CHAPTER - 1
INTRODUCTION
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INTRODUCTION

To be educated along right lines is divine and great. It is something which has to be acquired through a life long, continuous, and conscious process, called education. But the tragedy in India is that in almost all the educational institutions the information from the printed text is poured into the young minds by the traditional spoon feeding methods. From this type of education knowledge may be acquired but all round development cannot take place. With all the knowledge at their command they hardly feel confident and competent in themselves. The feeling of dissatisfaction with the present system of education, has been expressed time and again by educationists as well as by general public. The quality of education is to be ultimately reflected through the behaviour of learners. The focus of teaching-learning process should be shifted from teacher-centered to student-centered, keeping in view the individual differences.

Teaching is an art as well as a science. As an art, it portrays the imaginative and artistic abilities of the teacher in creating a worthwhile situation in the classroom in which the learners learn and achieve the specific objectives and general aims of education. Teaching as a science points to the logical, mechanical and procedural
steps to be followed to attain an effective accomplishment of goals. (Vedanayagum E.G. (1989).

Learning takes place when the learners achieve what the teacher perceive as essentials to be achieved while a course or a unit of a course is taught in the classroom or outside it. In order to know if learning has actually taken place, the teachers should be clear about what they perceive as essential and how they expect the student to learn. In other words, the objectives of teaching must be specifically defined so that the teachers keep those as frame of reference to find out if learning has taken place and if so whether their teaching has been effective. It implies, therefore, that effectiveness of teaching is the outcome of adopting appropriate teaching techniques to help students achieve these objectives and of an appropriate evaluation to find out if learning has taken place. It follows that instructional objective, teaching strategies and evaluation are the three salient features of effective teaching which indicates effective learning. (Vedanayagum. E.G. (1989).

Appropriate teaching strategies are of immense importance in bringing about required modification in student behaviour and his/her learning styles. Thus, if teachers really want to help learners to become academically successful, they would have to first examine them more closely and then develop alternative self-learning modules suitting to their individual cognitive styles.
1.1 THE CONCEPT OF MODULE

A module is a self-contained and independent unit of instruction with the primary focus on a few well defined objectives. The substance of a module consists of materials and instructions needed to accomplish pre-determined objectives. The boundaries of a module are definable only in terms of stated objectives (Creager and Murray, 1971). No single definition of a module has been acceptable to everyone, and as a consequence, the term has been applied variously to include all sorts of units, materials, and the combinations. However, in each case a module seems to represent a self-contained instructional package covering a single conceptual unit of subject matter. The idea did not have its inception in any one individual or individual groups, but was generated spontaneously by many people interested in improving education and instructional design. The use of modules grew rapidly through 1960s and 1970s and currently the modular approach is well-entrenched as a means of tailoring instruction to individual needs. Nearly all individualized instructional strategies are based on the use of modules and minicourses.

A module consists of following components:
- Statement of purpose;
- desirable pre-requisite skills;
- instructional objectives;
- entry behaviour test;
- transaction of instructions;
1.2 SELF-LEARNING MODULE

A self-learning module is one type of instructional material with which a learner can acquire knowledge, skills and attitudes in the absence of a teacher. It differs from other types of instructional materials. It is self-contained and independent of live instructions.

Abedor, A.J. (1978) "A self-learning (instructional) module is a set of self-contained material used independently by student to achieve a predetermined set of learning outcome".

A self-learning module is so designed that it does not require the presence of a teacher. It is capable of standing alone and acts itself as a teacher.

1.3 ESSENTIAL CHARACTERISTICS OF SELF-LEARNING MODULE

Research on instructional processes have shown that the existence of certain characteristics in instructional material greatly improves learning.

In a self-learning module some of the important and essential characteristics that should be present for effective learning are listed as follows:
1.3.1 INFORMING THE LEARNER ABOUT THE OBJECTIVES

A self-learning module is based on certain predetermined objectives to be achieved by the learner after going through the module.

The learner should be informed at the very beginning of the objectives to be achieved so that the learner can develop a frame of reference which helps in acquiring new knowledge, skill and attitude. Objectives make the teaching-learning directional.

1.3.2 LIST OF PRE-REQUISITES

For acquiring new knowledge, skills or attitude a learner must possess certain abilities (pre-requisites). Pre-requisites may consist of a body of knowledge, skill or attitude which the learner require to use while learning new material. Therefore, in a self-learning module a list of pre-requisites should be provided. This list of pre-requisites indicates the entry level of the learner for the self-learning module. Often a pre-requisite test (Entry behaviour test) is provided to ascertain suitability of a learner for the module.

1.3.3 GAINING AND MAINTAINING ATTENTION OF LEARNER

Gaining and maintaining learner’s attention is very important in self-learning but is one of the most difficult jobs in instructional design. Research has shown that the most successful method of gaining and maintaining attention
is through skill of stimulus variation. Frequent variation in instructional mode can be used for gaining and maintaining attention of learners. Various techniques suggested by different educationists for gaining and sustaining attention are:

- use of Diagrams, sketches, charts, photos, cartoons
- use of intertext question
- use of humour
- introduction of variety of activities
- use of techniques of emphasizing underlining, capitals, or use of boxes etc.

1.3.4 ORIENTATION AND MOTIVATION

To motivate learner, the learner should be informed of what knowledge, skill and attitude to be learnt and how it is related to his present study and how it will help him in his future career.

1.3.5 PRESENTATION OF THE CONTENT IN ORGANIZED MANNER

In a self-learning module new information should be presented in an organized manner. The module should provide an organizing framework (advanced organizer) showing the learner the relationship between the new idea presented. Several methods for presenting the information may be adopted. Some of the important methods are:

I. Sequence of information in different manner like -
   (a) Psychological (i.e. simple to complex, concrete to abstract, general to specific)
   (b) Chronological (first, second, third etc).
(c) Spiral (presenting simple version first, and then repeating it with more complex elaboration, example etc.)
(d) Logical sequencing based on reasoning methods.

II. Inductive or deductive presentation of information -
(a) Inductive method where learning takes place by 'discovery'.
(b) Deductive method where principle is presented first and then examples.

1.3.6 REQUIRING LEARNER TO MAKE RESPONSE AND PROVIDE FEEDBACK ON RESPONSE

The primary aim of a self learning module is to help the learner to process, store and retrieve the information presented in the module. Requiring the learner to practice response and then providing feedback on the response made, enhances the processing, storing and retrieval of information. A practice exercise requires the learner to apply the knowledge just acquired which activates the learner's processing, storage and retrieval mechanism. The feedback on learner's response provides the correction of the response and, thus facilitates acquisition and retention of desired information or skill.

1.3.7 PROVIDING SELF-PACING AND REDUNDANCY

Abedor (1978) "Pacing is the rate at which the information is presented, while redundancy is the degree of repetition
of ideas in a given instructional sequence."

Every individual learner differs in his/her rate of learning. Learning always improves if the learner is allowed to proceed at his own rate. Self-pacing is automatic in self-learning module because it is under the control of the learner. Related with pacing, another important characteristic is redundancy. Sufficient redundancy is to be built in into the self-learning module. If sufficient redundancy is not built in then the learner has to repeat all or part of the module several times to achieve an objective. Therefore, certain key concepts are to be deliberately made redundant. Some of the ways to build in redundancy in self-learning module are:

1. Providing frequent review or summaries of information covered

2. Providing frequent practice and feedback.

Again it should be noted that using these techniques too much make the module boring.

Thus, while developing a self-learning module the above mentioned characteristics should be taken care of, so as to make the self-learning module an effective one.

1.4 ACADEMIC ACHIEVEMENT

Academic achievement means the amount of knowledge gained by the students in different subjects of study. It encourages the students to work hard and learn more. Also it helps the
teachers to know whether their teaching methods are effective or not and helps them to bring improvements accordingly. Thus, academic achievement helps both the teachers and the students to know where they stand.

According to ‘International Dictionary of Education’, Achievement means the performance in school or college in a standardized series of educational tests. The term is used more generally to describe performance in the subjects of the curriculum.

According to Crow and Crow (1907), ‘Achievement means the extent to which the learner is profiting from instructions in a given area of learning’.

Perssey Robinson and Horrack (1941) defined, Achievement as ‘status or level of person’s learning and his ability to apply what he has learnt; Achievement means a person’s level of skill or the range of information and what he has accomplished in any designated area of learning or behaviour.

Stephen (1956), ‘The fact remains that academic achievement is the unique responsibility of educational institutions established by the society to promote the wholesome scholastic development of the pupil.’

Traw (1956) defined, ‘Academic Achievement’ as the attained ability or degree of competence in school tasks usually as
measured by standardised tests and expressed in age or grade units based on norms derived from a wide sampling of pupils' performance.

In other words, Achievement, may be defined as the competence, children actually show in the school subjects in which they have received instructions.

We can also say that Achievement means the extent to which teaching and study has resulted in mastery. It is the outcome of general and specific learning experiences.

Academic Achievement generally refers to the degree of success or that of proficiency attained in some specific area concerning scholastic or academic work. It is the competence actually shown by the pupils in the subjects in which they have received instructions at school.

Mehta (1969) expressed the view that the word, Performance is a wider term which includes both the academic and co-curricular achievements. Achievement is the learning outcome of the students in which performance of the individual is included.

1.4.1 IMPORTANCE OF ACADEMIC ACHIEVEMENT

Academic Achievement has been considered as an important factor in life. In this rapidly changing world and with the growing advancement in science and technology, the place of education has become so vital that every parent today sets high goals to educate his/her child. Good academic record
and its proper development to certain extent predicts future of the child. Ours is an age of competition at every step of life. The academic records speak for the individuals. At the time of admission, for entrance in job, for scholarship, for future studies, good academic result is the only recommendation. It portrays the individual in a mere organism without any worth.

1.4.2 FACTORS AFFECTING ACADEMIC ACHIEVEMENT

The factors which are responding for high and low achievements of the students can be grouped into two broad factors: subjective factors or individual factors and objective factors or environmental factors. The subjective factors are related to the individual himself and the objective factors conform to the environment of the individual.

1. INDIVIDUAL FACTORS:

These factors present within the individual are:

a) Cognitive factors e.g. Intelligence and creativity.

b) Non-cognitive factors e.g. Study habits, aspirations, interest and self-concept of the learner.

2. ENVIRONMENTAL FACTORS:

The nature of children's development is greatly influenced by the environmental conditions in which they are brought up.

Environmental factors are of two categories:

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a) Home Environment:
This includes the social-economic status of family, family relationship, parental aspiration, social expectation etc.

b) School Environment:
This includes teachers personality, attitudes and methods of teaching, curriculum etc.

1.5 MASTERY LEARNING STRATEGY

1.5.1 HISTORICAL PERSPECTIVE
Although effective mastery learning strategies have been developed only recently, the idea of learning for mastery is quite old. As early as the 1920's there were at least two major attempts to produce mastery in students learning. One was the Winnetka Plan of Carleton Washburne and his associates (1922); the other was an approach developed by Professor Henry C. Morrison (1926) at the University of Chicago's Laboratory School.

The Mastery learning strategy has been delivered primarily from the work of Carrol (1963) supported by the ideas of Morrison (1926), Skinner (1954), Good Lad and Anderson (1959), Bruner (1966), Suppes (1966) and Glaser (1968).

In the late sixties and early seventies, the importance was given to the mastery learning strategy by Bloom (1968, 1971 and 1976), Keller (1968), Block (1971, 1974), Keller and Sherman (1974). Bloom's (1976) theory of mastery learning and Keller's (1968) Personalized System of Instruction have
their roots in Carroll’s Model of School Learning (1963). Bloom’s theory (Fig. 1.01) starts with the assumptions about good education. According to Bloom (1976), a good educational system is one which maximizes the percentage of students mastering the substance or content of instruction where errors are redefined as action that leaves some children behind others with respect to the quality of what is known.

Figure 1.1

BLOOM’S THEORY OF LEARNING

Bloom (1976) further says that the purpose of formalizing the theory of learning is to permit society to move towards a minimal error system in the process of schooling.

Further more Bloom (1976) describes students’ characteristics in terms of cognitive and effective entry behaviour. The instructional component of the model includes specific tasks to be learnt and the quality of instruction, especially with
respect to presentation, feedback and corrective instruction. Learning outcome include level and type of achievement, rate of learning and effective outcomes.

Presently, the mastery learning strategy is being advocated as a viable alternative to the traditional classroom instruction.

1.5.2 THE VARIABLES FOR MASTERY LEARNING STRATEGY

The model proposed by Carroll (1963) indicates that if students are normally distributed with respect to aptitude for some subject and all students are given exactly the same instruction (in terms of amount and quality of instruction and learning time allowed), then achievement measured at the subject’s completion will be normally distributed. Under such conditions the correlation between aptitude and achievement will be relatively high (r = + . 70 or higher). Conversely if students are normally distributed with respect to aptitude, but the kind and quality of instruction and learning time allowed are made appropriate to the characteristics and needs of each learner, the majority of students will achieve subject mastery. The correlation between aptitude and achievement should approach zero.

1. APTITUDE FOR PARTICULAR KIND OF LEARNING

Individuals do differ in their aptitudes for particular kinds of learning, and over the years a large number of tests have been developed to measure these individual differences. Aptitude test has
2. QUALITY OF INSTRUCTION

Carrol (1967) defines the quality of instruction, and ordering of elements of the learning task approach the optimum for a given learner. Bloom believes that if every student had a well-trained tutor, then most of them would be able to master a particular subject. Dave (1963) suggested that the quality of instruction must be developed with respect to the needs and characteristics of individual learners rather than group of learners.

3. ABILITY TO UNDERSTAND INSTRUCTION

It can be defined as the ability of the learner to understand the nature of the task he is to learn and the procedures he is to follow in its learning. The use of alternative methods of instruction and instructional materials is an attempt to improve the quality of instruction in relation to the ability of each student to understand that instruction.

4. PERSEVERANCE

Carrol (1963) defines perseverance as the time the learner is willing to spend in learning. Husen (1967) says that perseverance is related to student attitudes towards and interest in learning. It is believed that perseverance is not fixed; it can be increased by increasing the frequency of reward and
evidence of learning success. Furthermore, the need for perseverance can be decreased by high quality instruction.

5. TIME ALLOWED FOR LEARNING

Assuming that aptitude determines the rate of learning; most students can achieve mastery, if they are allowed and do spend the necessary amount of time on a learning task. Husen (1967) supports the Bloom's view, that it is not the sheer amount of time spent in either school or co-curricular learning that accounts for the level of a student's learning. The learning time needed will be affected by his aptitude, his ability to understand the instruction and the quality of instruction.

1.5.3 MAJOR FEATURES OF MASTERY LEARNING STRATEGY

The major features of the mastery learning strategy as observed by Mathur (1983) are as follows:

1. UNIT-WISE BREAK UP OF THE SUBJECT MATTER

The content is divided into small units such that each unit is covered by an average student in a specified interval of time at a normal rate of learning.

2. ADVANCE ORGANISERS

These are elements which guide the learner about the learning procedure. The advance organizers in the
mastery learning strategy are: performance objectives, course policy and grading policy and these are made clear to the students before they start learning the unit content.

3. SELF-PACING
Each student is allowed to learn a given Teaching-Learning Unit (TLU) at his own rate of learning.

4. CONSOLIDATION OF LEARNING
The student is expected to master the subject of his on-going unit before he advances to the next one which will be confirmed by taking a test at the end of unit.

5. INDIVIDUAL GUIDANCE
The individual guidance from the fast-pacers and the instructor is made available for classification, correction and remediation.

6. MASTERY TEST OR CRITERION TEST
The student is assessed with respect to an absolute standard of performance called criterion or mastery level.

In mastery learning strategy, the student is expected to take charge of his own learning at rate approximate to his capacity and potential. Alexander (1975) says that the subject material can always be
developed in terms of conditions for satisfactory terminal behaviour, i.e., mastery of the learning material and an error rate of less than 10%.

1.5.4 DEVELOPMENT OF MASTERY LEARNING STRATEGY

The principle of operant conditioning in learning have attracted many educators to apply them to classroom instruction. Mastery learning strategy is an application of operant conditioning for classroom teaching. The theoretical model of mastery learning strategy was presented by Carroll (1967) and practical implementation was done by Keller (1968) and Block (1971).

In mastery learning strategy, each student is given the study material comprising of small learning segments called 'Study Units'. The student assimilates and consolidates his on-going study unit at his own pace. He is not allowed to move on to the next study unit unless he passes a criterion test with marks more than the prescribed level of achievement which is generally 80% to 100% marks (see Fig. 1.02). The student is also given enough individual guidance and corrective feedback to enable him to achieve mastery on his on-going unit.
Currently there are two approaches to the use of these ideas and practices. The first is a group-based, teacher-paced approach. Students learn cooperatively with their classmates and the teacher controls the delivery and flow of instruction. The prototype for this approach is Bloom’s learning for Mastery. This approach has evolved from within the field of education and has had a major impact at the elementary and secondary level of schooling. He states that 'most students (over 90%) can master what we have to teach them'. The following is an outline of his mastery learning strategy (Bloom,1971):

- The course is broken down into small units covering one or two weeks of instruction.
- The instructional objectives are clearly specified for each unit.
- The learning tasks within each unit are taught
using regular group instruction.

- Diagnostic progress tests (formative tests) are administered at the end of each learning unit to determine whether each student has mastered the unit and if not, what he still has to do to master it.

- Specific procedures for correcting learning deficiencies, such as working with other students in small groups, re-reading specific pages and using programmed materials and audio-visual aids, as well as additional learning time are prescribed for those who did not achieve unit mastery. Retesting may be done after the corrective study.

- When the unit is completed, a final test (summative test) is administered to determine course grades. All students who perform at or above the predetermined mastery level receive a grade of A in the course. However, grades are also assigned on the basis of absolute standards that have been set for the course. The student is assigned the next study unit only when he demonstrates mastery on his present unit.

Thus, in this mastery learning strategy the student interacts with the printed study units, the fast-pacers and the teacher. The interaction with the fast-pacers and the teacher are for
The second approach is individual based and learner paced. Students learn independently of their classmates and student’s control the delivery and flow of instruction. Ideas and practices related to this latter approach lie at the heart of Keller’s personalized system of instruction (PSI), Postlethwait’s Audio-tutorial Instruction. This second approach evolved from the fields of psychology and biology and has had its impact at the college and university levels.

Both of these mastery learning approaches attempt to modify the instructional setting so that students possessing differential entering behaviours can succeed.

1.6 NON-MASTERY TEACHING STRATEGY

It is a strategy in which students will be exposed to self-learning module but without corrective feedback, remedial material and diagnostic formative testing throughout the
1.7 INTELLIGENCE

Intelligence is generally considered as the most important correlate of achievement. So intelligence is the common factor to affect the achievement of a learner.

Vernon (1969) summarized the concept of intelligence as basically involving (a) genetic capacity - that intelligence is part of genetic equipments (b) observed behaviour - that intelligence results from both hereditary and environmental factors and (c) a test score - that intelligence is the construct measured by an intelligence test. Charles Spearman (1927) believed that intelligence was a function of general ability (the g factor) plus specific ability (the s factor). The g factor represents general intelligence, believed to be an inherited factor, which activates the s factors. Spearman believed that performance of a mental task was determined by both the g factor and the person's specific ability for that kind of task.

Louis Thurstone (1938) criticized Spearman's proposal, believing that there was more than one primary mental ability. Thurstone maintained that intelligence is a composite of seven factors that he considered primary mental abilities: verbal comprehension, memory, reasoning, ability to visualise spatial relationships, numerical ability, word fluency and perceptual speed.

J. Paul Guilford (1967), one of the foremost researchers in
this area, believed that intelligence is a function of multiple cognitive abilities. Guilford proposed three basic dimensions (abilities) of intellect:

1. Mental Operations, which are thinking processes - Cognition, convergent thinking, divergent thinking, evaluation and memory.

2. Content, which is what people are thinking about - visual figures, word meanings, symbols and behaviours.

3. Products, which are the end result of thinking - units, classes, relations, systems, transformations and implications.

Howard Gardner (1983) proposed a theory of multiple intelligence that identifies seven separate kinds of intelligence: linguistic (verbal), logical-mathematical, spatial, musical, bodily or kinesthetic, knowledge of self (intrapersonal) and knowledge of others (interpersonal). Interestingly, Gardner noted that some people excelled in one of these abilities but scored average on the remaining abilities.

Robert Sternberg (1985) has provided a modern approach to the study of intelligence that he termed the triarchic theory of intelligence. Mental processes are investigated in terms of three levels of components, which are basic processes classified by function and generality.
1. Metacomponents - processes involved in higher order functions, such as planning and strategy selection.

2. Performance components - processes that execute selected strategies, and perceive and store information.

3. Knowledge - acquisition components - processes used to acquire new information and separate important from irrelevant information.

In summary, Sternberg's triarchic theory provides a way to relate mental abilities to underlying basic processes.

1.8 STUDY HABITS

Efficient learning depends not only on good teaching alone but on satisfactory learning procedure also. Efficient learning depends upon the learner's ability to schedule his time, the plan of his study, the habit of concentration, note taking, mental review, over learning, the judicious application of whole and part method, massed and distributed learning and so on. In other words, learning involves the development of proper study habits and skills. According to Good's dictionary of Education, Study habit is the tendency of a pupil or student to study when the opportunities are given, the pupil's way of studying whether systematic or unsystematic, efficient or inefficient etc. Thus, study habits implies a sort of more or less permanent mode or method of studying. Individuals have their own way of
studying. It has also been found that those who have good study habits, excel others of equal intelligence in academic achievement.

The problem of study habit is one of immense importance both from the theoretical and practical points of view. Theoretically, efficient learning depends upon the development of good study habits and skills and as such one of the continuous objective of teaching should be the improvement of study habits and skills of the students. From the practical point of view, the problem is all the more important. Very often, teachers come across such students who appear to have above average in scholastic aptitude, yet they are doing very poorly in their courses of study. A large majority of these seem to have faulty study habits. Proper guidance to them would, it is expected change their faulty study habits into desirable ones. As much study habit is important for higher academic achievement of students as much it is important for their fruitful use of leisure time. Thus 'study habit' as a habit is generic than specific in terms of its importance. It has very long reaching effects deep into the life of the individuals and by cumulative and interactive effects in the society. It is a common belief that a man who does not have good study habits, how so far intelligent, capable and pushing he may be, cannot be an efficient learner.
1.9 REVIEW OF RELATED LITERATURE

With a view to seek some guidelines from the previous researches, which could be helpful in formulating the present investigation, the results of some of the related studies are discussed below, to formulate hypotheses and get insight into variables.

1.9.1 TEACHING STRATEGIES AND ACHIEVEMENT

Rousos, T.G. (1979) indicated that students taught using the traditional lecture/discussion mode of instruction did equally well in terms of achievement as the students taught using mastery learning and a tutorial laboratory strategy, success rate and attitude. The effect of mastery learning and a tutorial laboratory on achievement in and attitude toward algebra for college students at the community and Technical College of the University of Totedo is not positive.

Thompson, C.J.H. (1980) supported the mastery learning strategy as a highly favourable instructional component for enhancing student learning.

Mclemore, W.S. (1981) concluded that among the subject of the study, mastery learning instructional methods resulted in significantly higher achievement than non mastery instructional methods on a standardized test of vocabulary skills and on a criterion-referenced final test of vocabulary skills.
Nanavati, U.R. (1981) studied the effectiveness of a Learning Package on population education. The major finding of the study was: The learning package was more effective than the traditional method in teaching the content of population education to the pupils of class IX.

Khanna, K. (1983) studied the effectiveness of the reading materials on the girl dropouts living in Delhi Slums. The major findings of the study were: The girl dropouts who were fluent readers took on an average, 75 minutes for reading the module and another 35 minutes for attempting the tests. Those who were poor readers took almost double the time. On the affective side it was found that after exposure to the module, the average score of the girl dropouts on opionnaire increased from 7.5 to 13.5, indicating a positive shift. When the module was discussed in the homes of the girl dropouts, a majority of them tried to introduce some change or the other. Majority of them expressed their desire for reading more of such material. The result of the follow up carried out with 12 girl dropouts selected from the original sample indicated that the module was remembered by all the 12 girl dropouts. They were able to recall not only the treatment given to them but also some of its content.

Kishore, L (1984) has reported that retention of students taught physics, using mastery learning strategy for senior secondary school students, was significantly higher as
compared to the control group, taught the same material through traditional method. 

Yadav, P.S. (1984) employed pre-test and post-test experimental design involving two groups of students to find the effect of mastery learning strategy on achievement of students in mathematics. The experimental group was taught by mastery learning strategy and the control group using the conventional method of teaching mathematics. The design neatly controls all the factors affecting the internal validity namely maturation, instrumentation, statistical regression and experimental mortality. The treatment was spread over twelve weeks. The sample was chosen from six high schools of Haryana consisting of the students of IX grades. The experimental group in different schools were taught by different teachers. The two comparison groups did not differ significantly in respect of intelligence, socioeconomic status and previous knowledge in mathematics. 

Blackmore, C.L. (1985) revealed the following major findings on the basis of statistical analysis (1) the achievement of the mastery group was significantly higher than the non-mastery group at the midtest. By the time of the post test, however, the non-mastery group had improved to the point where both groups were found to be equal. It was evident that the conditions provided by the mastery learning model were effective for producing specific results quickly; (2) In particular, low aptitude students, females and especially the low aptitude females benefited from the condition
Jayalakshmi, T.K. (1985) studied the effectiveness of the modules as instructional materials in respect of intelligence and English-reading comprehension. The main findings of the study were (i) The instructional strategy for learning educational psychology at the B.Ed level was quite effective, (ii) The instructional modules had potentiality for use in any institution with marginal change in personnel, (iii) The modules as a whole had provided good motivation for the study of Educational Psychology at the B.Ed level (iv) The PLM as a basic component, had been successful in giving the basic information (v) The different enabling activities had been effective in contributing to better achievement, (vi) Facility with language was found to be a significant factor effecting the performance of this group (vii) Learners were helped in acquiring a better knowledge about certain class room techniques like discussion.

Salim, M.I. (1988) studied the effects of mastery learning strategy on the chemistry achievement of secondary school students. The results of the study showed that the mastery learning students had significant achievement gains in chemistry across all achievement tests.

Kim IL-Sum Yang (1989) studied the validation of self-
instructional food service inventory control system module. Because adjusted mean scores on the achievement pre-test between the two experimental groups were significantly different with the mean scores for the self-instructional treatment being higher, the inventory control self-instruction method was judged at last equal as good as the lecture method. The students' responses to the attitude inventory showed that students in the self-instruction group had overall favourable attitudes towards the module. Therefore, the self-instructional method appears to be an effective innovation. Further use and study of this method for teaching college students and practitioners seem, justified.

Smith, Marian Williams (1989) conducted an evaluation of six learning modules based on industry-related Applied Mathematics problems. The major conclusions of this investigation were as follows: (i) Project AIM application in (mathematics) appears to give secondary schools a teaching resources that has a high degree of pedagogical flexibility, (ii) Students can successfully engage in real-world problem solving and exhibit use of reasoning, writing and mathematical abilities, (iii) Project AIM could be instructional in bringing about a unit in secondary schools by demonstrating that mathematics and its applications are inseparable, (iv) Project AIM learning modules were strongly aligned with the NCTM (National Council of Teachers of
Mathematics) standards goal of having students engage in application.

Berger (1990) conducted a qualitative study of the process of self-directed learning and concluded that most of the participants judged the quality of their learning projects through both their own internal standards and external signs of recognition.

Clark (1990) found a significant relationship between teaching method and the dependent variables with the mean scores in clinical performance and self-directed learning higher in the traditionally taught groups.

Alspach (1991) studied the self-directed learning readiness of nursing students and found nursing programme afford only a limited amount of self-directed learning opportunities for students and that faculty perceive that they provide self-directed learning opportunities much more frequently than students perceive receiving them.

Lee (1991) investigated the instructional strategies such as adjunct questions and visualization should be used with caution because they may not always facilitate self-paced prose learning for either high school students or adults.

Singh (1993) investigated the relationship between group empowerment and self-directed learning in selected small groups and observed the enhancement of competencies to be self-directed learners to help the groups become more empowering.
Pant (1997) revealed students' achievement in book keeping and accountancy increases significantly by making use of the guided instruction through self learning modules.

1.9.2 INTELLIGENCE AND ACHIEVEMENT

Sahay, C.B. (1961) found a positive and significant relationship at .01 level of significance between intelligence and post-test scores of students when taught through programmed learning.

Rastogi, K.G. (1964) found significant positive relationship between intelligence and achievement both in science and English.

Feldman, M.E. (1965) found in a study that on transfer test subjects of high ability did better than those of low ability but subjects of low ability did better from study by text than study by programme.

Rao, D.G. (1965) concluded in his study that intelligence, study habits and school attitudes were significantly related to the prediction of scholastic achievement.

Cuppens (1967) in a study with Dutch high school subjects found a positive correlation of .28 and .31 between intelligence and achievement.

Lewis, L (1967) while making a multivariate analysis of variables associated with academic success within a college environment, found that mental ability was most
significantly related to academic achievement.

Vidhu, M (1968) revealed that the correlation between intelligence and academic performance was positive, and highly significant.

Jha, V (1970) found in his study that there was a significant positive relationship between achievement in science and general intelligence but there was no relationship between achievement in science and extroversion.

Joshi, J.N. (1970) concluded in his study that superior intelligence is associated with higher scores on the algebraic concepts.

Chaudhry, N (1971) The findings of his study concluded that achievement and intelligence were not significantly and positively related to each other.

Mohan, V (1972) noted the imperfect nature of correlation between academic achievement and intelligence, ranging between .20 and .60.

Pathak, A.B. (1972) revealed in his study that the high achievers had a significantly higher mean I.Q. (131.2) than the low achievers.

Masih, S (1975) found that there is a positive though low but statistically significant relationship between intelligence and academic achievement (r = .32).
Mohan, S (1975) reported that intelligence as measured by progressive matrices scales was positively related with total educational attainment in the study of SSC passed students.

Sodhi, G.S. (1976) investigated programmed learning in chemistry in relation to taxonomy of educational objectives, intelligence and personality traits at the higher secondary level and concluded that intelligence acted as a redundant variable so far as overall achievement in various taxonomic categories is concerned.

Contractor, B.M. (1977) in a study with third year BA students found that there was no relationship between intelligence and education attainment in English.

Malik, J.P.S. (1977) found that intelligence, academic achievement were highly correlated (r = +.435)

Kumari, S (1982) found a high positive relationship, significant at .01 level (r = .6663) was obtained between intelligence and achievement.

Mohini, T (1982) conducted a study entitled 'The effect of sex, intelligence, schools achievement and self concept on development of Piagetion Operational Comprehension among the school adolescent'. She concluded that students who were highly intelligent will not necessarily score high on operative comprehension test. So intelligence is not
significantly related to operational comprehension thinking.

Rajput, A.S. (1984) found that intelligence affects the achievement of students in Mathematics significantly at all the three levels i.e. high, average and low levels. t-test shows the superiority of high intelligence group over the average intelligence and low intelligence groups in their achievement in mathematics. It also shows that the students of average intelligence are better achievers in mathematics than the students of low intelligence.

Gakhar, S.C. (1986) study aimed at investigating the relationship between intelligence and academic achievements of college students, found significant correlation for science, commerce, arts and home science groups.

Mishra, B.C. (1986) studied the relationship between creativity and problem solving ability at different levels of intelligence and found positive correlation between high intelligence and problem solving ability but insignificant correlation between low intelligence and problem solving ability.

Yadav, G.L. (1987) revealed that high intelligence students were found to be having more achievement scores in Mathematics than low intelligence students irrespective of mode of instructions, levels of thinking and types of personality.

Sawhney (1993) indicates that student of above average and
average ability groups retained more algebraic concepts than the students of below average group - irrespective of teaching strategy.

1.9.3 STUDY HABITS AND ACADEMIC ACHIEVEMENT

Besides intelligence and teaching strategies there are certain other factors which may account for the scholastic attainment of a child. One of these factors is study habits. This view is supported by following studies.

Weinlend (1930) and White (1932) reported that successful students had better study habits.

Duncan and Duncan (1934) found that poor study habits resulted in poor scholastic achievement.

Heaton and Weadon (1939) reported that students improve their achievement by improving their study habits.

Alexander and Woodruff (1940) found no definite relationship between study habits and scholastic success.

Michael and Reeder (1952) found that scores in the study habit inventory which they had constructed for college students correlated significantly with the weighted grade average.

Carter (1953) found significant correlation between study habits and academic achievement varying from .46 to .51.

Diener (1960) observed that over-achievers and under-
achievers differed significantly in respect to their study habits.

Jain (1967) attempted to observe the study habits and academic achievement of college students. The scores on study habits inventory correlated significantly and positively with attainment.

Jain and Robinson (1969) revealed that good achievers have always good study habits. Working habits was found to be most important.

Entwhistle and Entwhistle (1970) in their study with the help of correlational technique found that better study methods have positive but low correlation with better attainment.

Cazelle (1971) found that study habits scale appeared to be one of the useful instruments in differentiating between academically successful and unsuccessful students.

Jamuar (1973) in his latest studies investigated study habits in relation to their intelligence and academic achievement, personality and background. He found statistically significant correlation between study habits and achievement.

Walia’s (1975) findings revealed insignificant difference between study habits of high and low achievers, similarly no difference between the study habits of male and female students of XI grade was found.
Tuli (1980) found that study habits is one of the correlates of achievement in mathematics.

Patel (1986) has reported that the better and greater the number of good study habits, the higher was the achievement.

1.10 EMERGENCE OF THE PROBLEM

Some fundamental questions regarding the vast sector of human endeavour like education are asked not only by the professionals, economists and educational planners but also by the conscious grousing public. Are returns for the huge expenditure involved in this vital sector of human development reasonable? Do children learn optimally according to their potentialities? If not, why? Can some correctives be applied? What correctives do the current researcher offer? Are they adequate? If not, what are the gaps? How can this gap be bridged through further work in the area? These are the pertinent questions that need to be considered seriously. Thus, if we want to give new dimensions to the field of education we must develop some alternate self-learning modules suiting to individual intelligence and study habits and study the effectiveness of the same.

Very few research has been done in the field of self-learning modules to determine their effectiveness at the senior secondary level. The present study is an attempt to
develop self learning modules in geography for senior secondary students and thereby determine their effectiveness on mastery and non-mastery groups as related to intelligence and study habits.

1.11 STATEMENT OF THE PROBLEM

EFFECTIVENESS OF SELF LEARNING MODULES ON ACHIEVEMENT IN GEOGRAPHY IN RELATION TO MASTERY AND NON MASTERY TEACHING STRATEGIES, INTELLIGENCE AND STUDY HABITS.

1.12 OBJECTIVES OF THE STUDY

1. To develop Self Learning Modules in the subject of Geography for XI class students.
2. To study the effectiveness of Self Learning Modules in Geography in terms of achievement.
3. To study whether the students belonging to below average, and above average intelligence differ in achievement of Geography.
4. To study whether the student's study habits affect achievement in Geography or not.
5. To study whether there is any interaction among mastery/non-mastery teaching strategies, intelligence and study habits.

1.13 HYPOTHESES

1. There will be significant difference in the mean achievement Scores of the students in respect of mastery and non-mastery classes.
2. There will be significant difference between mean scores of students having different levels of intelligence.
3. There will be significant difference between mean achievement in Geography of students of good study habits and poor study habits.

4. First order interactions:
   (1) There will be no significant interaction between Mastery/Non-Mastery teaching strategies and Intelligence.
   (ii) There will be no significant interaction between Mastery/Non-Mastery teaching strategies and study habits.
   (iii) There will be significant interaction between Intelligence and study habits.

5. There will be significant interaction among Mastery/Non-Mastery teaching strategies, Intelligence and Study habits.

1.14 DELIMITATIONS OF THE STUDY

1. The population of the present study was limited to students, who opted Geography as a subject at 10+1 level in schools of Union Territory, Chandigarh.
2. The study was limited to a sample of 200 students of 10+1 class only.
3. The study was limited to students studying Secondary Schools located in Chandigarh only.
4. The Self Learning Modules were prepared on topics of Geography.