CHAPTER I
CHAPTER - I

INTRODUCTION

1.1 PROGRESS OF EDUCATION SINCE INDEPENDENCE

To sustain and promote cultural, social, economic and scientific achievements of our nation in the rapidly changing world of today, the makers of our constitution enshrined in the Directive Principles of the Constitution that the State has to provide free and compulsory education to all children up to the age of 14. Since our independence in 1947, serious efforts have been made by the government and other agencies to meet the requirements of free and compulsory education, though with limited success only. Many attempts through committees and commissions have been made over the last fifty five years to identify the weaknesses and problems besetting Indian educational scene and to recommend ways and means to reform and recast the system with a view to make it as an effective instrument of national reconstruction and development. Two educational policies brought out by our government, first in 1968 and then in 1986, express and underline the national will to review the present crisis with its ramifications and contradictions.
They seek to visualize the future aspirations and requirements of society, to consolidate and vitalize the existing progressive trends, and to recommend the strategies of implementation so that objectives of our Constitution are achieved successfully with the help of education system of our country.

The present educational scenario in India highlights two prominent features of the system: it is vast in size and it is nearly dysfunctional. The enormity of its size is clear from the fact that today India possesses the third largest education network in the world. The number of universities and deemed-to-be universities has gone above 250 and the number of colleges has crossed the figure of 8,000, accounting for a total enrolment of over 50 lakhs, and an annual expenditure of about Rs. 1400 crores. Enrolment in higher education accounts for 40 percent of the enrolment in the developing countries. Every eighth student enrolled in higher education in the world is an Indian.

Similarly, school education too has witnessed vast expansion. The number of primary schools had gone up more than six lakhs with an enrolment of 11 crore students. The number of middle schools and high/higher/senior secondary schools is
more than two lakhs and nine lakhs with an enrolment of four hundred lakhs and three hundred lakhs respectively.

Now such a tremendous and enormous increase in the number of schools, teachers and students as well as in terms of money expended, pose certain serious question which call for objective answers. We are inclined to ask whether the goal of universal enrolment envisaged by planners has been achieved. Do the students enrolled, stay in schools to acquire the maximum expected standards of education by the age of 14? Are the students able to develop and utilize their potentials to the optimum level? Are the students being imparted the knowledge, efficiency and competence suitable to meet the challenge of the 21st century? Are the facilities in the school, methods of teaching and motivation of teachers and students adequate for acquiring optimum results? Can the gaps, imbalances and inadequacies be rectified? These are some of the questions which require immediate attention and remedial measures by all those who are interested in the welfare of this country.

Reality of the fact is that targeted aims national requirements have not been achieved and these have become obvious to a close observer of the system. Although the literacy rate has gone up from 18.33% in 1951 to 52.11% in 1991
and 60% in 2001 (Ministry of Information and Broadcasting, Government of India), we are far from achieving the goal of universal literacy. According to the Fifth All India Educational Survey (1986), there are still about 6% large habitations without any school facility. Out of the total number of 9,79,065 habitations only 51.36% are provided with primary schools within the habitation and 84.45% are served with the facility either within the habitation or within a distance of 1 km. The dismal state of physical facilities provided in these schools is reflected by the fact that 27.25% of these primary schools have no pucca buildings, 39.72% are without black-boards and 59.5% have to do without any facility for drinking water. 27.96% schools have a single teacher to teach 3 or 4 different classes. Teacher absenteeism is also a serious problem, particularly in schools located in rural areas of the country. As a result of poor physical facilities, and many other socio-psychological factors, even the target of enrolling all the children in the age group of 6-14 years has not been met. Approximately 95% children in 6-11 years age group and 50% children in 11-14 years age group are enrolled in schools, the corresponding figure for girls being 77% and 36% respectively. However, nearly 60% children drop out between classes I-V and 75% between classes I-VIII (National Policy on Education, 1986).
Our educational achievements, it is obvious do not compare favourably with only the richer industrial countries like Japan and Italy but also with poorer nations like Malaysia and Sri Lanka where almost all children complete primary schooling (UNESCO, 1989). Such a high dropout rate in our primary schools represents an immense cost. It amounts to over 16 per cent of the total annual expenditure on primary education. In addition to the resource cost, these dropouts also represent a significant human cost to themselves and the nation since they will most likely be permanently illiterate (Desai, 1991).

Our education system is not capable of developing to the full the potential of the children. On this point, the situation is far from reassuring and leaves much to be desired. The need to improve quality of education has been recognized and expressed by educationists, planners, teachers and the enlightened parents. The desire for a high level of achievement puts a lot of pressure on students, teachers, schools and, in general the educational system itself. In fact, it appears as if the whole system of education revolves round the academic achievement of students, though various other outcomes are also expected from the system. The phenomenon of underachievement is prevalent at
all the different stages of education. An assessment of students’ achievement reveals that there is no uniformity in their achievement. Some of them do very well while some others achieve relatively less. There are still those who fair very poorly. The latter two categories of children obviously fall in the category of underachievers. According to researchers, the problem can be attributed to a number of causes. Chandra (1975) found that lack of learning material, proper co-ordination and lack of good rapport are the causes of low achievement. The study by Doctor (1984) indicated a relationship between classroom climate and academic achievement. He found that academic achievement was dependent on teachers’ and pupils’ behaviour, pupils’ psyche and classroom climate. Upadhyaya’s study (1984) also revealed that each of the three aspects of classroom environment-interpersonal relationships, goal orientation and system maintenance and change was significantly related to academic achievement.

According to Fourth Survey of Research in Education (1991), studies on achievement of students indicate that achievement in a child is caused, promoted and affected by a number of variables such as variables arising out of the person or self, variables arising out of the teaching-learning set-up, variables arising out of the home, variables arising out of subject
of study, and so on. Each one of them is actually a cluster of variables which individually or on interaction with others have their influence on achievement.

There are evidence to prove that all students proceed through the same curriculum but at different rates and with different measures of attainments. These differences are explained by Musgrave (1976) when he points out that no two living organisms are alike; no two learners achieve at the same rate; use the same study technique; no two learners possess the same repertoire of behaviours, patterns of interests and capacity to learn; no two learners are motivated to achieve the same goal, to the same degree and to learn at the same time.

The individual difference in levels of achievement is, indeed, a widely accepted phenomenon. Moreover, the differences in the degree of achievement noticeable at an early stage in school tend to persist and even increase at a later stage. The longitudinal research studies reveal that there is a significant relation between achievement differences among a group of students at one time and their achievement differences after several years (Payne, 1963). The fact that students do show differences in achievement goes unquestioned, but the studies which attribute these differences to the individuals’ mental levels
only tend to obscure more than reveal the truth about its causes. It follows the assumption that just like mental abilities, achievement also follows the laws of normal distribution, i.e. when something is taught in the classroom, most of the students will have average learning, some will achieve above average and some of them will achieve below average. Evaluating students’ achievement is also based in this concept. It results in the tendency on the part of the administrators and educationists to under-estimate the need of finding out the ways and means to improve classroom environment. Furthermore, it fails to motivate both the teacher and the student for better performance.

1.2 NEW APPROACHES TO THE TEACHING LEARNING PROCESS

The question of how to raise achievement of largest number of students to the optimum level has received considerable attention from researchers and teachers. Crawford and others (1972) found that some new curricula and instructional strategies result in superior learning by students as compared with more conventional approaches. Similarly, the model developed by Carroll (1967) is also based on the assumption that the achievement of students can be optimized provided suitable techniques are used in systematic manner. His model, as
summarized by Bloom (1976), states that if students are normally distributed on the basis of their aptitude for a given subject and all are provided precisely the same instruction (in terms of amount and quality of instruction and learning time allowed), achievement measured at the completion of the subject will also be normally distributed. Under such conditions the correlation between aptitude measured at the beginning of instruction and achievement measured at the end of instruction will be relatively high (typically about +0.71). On the other hand, if students are normally distributed with respect to aptitude but the quality of instruction and learning time allowed are made appropriate to the need of the each learner, majority of students will achieve mastery of the subject. In such a case the correlation between aptitude and achievement should approach zero.

Based on Carroll’s model of school learning, Bloom (1976) developed mastery learning strategy for optimising students’ learning in different areas of curriculum. The basis of his strategy is that most students can attain a high level of learning capability if instruction is approached sensitively and systematically, if students are helped when and where they have learning difficulties, if they are given sufficient time to achieve
mastery, and if there is some clear criterion of what constitutes mastery.

Mastery Learning is the set of old and new individualized instructional ideas and practices that consistently help most students to learn excellently, quickly and self confidently. These ideas and practices produce instruction that is systematic, provides help to students when and where have learning difficulties, and provides sufficient time for students to achieve mastery (Bloom, 1974). Mastery Learning approaches attempt to modify the instructional setting so that students possessing a variety of entering abilities, skills, knowledge, attitudes and values can succeed. Moreover, Mastery Learning approaches rely primarily on human being for their success rather than on machines and other technological devices.

According to Bloom (1971), mastery learning strategies can produce outcomes that are both equal and very similar and at high levels of achievement. Bloom (1971) maintains that 95% of the learners can master 95% of instructional contents if tutored through different strategies of mastery learning. Block’s findings (1971, 1974) also are in the same line. He has concluded that the achievement levels of 75%
of all students can be raised to the achievement levels now enjoyed by only top 25% of students. Burns’ (1979) analysis of 157 mastery learning studies revealed that most of the results were statistically significant in favour of mastery learning. Hyman and Cohen (1979) also found that mastery learning was consistently more effective than traditional curriculum.

1.3 MAJOR VARIABLES INVOLVED IN MASTERY LEARNING

It is a well documented fact that mastery learning is an effective strategy to raise students’ achievement to the optimum level. The major variables in mastery learning based on the work of Carroll (1963) and Bloom (1971) and supported by the ideas of Morrison (1926), Skinner (1954), Suppes (1966), Bruner (1966) and Glasser (1968) are

i. Aptitude and rate of learning
ii. Quality of instruction
iii. Ability to understand instruction
iv. Perseverance
v. Time allowed for learning.

i. The core idea in the theory of mastery learning is based on Carroll’s (1963) perspective on the meaning of aptitude.
Traditionally, the concept of aptitude has been associated with students’ characteristics that correlate with his or her achievement. It is stressed that the more aptitude one has, the more one is likely to learn. Carroll, however, views aptitude as the amount of time it will take someone to learn any given material, rather than his or her capability to master it. His view implies that pupils with very low aptitude with respect to a particular kind of learning simply need a much longer time to reach mastery than pupils with a higher aptitude. This view suggests that nearly all students can, almost everything given to them for learning provided sufficient time is given along with materials and instruction appropriate to their needs.

ii. The second important variable in mastery learning is quality of instruction. The large individual differences in rate of learning observed in many studies are attributed by Block (1974) to poor instruction. Carroll (1967) and Merill (1970) also found positive correlation between quality of instruction and learning rate. Carroll (1963) in his paper on a model of school learning defined quality of instruction in terms of the degree to which the presentation, explanation and ordering of elements of the task to be learned approach
the optimum for a given learner. This definition suggests that each student can learn if the instruction approaches the optimum for him or her. It implies that the quality of instruction has to be made suitably appropriate to the needs of each learner for optimum outcome. While Bloom agrees with Carroll that students differ in the qualities of instruction they need to learn a given task, he differs with him on what is involved in quality of instruction. Bloom, in his definition of quality of instruction, lays emphasis on the interaction between instruction and students.

The major components of quality of instruction are cues, participation, reinforcement and feedback/correctives (Bloom, 1976). These four elements of instruction account for 20-25 per cent variation in achievement. The quality of instruction proves more helpful in the case of those who have not developed mature learning procedures. There are many studies which suggest that, in general, the quality of instruction is of the greatest significance for groups of pupils at the lower portion of the ability of achievement distribution (Coleman, et al., 1966). This proves effective if the quality of instruction is designed appropriately to meet the special needs and characteristics of the individual in the class group.
iii. The third variable, the ability to understand instruction may be defined as the ability of the learner to comprehend the precise nature of the learning task he is to learn and the procedures he is to follow in its learning. There are a number of instructional techniques and aids that may be employed to meet appropriately the differing requirements and characteristics of the learners. In this context reference may be made to the usefulness of tutorials, educational games, audio-visual material, programmed instructional units etc. These strategies are selected, used and adjusted by the teacher in accordance with the difficulties his student faces during the process of learning.

iv. The fourth variable is perseverance, which is defined by Carroll (1963) as the time the learner is willing to spend in learning. He sees a close relationship between motivation and perseverance. Perseverance is not static, it can be increased by increasing the frequency of reward and evidence of learning success. Husen (1967) noticed that perseverance is related to students’ attitude towards and interest in learning. The quality of instruction also influences the perseverance of the learner.
v. Time allowed for learning is the fifth important variable. According to Carroll, the time spent on learning is the key to mastery. He bases his argument on the assumption that the rate of learning is determined by aptitude of the learner and that most of the students can attain mastery level if they devote the amount of time they need for it. Bloom (1971, 1976, 1978, 1980) asserts that individual differences in learning rates and time needed to learn, like differences in achievement, are artifacts of the schooling process. He believes that when students begin to learn a new unit without having mastered prerequisites, their learning rates become progressively slower. Bloom even suggests that there will be a vanishing point of individual differences in learning rate and time needed to learn provided the learner proceeds through the adequate mastery learning procedures. Anderson (1976) also found that as students in a mastery learning treatment became homogeneous with respect to pre-requisites for each succeeding step, they also became homogenous with respect to time needed to attain mastery.

These five variables – aptitude, ability to understand instruction, perseverance, and time allowed for
learning and quality of instruction—according to Carroll, have influenced his model.

1.4 BLOOM’S MODEL OF MASTERY LEARNING

Using Carroll’s model as a basis, Bloom (1968) developed this conceptual model of school learning into working model for classroom instruction. His theory tries to explain school learning in terms of a small number of interdependent variables. These interdependent variables mainly account for much of the variation in school learning. The three interdependent variables which Bloom’s model takes into account are:

i. The extent to which the learner has acquired the basic prerequisites for further learning (Cognitive Entry Behaviour).

ii. The extent to which the learner is motivated to undertake the new learning assignment (Affective Entry Characteristics),

iii. The extent to which the instruction to be imparted is made appropriate to the needs of the learner (Quality of Instruction).

More specifically, Bloom’s model deals with pupil characteristics, instruction and learning outcome.
Figure 1.1
Major Variables in Theory of School Learning

Pupil Characteristics  Instruction  Learning outcomes
Cognitive entry behaviours signify the knowledge, skills and competencies which are essential pre-requisites to the new learning task. In the absence of necessary pre-requisites the learner finds it very difficult to adequately learn the new task. The studies conducted by Sinha (1968), Glasser (1968), Block (1970), Anderson (1973), Menon (1973), Levin (1975) make it clear that there is a strong positive relation between the cognitive entry behaviours of a student and his achievement in subsequent learning tasks. On the basis of the findings of such studies, Bloom (1976) estimated that cognitive entry behaviours account for about 50 per cent of the variation in achievement. Thus cognitive entry behaviours are casual links in determining new learning tasks and in accounting for cognitive educational achievement.

Affective entry characteristics denote the learner’s interest, attitude and self-views with which he takes up the new learning task. If a student approaches a new task with interest and enthusiasm, he learns it easier, quicker and to a higher level than those who approach it with lack of enthusiasm and interest. The studies conducted by Block (1970), Anderson (1973) and Bhasin (1974) bring out significant relationships between affective entry behaviour and related measures of school
achievement. This casual link, it is estimated, can determine nearly 25% of the variance on relevant cognitive achievement measures (Bloom, 1976).

Quality of instruction refers to the interaction between instruction and students. In this context cues, participation, reinforcement and feedback/corrective procedures become major characteristics determining and influencing the quality of instruction and their effects on students learning. These characteristics must be made appropriate to the needs of the learner in order to raise his learning achievement. The studies available indicate that quality of cues, participation and reinforcement can account for at least 20 per cent of the variance while feedback and corrective procedures can account for about 25 per cent of the variance in pupil learning.

These interdependent variables can help schools a great deal to build up an error free system of education if they are properly attended to. The idea central to this theory is that variations in the cognitive entry behaviours and affective entry characteristics and the quality of instruction will determine the nature of the learning outcomes. These outcomes are observable in terms of the level and type of achievement, the rate
of learning and the affective characteristics of the Learner in relation to the learning task and self. This theory aims at explaining the interaction between an individual learner, the instruction, learning task and the learning finally accomplished.

In order to achieve the goal of raising teaching and learning to the optimum level, Bloom and his associates developed mastery learning strategy. In developing the strategy, they have tried to identify some pre-conditions, operating procedures and evaluation of outcomes. This strategy has been adapted to meet the peculiar conditions of Indian Educational System (Jangira, 1980; 1983).

Operating Procedures

The Mastery Learning Model takes into account several activities in a sequence. The sequence of activities is shown in the figure 1.2. These steps in the order of sequence may be described as under:

Phase –I

The first important step in mastery learning strategy is the selection of contents to be taught. Contents of the curriculum are organized sequentially in the form of units. In
preparing the sequence of teaching units, the hieratical order of
different concepts is to be followed. In such arrangements, each
learning unit becomes a pre-requisite for the subsequent unit. The
level of achievement of each task influences the learning of the
later task, and each task thus has a necessary relation to the later
tasks in the series. The teacher tests the pre-requisites the students
possess. If all the students are equipped with necessary pre-
requisite for a particular task, they would tend to learn with less
variation in the rate and level of learning. The students deficient
in pre-requisites have to be helped in acquiring the required pre-
requisites.

Phase –II

Students are then told about the units to be
covered. They are told specifically about the concepts, rules and
processes involved. Instructional objectives are made clear to the
students at this stage. They are also told about the mastery level
decided. First unit from amongst the decided content is taught to
the class as a whole employing the usual techniques of teaching
with a view to achieving maximum learning for maximum
number of pupils. The presentation of learning task is followed by
assessment of the mastery level of the pupils by administering the
formative test I and diagnosing pupils’ difficulties. On the basis
Figure 1.2
Mastery Learning Model (KLM)

PHASE-I
Selecting content to be taught. Developing sequential teaching units. Deciding goals in terms of specific objectives (deciding mastery level).

Teaching for learning: task. Pre-requisite

Pre-requisite available
Pre-requisite not available

PHASE-II
Core teaching session

Performance Assessment
Administering unit formative test - I

PHASE-III
Group attaining desired mastery level (M)
Group not attaining desired mastery level

Differential teaching session
60-79%
40-59%
20-39%
0-19%

Self study with different materials
Peer tutoring
Peer tutoring
Teacher tutoring

Performance Assessment
Unit formative test - II

PHASE-IV
Group attaining desired mastery level (M)
Group not attaining desired mastery level

Intensive Teaching Session
Peer and teacher tutoring

Performance Assessment
Unit formative test - III

Not attaining mastery
Special tutoring by teachers
of the formative test, the students can be classified into groups according to the level of their mastery.

Phase – III

Pupils who get 80% or above may be in one group called the mastery group. The number of forming this group may vary from class to class and from unit. Rest of the students may be placed in another group in mastery group. This may further be divided into sub-

Students approximating the mastery level with 60% to 79% need a little more practice with additional materials related learning task to reach mastery level. This group can mastery level by working on its own. The students in the 40-59% are divided into further smaller groups who helped by small group peer instruction by the pupils of group. The pupils in the learning range of 20-39% are individually by peers. The remaining group of students within the range of 0-19% mastery level is intensively tut the teacher. In the light of the formative test I, the provides to the peers to assist pupils who are attended to by the teacher. In the light of the formative test I, the teacher also tells the students about their respective and weakness as shown by their performance in the test. The teacher also told about the necessary corrective measures.
The pupils are then administered formative test II. Again the students are divided into mastery and non-mastery groups. Formative test results are used for planning further strategy to improve the non-mastery group of students to the mastery level.

**Phase –IV**

The size of the non-mastery group being smaller, it may be possible to have peer-tutoring and teacher-tutoring using alternative instructional material. The teacher has to attend to the students falling at the lowest range on the formative test II. They are helped through practice and drill. Then, they will be administered the formative test III. It is expected that most of the learners should attain mastery level at this stage. The students who still fail to make to the mastery level are assisted outside the class by the teacher or parents.

All the other units too are covered following the same procedure. It is ensured that all the learners achieve mastery level in the unit taught before moving over to the next unit. This is especially important in the case of subjects with sequential structure based on hierarchical nature. The studies
available indicate that mastery learning has proved most effective in those subjects which require previous learning which most learners already possessed (Bloom, 1968; Black, 1970).

1.5 ENVIRONMENT EDUCATION

HISTORY OF ENVIRONMENT EDUCATION

In 19th century, in 1899, Patric Geddes – the Scottish Professor of Botany thought that the quality of education and quality of the environment is closely interconnected and a child brought into realities of his environment would understand that ‘environment’ is the result of interaction between place, work and folk.

In 1965, in University of Keele, the Environment Education was agreed to be an essential part of the education for all because of its immense educational potential and importance of understanding environment. With the organization of International Conference on Human Environment in Stockholm, Sweden, by the United Nations in 1972, the movement of EE became truly international. In October, 1975, IEEP organized the historic Belgrade International workshop on
Environment Education and it was realized that the four educational sectors with the highest needs in general EE are respectively:

i. Primary Education
ii. Secondary Education
iii. Tertiary Education
iv. Out of School Education

It was only when the emphasis was given on imparting environmental education “Adult and Social Education courses”, that is, at informal level of Education.

At present in the opinion of great majority of countries (nearly 63%) they need Environmental Education programmes of both types – formal and non – formal for the development of their countries.

ENVIRONMENTAL EDUCATION

According to Encyclopedia of Education Research (Mitzil 1982) Environmental Education is the process of recognizing values and clarifying concepts related with the
environment and its problems in order to develop skills and attitudes necessary to understand surroundings.

Thus Environmental Education is a process to promote the awareness and understanding of the environment, its relationship with man and his activities. It is also aimed at developing responsible actions necessary for preservation, conservation and the improvement of the environment and its components. For this, three concepts of EE flow; ‘about’ the environment, ‘from’ the environment and ‘for’ the environment. Education ‘about’ the environment is acquiring and understanding of the total environment. When the environment is used as a vehicle for gathering concepts, knowledge and skills related to specific academic disciplines, it is learning ‘from’ the environment. And finally, the development of attitudes, skills and evaluation abilities for the proper use and the development of the environment is education ‘for’ the environment.

It is universally agreed, however, that environmental education should be inter-disciplinary – drawing from biological, sociological, anthropological, economic, and political and human resources. It is also agreed that a conceptual approach to teaching environmental education is the best.
OBJECTIVES OF ENVIRONMENTAL EDUCATION

The objectives of Environmental Education programmes are drawn on the basis of the objectives described in Belgrade Charter. The main objectives of Environmental education have been stated by Stapp et al. (1970) as follows:-

1) A clear understanding that man is inseparable part of, a system, consisting of man, cultural and biophysical environment and the man has ability to alter the inter-relation of this system.

2) A broad understanding of the biophysical environment both natural and man made, and its role in the contemporary society.

3) A fundamental understanding of the biophysical environmental problems confronting man, how theses problems can be solved and the responsibilities of the citizens and government to work towards solution.
4) Attitude of concern for the quality of biophysical environment that will motivate citizen to participate in biophysical environment problem solving.

METHODOLOGY AND RESOURCE OF ENVIRONMENTAL EDUCATION

The different methodologies are used, according to the suitability of the topic, local resources and other requirements. The common methodologies are discussion, group projects, field trips, community resource visit, etc.

There is an approach (Saxena 1983) defined as having making use of easily available material from the local environment for conducting experiment, demonstrations, discussions etc.

Low cost resources curriculum may use some common plants, glass, water, heating system, local animals, cloth pieces and other easily accessible material in the community. In one case (SC, 1974) the total list of all the resources is – Community Libraries, Polluted Water Sources, Magazine, Ground Land, Equipment, Visual Aids, Documentary
Films, Skits, Drama, Radio, T.V. and Lectures of fine and learned speakers.

NCERT, School Science and Environmental Education

Environmental concepts and related topics have been included in the instructional materials developed by the NCERT for different levels of school education. In the sixties conservation concepts were introduced with the ideas promoted by the International Union for Conservation of Nature and Natural Resources (IUCNNR) at present known as World Conservation Union. Later on, the information on environment was updated in the school curricula in the light of the international inputs through the Stockholm Conference (1972) and the Tbilisi Inter – Government Conference, (1977).


The National Policy on Education (NPE - 1986) has envisaged protection of the environment as the core element of education at all levels. It should be developed as one of values among the children. The policy has also recommended
the creation of environmental consciousness among all ages starting with school education.

Science and social studies are the two main subject areas with intensive coverage of environmental topics. Several topics covered in science, geography, biology, chemistry and economics would help in understanding the structure and functioning of the environment. Environmental problems and issues are also included at appropriate places. There are several poems and stories on trees, insects, animals, in language subjects like Hindi and English to create interest and motivate the children to contribute to the protection of the environment.

The department of education in Science and Mathematics of NCERT has undertaken a project (1993) to analyse the School Curricula developed by the Council as part of the implementation of National Policy on Education (1986). The analysis was done to identify the EE concepts and activities vis-à-vis the universal objectives of EE. This exercise also helped in the identification of the strengths and weakness of NCERT curricula in terms of expectations of EE.
The department of Science and Mathematics, on behalf of the NCERT also undertook a UNESCO sponsored Case Study on Environmental Education in India. This opportunity provided insight into the present status of EE concepts and training at the school level, higher education and technical education. This would help in strengthening EE components at the school level.

List of Environmental Topics Covered in NCERT Science Textbooks for Various School Levels

Environment, forests, wild life, natural resources and their conservation and other areas like health, environmental sanitation have been incorporated in the NCERT Science Textbooks at various school levels keeping in view the age group of the children, teachers and resources available in the schools. Efforts have been aimed at encouraging children to become aware of their environment, understand its structure and functioning and work for environmental protection and conservation. Activities on studies of components of environment have been included to strengthen the teaching-learning process. The topics covered in the syllabus and textbooks are given class-
wise and subject-wise for various levels – primary, primary, secondary and senior secondary. It would be teachers to emphasize the need for understanding environmental components and motivate the children to contribute towards the improvement of our environment.

Environmental Studies – Science (Class V)

1. How Living Things Adapt Themselves: Living organisms on land and in water and air; habitat; aquatic plants, animals; amphibious organisms; adaptation in fish, camel, cactus, water lily in cold climate.

2. Deficiency Disease and Communicable Diseases: requirements of different age-groups; symptoms of p carbohydrate deficiency; vitamins and their deficiency diseases; role of bacteria in spreading common diseases; vaccination.


5. Air- Its Uses and Pollution; Air composition; exchange of oxygen and carbon dioxide: role of oxygen and nitro
plant growth; air pollution-smoke from industries, automobile exhausts, fuel burning, prevention of air pollution.

6. Energy: Fossil fuels (coal, petrol); wind energy; solar energy; biogas.

7. Science and Environment: Progress of Science and Technology production of consumer goods, over use of natural resources.
1.6 STATEMENT OF THE PROBLEM

"Effect of Mastery Learning on Achievement in Environment Science, Self Concept and Classroom Trust behaviour of the Students".

1.7 OBJECTIVES OF THE STUDY

Research study was conducted by keeping in mind the following objectives:

1. To develop and standardize Environmental Science Achievement Test.
2. To compare the mean achievement scores of two groups of students, taught environmental science with mastery learning model and conventional method, before and after the experimental treatment.
3. To compare the mean self-concept scores of two groups of students, taught environmental science with mastery learning model and conventional method before and after the experimental treatment.
4. To compare the mean classroom trust behaviour scores of two groups of students, taught environmental science with
mastery learning model and conventional method before and after the experimental treatment.

1.8 DELIMITATION OF THE STUDY

1. In order to control effectively the variable of instructional variation, the study was confined to single school.
2. Fourteen units from environmental science syllabus of Class V were selected for the purpose of this study.
3. The subject of environmental science is chosen for the study due to its importance in every day life of the students.

1.9 DEFINITIONS OF KEY TERMS

1. Mastery Learning:
   It is systematically planned programme of instruction adopted by teacher to raise the achievement of students to predetermine mastery level. It involves presentation (cues), feedback (mastery testing), correction (using alternative instructional material and method) till practically all students achieve the desired mastery level.
2. **Conventional Method:**

Here teacher is only active participant and gives lecture, house assignment and administers test periodically. He assigns marks to students and this method has no value in terms of improving the quality of instructions.

3. **Academic Achievement:**

It is the level of learning in a particular area of subject in terms of knowledge, understanding skill and application, usually designated by test scores or marks assigned by the teacher or both (Good, 1973).

4. **Self-concept:**

Pupils’ self-concept means those perceptions, beliefs, attitude and feelings which individual views as a part of characteristics of himself. It is his own perception of his health and physique, intelligence ability, academic status, behaviour temperamental qualities, mental health etc. (Good, 1973).
1.10 VARIABLES INVOLVED IN THE STUDY

Independent Variables:
Mastery learning strategy and conventional method of teaching used in this study form the independent variables.

Dependent Variables:
Achievements in environmental science, self-concept and classroom trust behaviour are the dependent variables. The first dependent variable is cognitive, while the other two are effective.

Intervening and Control Variables:
The intervening and moderate variables which need to be controlled for ensuring the internal validity of the experiment are – intelligence, socio-economic status, grade to taught, subject and topic taught to the children in both the groups, their previous knowledge in environmental science, institutional variations and instrumentation.

In the present study, mastery learning is measured with the help of formative tests. The scores on
different formative tests indicate the children achievement of mastery level. For the purpose of present study the mastery level decided is 90 per cent learning achieved by 90 per cent of the children.

Formative Tests

Formative tests also called mastery tests, have been used here as they provide the information necessary to make instruction appropriate to the needs of the individual for achieving mastery level. Formative tests are administered during the course of mastery learning to find out the levels of children achievement in a particular area of content and to diagnose children difficulties. These tests are given at the completion of each learning unit. They serve the vital function of providing feedback necessary to design the quality of instruction accordingly.

Summative Tests

Summative tests also known as Criterion Achievement Tests are administered at the end of major units of period of instruction. Its primary aim is to assess or evaluate the degree of the children achievement and to grade them according to their performance.
1.11 NEED AND IMPORTANCE OF THE STUDY

The research evidences, thus, indicate clearly that mastery learning strategy can prove very effective in utilizing the potential of the learners to the maximum level. It can in this way help remedy the chronic problems of under-achievement, and the like. But in order to achieve the best possible outcome, it should be developed to meet the special requirements of Indian conditions. Jangira (1983) developed Mastery Learning Model appropriate to the needs of Indian situations. Studies conducted by Mathur (1983) Hooda (1983), Singh (1983), Chand (1984), Yadav (1984), Patadia (1987), Vaidya (1989) and Sangwan (1992) have also tested the effectiveness of mastery learning strategy in Indian situations.

The subject of Environment Science is one of the important subjects at the elementary stage of education as well as in the daily life of the children, and till now practically no research has been conducted where from we can improve the teaching of this subject.
Indiscipline problem in the class is due to faulty method of teaching. Chalk and talk are the monotonous lectures of the teachers which do not appeal to the senses of the children. That is why there is truancy, inattentive behaviour, class fights, abuses and damage to class and school property. Therefore, it becomes essential to investigate whether some other method of teaching e.g. mastery learning can be more effective as compared to conventional method so that students can be saved from frustration and anxiety.

From the Fourth Survey of Research in Education (1991), it is observed that the effect of certain methods/model of instruction in different subjects e.g. Mathematics, Physics etc. have been studied on a variety of variables but there is no research in which the effect of mastery learning on the environmental science has been explored.

Further the findings of this study will be very useful for the teachers, teacher educators, curriculum – makers, planners students and above all for the society.

Study of the trend reports and abstracts in Buch’s Fourth Survey of Research in Education (1991) reveals
that model of teaching as an area of research is emerging in a significant manner. The present study is an attempt in this direction.

Hence, the effectiveness of mastery learning model on students’ achievement in environmental science, self-concept, calls for an in-depth research.

1.12 ORGANIZATION OF RESEARCH REPORT

Introductory remarks rationale of the problem, objectives, need and importance of conducting the present study have been given in Chapter I, while the Chapter – II has been devoted for the review of Research literature and hypotheses. Chapter III deals with the development of Environmental Science Achievement Test, while in Chapter IV design and procedure of the study has been given. Chapter V deals with the Analysis and Results, whereas Chapter VI deals with the summary, conclusions, educational implications of the study and suggestions for further research. Bibliography and appendices have been given at the end of the thesis.