Chapter-I
INTRODUCTION

Teachers in the new millennium have an unprecedented responsibility of enriching the students with ever exploding information. In India, being a developing country which had been under foreign rule until August 1947, the role of the teacher is to make the country economically independent. It is by undertaking the stupendous task of making students competent on a part with their counterparts in the developed countries in order to enable them to contribute to the nation with their innovations and inventions as well as grade making and problem solving with independent and logical thinking. The new generation of the youth during schooling must acquire all the skills and ingredients essentially required for hewing out for themselves a career with the dual purpose of earning a livelihood and doing a gratuitous service to the nation.

The educational Scenario in India

Today the educational scenario in India is mis meretricious. We speak of education for all but in reality majority of the students remain academically backward. Their number is alarmingly high at all stages of education. In higher education especially in professional courses where there is much competition the low performing students are pushed out. Again education is thus the monopoly of a handful of able students. And the low performing students labelled as the learning disadvantaged became satisfied.

The surveys conducted in this large group of students show that majority of them hail from the families that come under the poverty line. Most of such students belong to the scheduled caste and scheduled Tribe too (Rao, 1984).

A considerable body of literature is accumulating on the education of the socially and economically disadvantaged. If the low socio-economic status of parents is the cause for the poor performance of the students it is not possible to raise their status as long as casteism and poverty exist in the society. Despite all the efforts made by the casteism is still prevalent as the worst social evil. The world Economic outlook of the International
monetary Fund (IMF) tracing the history of economic growth policies and its impact in India since independent states that despite the impressive gains registered by India in the realm of economic growth the poverty rates remain high. It reveals that more than a third of the population is still living below the poverty line (Hindu April 13, 2000). This indicates that the low performing students belong to the low socio-economic group. They are either culturally deprived or socially backward too. Can these students overcome the learning difficulties? It is a permanent handicap in them?

The teacher as well as the public have a notion that their academic backwardness is due to their low socio-economic status (SES) not their cultural deprivation and social backwardness and it can therefore hardly be minimized. But the studies conducted in grade twelve level show that the learning difficulties experienced by science students are mainly due to lack of a series of skills required for higher learning (Sebastian, 1985, Mathew, 1985: Uzhavath, 1985).

The skill required for high performance have direct or indirect relation with the theories of Gagne's eight types of learning Augubel's principle of subsumption and the stages of cognitive development by Piaget and Bruner. They further reveal that the students irrespective of the SES and cast have learning difficulties, but its extent is significantly higher among low SES and SC/ST students. If the students in grade 12 have the learning difficulties, it is obvious that they must have experienced the same in lower grades too. A study on how the learning difficulties of students in lower grades could be minimized is in this context not only relevant but significant as well.

**Nature of Language**

"Language is a set of human habits the purpose of which is to give expression to thought and feelings".

Language is the divine gift of God only to the man. A language helps a person in the development of his personality. What distinguishes a man from an animal is the language and all other forms of life. In fact it is the language which bring the people of different culture and communities closer. Language is a mean of communicating thoughts and feelings to other. The purpose of language teaching is to facilitate language learning.
Teacher has to understand the concept of language teaching and learning because its nature is quite different. Teaching is an art and learning is science.

Meaning of Language:

Language is an essential part of human life. The word ‘language’ seems to have been derived from the Latin word Lingua which means ‘tongue’. It is a specific form of speech that evolved over a period of time. It is a kind of conventional arrangement a common usage and intelligible patterns of words and idioms which help the group to communicate effectively since language has relevance only in a social phenomenon. Language undergoes a continuous change.

Some definitions of language:

i) According to B.H.M strong, "Language is an articulated system of signs, primarily in the medium of speech."

ii) John Dewey says "Language exist only when it is listened as well as spoken. The hearer is an indispensable partner".

iii) O Jesperson defines language as "A set of human habits the purpose of which is to give expression to thought and feeling".

iv) Block and Trager write "A language is a system of arbitrary vocal symbols by means of which a social group operates".

v) H.A. Gleason says "Language is one of the most important characteristic forms of human behaviour."

vi) According to Sweet "Language reveals ideas and feelings through meaningful sound of words."

vii) Oxford English Dictionary defines language as "words and the methods of combining them for the expression of thought."

viii) According to Ben Johnson "Language most shows a man speak that I may see thee".
ix) R.A. Hall (1964) defined language as "It is the instruction where by human beings communicate and interact with each other by means of habitually used oral - auditory arbitrary symbol."

x) E. Sapir opines that language is "A purely human and non- instinctive method of communicating ideas emotions and desires by means of voluntarily produced symbols".

Broadly speaking language includes all other verbal and non-verbal action of human beings that are related to the communication of ideas. It is a complex system of communication with various levels of complexities involving intricate selection and ordering of meaningful sounds and larger units and arrangements. Language emerges from meaningful sounds. The moment we say something meaningful we are saying it in some language.

According to all these definitions, it becomes clear that language is used to give expression to thoughts and feelings of a social group.

**Importance and Functions of Language:**

Language is a beautiful gift of God to man, is the pride of its native speaker. At present undoubtedly English is the language of masses. Its importance is of utmost value in India as it has planted its roots deep in Indian culture. Here, in India without knowledge of English a man how high education he has, is considered misfit in modern society and illiterate. Its importance can be seen in all the spheres- political, academic, social, economical or social, of Indian life holding a major position. In this reference Pt. Jawahar Lal Nehru rightly quoted, “English language is our's by historic necessity”.

But why we use it? It is because language is the most important social activity and it is the fact that it greases the social machinery work. Our feelings and desires are communicated with the help of language. It is species specific, as no other creature than man can use it. Parrot or Dolphin use language but these can use only words and cannot handover these words to coming generations. What is in our brain? It is only human being, who can give the ideas a language, but in India, English language’s importance is increasing day by day.
English speaking people are increasing daily. In common routine life, even the illiterate people, unknowingly use hundreds of English words, in market, parks, bazaars, at railway stations and bus stands, the hoardings and announcement are done in English language.

Certainly now English language has intermixed in our social life so minutely that we cannot separate it or even sieve it out from our life. Moreover, the use of English at international level is also increasing. In such atmosphere we cannot shun its use. Disdain, to it, will cost us a lot and we will remain backward and the frog of well. It is obvious English is a foreign language, therefore its use should not hamper the growth of our Hindi language. We are to, in this reference, enhance our outlooks and let both the languages hand in hand for the progress of India Regarding the use of English, Raj Gopalacharya rightly said" English language is the greatest gift of goddess Saraswati to India."

Pt. Nehru, the first Prime Minister also highlighted its importance through his words, "One hundred and fifty years of intimate contact has made English an integral part of our education system and Indians can neglect its study only at the risk of loss to themselves. I am convinced that in the future the standards of English teaching should be maintained at high level as possible as".

Background of English

India is a multilingual country. Since time immemorial, here different languages have been in use. The introduction of English to Indians was made when the Britishes established East India company in India and later during the kingdom of queen of England. The East India company which was established only for commercial purpose in the beginning, betrayed the Indian's faith and cunningly dominated over India and ruled over Indians for nearly 150 years. After complete hold on India, Lord Macaulay tried to introduce English to Indians only to prepare a team of English speaking Indians who would be English by thoughts and opinions. In this regard, he got success and through Indians, ruled over other Indians for a pretty long time. Macaulay’s plans have beautiful been defined by William Bentinck. He said, "that the great object of the British Government ought to be the promotion of European literature and since among the
natives of India and that all the funds appropriated for the purpose of education would be best employed on English education alone”.

Thus, English language dominated the curriculum during the English period and benefited them by producing an English speaking Indians favoured and supported them physically and mentally.

**Position before Independence**

Before independence, Britishers ruled over India, so naturally, English language would have enjoyed the prix status in India. The place of English before independence can be studied in following points.

1) Queen of languages
2) Vast English literature
3) Language of office
4) As ready red corner for Employment
5) Medium of Instruction
6) English Inculcated through Native speakers
7) As compulsory subject

(1)** Queen of languages:**

During British rule, English language was the hub of other languages. It has been rightly said queen of the language as it has enjoyed a privileged status in India. It was read and taught as first language. It was a token of power, aristocracy, superiority and pride. Even Indians felt honoured and proud in speaking English and taken with English people.

(II) **Vast English Literature:**

Though Sanskrit literature till date has not been completely explored, yet English literature's vastness is accepted. With the British rule Sanskrit lost it's importance and reduced only to the 'Shastries' and 'Pandits' On the other hand, in English writers like Marlow, Donne, Shakespeare, G.B. Shaw, Sophocles,
enriched English literature with their creations. Moreover the upto date knowledge of that time and scientific studies were carried out in English. This vastness of literature attracted not only I.P.S., Candidates but common students of India also.

(111) **Language of Office:-**

During English rule all the activities and work of offices were carried out through English. English even dominated in judicial process. All government policies and orders were passed in English. This resulted in Indian's looking upon those who could read and write English.

iv) **As Ready Reckoner for Employment:**

To rule over such a vast nation was not a child's game. It required manual power besides other powers. Britishers could not bring all the Britishers for every purpose. That's why, they depended largely on the English speaking Indians. Hence, they invited Indians in various fields for support and help. Only this reason, made English popular among the unemployed Indians.

v) **Medium of Instruction:**

English would be used as a medium of instruction at school and college level. Even at K.G. or primary level, English medium was compulsory. Even Indians started loving to read and study different subjects through English medium.

vi) **English Inculcated through English people:**

Before independence, at school and college level, English subject was taught by the native English speakers, who had a great knowledge of the language and literature. In maximum schools the medium for all subjects was English. This created interest and attraction for English and maximum Indians look to this language. That's why our elders, who got their schooling during British Empire, speak English with better accent and pronunciation.
7. **As a compulsory Subject:**

Before independence, English was taught as a compulsory subject at school and college level. Missionary schools were established at important places, where English was taught in perfect English ambience as a compulsory subject. Right from K.G. or nursery, English was compulsory subject.

**Position after Independence:**

For almost two centuries now, English has been playing an important role in our education system as well as in our national life. It is true that British rulers ruled over India for a pretty long time. After a long struggle, we got our freedom on August 15, 1947. Before freedom English was the language of administration, a compulsory subject at school and college level and also at university level. Therefore, after independence we inherited many aspects of British culture. English language is one of them. But now the position of English after independence has become a controversial matter. Mahatma Gandhi argued the case against English. On the contrary, C. Rajagopalacharya favoured the retention of English. He observed "English language is the greatest gift of goddess Saraswati to India."

Mahatma Gandhi opined, "It is my considered opinion that English language, in the manner it has been given, has emasculated the English educated Indians. It has put a severe strain upon the Indian students and made us imitators. He further quotes, "all the superstitions that India has, none is so great as that, knowledge of English language is necessary for imbibing ideas of liberty and developing accuracy of thought". Whereas Pt. Nehru holds the opinions regarding English, “one hundred and fifty years of intimate contact has made English an integral part of our education system. Indians can neglect its study only at the risk of loss to themselves. I am convinced that in the future, the standards of English teaching should be maintained at as high a level as possible". In this reference, Indian president Maulana Abdul Kalam Azad said at a press conference "so for as general studies are concerned it was never my intention to suggest that there should be any falling in the standard of English".
C. Rajahopalacharya said "we in our anger and the hatred against the British people should not throw away the baby (English) with the bath water (English people)".

When the constitution of India was being framed the committee, unanimously passed resolution and made a provision to keep English language as or official language for next 50 years. Undoubtedly this resolution gave rise to a protest by the Hindi lovers and protesters against the use of English language, as by this time Hindi language in Devanagari script was recognized as the National language particularly by the northern and central Indians. But to the amazement, the southern people objected Hindi as a national language. Due to all this the agitation became so violent that in 1962-63 to resist and passify the activities, Parliament had to pass a bill declaring that English language will continue to remain the Associate official language of the country for an indefinite time. Gradually, the opinion of the people got changed and a few states accepted its optional medium at school and college levels. But the amazing thing was that it was not Hindi language which played the role of link language by different states, but it was English which played such role and brought north and south near.

Reddy T. Prabhaker, in the journal of English language teaching (1977) assorts, "the number of Indian writers who use English for creative writing is increasing gradually. It looks as if it has become one of the languages of India and its long and wide use by the Indian intelligentsia has given it a distinct identity.

**Educational Diagnosis:**

**Introduction:**

The process of determining the cause of educational difficulties is known as educational diagnosis. The scope of educational diagnosis is much larger than the use of tests and examinations. It is not proper to limit the scope of diagnosis to locating the causes that interfere with the ordinary academic prognosis of the pupils. An adequate diagnosis may involve the use of intelligence tests, both general and specific and of diagnostic achievements types of laboratory apparatus for measuring sensory activities, co-ordination and the like. Other forms of appraisal such as rating scales, controlled observation, questionnaires and interviews can also be used for diagnosis in education.
According to Tiger (1968), major function of diagnosis is to facilitate the optimum development of every student. According to Good (1945) diagnosis is the procedure by which the nature of a disorder, whether physical, mental or social is determined by discriminating study of the history of the disorder and of symptoms present.

According to Bear et al. (1947) the correction and elimination of the weakness through a constructive attack on their causes constitute an essential complementary process closely related to diagnosis. The development of systematically constructed and standardized diagnostic tests and procedures of various kinds have a marked effect on instructional practices and materials.

Educational diagnosis is the basis of effective and intelligent teaching. Diagnosis in education means a case study of the condition of learning to determine its nature and to find out the causation with the main purpose of correcting and to find out the causation with the main purpose of correcting and remedying the difficulty involved in active remembering. The major function of diagnosis is to facilities the optimum development of every student. It is the determination of the nature of learning difficulties and deficiencies.

**Importance of Educational Diagnosis:**

A satisfactory level of diagnosis can be reached when the teacher has gained sufficient insight into the nature of the child's problem and enables him /her to plan appropriate corrective instruction. To a great extent this will be determined by the complexity of the individual problem. For attaining maximum effectiveness in teaching, diagnosis of a child's learning difficulties should be made as early as possible. When the nature extent and causes of a child's retardation and acceleration are known, together with data on his /his capacity for learning effective development or corrective teaching can be planned.

Monroe (1965) suggested two major aspects of diagnosis in teaching. They are

i) Determination of the extent to which desirable educational objectives are achieved.
ii) Identification of factors that may be interfering with the optimum growth of the individual.

Diagnosis is an understanding of a present situation in terms of its causes what has brought it about or in terms of what it will cause. Diagnosis in one way or another involves a conception of cause.

Ross (1956) suggested the five levels of diagnosis. They are

i) Who are the pupils having problem?

ii) Where are the errors located?

iii) Why did the error occur?

iv) What remedies are suggested?

v) How can the error be prevented?

First four are grouped as corrective diagnosis and the fifth one is known as preventive diagnosis.

In the words of Sheldom (1960) the following principles need to be understood by a teacher to check the disabilities of his pupil diagnostically.

i) Diagnosis is an external aspect of teaching and is a preliminary step to sound instruction.

ii) Diagnosis should be continuous because child's growth in various skills depends on the sequential development of each skill, which is promoted through the teacher's knowledge of the progress of each child.

iii) Diagnosis is an individual task and reflects the fact each child is different.

iv) Since the instrument of diagnosis has not been perfected the limitations of each instrument must be thoroughly understood.
CHARACTERISTICS OF DIAGNOSTIC TEST

The following are the characteristics of educational diagnosis.

(i) Objectives

Diagnosis is essentially the task of locating more specifically those factors which bear more causal relation to the progress of learning of a pupil or a group of pupils. If educational diagnosis is to be a hand made to effective teaching. The essence of educational diagnosis is the identification of some of the causes of learning difficulty and some of the potential educational asserts so that, by giving proper attention to these factors more effective learning may result.

(ii) Validity

Validity refers to the evidence of causal factors to the attainment of the objectives. Investigations have shown that the attempt to diagnose children's difficulties in arithmetic by inspection of the test papers was reasonably valid for detecting kinds of examples that they could or could not solve correctly but the method was not valid for determining the mental process involved in the children's method of work. This shows that a method of diagnosis may be valid for discovering certain factors while not valid for determining other factors.

(iii) Objectivity

Third characteristic of a satisfactory diagnosis is its objectivity. The elimination of widely varying personal judgments in diagnosis is essential if diagnostic procedures are to be used with any degree of precision.

(iv) Reliability

Increase in reliability is related to the decrease in the fluctuation in conclusion that can be secured by providing a more adequate and representative sample of the pupil reaction upon which the conclusions are based. The improvement of the reliability of any diagnosis involves the utilization of a more satisfactory sample of pupil reaction as a basis for the diagnosis.
v) Level of Diagnosis

A diagnosis that locates only a very general area is obviously less useful than that which defies the mistakes more precisely.

vi) Comparability

An interpretation of the results of a diagnosis usually rests upon the experience with similar data. Hence, diagnostic procedure that give comparable results are basic to intelligent interpretation. The program of the pupil over a period of time is basic to the appraisal of the effect of remedial teaching.

vii) Exactness

Some diagnostic tests give only vague results. Diagnostic test may be tried with typical classes to discover their exactness. The exactness may be increased by analysing the characteristics of the progress in learning more minutely and utilizing the symptom thus identified as the base of the diagnosis.

viii) Comprehensiveness

Teachers make a very minute diagnosis in certain limited aspects of pupil activity and no diagnosis at all in other aspects. This incompleteness is dangerous because the attention of teacher and learner is apt to be directed primarily towards those things for which a through diagnosis has been made.

ix) Appropriateness

Certain desirable changes in boys and girls usually develop under a wide variety of educational environments without the necessity of giving very specific treatment. These are the changes that we consider characteristics of maturity. For such cases, an educational diagnosis is unnecessary and inappropriate. Any satisfactory diagnosis must be appropriate to the programme.

x) Practicability

Many of the most valid and reliable diagnostic procedures that have been developed are impracticable for use in all schools. New diagnosis procedures need to be
developed that meet the other qualifications of a satisfactory diagnosis and that at the same time are capable of extensive use under school conditions.

xi) Qualified Diagnosticians

A satisfactory diagnosis usually requires educational diagnosticians who are well qualified. The educational diagnostician must be a specialist or a teacher, must understand the educational programme in connection with which the diagnosis is being made.

Cook (1958) has stated the following characteristics of an effective diagnostic test

i) It should be an integral part of the curriculum emphasizing and clarifying the important objectives.

ii) It's test items should require response to be made to situation approximating as closely as possible to be functional.

`iii) It must be based on experimental evidence of learning difficulties.

iv) It should reveal the mental processes of the learner sufficiently to detect point of error.

v) It should suggest or provide specific remedial procedure for each error detected.

vi) It should be designed to cover a long sequence of learning systematically

vii) It should be designed to check forgetting by constant review of difficult elements as well as to detect faulty learning.

A diagnostic test is a test used to diagnose or reveal an individual's weakness and strength in a certain course of study. These are designed to analyse individuals performance and provide information on the causes of difficulty. The purpose of diagnostic testing in to furnish continuous specific information in order that learning activities may be most productive of desirable outcomes. Diagnostic test would be helpful in indentifying the use of faulty, round about or in correct procedures; the use of elementary processes where these could have been replaced by advanced processes. A carefully constructed test could be used as an inventory test towards the beginning of an year's work or topic as an analytical test of competent skill involved in the different
branches or units of study. To what extent educational diagnosis can be effectively engaged by teacher and how the educational diagnosis function in the class room is a problem of importance.

**STEPS IN EDUCATIONAL DIAGNOSIS**

The essential steps in educational diagnosis are

i) Identification of students who are having learning difficulties.

ii) Locating the errors of learning difficulties.

iii) Discovering causal factors.

**Reason For Lack of Success in Educational Diagnosis:**

Instructional planning for a class can be enhanced by taking such data into account instructional material can be selected or developed to improve learning in deficient areas, and time can be reallocated from topics on which students have demonstrated higher level of accomplishment.

Any achievement test can provide diagnostic information of value to individual student if they are told which items they missed with the teachers help. These students can then correct the mistakes. An important reason for this lack of success in educational diagnosis is that effective diagnosis and remediation take much time than most teachers have or most students would be willing to devote. The diagnosis of reading difficulties is a well developed skill and remedial treatment can be very effective. Because reading is so basic to other learning, the time required for diagnosis and remediation is often spent ungrudgingly. But where the subject of study is more advanced and more specialized the best solution to learning difficulties in an area, say physics, Chemistry or German, may be put off study in that area and cultivate learning in other areas that present fewer problems.

Often the results of the subject matter test in a battery indicate a general problem, and the diagnostic test in administered to ascertain the specific deficits in term of skills and sub skills. Unfortunately, diagnostic test like other achievement tests, help to identity problem areas, but they seldom provide reason for the difficulties and cannot prescribe
solution to overcome them. A major challenge to the teacher is to synthesize the entering behaviour information about a student so that the instructional strategies and materials can be selected that will optimize that students condition for learning.

**Diagnostic Testing**

Thorndike and Hagen (1970) suggested that a diagnostic test should provide a detailed picture of the strengths and weaknesses of a pupil in a particular area.

Any test that yields more than a single overall score is diagnostic. Diagnostic has become an essential phase of developing plans of adaptational instruction to individual differences. Recent research on characteristic differences between traits and performances of good and poor achievers in several areas of learning has yielded a rich body of information, which proved to be having considerable value in diagnosis.

A diagnosis test is a test designed to locate specific learning deficiencies in case of specific individuals at a specific stage of learning so that specific efforts could be made to overcome those deficiencies. It help the teacher in identifying the states of the learner at the end of a particular lesson unit or course of learning as to what specific teaching and learning points have been properly grasped by the learners. If such a deficiency is located in several students it become obvious to the teacher to reflect upon whether something went wrong with his method of teaching. After administering a diagnostic test or batter test to students, a teacher takes remedial measures to overcome the deficiencies thus discovered.

Diagnostic test differs markedly from achievement test though every achievement test has some diagnostic value and vice-versa. The main difference is in the way items are sampled. In an achievement test, sampling of questions is not so exhaustive to cover each and every learning point as the content is generally a large portion, whereas in a diagnostic test each learning point has several items each duster of such items forming a subtest. The diagnostic value of the test is obtained from the total score which is the sum of the scores of these subjects. The coverage of subject matter is more detailed, though based on a smaller area than an achievement test. A diagnostic test thus requires a very
careful analysis of the content and a detailed study of the common errors made by the students.

**Functions of Diagnostic Test**

**Cook suggested the following functions.**

(1) **To direct curriculum by:**
   (i) Focusing attention on any of the important ultimate objective of education as possible.
   (ii) Clarifying of educational objectives to teachers and pupils.
   (iii) Determining elements of strength and weaknesses in the instructional programme of the school.
   (iv) Discovering inadequacies in curriculum, contest and organization.

(2) **To provide for educational guidance of pupil by:**
   (i) Providing a basis for the preliminary grouping of pupils in each learning area.
   (ii) Serving a basis for the preliminary grouping of pupils in each learning area.
   (iii) Discovering special aptitude and disabilities.
   (iv) Determining the difficulty of material pupil can read with profit.
   (v) Determining the level of problem solving ability in various areas.

(3) **To stimulate the learning activities of pupils by:**
   (i) Enabling pupils to think of their achievements in objective terms.
   (ii) Enabling pupils to complete with their past performance record.
   (iii) Giving pupil’s satisfaction for the progress they make, rather than for the relative level of achievement they made.
   (iv) Measuring achievement objectively in terms of accepted educational standards, rather by the subjective appraisal of the teachers.
To direct and motivate administrative and supervisory efforts by:

(i) Enabling teachers to discover the areas in which they need supervisory aid.

(ii) Affording the administrative and supervisory staff an over-all measure of the effectiveness of the school organization and supervisory policies.

Diagnostic tests are not administered to all students. Before the administration of diagnostic tests, the student’s achievement usually is established as deficient relative to other students. The diagnostic test is expected to indicate the specific skills with which the student is deficient. To accomplish this, a diagnostic test must have the following characteristics:

(i) The test must provide a series of scores, each representing performance in a specific skill.

(ii) The respective skills must be critical to the overall performance being evaluated, such as reading achievement or arithmetic achievement.

(iii) The sub test used to assess each of these skills must represent a valid measure.

(iv) Each sub test must have high reliability.

(v) The correlation among sub tests must be low.

In essence a diagnostic test is a series of achievement tests, each designed to measure behaviour. These tests provide independent measure of the respective skills and this validity and reliability must be established separately for each scale. All diagnostic tests provide a series of scores, although the number of scales varies considerably among tests. Diagnostic tests can indicate what a student’s deficiencies are and why these deficiencies have occurred. A diagnostic test, however, is used to find a way to resolve the difficulty a student is having. A diagnostic test might identify important specific skills the student has yet to achieve, but it will not indicate why these skills have not yet been achieved or what action, if any, will help the student to overcome these difficulties.

From a measurement perspective diagnostic test have significant limitation consequently their scores must be interpreted conservatively. Most diagnostic tests are
administered to one student at a time. The test therefore provides a structured setting through which the examiner can try to gain insight into the student’s difficulty. This use of diagnostic tests would be particularly useful to individuals such as reading specialist who are trained in identifying specific learning problems.

**Construction of Diagnostic Test**

Diagnostic test may be either standardized or teacher-made. Teacher-made tests besides being more economical are also more effective, as each teacher can frame it according to the specific needs of students.

**The stages of preparation of a diagnostic test:**

(i) Planning  
(ii) Writing items  
(iii) Assembling the test  
(iv) Providing directions  
(v) Providing the scoring key and making scheme  
(vi) Receiving the test

The details regarding the stages of preparation of diagnostic test are given below.

(i) **Planning:**

The unit, on which a diagnostic test is based :requires a detailed exhaustive contest analysis. It is broken into learning points without omitting any point. The diagnostic procedure is based on the premise that mastery of the total process cannot be stronger than that of the weakest link in the chair of related concepts and skills of learning point called into play is identified at the time of constructing the test. As far as a diagnostic test is concerned it is not very necessary to know the relative importance of the learning points. All the learning points have to be covered in an unbroken sequence. Each learning point should have an adequate number of questions to help identify the area of weakness.
(ii) **Writing items**

All the forms of questions (essay, short answer & objective types) can be used for testing different learning points. However, it appears for diagnostic purpose, short answer questions involving one or two steps, are used widely.

Whatever be the form of questions, they should in general be easy, suitable for average students of that age or grade. The questions have to be specifically related to the learning points and should be such as to throw light on the weakness of the students. The question should be written in simple language. The scope of the expected answer should be clear to the students.

The questions are clubbed around the learning points, even when they are of the different forms; the learning points are arranged sequentially from simple to complex which ensures that students do not have to change their mental sets very frequently.

(iii) **Assembling the test**

Preparation of blue print may altogether be avoided. No rigid time limit need to be specified, though for administrative case a time limit may be set.

(iv) **Providing directions and preparing scoring key**

A set of instructions clear and precise, is drafted. It should also be provided with a scoring key and marking scheme.

(v) **Reviewing the test**

Before printing the test, it should be carefully edited and reviewed. This ensures that any inadvertent errors are eliminated.

**Administration of Diagnostic Test**

The following points need to be kept in view:

(i) The first task of the teacher is to win the confidence of the students and assure them that test is to help them in the improvement of their learning rather than for declaring pass or fail.

(ii) It should be administered in a released environment.
(iii) Students should be seated comfortably.

(iv) Students should be asked not to consult each other while taking the test.

(v) If any student is not able to follow something, he should be allowed to seek clarification from the teacher.

(vi) The teacher may ensure that the students taking the test attempt all questions.

(vii) Time schedule should not be enforced strictly. If any student takes a little more time, he should be allowed to do so.

**Role of computer in diagnostic testing**

Role of computer in diagnostic testing is too important.

Computer can be used for diagnostic testing in education. Several commercial test publishers have developed programmes for interpreting scoring of available diagnostic tests and for combining test scores and other data in the prescriptive formulation of individual used instructional programmes. Forhand (1987) developed a computerized testing programme jointly sponsored by college Board and educational testing service in United States of America Ward et al (1986) designed a testing programme for use in conjugation with computerized adaptive testing (CAT) programme for placement of students in need of remedial instruction in basic skills. Through interactive computer use, the programme is tailored to the students own performance.

**Use of Diagnostic Tests**

The important uses of diagnostic tests are:

(i) Items, units or skills, which are understood by a majority of students, can be located and teaching can be adjusted to the situation.

(ii) Items, units or skills are not understood by a majority of pupils can be located and there by special emphasis in these aspects can be attempted.

(iii) The causes for the difficulty in certain items can be find out, for which remedial measures can be taken.
(iv) Individual weakness can be find out which would serve as the baseline for which remedial measures can be taken.

(v) Individual weakness can be find out which would serve as the baseline for individual correction work and personal guidance.

(vi) Diagnostic test may be used for prognosis. It helps to predict the possible success in certain type of courses or vocation and therefore it helps in providing guidance and counseling.

(vii) Diagnostic tests can be made the basis of individualized instruction. Differentiated teaching methods, ability grouping, individual drill, differentiated assignments etc. can be attempted on the basis of the results of diagnostic tests.

(viii) Diagnostic tests measures real understanding as opposed to superficial mastery of subject areas measured by achievement of pupils in subject areas.

(ix) Diagnostic tests can assist the pupil in locating one’s weakness and so they can be corrected with maximum ease and economy.

(x) Diagnostic tests can indicate the effectiveness of specific methods of teaching in dealing with specific teaching situations.

(xi) Diagnosis of pupil’s weakness and self-discovery can lead to motivation and interest can generate co-operation in future teaching learning situation.

**Remedial Instruction**

The term remediation is employed in a broader sense to connote teaching which is developmental in its scope. Though our schools posses pupils who do not have any particular defects or faults which need correction, there are a group of students who urgently need assistance in developing increased competence in reading and other fundamental processes. In their case, it is not primarily a problem of re-teaching or the remedying of errors, but it is rather teaching them for the first time those basic skills which are solely needed and are apparently lacking. Remedial teaching involves taking a
pupil where one is and starting from that point leading one to greater achievement. It is just effective teaching in which the learner and his/her needs occupy the focal point.

The introduction of compulsory education is one of the main factors responsible for the fall in standards. A large number of pupils who fail to make normal progress in rural schools are merely between backward or slow learners. The failure to maintain a standard of scholastic progress compatible with intellectual capacity is associated with factors intellectual and emotional, physical and environmental. According to Cyrill (Cyril Burt) The educationally backward is one whose disabilities are innate and general but acquired. Very poor home conditions which result in an impoverished cultural atmosphere and a limitation of extra experience are some of the causes of backwardness.

Irregular attendance and failure are other causes. Pupils scholastic disabilities are of a remedial kind. The problem can be solved at a comparatively low cost. Effective remediation which provides progress for all points pupils in the fundamental subject is a nutritive for the normal mental health of all children. Happy well adjusted children mean happy well adjusted adults. The necessary emotional adjustment together with the removal of scholastic backwardness can be effected using appropriate remedial measures. If remediation is given, dropout, failure and wastage can be avoided. Remediation is an integral part of all good teaching. It takes the pupils at his own level and by intrinsic methods of motivation leads him to increased standards of competence. It is based upon careful diagnosis of defects and in general to the needs and interests of pupils.

Need for Remediation

Teaching involves communication. That is, messages are being sent at one end and received at the other. When the messages are received as they are transmitted, then effective communication is believed to have taken place. Sometimes the message not get across at all or may teach the other end in a garbled distorted and unrecognizable version. In such instances a ‘gap’ develops between ‘teaching’ and ‘learning’. Frequently the learner has not learnt what the teacher intended him to learn. In this case, a message is received, but it is not the one which was sent out.
Several problems arise in dealing with this situation. First of all, the teacher has to find out if the message received by the student is the one sent out. For that, the teacher has to rely on the feedback from the student what he has received. Usually the student finds it hard to express what he has received and this give the teacher the impression that learning has not taken place at all. So the teacher tries to get the message across through repetition. But, if the message received is a wrong one, it has to be cancelled before the correct one can be written in order not to create problems of interference. This is one of the functions of remediation.

Learning problems are of different kinds and each call for different remedial solution. Most of the problems are caused by incomplete or inadequate learning. The diagnosis of the learning problem is, hence, very important. Wrong learning inevitably results wherever there is teaching. It interferes with the desired learning. There can also be different kind of degrees of learning requiring different strategies of remediation. The diagnosis of the learning problem is, hence, very important. Remediation may be regarded as an activity parallel to the teaching function of motivation which maintains constant vigil over his students. But it is possible to create in the students mind the same kind of alertness which his presence seems to endure. It must be made felt that it is important for the learner not to make mistakes and draw forth censure and ridicule. The correction of wrong concepts and insights, and the strengthening of desired concepts can be affected through explanation of various kinds. If an error seems to be due to interference, a comparison of the two language systems at that point may be provided. The wrong learning of certain concepts may also have to be remediating. The learner can be prevented from practicing a wrong concept only if there is constant and effective monitoring, so that the correction is immediate. Unmonitored practice will invariably result in the strengthening of any wrong concept which exists.

The greatest problem in any type of remediation is to make the new learning abide. Old errors have the habit of coming home to the roots. However, effectively they are remEDIATE and there is a point beyond remediation is impossible because no more learning takes place at that stage. The errors become fossilized. Development of the
necessary attitudes and determination on the part of the learner is far more crucial than the development of ‘concepts’ or mere ‘habits’.

It can be inferred that diagnosis is an important factor in imparting instruction. Instruction will be incomplete without diagnosis and remediation. Individuals differ in abilities. Pupils of different levels of ability are likely to be present in a class of forty or fifty. Slow learners, fast learners and average learners – all have to be catered to in different ways. The highly talented should be provided with additional work which requires higher intelligence level and whereas the slow learner have to be specially cared for in order to bring them to the level of the average student. It is valid to consider insight-formation, application, consolidation and revision.

Ideally new learning should not be permitted until wrong learning has been cancelled and corrected. This is, however, impractical since remediation is a slow and laborious process. A thing once learnt is difficult to cancel, whether correct or incorrect. Remediation, hence, has to go on simultaneously with the other teaching functions. The more teaching a learner has had, the more he may be in need of remediation.

The possible causes of failure in learning can be due to interference from concepts previously learnt or over generalization on the basis of previous learning. These errors of learning are caused by the learner taking an active part in the process of learning. They tend to adopt a particular learning strategy. Here, the learner tries to simplicity the task of learning or transfers his previous learning to a new situation. The teacher is in no way responsible for these errors. He can probably do nothing to prevent them.

Learners seems to learn through their errors. It follows that the teacher should not only permit certain kinds of errors but assist him to form rules or hypotheses which may be used as touch stones and amended if necessary. Each time the error is made, the learner receive feedback, which he uses to amend his self-made rules. Then he finally arrives at his linguistic competence. The appropriate strategy of remediation can be determined by the types of errors which have to be dealt with. They need classifying into groups and types as all the individual errors cannot be dealt with practically.
Remediation is basically cognitive. The aim is to make the learner conscious about the rules of concept attainment and his own use of it. A teacher cannot consider remediation as a ‘follow-up’ or an optimal activity.

**Basic Principles of Remedial Instruction**

Remedial instruction consists of remedial activities taking place along with the regular instruction or outside the regular class instruction and usually conducted by a special teacher. The type of remedial treatment given to the students depends on the character of the diagnosis made. If physical factors are responsible remedial attention should be provided. The result of diagnosis have significance only if they constitute the basis for corrective instruction and for remedial procedures, which remove, alleviate or compensate for causal factors in the child and his/her environment. If a teacher can identify several children who lack a thorough understanding of certain concepts, he/she may re-teach these concepts through group instruction, demonstrations, and supplementary silent reading by the pupils etc. General backwardness in subject is frequently due to inadequate mastery of the basic skills of reading, arithmetic, language, handwriting and spelling or inadequate command of the work, study skills, etc. Hence corrective work in the basic skills plus improved motivation in the subject may be sufficient to effect improvement.

The following are the general principles of remediation –

(i) Individual consideration of the backward pupil with recognition of his mental, physical and educational characteristics.

(ii) Through diagnosis with a pretest.

(iii) Early success for the pupil in his backward subject or subjects by use of suitable methods and materials.

(iv) Dissipation of emotional barriers through early success, praise, continuous help, sympathetic consideration of his difficulties and sustained interest.

(v) The need for a new orientation towards the backward subject through new methods involving play way approaches, activities and appropriately graded materials.
(vi) Frequent planned remedial lessons.

(vii) Co-operation with the parents.

**Preparation of Remedial Materials**

Preparation of remedial materials for a crucial aspect of corrective instruction. Remedial material prepared should meet the following criteria.

(i) The difficulty of the remedial material should be geared to the child’s readiness and maturity in the subject or skill to be improved. A set of remedial materials should provide a wide range of difficulty, covering several grades.

(ii) The remedial measures should be designed to correct the pupils, individual difficulties. Though the use of observation, interview and diagnostic testing materials, the teacher would have analyzed the work of the backward children in order to locate the specific retaining needs. An adequate amount of remedial materials must be provided which is designed to correct the specific difficulties identified.

(iii) The remedial materials should be self-directive. Children may differ widely as to the instructional materials needed to correct their difficulties.

(iv) The remedial measures must permit individual rates of progress.

(v) A method should be provided for recording individual progress. When the child has an opportunity to record his/her successes on a progress record, he/she is given an additional incentive to achieve.

**Programmed Learning**

Many terms are used for programmed learning such as programmed study pre-planned instruction and systematic study. But the term ‘programmed learning’s is used frequently. This system was hypothesized to keep the pupils and the teachers in a well-controlled environment. It is the most modern system. It includes language, science, psychology, education sociology, logic, philosophy etc. Through this teaching system the pupil inclines towards self-learning and goes on leaning with interest.
This approach has contributed significantly in making the learning activity effective and simplified. These days it is being used in the training institutes of various vocations such as language teaching, banking, industry etc.

In this approach, the subject matter (study material) is presented to the pupils after dividing it in smaller steps or parts. The pupil advances only after leaning each part or step. A mention of programmed learning occurs in the ‘Socrates Method’. In this method the teacher asks questions in a sequence. Hence, it is also known as ‘Socrates Question-Answer Method’ because it was inspired by Socrates. The seeds of programmed learning are found in Socrates Method. Socrates is known for developing this new thought.

The credit of presenting the programmed learning in the modern from goes to Sidney L. Pressey of Ohio State University and B.F. Skinner of Harvard University. In 1920, Pressey developed a machine with which the pupil could evaluate his self-attained knowledge. Skinner experimented on animals in his laboratory. According to him, if a person gets immediate reinforcements for his performance, this works as a motivator for him. He goes on advancing in the field of learning.

According to Skinner, continuous use of reinforcement in the learning process creates interest and it makes the knowledge permanent. Therefore, the reinforcement should be used to the maximum.

According to Prof. Rush, programmed learning is such an instruction in which the material is presented in frames and these frames are arranged in a sequence. In order to cross over the next frame, the pupil will have to answer the previous frame correctly. The pre-planning of the question is done by the teaching himself.

The material based on self-teaching method of programmed leaning can be evaluated by using it on the pupils. On the basis of this evaluation, continuous changes can be brought in the matter. These changes can be brought till changes in his behavior or knowledge have not taken place.

Programmed leaning has been announced as a revolution in education techniques. Programmed learning has a long past but only a short history.
Historical Background:

1. Contribution of Socrates: Socrates was one of the earliest programmers who developed a programme in Geometry. This was recorded by Plato.

2. Contribution of S.L. Pressey: In Ohio University S.L. Pressey (1926-27) was the first to devise a machine which could teach as well as test. The teaching machines as devised by Pressey presented a series of question to a student and informed him immediately whether his response was right or wrong. But no recognition was given to his initial attempts because of the following two reasons:
   (i) No systematic programming: In his machine no provision was made for systematic programming of materials to be used.
   (ii) No favorable environment: The period of depression and its impact on social conditions and education did not offer a favourable environment.
   
   In 1932 Pressey had to give up his work on teaching machines and dreamed of industrial revolution in education as early as 1932.

3. B.F. Skinner’s contribution: Programmed learning got historical momentum only after the publication of Skinner’s paper “the Silence of Learning and the Art of Teaching” in 1954. Skinner and James G. Holland devised the auto-instructional methods which have served the present generation as the basis for present work in programmed learning.

4. Contribution of co-workers of Skinner: The associates and Co-workers of Professor Skinner gave a movement for programmed instruction by publishing a number of papers on its various aspects based mainly on laboratory experimental observations. Thus in short the method became popular in the U.S.A. and began to be considered as an expedient technique of imparting instruction.

History of Programmed Learning in India:

Contribution of NCERT: The movement of programmed learning came to India in early sixties. In 1963, some research students in National Council of Educational Research and Training (NCERT) started work on the development of programmed learning material and took up research studies in pertaining to the efficacy of programmed learning material. In 1965, a seminar was held at the NIE to acquaint some
of the senior teachers of colleges of education and universities with the new movement of programmed learning.

NCERT has organized 5 sequential courses on programmed learning for training persons in the art of preparing programmed learning material. Members from many disciplines such as educational institutions, industrial concerns and defence services participated in these courses. A few good programmes have also been prepared.

NCERT has given special grant to seven different Extension centers in India to develop programmed learning material for different school subjects. It is hoped that this scheme will serve two important functions.

(i) It will discriminate the idea of programmed learning in schools.
(ii) It will help in developing programmed learning material needed for improving instruction.

Contribution of Indian Association for Programmed learning: In 1967, some of the enthusiastic persons interested in the programmed learning movement formed an association of Programmed Learning (IAPL). The association is doing very useful work in organizing annual conference on programmed learning mobilizing resources for preparing programmes on different units of curriculum.

Research work Done in India:

(i) M.S. Shah’s Study (1963): M.S. Shah’s study is the first systematic study in the field of programmed learning. She developed a programme on solving equation and compared its results against those obtained through conventional lecture method. Her finding show that experimental group taught through programmed material achieved more in less time.

(ii) Mullick and Kulkarni’s Study (1968): Mullick and Kulkarni investigated the effectiveness of programmed leaning material in a correspondence course situation. Their findings reveal that programmed learning material proved more useful than conventional material.

(iii) Gupta’s Study: Gupta (1965) found that even adapted programmers can give good results. He pointed out that adapted versions save much of our time and
energy. Which can be used for other programmed learning materials essentially needed for Indian schools.

(iv) Studies by Sharma and other: The studies by M.M. Sharma, R. Desai and Gibson (1965) confirm the view that performance is better when taught through programmed learning material.

(v) Studies Diwan and Kulkarni (1967): Diwan and Kulkarni have explored the possibility of applying programmed learning principles to TV instruction. The findings show the superiority of experimental group over conventional TV lesson group.

(vi) Study by Dr. G.B. Krishnamurti: Dr. G.B. Krishnamurti has successfully applied programmed learning techniques in the training of family planning workers. His programmes “A Programmed Guide to Happy Family”, “The Pill and A Guide to Better Long Life” have met with wide success.

(vii) Research studies in the Centre of Advanced Study in Education: The Centre of Advanced Study in Education had taken up programmed learning as major field of research. Research studies have been taken both at M.Ed. and Ph.D. levels.

What Programmed Learning is Not?

1. Not a test: Programmed learning is not a test. It is a teaching method and helps the students in learning the material. It is not a testing method.

2. Not an audio-visual aid: Programmed learning is not an audio-visual aid. It has been regarded as a part of the new technology of education.

3. Not a panacea: Programmed learning is not a panacea. It is a gifted student’s learn quickly and backward students will learn at a slower rate.

4. Not a solution for shortage of capable teachers: Programmed learning cannot take the place of a teacher. It is not a solution of the shortage of capable and devoted teachers.

4.1 Meaning of Programmed Learning

The programmed learning is a method of learning in which the pupil acquires self-education with the help of teaching machines, text-books and some special type of
curriculum. In this instruction, the education material is organized in small parts of frames arranged in a sequence and the relevant questions related to each frame are arranged in a sequence. The pupil moves towards the second frame after answering the first question correctly. The correct answers are achieved from some other page of the text book or from a machine.

According to Susan Markel, “Programmed learning is method of designing reproducible sequence of instructional events to produce a measurable and consistent effect on behavior of each and every acceptable student”.

The American authors have used the term ‘Programmed learning is a method of designing reproducible sequence of instruction is a process of arranging the material in smaller frames in a sequence which is to be learnt and these frames are constituted in such a way that the pupil passes through self-instruction and moves from unknown to the known. The pupil moves towards highly complex knowledge and principles.

James E. Espich and Bill Williams have made its meaning clear in their book entitled “Developing Programmed Instructional Materials,” as under:

Programmed instruction is a planned sequence of experiences, leading to proficiency in terms of stimulus—response relationship.’

British authors have, used the term ‘Programmed Learning’ most frequently. According to them, it is a learner-oriented system and its material is presented in such a way so that is may acquire the form of ‘auto-instruction.’

According to Smith and Moor (1962), “Programmed instruction is the process of arranging the material to be learned into a series of sequential steps, usually it moves the student from a familiar background into a complex and new set of concepts, principles and understanding’.

According to Arthur Lumsdain (1964), a program pays attention towards the fact that the pupil must learn and the program owns the responsibility of failure of the pupil. A program can be differentiated from the book and a lesson plan, i.e. there is a difference among them. A book is only a source of materials to which the student exposes himself. No pre-determined interaction takes place between a book and the reader in the form of
expected response and feedback. A lesson plan is often a skeletal outline of materials and activities the teacher will use in teaching.

Instruction is different from a lesson plan but is related to it. A program is a real instruction. The pupil’s success or failure depends on the program. Almost all the pupils are able to learn if the programmed material is arranged for them.

From the above mentioned definitions and description, the following characteristics of programmed instruction or learning become distinct.

(i) The material is divided into small steps or frames.
(ii) Pupil’s continuous responses are needed.
(iii) There is a provision of immediate confirmation of the correct responses along with the provision of immediate correction of wrong responses.
(iv) Actual try-out of the frames or steps of the material or content and the sequence should be done on the pupils. A modification should be brought on the data collected by the program writer.

All the above our characteristics are the characteristics of both the programmed instruction and programmed material. There is also a difference between the programmed instruction and programmed material. The programmed material is that simple educational material from which the pupils learn. A program is responsible for managing the learning situations. Hence, the programmed material is concerned with the content while the programmed instruction is the practical aspect.

**Principles of programmed learning**

Prof. Edward F.O. Day had classified the principles of programmed learning into the following two categories in his book entitled programmed instruction’s techniques and Trends’:

A. Mandatory principles
B. Optional Principles

**A mandatory principles** -- This category includes the following principles:

(a) **Specification of Objectives** – when a programmer starts to prepare a programme, he has to specify the objectives prior to this and these objectives are to be written
in behavioral also. Besides this, he has to specify the situations too in which the achievement of these objectives is expected.

(b) **Empirical Testing** - The programmed material is tested on the basis of the experience. The draft of the program is tested in the following three phases:

(i) **Individual Try-Out** - after individual try-out, that draft is tested on 5-10 representative students of that class for which the program is meant.

(ii) **Small Group Try-Out** – after individual try-out, that draft is tested on 5-10 representative students of that class for which the programme is meant.

(iii) **Field Try-Out** - after the try-out on small group, that program is subjected for some modifications and then it is used in the actual class.

(c) **Self-Pacing** – The pupils take decision themselves regarding the pace with which the pupil is to develop by a program in the programmed learning.

They adjust their pace of development according to their abilities and motivation level. It is not necessary to learn with the pace of other pupils of the class. Hence, the individual differences have their own importance. The program maker must pay attention to this aspect.

**Optional Principles** – this category includes the following principles:

(a) **Overt responding** – The pupil is asked for overt-responding. This keeps the pupil active and concentrates on the educational material. Hence, the pupil’s activeness increases his motivation for working.

(b) **Immediate Feedback** – Feedback provides information’s to the pupil regarding his background. It also includes the knowledge of result regarding the functioning of the pupil. When the pupil learns according to the program, his feedback should be immediate.

(c) **Small step-size** – The knowledge is broken into small and meaningful parts or units which are known as ‘frames’. The pupil is presented with one frame only at a time.

On the basis of B.F Skinner’s experiments, the principles of programmed learning or instruction can be mentioned as below:
(i) Principle of small steps – According to this principle, the subject matter which is to be programmed is analysed in detail and then it is divided into small and meaningful parts or steps. The pupil is presented with one part at a time. This part of the information is known as a ‘frame’

(ii) Principle of immediate confirmation or feedback – immediate confirmation of the results is another principle of programmed learning. Immediate feedback or confirmation is two-way beneficial, first, the pupil cannot guess in any relevantly developed program, second, when the pupil is uncertain about his own response, he can confirm his response or it can be corrected if it is not correct.

(iii) Principle of active responding – according to this principle, if a pupil is to learn anything, he must respond, the program makes the pupil’s response active. This makes the activity permanent also. Before moving towards the next frames, the understanding of the previous frames is necessary. Active responding means pupil’s complete involvement in the learning process. A short answer or response for a smaller piece of information will not be designated as active responding.

(iv) Self- pacing --- The pupil makes progress at his own pace. When he is involved in a program, he cannot move with the pace of other pupils in the class. Also he cannot be forced for this. The basis of this principle is the individual difference.

(v) Student Testing ---- the teacher can do continuous evaluation of his pupils. He can find out the weaknesses of his program. He can modify his performance the basis of pupils’ performance.

Difference between Programmed Instruction and Traditional Teaching Methods

It is essential to understand the difference between the programmed instruction and traditional teaching methods. These differences are as follows:

(i) Individual differences – Programmed instruction is based on the individual differences such as the attention is given to the learning –paces of the pupil, but there is no such provision in the traditional teaching methods.
(ii) **Immediate feedback** – the specification of objectives occurs in the programmed instruction while the objectives are vague in the traditional teaching methods.

(iii) **Specification of objectives** – the specification of objection occurs in the programmed instruction while the objectives are vague in the traditional teaching methods.

(iv) **Use of teaching principles** – in the programmed instruction the teaching principles are practically used but it is difficult to use these teaching principles in the traditional teaching methods.

(v) **Size of Information Unit** – The size of information unit of frame is small in programmed instruction but the material is not divide into frames in the case of traditional teaching methods.

(vi) **Emphasis on Students Participation** – The pupils are forced to respond continuously in the case of programmed instruction. In the traditional teaching method, the pupil remains completely passive and it fails to tell us whether the pupil has learnt anything or not.

(vii) **Organization of Subject Matter** – In programmed instruction, the subject matter is organized in order of increasing difficulty while the traditional teaching method lacks such material.

### Need of Programmed Instruction

The need of programmed instruction is a follows:

(i) Each pupil had his own pace and he cannot be forced to learn with the pace of other pupils. Hence, the need of programmed instruction arises in order to learn at one’s own pace.

(ii) The pupils need immediate feedback in order to rectify their mistake s and to remove their errors. The programmed instruction has the provision of immediate feedback. Hence for this purpose programmed instruction is needed.

(iii) Programmed instruction is needed in order to give information concerning the success and the achievement of the pupils.
(iv) In order to involve the pupils to the maximum in the learning process and to make them more active, programmed instruction instead of traditional method is needed.

**Types of programmed learning**

In programmed learning the solution of the problem or answer to question depends on the solution of the previous problem or answer to the previous question. The entire programme is based on the entering behaviors of the pupil which function as criteria. The programmed learning is of the following three types:

1. Linear Programming.
2. Branching Programming
3. Mathematics Programming

**Linear Programming**

B.F. Skinner is considered as the person who developed this type of programmed learning. Its basis is psychology. This method presents stimulus — response bond. In this the questions are directly asked to the pupils who are asked to think and write answers to those questions. Such types of responses are known as ‘Constructed Response’ The literal meaning of linear programming is the program in a straight line in which the pupil starts from his initial behavior to the terminal behaviour following a straight line. In this way the pupil goes on moving from one frame to the other frame till he completes the entire program. The subject matter is broken into various small units which are arranged in a proper sequence. Immediate feedback is provided to the pupil. A bit of information is given in each frame. Sometimes paragraph from more complex and comprehensive subject can be given in a single frame.

Linear programming can also be known as extrinsic programming. Both the terms carry the similar meaning. According to Shiksha Paribhasha Kosh, linear programming is that technique in which, after reading the information given in the unit, the pupil selects the correct answer to the question based on the material. The answer to a question has two alternatives—right or wrong. Before proceeding to the next unit, he comes to know whether his answer is right or wrong.
Characteristics of linear programming

In short the linear programming carries the following characteristics:

(i) In linear programming, all the pupils read every frame and respond.
(ii) It is a linear program because there is only one way or line to follow.
(iii) The pupil goes from one frame to the other till the entire program is over.
(iv) In the linear programming, constructive (fill in the blanks) responses are used mostly.
(v) In linear programming small frames are used in comparison to the branching programming. But ‘single statement or ‘small’ is not the necessity of the linear programming only. Make (1964) developed linear programs by using larger frames and frames with paragraphs.
(vi) The pupils are provided with stimulus or signals at the initial stage of the program.
(vii) The entire program consists of many smaller frames and each frame contains single idea, example or rule.
(viii) Each pupil functions at his own pace and follows the frames similarly.
(ix) Copying or cheating is discouraged because without the first response, the next response is not possible.
(x) Feedback or reinforcement is given immediately. The immediate knowledge of results functions as reinforcement and maintains the motivation.
(xi) The possibility of committing mistakes reduces in this programming.
(xii) In linear programming, the responses of the pupils are kept under check.

Limitations of Linear programming

There are certain limitations of linear programming too beside its characteristics which are is follows:

(i) It is very costlier method and consumes much time.
(ii) In this method, the freedom of the pupils is restricted.
(iii) This method is helpful in providing the knowledge relating to the lower level of the cognitive domain, e.g. knowledge of some facts, information’s and principles.

(iv) It is a very difficult job to produce a programmed material of higher level.

(v) It is not helpful in producing the material for all the school subjects.

(vi) Since it is controlled instruction, this method does not help in creating the situations which can develop ‘creativity’.

**When to Use Linear Programming?**

The linear program is based on the assumption that we can analyse each step in learning and we can present it in a proper sequence, at the proper time and with proper reinforcement. Pupil’s correct response is emphasized. If the pupil fails to learn, then there is some which is wrong. This method is used in the following situations:

(i) When the program maker or the teacher fears that the pupil cannot learn in a single attempt.

(ii) When the teacher thinks that the mastery on concepts or skills is necessary.

(iii) When the entering behavior of all the pupils are similar.

**Examples of Linear Programming**

How to Use the Programme ---- This programme resembles a test but it is not a test. Also it is not an ‘orthodox’ textbook. It is a method of teaching which resembles a lesson or a tutorial. It will enable you to check on your learning as you go along.

The programme is divided into sections called ‘frames’. Each frame is numbered and divided off from the other frames by spaces. Almost every frame teaches something and asks a question which is answered in the next frame. When working through the programme, you should answer the question in one frame before looking at the answer provided in the following frame. In order to prevent inadvertently looking ahead, you should cover the page, except for the frame you are working on, with a piece of card or thick paper. When you have answered one frame, move down the card to expose the answer and the next frame.
When composing your answer to a question, you will naturally use your own words. You are rarely expected to provide exactly the same form of words; which are provided.

At the beginning of each part you will find a note giving the approximate working time for each part. These times have been calculated from times actually taken by students in their first year in a college of education. The times given, then, should provide you with a guide to help you plan your study time. However, the length of time taken varies among individuals so you may find yourself taking a somewhat different length of time from the one given. Whether you work quicker or slower than the times given will not affect your learning. This had been established experimentally.

Should you find that you have to break off in the middle of one of the sections of the programme, it is advisable to look through the review frames of the previous parts to refresh your memory before proceeding. If possible, however, you should plan your work so that you work through one part at a time. The times given should help you to do this.

**Example or frames**

1. As a baby grows up its physiological development (often referred to as maturation) makes possible new patterns of behavior. However, these patterns of behavior are also greatly dependent upon learning. They do not just appear. Thus we may say that new patterns of behavior are in the main produced by (1) and (2) acting together. (1)Maturation (2) Learning (or Vice-versa)

2. While we must not lose sight of the effect of growth, this programme mainly unconsidered with the changes brought about by learning. Why do you think that, in general, teaching are mainly dependent upon maturation? Because children’s learning can be influenced by the teacher whereas maturation cannot. Learning, in addition, generally produces change more quickly than maturation.

3. E.L. Thorndike, a famous American psychologist, made a special study of learning. He studied animal learning as well as human learning. In one of his experiments he put a hungry cat in a cage. From outside he served food. The cat
could escape by operating a catch which would release the door lock. The cat has to solve a problem before it can reach food. What is the problem?

To release the catch or to escape from the cage.

In this way, many more frames can be formed and arrange in a sequence.

**Various Steps for Preparing a Programme**

One had to pass through various phases and steps to prepare a programme. Principally, linear and branching programmings are absolutely different. But the phases of development of linear and branching programming are similar. There are differences among specific activities of these phases. The development of methetics programming is different from all these. The methods for preparing linear and branching programming and methetics programming are given below:

1. Development of Linear and Branching Programmes

   It is most dynamic, challenging and time consuming process. The programme developer should have the skill of writing the programme and he should be practical. A relation must exist between the structure of the subject and expected behavior.

The following are the main three phases of developing the programme:

1) preparation
2) writing the Programme.
3) Try-out and Revision

I preparation:

(a) Selection of Unit or Topic.
(b) To Prepare a Content Outline.
(c) Define Objectives in Behavioral Terms.
(d) Construct and Administer a Test of Entering Behaviour.
(e) Construct and Administer a Test of Terminal Behaviour.

(a) **Selection of Unit or Topic** - The programme developer should select that subject matter with which he is familiar. Secondly, he should keep himself in
touch with very small area of the subject matter. Thirdly, he should select that subject matter for which the development of the programme is easy.

(b) To prepare a Content Outline - Whatever the teacher thinks to teach the subject matter, should be included in this content outline. Hence, the textbook and other resources should be studied very carefully. If the teacher had not taught the subject, even then he should consult some other experienced teacher.

(c) Define Objectives in Behavioural Term - Writing objectives includes task description and task analysis. In task description, expected or terminal behaviours are described while task analysis describes those main behaviours from which the terminal behaviours can be achieved. Peter Pipe (1966) has suggested that writing the objectives in general from is comparatively better that writing in behavioral terms. A normal statement is an instructional goal. You can analyse this goal by asking yourself how this goal can be achieved. It is Peter Pipe’s suggestion that you go on analyzing till you get the goal.

(d) Construct and Administer a Test of Entering Behaviour - Before writing items, the entering behaviours function as a foundation. These are the starting points. If the group is heterogeneous, there would be many entering behaviours. In such situation. The branching programming is very helpful.

    The construction of a test is must for entering behaviours. For this test, the knowledge of pre-requisite behaviours is required. The knowledge of prerequisite behaviours is very essential to write the test items for entering behaviours test. Many items should be written for each entering behaviour just to avoid pupil’s guess. While working with one group of the pupils, many variations in entering. Behaviours come across. In this situation help can be sought from branching programming.

(e) Construct and Administer a Test of Terminal Behaviours - This test, based on task description, is applied for performance assessment which is the fourth element of Glaser’s Basic Training Model. For each terminal behaviour, at least four test items should be prepared. These should be mixed and there should not be any sequence. According to Peter Pipe (1966), this test should
be administered to the pupils before start in the programming. The material or the items with which the pupil is familiar should be deleted from the programming. At the time of starting the programme, the pupil’s score in the test of terminal behaviours should be zero. This test tells us whether the pupil had not achieved those behaviours actually before teaching the programme which is yet to be taught.

2. **Writing the programme**

(a) Present the material in frames.
(b) Require active student response.
(c) Provide for confirmation or correction of student response.
(d) Use prompts to guide student responses?
(e) Provide careful sequencing of frames.

(a) **Present the Material in Frames** - After the preparation phase, the process of developing the real programme starts. The first step of the process of developing the programme is to present the material in steps or frames. A frame is a small segment of subject matter. On the basis of these frames the pupil is asked for a particular response. As a programme writer, our functions to provide stimuli which are helpful to overate those responses which more the pupils towards terminal behaviours. According to Klaus (1961), a frame had the four essential parts - (i) Stimulus and stimulus context, (ii) Prompts necessary to produce the response reliably, (iii) Responses the stimulus evokes, (iv) Enrichment material which makes the frame more readable or interesting. In any programme material, new stimulus material is included gradually and the prompts and the familiar material are removed gradually. Hence, the pupil’s behaviour come under the control of new subject matter.

Each frame should contain a small portion of the material. Sufficient material should be there for a response. The size of the frame may vary in different parts of a programme. According to Nathan Maccoby and Fred Sheffield (1961).

(i) For initial learning, small frames are more effective than the large frames.
(ii) The best performance occurs in the test of terminal behaviour.
Precautions are required to give a particular sequence to the frames. Move from simple to difficult. A single concept or fact should be used in one frame at a time.

**B) Require Active Student Response** - The most essential part of a frame is the pupil’s response for which he is asked, in each frame the pupil should be asked to respond so that no frame should be left un-responded. In frames, the response depends on the essential part of the subject matter such as the identification of the necessary description of the subject matter or to acquire new vocabulary.

For the modification in any programme, the basis is the written record of the pupil’s responses. For its modification, the 10% formula is used. If the error rate is more than 10%, then the programme should be modified. But Parry (1963) has cautioned against this rule. In some situations, his cannot be applied, such as when as a result of learning, incorrect and undesirable responses exist in advance, when the pupils are asked to guess after the wrong responses, and when the pupil is asked to explain his own opinion.

**C) Provide for Confirmation of Correction of Student Response** - Correct responses should also be disclosed so that the pupils may compare their responses. It is a characteristic of the programmed instruction. When the pupil comes to know that his response is incorrect, he should be asked for correction.

**D) Use Prompts to Guide Student Response** - Prompts should be provided in the frames of the programme in order to get correct responses from the pupils. Theses prompts help the pupil in correct responding. Secondly, these prompts avoid unnecessary errors. In the last stages of the programme, the prompts is known as fading or vanishing of prompts.

The frames should be free from over-prompting and under-prompting. The source of over-prompting is the copying frame in which the pupil is asked to respond given in the frame. The pupil only copies the given word. Such type of frame is appropriate as an introductory frame. On the other side, if it is a complete response, we cannot call it a prompt. Its main drawback is that the pupils do not respond after understanding it conceptually. Margules (1964) has modified these copying frames. Sometimes, the pupils give all the correct responses in all the frames but they fail to respond correctly in the terminal behaviour tests. It is often due to over-prompting.
C. **Provide Careful Sequencing of the Frames** - The sequencing of the frames depends on two factors:

(i) Description and analysis of the behaviours you programme intends to teach.

(ii) The conditions necessary for the learning required by the various tasks.

All the basic learning conditions such as discrimination, generalization, practice and reinforcement can be used for the sequence of the frames. The test can be administered according to the sequence of the frames.

(C) **TRY-OUT FOR MODIFICATION**

The programmed units are subjected to experimental try-out three times namely:

(1) Individual Try-out (2) small Group Try-out,(3) Field Try-out.

(1) **Individual Try-out:**

In individual try-out or testing the programme is administered on a few student and the programmer. It should establish proper rapport with the student to put him in proper frame of mind. It should be clear to the leaner that he is not going to be tested but he is to help in the modification of the programme. The learner goes through the frames one by one and writes down suggestions (if needed) concerning each frame on a separate sheet of paper so as to improve the content, sequence or organization of the frames.

After administering a frame, a discussion may be held with the student. The programmer tries to record the reactions of each learner, his difficulties and comments on each frame. Time taken on each frame by the learner is also noted.

Consequently based on the results of the try-out on individual level, the programmer tries to bring necessary improvement and modification in the draft of the programme.

**Purpose of individual try-out**

(1) To disclose as programme inadequacies as possible and to eliminate them from the programme.
(2) To bring improvement in the (i) Language of the frame, (ii) Size and sequence of the frames, (iii) response of the frame, (iv) Grammatical errors/cues in the frames and ultimately in (v) The draft of the programme.

Rules of Individual Try-out:

1. **Separate cards:** the instructional units or frames are prepared on separated pieces of paper of cards with correct response on the reverse of it.

2. **Selection of unit:** A student is selected who is a typical representative of the population for whom the programme has been written. It is always better to select an average student.

3. **Easing the student:** every effort is made to put him at ease. It is pointed out that he is not being tested rather he is helping the programmer and any comment especially his difficulties will be welcome.

4. **One item at a time:** the programmer presents the programs one item at a time to the learner thus making the situation cheat proof.

Sources of Errors in Frames:

Errors in frames may be ascribed to:

1. Insufficient and vague information (stimulus)
2. Inappropriate placement of stimulus.
4. Irrelevant response to the stimulus context.
5. Lack of prompts to arrive at correct response.
6. Too many prompts at the teaching frames to cause error on terminal frames:

Review of these errors helps the programmer to modify frames to elicit the desired response. You may functionally improve frames with every trait with a new subject. The criterion for modification here is to elicit desired responses.

2) **Small group try-out:**

After making necessary modifications in the frames on the basis of individual try-out the programme is tried out on a small but a representative group of five to ten average
students. Here the programmer determines whether that programmed succeeds in bringing desirable gain in learning.

Pre-test (before beginning programmed instruction) and post-test (after completing programmed instruction material) are conducted. The difference in the scores of pre-test and post-test, helps to assess programme proper rapport with the students. He should keep in mind the following instructions before administering the programme:

1. Programme in definite format: the programmer should write the programme in definite format. Various types of formats can be used for presenting the programmed material such as three frames or four frames on a page. The responses of the frames may be written on the right hand side of the same frames or the alternative frames. Response may also be written at the foot of the same frame.

2. Instruction for students: definite instruction should be framed for the guidance of the students.

3. Demonstrating frames: the programme may provide a few frames to demonstrate the method of responding to make the students familiar with this new technique of teaching –learning.

4. Pre-test: The programmer should administer a pre-test to determine the extent of knowledge of the student in the subject.

After following the above instructions the programmer should perform the following tasks:

1. Distributing booklets: the programmer should distribute the programmed booklets among the students.

2. Asking for reading: He should ask the students to go through the material.

3. Noting the starting time: the starting time should be noted down.

4. Offering no help: once the students start working the programme, no help should be provided to them.

5. Asking to locate defects: his should ask the students to locate the defects in the programme.
6. Recording time: the time at which an individual student finish the programme should be recorded.

7. Discussion: At the end of the programme, the programmer should discuss difficulties with the students.

8. Administering post-test “At the completion of the programme, a post-test is administered to all the students to find out the benefits of training and to determine the success of the programme.

9. Discussion about difficult areas: After finishing the administration of the post-test, the programmer discusses the difficult areas as marked by the students.

10. Statistical analysis: the programmer statistically analyses the date collected on the programme in terms of error-rate, sequence progression and density.

11. Modification: He modifies the programme in the light of statistical analysis.

12. Repeating the process: In case the standards set are not met the process of small group testing (try-test) is repeated. If the programme reaches the standard, then it is ready for field testing.

**Difference between Individual and small Group Try-outs:**

**Table 1**

<table>
<thead>
<tr>
<th>Individual Try-out</th>
<th>Small Group Try-out</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number</strong>: only one individual is tested.</td>
<td>Five to ten representative students are tested</td>
</tr>
<tr>
<td><strong>Interaction</strong>: there is face to face</td>
<td>There is no face to face interaction between the programmer and the student.</td>
</tr>
<tr>
<td>interaction between the programmer and</td>
<td></td>
</tr>
<tr>
<td>the student.</td>
<td></td>
</tr>
<tr>
<td><strong>Written programme</strong>: programme is written on cards or papers.</td>
<td>Programme is written in a definite format in the form of a booklet.</td>
</tr>
<tr>
<td><strong>Instructions</strong>: verbal instructions are</td>
<td>Instructions are written in programmed booklet.</td>
</tr>
<tr>
<td>given</td>
<td></td>
</tr>
<tr>
<td><strong>Tests</strong>: Pre-tests and post-tests are not administered.</td>
<td>Pre-tests and post-tests are administered.</td>
</tr>
<tr>
<td><strong>Data</strong>: Data are not statistically analysed.</td>
<td>Data are statically analysed.</td>
</tr>
</tbody>
</table>
3. **Field try-out or Testing:**

After improving the programme draft in accordance with the suggestions of small-group try-out, the programmer does a field try-out in order to test the validity of programmed instructional material in real setting. In field try-out the programme is tested in actual class-room situations. The programme is its final from i.e. complete in all respects is administered to a representative group of fifty or more students of an entire class. The main objective of field try-out is to pinpoint the specific areas which need improvement teacher and not by the programmer. Pre-tests and post-tests are given to the students and the scores are analysed to determine effectiveness of the programme. Suggestions and responses of students to each frame are noted and incorporated to improve the programmed material.

Steps in Field Try-out/Testing can be summarized as under:

1. Selection of representative sample of the target population.
2. Administration of pre-test to the sample.
3. Administration of programme.
4. Administration of post-test and attitude inventory.
5. Administration of criteria of the programme.

**Self-Instructional Material**

We analyzed that SIM is a learner-oriented instruction in which learning takes place without requiring the physical presence of teachers. It is based on the principles of programmed learning which in turn are founded on the concept of operant conditioning given by Skinner in 1954. Programmed instruction is a process of arranging material to be learned in a series of small steps designed to lead a learner to through self-instruction from what he knows to the unknown of new and more complex knowledge and principles. Some features of learning self-instructional units which have been derived from the programmed instruction are objectives, division of content into steps, frequent feedback, self-check questions and answers.
Now question arises how to design, write and produce self-instructional print material of appreciable quality. It is a strenuous task and at the same it is different from production of text books.

SIM is prepared in such a way that the learner does not face any hurdles while learning the subject. It is one of such media in distance education which teaches efficiently, effectively and individually. Moreover, it sustains the motivation to learn, makes the learning affair not only easy but stimulating as well.

**The Instructional Module – A Brief Outlook**

The philosophy behind instructional modules is based on the generally accepted fact that each learner is unique and different from others in backgrounds experience, inherent qualities, habits and learning styles and as such should be allowed to grow and develop to fullest potential. Modular approach is an attempt to make the instruction individualized so that the student learns at his own pace according to his interest, capabilities and capacities. The investigator considers that modular approach is a comprehensive self-study device for the children.

**Programmed Instruction**

New methods and techniques in education are having an increasing effect on the traditional approach to teaching and learning. Among the new approaches and innovations that have gained acceptance in recent years is programmed instruction. It is a distinct strategy of instruction based upon the principles of efficient learning evolved by psychologist under controlled laboratory conditions. These principles emphasize the need to specify the terminal behaviour to be developed in the learner and then design the instructional process so as to maximize the rate or acquisition and maintenance of terminal behaviour to be developed in the learner and then design the instructional process so as to maximize the rate or acquisition and maintenance of terminal behaviour. The application of active responding, reinforcement, gradual and successive progression and empirical validation achieve this. A learner can learn only if he actively responds in a learning situation. In programmed instruction active responding is arranged with a limited amount of learning material with which he is ready to interact (Chauhen, 1978).
Programmed instruction received its major impetus from the work of the American Psychologist B.F. Skinner, who in 1954; described how programmes could be developed scientifically. By late 1950 programmes had been developed for use in all levels of teaching, from grade school to graduate school. Most early programmes presented information in small steps. Students read a sentence or two and then responded to a question by filling in a blank or choosing from a set of alternative answers. Then they viewed the correct answer and checked the accuracy of their own responses. Such formats, which seem impoverished in and multifaceted nature of this construct. Inquiry involves the development and use of higher – order thinking to address open-ended problems. Resnick (1987) describes higher order thinking as non-algorithmic and complex. The path to a solution is not discernible from a single point of vantage. Multiple solutions are possible, and the inquirer may have to use multiple, sometimes conflicting, criteria to evaluate his or her options. Inquiry is characterized by a degree of uncertainty about outcomes. True inquiry ends with an elaboration and judgement that depends upon the previous reasoning process.

Traditionally, critical thinking has been embedded in the application of various science process. Schwab (1962) proposed that teachers present lab problems at three levels for the purpose of developing an orientation to inquiry. At the first level, teachers present problems not discussed in the text, with descriptions of different ways to approach the solution. At the second level, teachers pose problems without methodological suggestions. At the third level, present the phenomena designed to stimulate problem identification. Each level requires more facility in using process skills than the previous level.

Trowbridge & Bybee (1990) also discuss three levels inquiry, beginning with discovery learning, in which the teacher sets up the problem and processes but allows the students to identify alternative outcomes. The next level of complexity is guided inquiry, in which the teacher poses the problem and the students determine both processes and solutions. The third, and most demanding level is open inquiry, in which the teacher merely provides the context for solving problems that students then identify and solve.
What is Reading?

Reading is receiving ideas, experiences, feelings, emotions, and concepts. It is an activity that permits one to gain vast knowledge. When reading, we can live and travel vicariously and become acquainted with people and events of the past that have shaped our worlds. Reading creates for us mental maps of events so that ideas can be transmitted from the mind of one, the author, to the mind of another – the receiver/reader.

Humans read even before encountering print. They read faces and sound vibrations; they read the thrust of the wind on their skin; they read the intriguing language of animals. It was not until humans invented a symbol system to record, in words, the ideas that emanate from human minds and souls that reading problems began. Interpreting the written “squiggles” that represent thoughts seems to create difficulties for some people. These difficulties, we believe, are not “reading problems,” but rather, they may represent problems with the coding system itself or with the pedagogy designed to help students learn to read. Actual problems with reading are often quite complex and misunderstood. Experts have difficulty agreeing what reading problems are, how to assess them, and how to assist students who have reading difficulties.

We believe that young children’s eagerness to learn to read is based on their belief that being able to read opens wonderful worlds of experiences. Students must experience the excitement of “breaking the code,” realizing that when they read ignorance is shed. This is the power of literacy and the excitement of the reading experience. When young children and adults achieve literacy, which permits the reception and expression of ideas and feelings, the result is joy and personal fulfillment. Diagnosis and diagnostic procedures, therefore, must be broad and flexible in order to discover what reading is for each student – and when each student does it well.

How do We Assist Students Who do not Learn to Read Well?

If we view reading as an activity that encourages initiation into new worlds, then reading assessment and pedagogical practices to assist students who are not reading well take on unique parameters. When we ask “What is reading?” we must look at individual students in many environments and observe strengths and needs. Observing them as
whole individuals who are unique dominates the diagnostic process. Nothing multiple reactions and responses and interpreting recorded observations in several settings seems to be a reasonable approach for discovering students’ strengths and needs. Interpretations of these observations should result in meaningful suggestions for students’ learning. Keen sensitive observers, like good researchers, find data that help to explain student performance and permit predictions of future student behaviors. Thus, a purpose for diagnosis seems to be directing educators to instructional changes.

Changes in instructional practices should result after observing students reading and composing in classroom-like settings, when they are involved in multiple and varied instructional and recreational reading activities. The process of diagnosing strengths in multiple environments as well as instructional settings over time reflects our model. Reviewing observation notes, video and audio recordings, materials produced by students, and then asking questions about data collection provides information about each student’s performance. Accumulating materials and reviewing them helps us look for consistencies or inconsistencies in behaviors. Once notes on students’ behaviors are gathered and reviewed, decisions concerning further diagnosis and instructional needs in reading and writing can be made by teachers, diagnosticians, parents, and students themselves. As Gillet and Temple (1982, p. 8) suggest, “diagnosis is a process requiring decisions made by people, not instruments.”

**Reading Skill**

Reading is a process of looking at a printed or written symbol and translating it into appropriate sound. This spoken symbol is further associated with an object for which it stands. Thus reading consists of three elements, the symbols, the sound and the sense.

For example the child reads the word “tree” and at the same time he looks at the symbol, translates it into a specific sound which stands for some object “tree” and at the same time he visualizes the concrete object or idea for which the said symbol stands.
Meaning of the term ‘reading’ – with a figure

Recognition

Reception

Reading Involves

Utilization

Evaluation

Comprehension

Interpretation

“Reading involves the recognition of the important elements of meaning in their essential relation including accuracy and thoughtfulness of comprehension.”

**Reasons for Reading**

People generally do not read unless they have a reason for reading, i.e., they have a need of some kind that can be satisfied through reading. So we read because:

(a) We want information for some purpose.

(b) We need instructions in order to perform some task.

(c) We want to keep in touch with friends through letters, or understand official correspondence.

(d) We want to know what is happening (newspapers, magazines, reports).

(e) We seek enjoyment (novels, poems, etc.)

(f) Reading is a good source of self-education.

(g) According to Lord Bacon, “Reading maketh a full man.”

(h) Professor Gandhi and Trivedi remark, “In fact education of a child is the ability to read, to decipher, to interpret and to understand properly the contents of a reading material. The intellectual advancement of the child is strictly limited, if he is unable to read”.

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The term ‘reading’ thus embraces a wide variety of tasks, activities, skills and mental process.

A.W. Frisby says, “Reading for those who have been guided to appreciate it, is one of the most important activities of life to bring to us not only a pleasant way of spending the time, but a way of entering into the life of the world and helping us to contemplate spiritual matters. Many of those who do not approach reading in this life have probably not received in their youth the right encouragement.

**Mechanics of Reading**

1. Acquisition of proper eye-movement, which is from left to right in the case of English.

2. Acquisition of proper eye-span that is, taking in a few words at a time.

3. Ability to translate visual symbols into a stream of sounds.

**The Process of Reading**

While reading a good teacher does not look at individual letters composing a word, or even a word itself. He grasps the meaning of two, three, or four words at a time, in a single movement. In the process of reading, the eyes do not travel smoothly along the lines of print, but they move by jumps separated by very short stops.

The eyes of a very good reader move quickly, taking long jumps and making very short halts. So increasing the speed in reading means taking in several words at a glance, or increasing the eye-span.

The implication of the fact that the eye takes in a phrase rather than a word or letters constituting it is that while teaching reading to students, the teacher should not follow the methods that concentrate on individual letters, i.e. Alphabetic method or
phonic method because they retard the speed of reading. Therefore, he should follow the word, phrase or the sentence method.

The reading material should be the same as the child has mastered orally. So he knows the meanings of those words. All that he now needs to do is to transfer his knowledge of auditory signs to visual signs.

Problems in Learning to Read English

1. **Unfamiliarity of Sounds**: A few words of English which are different from the sounds of the mother-tongue of the learners are misunderstood by them. For example, /V/, /W/. They produce both the sounds like Hindi sound of ढ. They will also confuse English sounds / ठ / and / / with Hindi sounds. The pupils identify these sounds as (ढ) and (च) like Hindi sounds. Similarly /V/ and /W/ are two sounds in English. But in Hindi they are used for (ढ) sound. But in spoken English /V/ and /W/ have different sounds. For uttering /V/, the speaker is to keep his lips wide spread and for /W/ the lips are to be kept in ‘rounded form’.

2. **Irregularity of English Spellings**: English is not a phonetic language. It is not spoken according to the spelling. Thus it gives rise to innumerable mistakes in reading. At the early stage, it is just possible that Indian learners may read the words in a funny way. For example, hat as हैट and that as ट्वैट, hut as हुट, and shut as सहट, Knife as कैटफ। In fact, English spelling is very illogical and arbitrary. There are some letters which remain silent in some words, e.g. –

   (a)  ‘K’ is silent in the following words:

   (i) Know      (ii) Knight     (c) Knock     (d) Knowledge
   (v) Knife     (vi) Knot

   (b)  ‘b’ is silent in -

   (i) Tomb     (ii) Womb      (iii) Bomb, etc.

   (c)  ‘h’ is silent in -

   (i) Honour   (ii) Hour      (iii) Honest, etc.
(d) ‘l’ is silent in -
   (i) Calm       (ii) Plam       (iii) Salm

(e) ‘P’ is silent in -
   (i) Pneumonia (ii) Psychology

(f) ‘r’ is silent in -
   (i) Park       (ii) Cork       (iii) Morning   (iv) Fork

Many such words can be seen where some alphabets are silent. In addition to this, in English language different graphic symbols stand for one and the same sound, such as ‘F’ is denoted by (ough) – enough, ph (graph), ff (stuff) etc.

Pupils at early stages naturally get confused because of these irregularities.

3. **Process of Reading**: Some students move their eyes from alphabet to alphabet. It is a wrong habit. Therefore, it is essential that proper training of reading should be developed among the students by the teacher. He can help the students by teaching the natural process of reading in which the eyes of the pupils should jump over phrases and groups of words.

**Three Stages of Reading**

(i) **Preparatory stage**: Also called as ‘pre-reading stage’. In this stage the teacher of English will begin by teaching structures, vocabulary at this stage, till he has laid a foundation for reading with the help of the following steps, materials, techniques:

- Use of reading cards
- Use of black boards
- Use of ward building, flash cards and pictures
- Teaching through actions, familiar objects
- Teaching through games, asking questions
(ii) **Productive Stage:** During this stage good habits of reading are formed. The students are taught intonations, stress on letters and words.

(iii) **Vivid – imagination – Realization Stage:** At this stage, the pupils read more vigorously. They are made accustomed to the use of books for knowledge and enjoyment sake. The students may be asked to read interesting written material.

**What is Writing?**

Learning to read and write is a process of experiencing language. Children learn to talk in a language of participating in communicative interactions. Once a child has begun to communicate orally in a language, writing can be introduced.

Writing is the physical expression of what you think. The close relationship between writing and thinking makes writing valuable. Thus, writing is closely related to the inner processes within a child’s mind, i.e., the internal manipulation of external experiences. In addition to this, writing reinforces the grammatical structures, idioms and vocabulary that we have been teaching our children, writing skill makes the language items learnt firmly fixed in the minds of the learners.

According to Bacon, “Reading makes a full man, conference a ready man and writing an exact man”. What he means is that writing is a useful means of organizing thought and giving it precision.

According to Harold Rosen, “The writer is a lonely figure... He writes with one hand tied behind his back, being robbed of gestures. He is robbed too of the tone of his voice. He is condemned to monologue, there is no one to help out, to fill the silences, put words in his mouth, or make encouraging noises”.

In the words of Bell, “Writing is a tool used to enable us to express what is in our mind and for some people is almost as important as important as speech”.

Mahatma Gandhi has also emphasized the importance of writing by saying, “Fair and legible hand writing is a tool used to enable us to express, what is in our mind and for some people is almost as important as speech”.
S.S.M. Gaudar says, “Writing has an instrumental value in schools”. He further says, “It is a means of preserving the knowledge which the pupil has gained or the judgment he has formed. It serves as a check on his forgetting useful items of knowledge and ideas. The habit of making notes of what is read and of summarizing helps the recollection of what has been studied.

**Aspects of Writing Skill**

1. Syntax (sentence structure and choices, etc.)
2. Content (Relevance, clarity, originality, logic, etc.)
3. Grammar (Rules for verbs, agreement, articles, adjectives etc.)
4. The writing process (Getting ideas, getting started, writing drafts, revising)
5. Mechanics (Handwriting, spellings, punctuation, etc.)
6. Audience (The readers)
7. Organization
8. Word choice (vocabulary, idioms, tone)
9. Purpose (The reason for writing)

**Writing Skill**

During teaching of a language, we develop a number of skills in our students. Writing is one of those communication skills. Through writing, a person is able to convey his thoughts or ideas to others who are not present in and out of the writer. Moreover, writing makes the records permanent. Whatever is written once remains for ever; unless it is knowingly destroyed. While writing, a person has to be very exact.

In some of the institutions, it is found that too much emphasis is laid down on writing and oral aspect of the language is neglected. No doubt, this type of practice helps the learners in the present day-type of examinations but it does not help them in the language in the long run. So the different aspects of language should be given due importance.
Teaching how to write involves manual skill – the skill of controlling the small muscles of the fingers, and the writ and securing co-ordination of the hand and the eye. Secondly, it involves doing various exercises in written work. The exercises cover a vast field ranging from copying the phrases and sentences to comparing a long essay.

There are two types of learners who can be taught writing of English language. The first category is of those who have not learnt the writing of any language. The second category is of those who have already learnt the writing of mother tongue. In the first case the teacher has to explain the learners how they have to sit, how to hold a notebook in hand and how to hold a pen. After this, they are given preliminary practice of writing with a pen. Then they are given this type of practice with the help of chalks and small boards which are meant for the students. There are blackboards fixed up on the four walls of the class room and they are very near to the floor on which the students are sitting. By using two type of blackboards, the students may be given practice of drawing straight lines. In the beginning the lines may not be straight. By and by, they should be given practice in drawing short lines in one direction and then in another direction.

After this they should be given practice in drawing circles, semi circles etc. This type of practice should continues as long as the students are able to move their fingers and wrists according to the writing specimens. It will be all the more useful if the students are asked to study drawing as a compulsory subject at this stage. All that will be fully helpful in the learning of writing. This much practice will pave way for teaching the writing of alphabets. The second category of students who have already learnt the writing of mother tongue, are already at this stage when writing of English alphabets is introduced to them.

**Posture of Writing**

The correct posture of sitting and hand are very important in writing. In the words of Bell, “Writing is a difficult art; it requires complete control of the muscles of the hand and wrist and this control a small child does not naturally possess.” However, in the modern world of newer inventions is it necessary to emphasize what posture a student should take while writing on a computer.
What is teaching of writing?

According to Bell, “Writing is a difficult art; it requires complete control of the muscles of the hand and wrist and this control a small child does not naturally possess.” So, there is need to teach writing English. It involves the following:

(i) Teaching to develop the skill of controlling the small muscles of the fingers and wrist, while writing.

(ii) Teaching coordination of hand and eye.

(iii) Getting students do various exercise in written work.

When to introduce writing English:

A proper time for teaching writing is when pupils can read a few phrases and sentences correctly and quickly.

Place of Writing in School Work

Writing is now more or less a regular feature of the school work. However, the importance of written work is not the same for all pupils because written work cannot be compared with oral work for making sound progress in language learning. One expresses one’s thoughts and opinions mainly through writing which is a valuable means of self expression. Consequently children should daily be encouraged to write at least a few of their ideas and experiences. Writing is an essential aid to expression and should be taught so that it becomes a smooth and efficient means of expressing thoughts.

Choosing the Script

The English letters have their origin in Roman script. At present, English has mainly three kinds of scripts: (i) Print script, (ii) cursive script and (iii) rounded cursive script.

(1) Print Script:

In this, letter of a word are not joined together. The printed material is always found in this script. Therefore, it is named print script. This type of script has the following advantages.
(i) Since little children have no control over their hands, it is easier for children.

(ii) Beginners also find it easy.

(iii) It follows the maxim of ‘from easy to difficult’.

(iv) It has beauty, cleanliness and clarity.

(v) This is the script we find in books.

A.W. Frisby says, “Children read their Reader. These readers are printed. Reading and writing go together. Hence, writing in a matter in which their readers are written (printed) will be more convenient for them to learn this type of writing.

**Print script has certain disadvantages too. They are:**

(i) Some letters, e.g. ‘a’, ‘g’ sometimes appear alike in print script.

(ii) It cannot facilitate speed which is essential for good handwriting.

(iii) It consumes much time and energy.

(iv) At a later stage, it appears childish.

2. **Cursive Script:**

   It is also named as running writing. In it, letters of a word are jointed together by curves etc. All the disadvantages of print script are its advantages. It is uniform, rhythmic, natural and speedy. Its disadvantages are those which are advantages of print script.

3. **Rounded Cursive Script:**

   It is also known as Marion Richardson’s script. In it, only some letters of a word are jointed together. Since it combines some characteristics of both print and cursive script, it has the advantages and disadvantages of both the kinds of scripts.

   Keeping in view, the advantages and disadvantages of print script and cursive script, it is advisable that during the first two years, print script should be taught, as the handbook of suggestions for teacher says, “In the beginning, the symbols used should resemble those they (pupils) have been accustomed to see in print.” After that, cursive
script must be introduced. A pamphlet of British Board of Education says, “The end is to equip the individual with a final cursive handwriting, which is facile and legible.”

**Mechanics of Writing:**

Mechanics of writing include knowing how –

(a) To make letters of the right shape and size.

(b) To have proper spacing between (i) letters (ii) words and (iii) lines.

(c) To use capital letters and punctuation marks correctly.

(d) To have a fluent hand movement in writing.

**Stages and Methods of Teaching Writing:**

The teaching of writing English should go through the following four stages:

**1st Stage:**

The first stage is related to motivation. First of all, the pupils should be motivated to learn writing. The teacher, for this, can use various motivational techniques.

**2nd Stage:**

This stage is very important. This is related to penmanship i.e. giving knowledge of writing letters of the alphabet. There are four methods of teaching penmanship.

(i) Kindergarten method

(ii) Tracing method

(iii) Free imitation method

(iv) F.G. French’s method

**(1) Kindergarten Method:**

It is based on the principles of kindergarten method of education under this method, a kindergarten box is used. In it, there are pieces of wood or plastic of different shapes. By joining these pieces, the letters of English alphabet (both capital and small) can be formed. Pupils are given practice of constructing letters of the alphabet by joining those pieces.
(2) **Tracing Method:**

This method requires the learner to make movements over the printed or written letters with a pen or pencil held in his hand. The letters of English alphabet are either written in dotted lines or in a frame like this:

![Tracing Method Example](image)

The teacher writes letters in this manner in the notebooks of students and asks them to pass their hands over the letters. Exercise books for this are also available.

(3) **Free Imitation Method:**

Under this method, pupils copy in their notebooks the model letters written by teacher on the blackboard or notebooks or written in books. Bell suggests that the model letters should be written on flash-cords. Since students imitate or copy the model letters with the help of their own imagination and retention power, it is called free imitation method.

(4) **F.G. French’s Method:**

French has suggested that beginners should not be taught writing letters straight, instead, they should be first taught to do some hand movements either with finger in a tray of sand or with chalk on a brown paper like these:

![French's Method Example](image)
After had movement practice, the following procedure should be followed.

(i) **Teaching stokes:** Pupil should be asked to draw these strokes.

![Strokes Diagram]

From these strokes they should be lead to write these words: A, E, F, H, I, K, L, M, N, T, V, W, X, Y, Z, i, 1.

(ii) **Teaching Circles:** Pupils should be given some practice in drawing circles:

![Circles Diagram]

These circles lead to these letters: e, c, o, Q, G.

(iii) **Teaching combining strokes and circles:** Now stokes and circles should be combined.

![Combined Diagram]

These lead to letters: b, d, p, q, D, B

(iv) **Teaching Curves:** Students should be asked to make curves like these:
This should be followed by teaching these letters: s, j, g, j

(v) **Teaching combining strokes and curves:** The strokes and curves should be combined like this:

These lead to the letters as: b, m, n, r, u, f, R, U.

One point of note is that the small letters should be taught first and should be taught according to their shape:

French has grouped them as follows:

```
 o j c e d q g p
 m n h r f j l i y u
 w v x z k

s
```

This method has all those merits and demerits which free imitation method has because in this method, too, the learner imitates the teacher.

**IIIrd Stage:**

In this stage, writing words and sentences should be taught. Side by side, emphasis should be given to beautiful and uniform writing.

**Handwriting: Qualities**

A good handwriting is composite of some characteristics. To know about the characteristics of good handwriting is an interesting process. Let us, therefore, visualize the main characteristics of good handwriting. The following are the characteristics of good handwriting.
Distinctiveness. Every letter of a word is distinct. It is clearly visible. It can be recognized easily by every type of learner of the language. Thus each letter is joined with the neighbouring letters of a word.

Proper Spacing. There is a proper space between the different wards of a sentence. There is a proper space between the different words of a sentence. Whenever a new paragraph is started, some space is left. That is maintained throughout the writing. Some space is also left while starting a new sentence.

Size of the Letters. The size of the letters is according to the age group of the learner. It is neither too big nor too small. The some proportion is kept in the whole writing.

Simplicity. A good handwriting is simple to look at. The different letters of a ward are no unnecessary strokes.

Straight Lines. Good handwriting runs in straight lines. That is all parallel to the top of the page.

Position of Letters. While writing, the position of letters is very important. The letters may be in erect positions. They may also be in forward slant positions. Backward slant positions are to be avoided.

Good Punctuation Marks. Good punctuation marks are also essential in writing beautifully. The punctuation should be correct. The shape of different signs of punctuation marks should be beautiful. They can make the beauty of writing.

Rationale of the Study

In the age of advance education composition, calculation and communication on paper alone is an unimpoverished, fractional and increasingly outdated concepts and practice for thinking and communication. To build on the accomplishments of real learning some advance methods must be in place. Testing now includes testing of errors, concepts, illustrations, explanations and examples, etc. Teaching includes remedial teaching, team teaching and clearance of concepts.

Remediation is entering into almost all subjects. It is supposed to be used as a tool where and when considered useful. Self-instructional material also helps the students to
learn freely, without any mental pressure. We want to cope with the challenges of the rapidly changing society and make use of new opportunities offered by diagnostic testing and remediation with the help of self-instructional material, it provides educators, teaches and student all the necessary equipments. The most important competence building in this field is the development of self-instructional material.

In this post modern era most of the developed countries use ultra developed and upto dated teaching methods and material. If we want to compete that scenario; we must develop the educational system according to the needs, challenges and requirements of our country. Today we see a lot of discrepancies in our educational system as well as general system. All this provide a stimuli to the investigator to know errors in reading and writing in English language at secondary level and to develop a self-instructional material to eradicate the errors and suggest some remedial programme so that we can compete with post modern developed world of education. In the present time of ICT then our educational system is faulty which leads to errors in reading and writing and communication skills. How will our students be able to compete and go ahead with the world. Hence all this motivated the investigator to find out the errors and lacunas of English language.

**Statement of the Problem:**

“Diagnostic Testing and Remediation in Reading and Writing Components in English with the Help of Self-Instructional Materials at Upper Elementary Level”.

**Operational Definitions:**

**Diagnostic Test:**

A test used to diagnose or analyse; that is to locate individual specific areas of weakness or strength, to determine the nature of his weakness or deficiencies, and wherever possible to suggest their cause. Such a test yields measures of the components or subparts of some large body of information or skills. Diagnostic achievements are most commonly prepared for the skill subject.
Testing:


Remediation:

Remediation is a process that intends to remedy a situation; that is to teach students what they should have learned. For example, reading classes at the High school or college level are considered remedial because most of the students learn to read in elementary school. The success of remedial education depends on several factors, including the teachers approach and expectations, the instructional material used and the student’s motivation to learn.

Self-Instructional Material:

A device with the instructional content or function used for teaching purposes, e.g. books, textbooks, supplementary reading material, audio and other sensory materials, programs for computer managed instruction, instruction sheets, and packaged sets of material for construction or manipulation.

Upper Elementary:

The stage of formal education in India, primarily concerned with providing basic education and usually corresponding to six to eight grades.

Objectives of the Study:

1. To prepare a diagnostic test in reading and writing components in English language.

2. To diagnose the errors in reading and writing components with diagnostic test in English language.

3. To develop a self-instructional material for reading and writing components in English language.

4. To see the impact of self-instructional-material[SIM] on the error of reading and writing components.
5. To study the effectiveness of self-instructional material in comparison with traditional teaching.

**Hypotheses:**

1. Self-instructional material would reduce the errors in reading and writing components effectively.
2. There is significant effect of self-instructional material as comparison to traditional teaching.

**Design of the Study**

The experimental method is found to be the most appropriate design for the present study. The pretest-posttest design will be used for the experiment. The subjects for the experiment are the students learning in grade VII of the schools in Sonipat district. Sufficient number of students were identified as subjects.

The experimental variable and dependent variable are the self-instructional material and diagnostic testing and remediation in reading and writing in English respectively. The experiment was conducted by providing self-instructional material and testing achievements by diagnostic testing. In the control group subjects were taught with the conventional method which is confined to the textual factors by the teacher. In the beginning of the experiment, the pretest using the diagnostic test prepared by the investigator in English was administered to the student in both groups and at the end of the experiment. The same test was conducted towards the posttest.

**Tool Used for Collection of Data**

A diagnostic test was prepared for assessment or to check the errors and weakness of students. Diagnostic test in English was constructed and standardized. To remediate the errors of experimental group a self-instructional material was developed by investigator. For assessment of personality and intelligence of the students M.P.I. by S. Jalota & S.D. Kapoor and R.S. Tandon’s Samuhik Mansik Priksha was used.
Sample

Sample for the experiment adopted for the study, experimental and control groups of students were selected from schools. The total sample consisted of all the students studying in VII standard in selected schools was 310 in total as in cluster form. To select the sample lottery system of random method was used for schools.

Statistical Technique

The pretest scores and the posttest scores of the experimental and control groups were consolidated for statistical along with the scores of intelligence, personality, diagnostic test. Since the regression analysis was done with the intelligence and personality. As the aim of the study was to test the effectiveness of the self-learning materials, paired ‘t’ test was used for pretest and posttest scores.

In order to determine the influence of extraneous variables like intelligence, personality on diagnostic testing and remediations achievements multiple regression analysis was computed.

Delimitations of the Study

It is presumed that the problem under investigation is very appropriate and essential for improving the existing learning. The study proposes to identify the areas, nature and extent of difficulties in the English language encountered by the students at secondary school level. The study also throws light on various aspects of remediation that may be useful for curriculum planning, textbook writers, teaching community and students. The study attempted to identify difficult areas in reading and writing in English and to prepare remedial material on the identified areas. Effectiveness of remedial material was tested using pre-test using pre-test, post test experimental design.

Despite the fact that all possible precautions have been taken arrive at valid and reliable results, certain limitations have crept into the study.

1. The experimental part of the study was limited only to secondary school of Sonipat district.
2. The self-instructional material for remedial treatment was prepared only for reading and writing components in English language at secondary level.

3. The study is limited to VII grades students in English language.