

# **CHAPTER -1**

## **INTRODUCTION**

# CHAPTER -1

## INTRODUCTION

### 1.1 Introduction

The ultimate aim of education is to develop all round personality of an individual. Mathematics learning is important not only is to achieve certain cognitive objectives but it is also instrumental in learning other subjects. Low achievement in mathematics is a problem of great concern for parents, teachers and researcher for several decades and is subjected to many rigorous investigations.

As a researcher I want to find out the reasons behind why a child may have serve difficulties in computation or reasoning a problem based on concept of Relations and Functions.

The main goal of mathematics education in schools is the mathematisation of the child's thinking. Clarity of thought and pursuing assumptions to their logical conclusion is central to the mathematical enterprise. There are many ways of thinking, and the kind of thinking one learns in mathematics is an ability to handle abstraction. It includes a way of doing things, and the ability and the attitude to formulate and solve problems.

Mathematics education at the elementary stage should help children prepare for the challenges they face further in life. We want mathematics education that is affordable to every child, and the same time, enjoyable

**According to the National Curriculum Framework (NCF 2005),  
School mathematics takes place in a situation where:**

- ❖ Children learn to enjoy mathematics rather than fear it.
- ❖ Children learn important mathematics: mathematics is more than formulas and mechanical procedures.
- ❖ Mathematics is a part of children's life experience which they talk about.
- ❖ Children pose and solve meaningful problems.
- ❖ Children use abstractions to perceive relationships and structure
- ❖ Children understand the basic structure of mathematics.
- ❖ Teacher expects to engage every child in class.

On the otherhand, mathematics education in our schools is beset with problems .we identify the following core area of concern:

- ❖ A sense of fear and failure regarding mathematics among a majority of children.
- ❖ A curriculum that disappoints both a talented minority as well as the non-participating majority at the same time,
- ❖ crude methods of assessment that encourage perception of mathematics as mechanical computation,
- ❖ lack of teacher preparation and support in the teaching of mathematics.

Systemic problem further aggravate the situation, in the sense that structures of social discrimination get reflected in mathematics education as well. Especially worth mentioning in this regard is the gender dimensions , leading to a sterotype that boys are better at mathematics than girls.

The shift in focus we propose is from mathematical content to mathematical learning environments, where a range of processes takes precedence: formal problem solving, use of heuristics, estimation and approximation, optimisation, use of patterns, visualisation, representation, reasoning and proof, making connections, mathematical communication. Giving importance to these processes also helps in removing fear of mathematics from children's minds. A crucial implication of such a shift lies in offering a multiplicity of approaches, procedures, solutions. We see this as crucial for liberating school mathematics from the tyranny of the one right answer, taught, such learning environments invite participation, engage children, and offer a sense of success.

A great deal needs to be done towards preparing teachers for mathematics education. A large treasury of resource material, which teachers can access freely as well as contribute to, is badly needed. Keeping this aspect in view the researcher had taken chosen is an attempt to find out the learning difficulties in set-theory (relations and functions).

### **1.1.1 What is mathematics?**

Mathematics is an important subject in school curriculum. If any subject area of study evokes wide emotional comment, it is mathematics. For the school-going children there is a general opinion in our society that those students who score poor marks in mathematics are dull students, even if they score good marks in other subjects.

The term 'mathematics' may be defined in a number of ways. It is an exact science that is related to measurements, calculations, discovering relationships and dealing with the problem 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 relations”.

**According to Locke,** “Mathematics is a way to settle in mind a habit of reasoning”.

Mathematics is considered one of the important subjects in primary school curriculum. It is more closely related to our daily life as compared to other subjects. It is also highlighted in **National Policy of Education - 1986** as follows – “Mathematics should be visualized as the vehicle to train a child to think reason, analyse articulate logically. Apart from being a specific subject it should be treated as a concomitant to any subject involving analysis and meaning”.

**Mathematics** involves a way of thinking which is considered by some to be a specific type of intelligence. Everyone has this intelligence, but whether it is as strong as one’s language abilities or physical abilities varies from one individual to next.

Mathematics is about patterns , structures , and reasoning , and that we are not limited to numbers and shapes as the subject of our studies.

**Mathematical thinking** involves seeing patterns in everyday life, thinking logically, thinking geometrically, recognizing relationships between numbers having a sense of whether or not a solution to a problem is reasonable and having devising strategies for solving novel mathematical problem.

**Mathematical research** is the long-term , open-ended exploration of a set of related mathematics questions whose answers connect to and build

upon each other, Problems are open-ended because students continually come up with new questions based on their observations .

During an investigation students make connection between ideas that further enhance retention

**Mathematical learning difficulties** indicates students were less efficient in their information processing relates to the ways in which individuals make sense of , or interpret, the information to which they are exposed . They do not have accurate number processing skills and have other components of the model in place.

One's strength with this intelligence stems both natural predisposition and from one's learning experiences. Some students experience great difficulty in doing numericals of relations and functions which is related to their mathematical intelligence.

**As a researcher I want to find out the reasons behind why a child may have serve difficulties in computation or reasoning a problem based on concept of relations and functions.**

## **Set theory**

Set theory is one of the important branches of mathematics . symbolism, mapping(like one-one,on-to), operations, connections and generalization are the five main characters which may be observed in the structure and processes of set theory , power of generalization, power of imagination, power of logical treatment and systematic analysis are all needed in dealing with set theory.

## Relations

The role of relations in our daily life is very important where each relation has its own significance. For example:

- I. Relation of mother and son.
- II. Relation of wife and husband.
- III. Relation of student and teacher.

Similarly, in mathematics also, there is variety of relations, whose knowledge is crucial. Here also each relation has its own meaning and significance. The concept of the term 'relation' in mathematics has been drawn from the meaning of relation in English language, according to which two objects or quantities.

Let us understand this with the help of following examples:

- I.  $4 \text{ is the square of } 2 \implies \text{Relation between } 2 \text{ and } 4.$
- II.  $\sin A = \frac{1}{\operatorname{cosec} A} \implies \text{Relation between } \sin A \text{ and } \operatorname{cosec} A$
- III.  $\text{Volume of cube} = (\text{edge})^3 \implies \text{Relation between volume and edge of a cube.}$

**In sets also, we often come across relations such as:**

- I.  $x \in A$  i.e.,  $x$  belongs to  $A \implies \text{Relation between } x \text{ and } A.$
- II.  $A \subset B$  i.e.,  $A$  is the proper subset of  $B \implies \text{Relation between } A \text{ and } B$

In all of the above examples, we conclude that every relation involves pairs of objects in a particular order.

Let  $A$  be the set of students of class XII of a school and  $B$  be the set of students of class XI of the same school. The some of the examples of relations from  $A$  to  $B$  are

- I.  $\{ (a,b) \in A \times B : a \text{ is brother of } b \}$

- II.  $\{ (a,b) \in A \times B : \text{age of } a \text{ is greater than age of } b \}$
- III.  $\{ (a,b) \in A \times B : \text{total marks obtained by } a \text{ in the final exams is less than the total marks obtained by } b \text{ in his final exams} \}$
- IV.  $\{ (a,b) \in A \times B : a \text{ lives in the same locality as } b \}$

However, abstracting from this , we define mathematically a relation  $R$  from  $A$  to  $B$  as an arbitrary subset of  $A \times B$ .

If  $(a,b) \in R$ , we say that  $a$  is related to  $b$  under the relation  $R$  and we write as  $aRb$ . In general,  $(a,b) \in R$ , we do not bother whether there is recognisable connection or link between  $a$  and  $b$ .

## Functions

Function is a special type of relation. In other words, it is a rule that makes new elements out of some given elements.

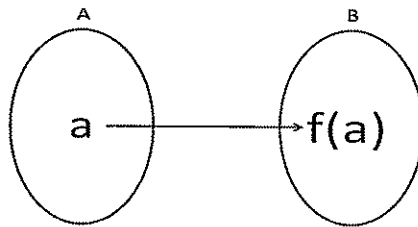
The word 'Function' is derieved from a latin word meaning operation. It is also called by some synonymous words like map and mapping.

A function is a relation from a non- empty set  $A$  into, a non empty set  $B$  such that:

- I. All elements of set  $A$  are associated with the elements of set  $B$ .
- II. An elements of set  $A$  is associated with one and only one element of set  $B$ .  $f:A \longrightarrow B$  such that  $\{ x, f(x): x \in A \wedge f(x) \in B \}$



A function from A to B is denoted by  $f$  and it is written as  $f:A \rightarrow B$  or  $A \xrightarrow{f} B$



### 1.1.2 Learning difficulties:

Students were less efficient in their information processing relates to the ways in which individuals make sense of , or interpret, the information to which they are exposed . They do not have accurate number processing skills and have other components of the model in place.

For example :- Some may recall number facts accurately but have difficulty in calculating while others can apply procedure but not recall the number facts.

These students do not have ability to manipulate saperate aspects of mathematics tasks in attention demanding ways. Their ability to process aspects of the information defining a task in frequently taken for granted.

**Immature knowledge here can lead to mathematics learning difficulties.**

Mathematics involves a way of thinking which is considered by some to be specific type of intelligence. Everyone has this type of intelligence, but whether it is as strong as one's language abilities varies from one individual to the next.

### **1.1.3 Remedial teaching:**

An average Indian school fails to bring out the potential talent in the individuals personality. It fails to direct the creative urges of students in the positive direction. In the contemporary Indian schools the memorization of text books is given the prime attention, as it leads to better academic achievement.

There are some students in each class who have some difficulties in understanding and learning certain concepts. The difficulty varies from individual to individual, subject to subject, grade to grade and institution to institution. In order to make the teaching-learning process effective, it is essential to identify the learning difficulties of students during instruction. This can be done by remedial teaching after a diagnostic test.

The term **remedial education** does not imply the persistence of some new and magical educational formula which will enable us to remove with a wave of the hand, all the problems that face the backward child, and speedily restore him to his rightful place in the class.

A process of removing and reducing the severity of the causes diagnosed and thereby improving the academic achievement is called remedial teaching. Remedial teaching can be equated with the treatment given by the doctor for any illness. The teaching strategies and techniques used in remedial teaching are individualized, i.e. made child or client specific. The process of modification/improvement in the academic achievement using individualized instruction as the basis is called remediation.

**The teaching done using various innovative approaches and techniques of teaching like co-operative learning, activity based learning, child centered learning, programmed learning etc during the process of remediation is known as remedial teaching.**

Once the child's error and difficulties have been located Precisely, it then becomes possible to frame a remedial programming at:

- Correcting basic errors.
- Re-establishing the child's confidence in himself and his ability to succeed in the subject.
- Improvement in teaching learning process of the diagnostic subject.
- Identifying the retarded learners who are having troubles in learning some important basic skills.
- Discovering hazards to the learning as learning difficulties or specific retrying needs.
- Suggesting the remedial teaching procedures for the effective as well as corrective learning of various important basic skills.
- Suggesting modifications and revisers in the text book and curricula.
- Introducing effective evaluation procedure for pupils of various language groups.

#### **1.1.4 Diagnostic test:**

In order to make teaching learning process effective, it is essential to identify the learning difficulties of students during instructions. This can be done by making use of diagnostic tests. The process of finding the reasons for academic failure of a child or for some observed educational discrepancy, between the achievement and potential is called diagnosis.

The diagnostic tests consists items based on a detailed analysis of the specific skills involved in successful performance and a study of the most common errors made by students. Thus, a good diagnostic test will permit a student to demonstrate all aspects of a skill being measured and will pinpoint the types of errors that he has made. These tests are available for different subjects and are designed for students of below average

performance. Such tests may provide only partial information for diagnosing a student's difficulty. Therefore, supplementary information concerning the physical, intellectual, social, emotional development of the student is also needed before an effective remedial programme is initiated.

"one designed to locate the particular source of a person's difficulties in learning especially in school subjects."

### **English and English (1958)**

Diagnostic tests serve as guides to locate the attainments of difficulties of the students and to help to group students for remedial or special coaching.

### **Importance of diagnostic evaluation:**

Diagnostic evaluation provides the feedback to the teacher as well as to the students regarding their strengths and weaknesses. It helps teacher to modify their teaching-learning strategies so as to make them more effective in the light of the feedback. Diagnostic evaluation is an integral part of overall evaluation.

### **Uses of diagnostic test**

- ❖ Diagnostic tests serve as guides to the attainment of the students.
- ❖ Diagnostic tests serve as guides to locate the attainments of difficulties of the students.
- ❖ Diagnostic tests help in isolating difficulties of students individually.
- ❖ Diagnostic tests help to group students for remedial or special coaching.

## **Diagnosis In The Subject Area**

The first step in remedial work is to make a thought examination of the child's difficulties in the subject in which he/she is failing. This is an analytical examination design to locate:

- ❖ The level at which break down is occurring.
- ❖ The seriousness of the failure.
- ❖ The specific errors being made and
- ❖ The cognitive weakness.

### **Steps in Diagnosis**

- ❖ Identifying students who have learning difficulties.
- ❖ Determining the specific nature of the learning difficulty.
- ❖ Determining the factors causing learning difficulties.

#### **1.2 Need of the Study**

Various finding suggested that one of the reasons for stagnation has been faulty pedagogy that has been practiced in our school. Therefore, need for pedagogical practices and material or learning situations is largely felt.

In spite of qualities and appropriateness of the text book, there are certain limitations of the text book. They can not fulfill the needs of every individual. Keeping this view in mind the need of material is being felt to create congenial environment for learning and to provide greater exposure to the target.

The elementary education in our country is in very bad shape. The prescribed curriculum is with a sense of load rather than with joy. The feeling of success motives the children to remain in the school while the feeling of failure pushes them out of the system. In this case many

children drop out to unattractive and uninteresting programmes that school offer. Therefore we could not achieve our goal, which is given, in our constitution universalization of elementary education.

For the systematic learning of set theory (relations and functions) there is always a need of some sort of assistance in the form of educational learning situations. Hence in teaching learning set theory (relations and functions) text books are used as powerful tool. Now a days, the material which is being produced helps in learning set theory (relations and functions) some of the shortcomings of the past textbooks have been overcome. The remedial material present today is more interesting, relevant and the contexts is closer to the learners but in spite of above improvement present text book though take care of average and above learner's needs but because of certain limitations, the needs of poor learners are not taken care of.

It always happens that students have problems in doing numericals based on concepts of relations and functions, so this study aims at finding out major area where students make error or face difficulty. Here the problem will be identified and suitable suggestions can be made for improving the teaching of mathematics in schools. Various remedial measures can be suggested for effective as well as corrective learning of various important basic skills. Various learning problem related to mathematics difficulties can be identified

### **1.3 Objectives of the study:**

Following objectives are kept in view while conducting this investigation:

1. To identify the learning difficulties of class XII students in solving problems based on concept of relations and functions.

2. To diagnose the causes of learning difficulties of class XII students in concept of relations and functions.
3. To design and implement remedial measures in solving problems based on concept of relations and functions and study its effect.

#### **1.4 Hypothesis**

The objectives stated above helped the researcher to formulate the major hypothesis of the study.

1. There is no impact of remedial measures on class XII students in solving problems of Relations and Functions.
2. There is no significant difference between the learning difficulties of boys and girls.
3. There is no impact of remedial measures on boys.
4. There is no impact of remedial measures on girls.
5. There is no significant difference between boys and girls of class XII students in their achievement after remedial measures.

#### **1.5 Statement of the problem**

The present study is undertaken to find and minimize the learning difficulties in solving problems of relations and functions and it is titled as

**“A Study of Learning Difficulties in set theory (relations and functions) of Class XII Students and Remedial Measures”.**

#### **1.6 Operational definition of key terms**

##### **Learning difficulties**

At risk students were less efficient in their information processing. Information processing relates to the ways in which individual make sense

of, or interpret, the information which they are exposed. They do not have accurate number processing skills and have other components of the model in place.

These students do not have ability to manipulate saperate aspects of mathematics tasks in attention demanding ways. Their ability to process aspects of the information defining a task in frequently taken for granted .Immature knowledge here can lead to mathematics learning dificulties.

### **Remedial teaching**

Remedial teaching is a process which involves those measures used to meet the educational needs of children with learning difficulties. It is essentially good teaching which, by careful diagnosis of defects of students, takes him/her at his/her own level and by intrinsic methods of motivation leads him/her to increased standard of competence.

### **1.7 Delimitations**

Following were the limitations of the study:

1. The study was limited to the achievement in relations and functions.
2. The researcher has delimited her study to private schools of Bhopal areas due to time constraints and lack of resources
3. The small sample of 54 students was taken due to limited scope and time of the study.
4. The study was conducted on one class i.e.class XII of each two schools in bhopal area.