

CHAPTER -1

Introduction

Mathematics education is a dynamic discipline. Developing children's abilities for mathematisation is the main goal of mathematics education. The narrow aim of school mathematics is to develop 'useful' capabilities, particularly those relating to numeracy - numbers, number operations, measurements, decimals and percentages. The higher aim is to develop the child's resources to think and reason mathematically, to pursue assumptions to their logical conclusion and to handle abstraction. It includes a way of doing things and the ability and the attitude to formulate and solve problems.

Today's technology has also given us certain powerful tools which we can make use of in the teaching of mathematics. This is interesting because the growth of mathematics has made this technology possible and now this technology can contribute to the growth of mathematics.

1.0 What is Mathematics?

According to Benjamin Franklin .

"What science can there be more noble, more excellent, more useful for men, more admirable, high and demonstrative than that of Mathematics."

"Mathematics is the science of number and space" while the other has defined it as "the science of measurement, quantity and magintude. Mathematics in the real sense is a science of space and quantity that helps up in solving the problems of life needing numeration and calculations. Therefore, Mathematics is the *"Queen Of All Sciences" And "Mother Of All Technologies"*

MATHEMATICS = ARITHMETIC + ALGEBRA + GEOMETRY

1.1 What Is Algebra?

According to A.N. Whitehead

"Algebra is the intellectual instrument for rendering clear the quantitative aspects of the world."

Algebra is one of the important branches of mathematics. Like arithmetic it may also be defined as a science of numbers with the distinction that here numbers are generally denoted by letters instead of figures. In a true sense algebra is a generalised arithmetic. Symbolism and generalization are the two main characters which may be observed in the structure and processes of algebra. In algebra, arithmetical facts or principles are denoted through abstract signs and symbols so that they may be expressed in an extended and generalized form.

According To The National Curriculum Frame Work , 2005 (Ncf) Algebraic notation, introduced at this stage is best seen as a compact language, a means of succinct expression use of variables, setting up and solving linear equations, identities and factoring are means by which students gain fluency in using the new language.

ALGEBRA = VARIABLES + CONSTANTS

1.2 What is polynomials?

Polynomials are algebraic expressions that include *real numbers and variables*. Division and square roots cannot be involved in the variables. The variables can only include addition, subtraction and multiplication.

polynomial contain more than one term. Polynomials are the sum of monomials .

A monomial has one term - $5y$ or $-8x^2$ or 3

A binomial has two term - $-3x^2 + 2$ or $9y - 2y^2$

A trinomial has three term - $-3x^2 + 3x + 2$ or $9y^2 - 2y + 4$

$$P(x) = ax^n + a_{n-1}x^{n-1} + \dots + a_1x + a_0$$

Where, P(x) is a polynomial in one variable x is an algebraic expression in x of the form a_0, a_1, \dots, a_n are constants & an #o.

$a_0, a_1, a_2, \dots, a_n$ are respectively the coefficients of $x^0, x^1, x^2, \dots, x^n$ and n is called the degree of the polynomials .

Each of :-

$a_n x^n, a_{n-1} x^{n-1}, \dots, a_0$ with $a \neq 0$ is called term of the polynomial $P(x)$.

A polynomial of degree one is called a linear polynomial. e.g. $2x + 2$

A polynomial of degree two is called a quadratic polynomial. e.g. $2x^2 + 4x + 2$

A polynomial of degree three is called a cubic polynomial. e.g. $3x^3 + 2x^2 + 4x + 2$.

1.3 Problems In Teaching And Learning Of Mathematics

According to the national curriculum framework 2005 (NCF 2005)

Any analysis of mathematics education in our schools will identify a range of issues as problematic. We structure our understanding of these issues around the following four problems which we deem to be the core area of concern:-

- **Fear And Failure :-** A sense of fear and failure regarding mathematics among a majority of children.
- **Disappointing Curriculum:-** A curriculum that disappoints both a talented minority as well as the non - participating majority at the same time .

- **Crude Assessment:-** crude methods of assessment that encourage perception of mathematics as mechanical computation.
- **Inadequate Teacher Preparation:-** Lack of teacher preparation and support in the teaching of mathematics .
- **Other Systematic Problems.**
 - (1) Compartmentalisation .
 - (2) Curricular acceleration.

1.4 Vision For School Mathematics

According To The National Curriculum Frame Work (NCF 2005)

- Children learn to enjoy mathematics rather than fear it.
- Children learn important Mathematics : mathematics is more than formulas and mechanical procedures.
- Children see mathematics as something to talk about, to communicate through, to discuss among themselves, to work together on.
- Children pose and solve meaningful problems.
- Children use abstractions to perceive relationships, to see structure, to reason out things, to argue the truth or falsity of statements.
- Children understand the basic structure of mathematics: Arithmetic, algebra, geometry and trigonometry, the basic

content areas of school mathematics, all offer a methodology for abstraction, structuration and generalisation .

Teachers engage every child in class with the conviction that everyone can learn mathematics.

1.5 Meaning of Remedial teaching

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 wand, all the problems that face the backward child, and speedily restore him to his rightful place in the class.

A process of removing or reducing the severity of the causes diagnosed and there by improving the academic achievement is called remedial teaching. The remedial teaching can be equated with the treatment given by the doctor for any illness. The teaching strategy and techniques used in remedial teaching are individualized i.e. made the 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 instruction etc during the process of remediation is known as remedial teaching .

1.6 Importance of Remedial Programme

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 textbooks 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 vary from individual to individual, subject to subject , grade to grade and institution to institutions. (In order to make teaching-learning process effective, it is essential to identify the learning difficulties of students during instruction . 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 discrepancy, between the achievement and potential is called educational 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 the 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.

1.7 Aims Of The Remedial Programme

Once the child's errors 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 retraining needs.
- suggesting the remedial teaching procedures for the effective as well as corrective learning of various important basic skill.
- suggesting modifications and revisers in the text book and curricula.

- Introducing effective evaluation procedure for pupils of various language group.

1.8 Principles Of Remedial Education

In framing the remedial Programmes, certain following basic principles have to be borne in mind .

- Good personal relationship must be established right from the start of remedial work. If rapport between the teacher and pupil is poor, then not even the most enthusiastic effort will bring success. The teacher should seek to convey to the child his or her personal concern and involvement, and genuine desire to help.
- The plan to attack on the problem should be clearly defined and set out, where treatment is to be given in a group situation, It is advisable to actually write down what you intend to try and do with each child, and how you are going to do it.
- An open mind must be kept on the methods and procedure to be used. The teachers must be prepared to modify, supplement or abandon a programme at any time in the light of results and try a new approach.

- Great care must be exercised in the choice of materials to be used in remedial work, bearing in mind the age, ability, attainment and interest level of the child.
- Motivation should be optimum and all methods of enlisting interest should be used according to the child's age and attainment level . play and story methods would be most effective with younger children, while utility and mastery approach would probably be most effective with children of higher age, the child's natural desire to win praise through success will operate at all age levels.
- The programme should be so designed as to furnished the pupil with immediate opportunities for success. Further this success should be made clear and obvious to the child .
- The pupil himself should be involved as much as possible in the remedial programme, which he is to follow. Progress should be measured not against any external standards, but in the light of his own previous levels of attainment. The keeping of progress charts and a record of timed Performances, for example are useful in this context.
- Treatment should be given individually or in small groups, if progress is to be rapid.
Each child would of course, tend to have his own remedial programme.

1.9 Diagnostic Tests

A diagnostic test has been defined by

English And English (1958) to these words, "one designed to locate the particular source of a person's difficulties in learning especially in school subjects."

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

1.10 Importance Of Diagnostic Evaluation

Diagnostic evaluation provides the feedback to the teachers as well as to the students regarding their strengths and weaknesses. It helps teachers 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.

1.11 Uses Of Diagnostic Tests

- 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.

1.12 Diagnosis In The Subject Area

The first step in remedial work is to make a thorough examination of the child's difficulties in the subject or the subjects 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.

1.13 Steps In Diagnosis

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

1.14 Significance Of Study

Algebra is one of the important branches of mathematics. **symbolism and generalization** are the two main characters which may be observed in the structure and processes of algebra, power of generalization, power of abstract thinking and reasoning, power of imagination, power of logical treatment and systematic analysis are all needed in dealing with algebra. As we know these powers are developed with age and experience, therefore, the teacher should wait for a proper maturity level of his students.

It always happens that students have problem in solving polynomials, so this study aims at finding out the major areas, where students make error. Here the problem will be identified and remedial teaching would be given to them, so that the student would not repeat the error and therefore, improve their achievement level.

1.15 Objectives Of The Study -

- To identify the problem in solving polynomials among IX standard students.
- To diagnose the problem in solving polynomials.
- To implement and design remedial measure in solving polynomials.
- To study the effect of remedial teaching on polynomials for IXth in standard students.
- To compare the achievement between boys and girls of IX standard students.

1.16 Hypotheses Of The Study

- There is no significant difference between pretest and post-test of IX standard students.
- There is no significant difference between boys and girls of IX standard in their achievement .

- There is no significant difference between pre-test and post test of girls.
- There is no significant difference between pre-test and post test of boys.

1.17 Statement of the problem

The present study is undertaken to find and minimize the error in solving problems of polynomials and it is titled as *"Effectiveness of remedial teaching on achievement of IX standard students in solving problem of polynomials."*

1.18 Operational Definition Of Key Terms

Independent variable - Remedial teaching

Dependent variable - Achievement in polynomials

➤ 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 standards of competence.

➤ Achievement In Polynomials

It is a general term in which a given work is accomplished successfully by means of exertion, skill ,practice or perseverance.

1.19 Delimitations

Following were the limitations of the study:

- The study was limited to the achievement in algebra.
- The investigator has delimited her study to only Govt schools of Bhopal area. Further, due to time constraints and lack of resources the study was delimited to only one school. Again, the investigator has selected one class i.e. class IX students for her study and the sample size came out to be 40 students i.e. the results of the study are on the basis of 40 students only.