: Maybe, he does not have genuine love for his subject and profession. He may have been forced by circumstances to take to this profession. He remains on the lookout for a better job and leaves the profession as soon as he get an opportunity to do so. He lacks faith in the utility of the subject, and therefore, cannot create interest among the students. Only really anxious and willing individuals should be allowed to join this profession by introducing a check at the time of selection, a teacher's love for his job and the subject should also be ascertained before giving him his duty.

Lack of purpose : The students do not recognize the purposes behind the study of the topics of mathematics. The particular and general aims of every topic should be emphasized effectively. The teacher has to be careful so that no student ever comes to think that these aims can be attained through easy, soft and amusing work. If the work lacks purpose, it is the teacher's duty to make it purposeful. The purpose should be attractive to stimulate the students to work hard. This misconception should be uprooted from the minds of the parents and pupils that most of the mathematics taught in the schools is not purposeful.

Method of teaching: The teacher clings to traditional methods, because these offer the path of least resistance. The powers of thinking, acquiring knowledge,

understanding, creating interest about the topic and retention are not thus developed in the students. If the students are not showing any interest in the subject, it can be created not by blind memorizing, but by shifting the methods. There is spoon-feeding and the daily dose of mental work is much more than the student can comfortably swallow and digest. The authorities run after showy results which are obtainable only through cramming. They have no appreciation for good mathematical teaching. There is no emphasis on thought, understanding, initiative, judicious study and power. The remedy necessitates a fundamental change in values and methods. Intelligent understanding should be the guiding principle.

Any student who is discouraged, he does not make much progress. Classroom atmosphere should be charged with freedom and encouragement. The child should be given the opportunity of self-education as far as possible. The teacher should not become a hard task master, but should be a sympathetic helper and guide. The emphasis should be on understanding, liking and interest.

Large classes: It is a general defect. No individual attention can be paid. It becomes difficult for the teacher to establish close contacts with the students. He cannot easily judge the capacities of the individuals. This defect can be removed only by limiting the number of students in each class up to a maximum of forty-five.

Practical Aspect: The practical and application aspect of knowledge is not generally emphasized. Knowledge given in the class-room is divorced from practical life. The subject loses its appeal, as it is taught in an abstract, dry and uninteresting manner. The affinity between mathematics and life should be discovered and put to use. The students should feel that they are getting something of direct practical value. Mathematics should be taught as a part and parcel of their daily life.

Mathematics Language: Mathematical symbols have their own meanings and have their own significance which the teachers generally fail to bring home to the students. The meanings behind these symbols and their historical background should be clarified to the students. Some assignments may be given for the clarification of their meanings and use.

Syllabus: Some people say that the syllabus is defective, because it is heavy and lengthy. The greater defect of the syllabus is that it does not provide hints and instructions for teacher's guidance. The teacher cannot deal with the syllabus effectively, because most of the details are left to him. It may be a bit lengthy, but it must lead to understanding. In that case, the students will not mind a little over-work.

TextBook : The traditional style of the syllabus also affects text-books adversely. The authors have not been able to get rid of dogmatism and traditionalism. The illustrations and problems given in the text-books are divorced from actual life. These have been mainly written on synthetic and deductive lines, whereas the psychology of the child and the nature of the subject require them in analytic and inductive forms. The material is made available in a readymade form which goes against thinking, discovery and originality. The present day books promote cramming and do not lay stress on understanding. Their style is seldom interesting and impressive. They do not provide suggestions that may facilitate learning. Text-books should give a brief history of the development, possibilities of correlation, applications in practical life, use of aids, plays, activities, projects, etc., concerning every topic. They should abundantly present diagrams, sketches, illustrations, etc. The arrangement of the subject matter should both be logical and psychological.

The Students: There may be some defects in the students of the subject. The subject demands regularity. It is a sequence subject, and if a student is absent even for a few days, the sequence is broken and he fails to comprehend the subsequent steps. An irregular student cannot pull on well in this subject. Similarly, irregularity in home work also makes the students lag behind. With the present –day methods of teaching and the criteria of judgement of progress, the students form misleading notions about their intelligence. The crammers excel whereas the intelligent ones may suffer. The present brings frustration for some able students, and there is in store frustration for the crammers in the future. So, in fact, the majority suffers. Nervous and rash students are also not likely to do well in this subject. The very sight of the examination paper upsets and puzzles them. Moreover, this subject demands whole-hearted concentration which some students may not be easily able to give. It is the joint responsibility of the home and the school to keep the students regular in attendance and home work. If there is some unavoidable absence, special and separate coaching arrangements for some time are desirable. If a proper approach in its teaching is adopted only really intelligent pupils will come to the forefront. To remove their nervousness and confusion, the teacher should try to develop self-confidence in the students.

Ban on short-cut methods: The use of short-cut methods has been banned totally, but these are of great value and must be employed wherever possible. The quickest, shortest and easiest methods of solving-problems should be popularized. The desire to save the time and effort is natural. Quick methods of calculation are much wanted in actual life also. To meet this demand certain special instruments and processes have been invented by mathematicians. The students should be acquainted with these instruments and processes.

1.1.6 Vedic Mathematics

Vedic Mathematics is a unique method of solving problems in the use of fast calculations. It is a unique system. Vedic mathematics helps all kinds of mathematical problem of all kinds to be solved easily and efficiently. This wonderful method has been discovered by **Sri Bharati Krishna TirthaSwamiji (1884-1960 of Govardhan peetha, Puri.**

Vedic Mathematics is Generally based on **sixteensutras** (formulas) and **thirteenSub-sutras**. It deals with numbers and also with advanced theories such as calculus, simultaneous equations, solving differentiation and integration problems. These sutras will enrich the skills of solving mathematical problems. By memorizing these simple sutras one gain confidence in rapid mathematical computation and solving mathematical problems intellectually.

Vedic Mathematics mostly deals mainly with various Vedic mathematical formulae / algorithms. Vedic mathematics is useful for solving even very difficult problems mentally. Vedic Mathematics is very easy and much simpler to understand than traditional Mathematics. By using, with the help of Vedic Mathematics we can solve problems in a single step and also problems can be solved faster than a calculator. Vedic mathematics helps to solve mathematical problems very much faster than the traditional methods of solving problems. In Vedic Mathematics, most of the calculations can be solved from left to right. This is opposite to traditional method of solving mathematical problems. In traditional method one can start to calculate problems from right to left. Vedic mathematics makes mathematics an easy one. This also creates an interest among students. Vedic Mathematics is considered as a magical method of fast calculation. It is a very unique system based on simple rules and principles which facilitate all kinds of mathematical problems to be solved easily and efficiently. Now – a – days many are using Vedic Mathematics with pleasure. Vedic mathematics can be used to solve mathematical problems without pressure but with much pleasure. Vedic Mathematics is an ancient technique, developed in India. Even some of the prestigious institutions in Europe, England Britain, the US, Australia etc are being started to use vedic mathematics. Even today, the NASA scientists have been applied vedic mathematics in the area of artificial intelligence.

1.1.7 Origin of Vedic Mathematics

Vedic Mathematics was born in the **VedicAge**, but it was buried under centuries of wreckage. The former **Shankaracharya** (a major religious leader) of Puri, India, **Bharati Krishna Tirthaji** delved into the ancient Vedic texts and established the techniques of this system in his pioneering work - Vedic Mathematics in 1965. This is considered the starting point for all work on Vedic Mathematics. It is said that after Bharati Krishna's original 16 volumes of work illustrating the

Vedic system were lost, in his final years he wrote this single volume, which was published five years after his death. Jagat Guru Bharti Krishanji had worked very hard for eight years to get all this knowledge.

1.1.8 SIXTEEN SUTRAS AND THEIR COROLLARIES

Sutras

1. Ekaadhikena Purvena (also a corollary)
2. Nikilam NavathascaramamDasathah
3. Urdhva-thiryagbhyam
4. Paravarthya Yojayet
5. Suniyam Samyaasamuccaya
6. (Anurupiye) Suniyamanyat
7. Sankalaana – viyavakaland-bhiyam (also a corollary)
8. Puraanapurambhyam
9. Calana-Kalanabhiyam
10. Yavathuunam
11. Viyastisamasthih
12. Sesanyankena Caramenna
13. Sopantyadvayamanthyam
14. Ekanyunena Purvena
15. Gunithasamuccayah
16. Gunakasamucscayah

Sub-sutras or Corollaries

1. Anurupiyena
2. Sisyate Sesasamjinah
3. Adyamadyenantya-manthyena
4. kevalaih Sapthakam Gunyath
5. Vesthanam
6. Yavathuunam tavathuunikrtya
7. vargancha yojayet
8. Anthyayorthasakepi
9. Anthyayoreva
10. samuccayagunitah
11. Lopanastapanabhyam
12. vilokanam
13. Gunithasamuccayah Samuccayagunitah

1.1.9 Advantages of Vedic Mathematics

There are obviously many advantages in the system of Vedic Mathematics.

- Vedic mathematics can be used to stimulate creativity in all types (gifted, average, below- average) of students.
- Vedic mathematics helps the slow-learners to understand the basic concepts and solve mathematical problems easily.
- Many students don't like mathematics. But vedicmathematics helps to create students in mathematics so that they can solve the problems easily.
- Vedic mathematics helps to reduce the burden of remembering more mathematical tables.
- When compared to the conventional method it enables faster calculation. Thus, the time that one gets saved with the help of using Vedic mathematics problems can be used solved very easily.
- Vedic mathematics helps to increase concentration and speed to solve more problems very fast.
- It encourages solving problems mentally without using paper and pen. Vedic mathematics saves time.
- A dreadful subject of many students is converted into a playful and blissful subject. Vedic mathematics helps students too participate and win competitive exams.
- Mathematical problems can be calculated very faster than the traditional method of solving problems with the help oh vedic mathematics.
- It creates interest towards mathematics and will be beneficial throughout lifetime.
- It helps the people to guess the answer intelligently. (Getting the answer without actually solving the problem).
- It is a magical tool to solve mathematical problems.

- It reduces the finger counting and improves mental calculation. Saves time during examination.

1.2 RATIONALE OF THE STUDY:

Mathematics is the most important & compulsory subject in our present school curriculum. From Multi millionaires to daily labourers have been using mathematics in one or another way. Therefore everyone should have the knowledge of mathematics.

But today most of our younger generations are completely depending upon technology. Technology has been diminishing their creativity. Because of many barriers, they cannot depend upon technology. They should know Vedic mathematics to solve mathematics problem very easily & quickly. It is the duty of teachers to preserve our traditions as well as lead our students to be self-dependent & solve the mathematics problems with confident. Mathematics being a compulsory subject of present curriculum, and also getting basic mathematics education is each and every child's right. It is the duty of the teacher to give quality education to all students.

In the present day mathematics, many students do not like mathematics subject. They require more effort in understanding and solving mathematical problems. But with the help of Vedic mathematics we can change students mind. They can understand the basic concepts and solve the problems without much effort but with reach interest.

Today interest in the Vedic mathematics system is increasing in many peoples. Some of the mathematics teachers are looking for something better. Today, many schools and even universities use Vedic mathematics as an alternative system of mathematics in modern mathematics. Modern mathematics has established methods and allows the use of calculators. In the case of Vedic math, it is flexible and encourages the use of arithmetic, geometry & trigonometry. This may contribute to brain development in children. With the help of Vedic mathematics students can score high marks and also excel in competitive examinations. In the present scenario, all the competitive examinations contain Mathematical aptitude sessions, in which students should score good marks . If the candidate or student is going to solve or calculate problems in a traditional manner he has to spend a lot of time for

completing that particular examination. If one uses Vedic mathematics in a proper way, then he can solve mathematical problems in very fast. And also he can save a lot of time in completing examination. Now Vedic Mathematics plays a significant role in Arithmetical, Algebra, geometry statistics and also in the theory of equations etc. However, much research is still ongoing, especially in India to find ways to facilitate the application of Vedic mathematics in calculus, geometry and calculus. Keeping the above points in mind, this topic has been selected by the investigator to serve the students' community & also give awareness about Vedic mathematics.

1.3 STATEMENT OF THE PROBLEM

The title of the present study was verbalized as:

“Effectiveness of Vedic Mathematical Techniques on Achievement of Students in Mathematics at Upper primary level “

1.4 OPERATIONAL DEFINITION OF THE KEY TERMS USED

Effectiveness

In the study, effectiveness is described as **significant mean difference** of a group over the other group on post-test in terms of students' achievement in mathematics. In this fashion, the group having greater mean is called more 'effective' than the other group.

Achievement in mathematics

Measurement of students' grasp of knowledge or their proficiency in certain skills based on taught mathematical themes during experimental treatment. Here in this study it means achievement score in mathematics obtained through **ATM (Achievement Test in Mathematics)**.

Vedic mathematical techniques

Solving mathematical problems easily with the help of some sutras, specifically based on the book Vedic Mathematics, authored by Sri Bharati Krishna Tirath Maharaja (1884-1960) of Govardhan Peetha, Puri (India). But it is originally rediscovered from Atharvaveda (Sthapathya-subveda).

Upper Primary Level (Class VII)

As it is determined by Education Department of Human Resource and Development Ministry (Ministry of education) of Govt. of India recognized from class 6th to 8th as upper primary level, In the proposed study researcher take class vii (class 7th) as a sample.

Conventional Mathematical Techniques

Conventional Mathematical technique means the present teaching of mathematics in the classroom by the teacher. i.e. A teacher centered traditional method of teaching with a due weightage to talk and chalk, based on problem solving approaches given in class VII mathematics text-books of Odisha Basic Education Board.

1.5 VARIABLES UNDER THE STUDY

Independent variables: Approaches of teaching mathematics i.e. Vedic mathematical techniques and conventional (traditional) mathematics.

Dependent variables: Students' achievement in mathematics.

Variables uncontrolled: Interest and attitude, socioeconomic status, self-concept.

Variables controlled: Time, average-age, classrooms conditions.

1.6 OBJECTIVES OF THE STUDY

Following were the general objectives of the present study.

General Objectives

- To test effectiveness of Vedic Mathematical techniques in Teaching learning Mathematics.
- To test whether the Vedic Mathematical techniques help students to solve sums in Mathematics.

Specific Objectives

- To compare mean scores of students' Achievement in Mathematics of control group and experimental group on pre-test.

- To compare mean scores of students' Achievement in Mathematics of control group and experimental group on post-test.
- To compare mean scores of Achievement in Mathematics at pre-test and post-test stages of control group students.
- To compare mean scores of Achievement in Mathematics at pre-test and post-test stages of experimental group students

1.7 HYPOTHESES

- ❖ H0 1: There is no significant difference between mean scores of Students' Achievement in Mathematics of control group and experimental group on pre-test.
- ❖ H0 2: There is no significant difference between mean scores of Students' Achievement in Mathematics of control group and experimental group on post-test.
- ❖ H0 3: There is no significant difference in mean scores of Achievement in Mathematics at pre-test and post-test stages of control group Students.
- ❖ H0 4: There is no significant difference in mean scores of Achievement in Mathematics at pre-test and post-test stages of experimental group Students.

1.8 DELIMITATIONS

- The present study was confined to the class VI students from Odia Medium state Government School (Baulimani M.E School, Kodagambhir, Bhadrak, Odisha).
- The present study was carried on class VII students' in terms of their achievement in mathematics only.
- The present study was focused on vedic mathematics and covered these topics only viz., Multiplication , Division, square, square-root. So only few Vedic mathematics sutras were used to teach these topics.
- The present study was conducted during covid-19 pandemic period which restricted the experiment, had taken in offline mode outside the classroom with social distance and proper sanitation.