Chapter II

**Self Learning Strategies - An Overview**

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SELF LEARNING STRATEGIES-
AN OVERVIEW

2.0 INTRODUCTION

For years, educators have attempted to find means to individualize instruction. At present, individualized learning material is available in various forms, and through so many channels. It endorses the current thinking of learner being central to instructional process than anything else. Self-learning provides for learner decisions on what to learn, when, how, how much and also provide for a complete enriched as well as retrievable and amenable setting and learning resources. (Lakshmi, 2003). An overview of certain important self-learning strategies are mentioned below.

2.1 PROGRAMMED LEARNING MATERIAL

Programmed learning technique or programmed instruction is defined as an arrangement of sequential experiences leading to proficiency in terms of stimulus response relations. It is a process to increase the rate and depth of learning by administering sequence of instructional material in very small steps to learners (Skinner 1954).
Programmed learning takes into account the individual differences in student by different instructional procedure. The student proceeds at his own speed. This method neither forces the weaker learners pace nor obliges the bright learners to slow down his own pace.

The operations involved in programmed learning technique are as follows.

1. The subject matter is logically sequenced and broken into small steps.

2. A small bit of meaningful segment of information is presented to the learner.

3. The learner reads the frame and is required to make a response to the information by writing a response.

4. By immediate feedback system he is informed as to the correctness of his response. If he is correct his response is reinforced and if he is wrong, he may see the correct response.

The learner is presented with a second frame and the stimulus response reinforcement cycle is repeated until the series of several frames present a complete programme.

2.1.1 Styles of Programming

Several styles of programming have been developed by researchers, classroom teachers and commercial establishments in the U.S.A., the U.K.
and Russia and other countries of the world. The main styles of programming are:

1. **Linear or Extrinsic programming:**

   Linear programming is based on programming ideas put forth by Skinner (1955). The main idea underlying this type of programming is that the learning process is strengthened if the correct response to a stimulus is immediately reinforced, incorrect responses when not reinforced, gradually drop out, leaving behind only the desired responses. In a linear programme, the subject matter is divided into quite small pieces of knowledge, known as frames. Each learner is taken through these frames, in small steps and in the same sequence, along a simple path or line, student’s response to the first frame is immediately confirmed, before he goes to the second frame. The correct response to the previous frame appears along side the forth coming frame.

![Figure 1: Diagramatic representation of Linear Programme](image)

2. **Branching or Intrinsic Programming:**

   The branching or intrinsic approach to programming was devised by Crowder (1954). Contrary to Linear programming which is based on a specific
learning theory, intrinsic programming device is based on the fact that “human learning takes place in a variety of ways and that these ways vary with the abilities and present knowledge to different students, with a nature of subject matter and with a number of interconnections between the source of variation and with other sources of variability of which we are not even aware.” (Stones 1968).

The student is given the material to be learnt in logical units. Each material unit is followed by multiple choice answer which appears correct to him. According to the item which he has chosen he is directed to different parts of the programme to check his answer. If his answer is correct, the student is put on the main line of the programme the same way as it happens in a linear programme. If he fails to choose the correct answer, the preceeding unit of information is reviewed, the nature and cause of his error explained and he is either returned to the original unit of information, or branched along a subsequence which gives him additional information, to correct himself on a re-test before he is made to return to the main line.

**Structure of Branching Programme**

In this strategy content is not presented in small steps but whole unit or concept is presented. The size of step is comparatively large. The size of step may be paragraph or two or whole page. The learner perceives the whole concept and tries to comprehend. He has not follow the sequence pages. Therefore branching programming text is known as scrambled text. This type of text consist of two types of pages - (1) Home pages and (2) Wrong pages.
Home page: The page on which the content unit or concept is presented and followed by multiple choice question is known as home page. Its purpose is to impart new knowledge. The multiple choice questions helps in assessing the attainment of the learner and simultaneously helps in diagnosing the weakness or difficulty of the learners. Thus the home page involves four aspects like teaching, response, diagnosis and re-inforcement.

Wrong page: If the learner chooses a wrong response he has to move to another page where he would get further clarification and remediation for the concept so that he may understand the concept and he would be directed to go back to home page.

The arrangement of home pages and wrong pages in branching programming can be represented as follows:

![Diagram](image)

Figure 2: Diagramatic representation of Branching Programme
The diagram indicates that content consist of four units which are to be presented on page 1, 6, 3 and 7. There will be four home pages in the programme. Each wrong page provides the remediation for two units. Thus there will be four wrong pages 2, 4, 5 and 8.

3. **Mathetics**

Mathetics is the systematic application of reinforcement theory to the analysis and reconstruction of learning and these complex behaviour repertories usually known as “Subject-matter Mastery,” “Knowledge and Skills”. Mathetics is a training system which provides the programmer with a set of procedures with which to diagnose training problems.

The ‘mastery of subject matter’ is the main focus of mathetics, therefore it gives emphasis on prescription. The prescription involves three principles:

a) **Principle of Chaining:** The chain of stimulus and response is helpful in developing the ‘mastery of content’ and determines its structure. The element of content are presented in stimulus and response form. The chain is formed by arranging stimuli and responses, if a response works as stimulus for next stimulus. It has been shown as,

\[ S_1 \rightarrow R_1 \rightarrow S_2 \rightarrow R_2 \rightarrow S_3 \rightarrow R_3 \rightarrow S_4 \rightarrow R_4 \]
b) **Principle of Discrimination**: The discrimination situation of learning is generated by providing different stimuli have the different responses. Every stimulus and responses are independent to the other. It can be shown as,

\[
S_1 \rightarrow R_1 \\
S_2 \rightarrow R_2 \\
S_3 \rightarrow R_3
\]

c) **Principle of Generalization**: The generalization is a crucial situation of learning. It helps in achieving higher cognitive objectives of learning. In this type situation a group of stimuli emit single response. It can be represented as,

\[
\begin{array}{c}
S_1 \\
S_2 \\
S_3
\end{array} \rightarrow R
\]

### 2.2 PROGRAMMED TUTORING

According to Ellson (1960), the principal developer of programmed tutoring, "it is a one-to one method of instruction in which the decision to be made by the tutor are programmed in advance by means of carefully structured printed instruction." In a typical programme the tutor and student sit down together to go through the lesson material. The teacher's book has the answers to the exercises, the student's book doesn't.
Programmed tutoring uses what might be called 'brightening' as opposed to the 'feeling' or gradual reduction of prompts used in conventional linear programmed instruction. In brightening the item is first presented in a relatively difficult form. If the learner response correctly he or she is reinforced and goes on to a new item. If not, a series of increasingly clear prompts or hints are given. The sequence of prompts would continue until the learner gives an acceptable response. Then reinforcement would be given. The idea is to lead the student toward the solution with brightening hints but to avoid actually giving the correct answer.

**Application and utilization of programmed Tutoring**

Programmed tutoring combines the qualities of programmed instructions with the warmth and personal attention that only a human tutor can add. The tutor may be a teacher, a parent or another student (peer tutor). Almost anyone can be trained as a tutor because the sequencing of the material and the tutor's response are carefully programmed into the lesson by the designer. Thus it is particularly attractive for areas in which qualified teachers are lacking.

Mathematics and Reading have been the most popular subject areas for the application of tutoring. These subjects lend themselves to this method because of their high degree of structure. Also, being very basic skills, they are frequently the targets of remedial or compensatory education programmes the milieu which volunteer tutoring projects are often mounted.
2.3 PERSONALIZED SYSTEM OF INSTRUCTION (PSI)

"The Personalized system of instruction (PSI) is the method in which each student is served as an individual by another person, face to face and one to one" (Guptha 1985). In a PSI course students are provided with a written study guide which is composed of a number of separate sections or units. For each unit of the course there is usually an introduction and a list of objectives. These are followed by a suggested procedure for achieving these objectives provided or referring to particular parts of text books, problems, exercises and practical work may be included to help the students achieve the objectives and there may be opportunities for students to test themselves by the use of self tests to help them decide whether they have mastered the content of that unit. When students believe they have mastered the unit, they can present themselves for a test during one of a number of scheduled test periods. During these periods students may take tests, study on their own or with their peers, or ask for tutorial assistance. The test are usually quite short, perhaps taking 20 minutes to complete.

When students have completed a test they take it to a proctor or tutor who marks it immediately and gives feedback back to the student on his or her performance. If students demonstrate mastery of the unit through passing the test with very few errors they then proceed to the next unit. If they have been unable to demonstrate mastery, they are instructed to study the unit further and retake an alternative version of the test.
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The key elements of the system are the requirements for progressive mastery and the self-pacing which necessarily follows. Students cannot progress unless they can demonstrate that they have mastered each unit.

As different students learn at different rates, the course proceeds at different rates for different students. Students are reinforced in their learning by receiving immediate feedback on their performance and they are not penalized if they are not successful at any stage. They can repeat the test until they are successful and the number of attempts does not count against them.

2.4 INSTRUCTIONAL MODULES

A module is self-contained, self-pacing and self-learning by nature, but a teacher has a positive role to play in its use. A module contains three co-ordinate basic elements of instruction: a) objectives b) learning activities and c) evaluation. It is in these characters that the module differ from other instructional materials, either do not have all the three elements ie. Objectives, learning activities and evaluation or if they do have, then the elements themselves are not co-ordinate. The philosophy behind instructional modules is based on the generally accepted fact that each learner is unique and is different from others in background experience, inherent qualities, habits and leaning styles and as such should be allowed to grow and develop to the fullest potential. Modular approach is an attempt to make the instruction individualized so that the student learn at his own pace according to his interest, capabilities and capacities (UNESCO Handbook 1978). Modular approach appears to be an
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effective and economical way of developing specific knowledge and skills with minimum of teachers direction and supervision.

The modules can be prepared in different forms. They can be in written from or in the from of slides, tapes, pictures etc. One of the unique characteristics of the modules is that they can be subdivided into smaller module units to meet the needs of each individual student or group of students. In other words they can be designed for individual or group study or both. Since a module often consist of self-contained modular units, its component can be used singly or in combination with others in accordance with the varied needs and interests of the students. One of the important characteristics of a module is that they are meant for self study and self-evaluation by a student or a group of students.

2.4.1 Essential features of a module

1. It should be self-contained. The module should be self contained so as to enable the learner to achieve the objectives with minimum assistance from the teacher and with out the need for using extraneous materials. The presentation of learning activities, pre tests, formative tests, post tests, assignments, answer keys etc. should be provided in the module.

2. The objectives and learning activities should be properly sequenced.

3. The learning activities should make the best use of local community resources
4. The subject matter should be correct, concise and presented in an interesting manner.

5. It should provide opportunities for the learner to interact with other students and the community.

6. It should be interesting to the learner.

2.4.2 Components of a module

1. **Introduction:** The introduction should give the background and rationale of the module as well as target population for whom the module has been developed.

2. **Overview:** The overview introduces the learner to the theme of the module, its purpose, structure, organization and uses. It should give an overall impression of the module and its content.

3. **Instructions to the users:** This component should include clear instructions to the learners as to how this should proceed and what he has to do after each step or stage. This is an important component of the module as it would help the learner in self-learning. Most of the instructions are relating to the different components of the module such as how to take pre-test, formative test, summative test and how to undertake learning activities etc. can be given in this section. Some of the specific instructions related to evaluation and learning activities can also be given at the appropriate stage.
4. **Pre test**: The pre test is taken by the learner at the beginning. This helps to find out the level of knowledge and skills that the learner already has. This helps the learner to find for himself the entry points in the module. If the ability of the learner is up to the criterion reference or to standard fixed by the teacher or the module developer, he may be advised to skip the module and go on to the next one. But if the level of achievement is below the expected, he is asked to study the module.

5. **Objectives**: The instructional objectives of the module should be clearly stated. They should specify the expected learning outcomes in terms of behaviours. A behavioural objective should be stated clearly and precisely so that the learner would know what the learning outcome of a given activity will be.

6. **Learning activities**: Learning activity should be provided in a planned and sequenced manner. These activities enable the learners to develop behaviour in a pre-determined direction.

7. **Formative tests**: Formative tests are given at the end of each learning unit or learning activity. The formative tests help the learner to know whether he has achieved the expected behavioural outcomes. If he has not reached the expected mastery level he should go through the learning activities again in consultation with the teacher.
8. **Summative evaluation**: The summative evaluation is done with the help of a post test. The post test helps in knowing how well the learner has attained the expected learning outcomes. In some modules the pre-tests and the post tests are the same but it is advisable to have two parallel versions of the same test.

2.4.3 **Developing a module**

The following are the steps which can be used for developing a module

1. Identify the target group.

2. Identify learning needs of the group

3. Decide terminal behaviour

4. Identify entry behaviour

5. Assessment of entry behaviour through pre test.

6. Teaching frames including objectives, learning activities, formative evaluation and summative evaluation.

7. Try out of the module

8. Revision and finalisation of the module.
Flow chart for the development of a module can be represented as follows:

**Figure 3: Flow Chart of Module Development**

2.5 **COMPUTER ASSISTED INSTRUCTION (CAI)**

The computer is one of the most important and outstanding inventions that has made an increasing and powerful impact on the working methods of
research and development in the field of science and technology and has revolutionized everyday social life in the advanced countries of the world. Computers are being used in the areas of transportation, communication, national defense, food material production, scientific research and education.

2.5.1 Types of computer Assisted Instruction system

Computers are being increasingly employed for classroom instruction as also for individualized and distance education. It can be done in one of the many different modes of instruction, some of them are:

- Tutorial mode
- Drill and practice mode
- Simulation mode
- Discovery mode
- Gaming mode

In the tutorial mode, information is presented in small units followed by a question. The student’s response is analysed by the computer and an appropriate feedback is provided. This is similar to programmed instruction. As in programmed instruction the information may be given in a linear fashion or in branched pathways.

In the drill and practice mode, the learner is provided a number of graded examples on the concepts and principles learnt earlier. The idea is to develop proficiency and fluency through doing. All the correct responses are
reinforced and the incorrect responses are diagnosed and corrected. The
computer continues the drill until mastery is achieved by the learner.

In the simulation mode, the learner is presented with scaled down
simulated situations bearing correspondence with the real situations.
Simulations are made to avoid risk, save money and conserve time. Simulation
of an aeroplane in flight, an experiment on titration, a nuclear reaction, collision
of two bodies etc. are good examples of the simulation mode.

In the discovery mode, the inductive approach to teaching and learning
is followed. The learner is encouraged to proceed through trial and error
approach, ie. by solving a given problem, realizing where and how he/she went
wrong, trying again and finally solving the complex problem.

In the gaming mode, the learner is engaged in playing opposite the
computer or opposite another learner. The extent of learning depends upon the
type of the game. Games on spelling, names of places and general knowledge
are some examples of the gaming mode. (Kumar 1997)

2.5.2 Development of Computer Assistant Instructional material

Any educational software development specially for self learning
purpose has to consider aspects such as content of the software packages to be
designed, aims and objectives of the programme, production and validation of
the programme, field try out and modification, and final product. The flow
chart of development of computer assisted instructional package can be represented as follows (Balasubramanian 2001).

Figure 4: Flow Chart of Development of Computer Assisted Instructional Material
2.6 COMPUTER MANAGED INSTRUCTION

The Computer Managed Instruction (CMI) or Computer Managed Learning (CML) is the one which enhances learning by providing automated management of elements of the individual student learning environment. Computer Managed Learning Systems are usually conceptualized and implemented as aids to teachers in their task of controlling and managing the content, pace sequence and method of learning of the students in their charge. More rarely CMI systems attempt to place the locus of control of learning closer to individual students. Thus using the computer to enhance the students power to understand and develop their own learning according to their own purposes.

The facilities provided by a fully fledged CMI are usually organized around three major sets of functions. Firstly the computer is able to capture data about the learner, to generate and mark objective tests being used for diagnostic or assessment purpose, to accept the results of tests marked subjectively by teachers and to analyse the performance of these tests. Secondly the computer is able to provide feedback to the individual student on test performance and acting on decision rules provided by the course developer, to steer or route the student through an individualized curriculum. Thirdly the computer is able to store and update records of each student's performance on the course and report in summary form on the general progress of students to the teacher or trainer, course developer or administrator.
2.6.1 Feedback and Routing

It is possible to divide CML system designers into two groups. Those who see the teacher manager as the prime beneficiary of the system, and those who see the individual student as the person upon whom the system is centered and for whom the system exists. For the latter group a CML system is of little purpose unless at the very minimum it provides feedback to students on their test performance. Typically CML system used in this way will provide the student with an item by item breakdown of their performance on objective tests. The marks gained are presented for each item in turn and automatically generated comments are printed. Sometimes these comments are limited to cryptic statements of “correct” or “incorrect”. More often course designers provide detailed statements which attempt to provide remedial learning, for example by indicating why the particular distractor chosen by the student in an objective test item is incorrect.

A second level of feedback can be generated if the test has been structured so as to examine the student’s competence in a number of different areas of knowledge or levels of skill. Test items can be costed so that the student score on that item is allocated to number of sub sections, each of which can measure understanding of some significant content area or give an indication of competence in some particular cognitive skill. Feedback comments can then be generated on the basis of student performance on these sub sections of the test.
A third level of feedback is brought into play if the computer makes reference to the student's personal records during the comment generating process. Test scores can be cumulated across several tests, current performance can be compared with past performance, trends identified and prospects deduced. Feedback generated after this kind of analysis can be extremely helpful to students as they try to place their current performance in the context of their own and other student's progress throughout the course as a whole. This is especially important if students are working at their own pace. If the computer keeps records of the dates of completion of learning tasks and submission of assignments, then the feedback comments can reflect the course designers wishes in relation to the student's progress through the course, congratulating those on schedule and encouraging or sanctioning those falling behind a reasonable rate of progress.

2.7 INTERACTIVE VIDEO

Interactive video can be defined as the presentation of video and audio information according to the response input made by the viewer. The presentation of images and sound is via a television monitor, which is usually part of a self-contained user-station with micro computer, video source, and input device. The source of video can be one of several devices such as videodisc, videotape or compact disc. The response input can be achieved using one, or a combination of several devices, such as numeric keyboard, alphanumeric keyboard, touch screen, light pen, mouse, tracker ball and/or voice recognition systems.
Interactive video creates a multimedia learning environment that capitalizes on the features of both instructional television and computer assisted instruction. It is an instructional delivery system in which recorded video material is presented under computer control to viewers who not only see and hear the pictures and sounds but also make active responses with those responses affecting the pace and sequence of the presentation.

The video portion of interactive video is provided through video tape or videodisc. Videodisc can provide colour, motion and sound. The image can be presented in slow motion, fast motion, frame by frame or single frame equivalent to a slide or filmstrip display. The audio portion of a videodisc may occupy two channels making possible two different narrations with any specific motion sequence. Many of the features of videodiscs can be obtained with currently available videotape systems at a lower cost.

The interactive feature of interactive video is provided through a computer. Computers have very powerful decision making abilities which video players lack. Combining these technologies means the strengths of each can compensate for the limitations of the other to provide a rich educational environment for the learner. Interactive video is a powerful practical method for individualizing and personalizing instruction.

A variety of levels of interactivity are available, ranging from essentially linear video to learner-directed sequencing of instruction. The goal of most developers of interactive video is to provide fully interactive response
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- dependent instruction featuring embedded questions, response feedback and branching within the lesson. In addition, student response histories can be used to affect instructional decisions.

2.8 MULTISENSORY INSTRUCTIONAL PACKAGES (MULTIMEDIA KITS)

A multimedia kit is a collection of teaching/learning materials involving more than one type of medium and organized around a single topic. The kits may include filmstrips, slides, audio tapes, recordings, still pictures, study prints, overhead transparencies, maps, worksheets, charts, graphs, booklets, real objects and models.

Thus multimedia is the synthesis of many medias as shown in the following figure (Kumar 1997).

![Diagram of Multimedia Kits](image)

Figure 5: Diagramatic representation of constituents of multimedia kits (Kumar 1997)
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Some multimedia kits are designed for use by the teacher in classroom presentations. Others are designed for use by individual students or by small groups (Robert 1989).

Because of their multisensory activities, instructional packages are very motivating to slow learners, who usually require repetition and varied approaches through many senses before they are motivated to acquire and retain new knowledge and skills. The tape, written script, tactual and kinesthetic materials may be used over and over again until the youngster masters the objectives of the package. Each instructional package focuses on a single objective or concept to be taught. This isolated goal is well suited to the learner who often finds it difficult to concentrate on more than one thing at a time. Conversely, unless the material in the package is extremely challenging, it is unlikely to interest high achievers who quickly become bored by repetition.

Instructional packages are especially appropriate to those youngsters who require structure. The step by step procedures provide clear sequenced directions that are repeated in a variety of ways until success is achieved.

Students who prefer working alone usually enjoy this multisensory method immensely. They can take the materials to an instructional area in the room, to the library or even to their homes to work on intensively and without the distractions of the classroom and their peers.

Sound in the form of recorded voice, music, or other taped effects can be provided or modulated through earphones or a cassette player.
All perceptual strengths are appealed to by definition, instructional packages include visual, auditory, tactual, and kinesthetic activities. Even when a student has only a single perceptual strength, he or she is likely to learn and to complete objectives because everything that is taught is introduced and reinforced through the four major learning senses. Generally speaking, instructional packages are ideal for slower students who require structure and who can be sufficiently motivated by their multisensory activities to progress independently and successfully.

2.8.1 Elements in Multisensory Instructional Packages

All multisensory instructional packages have certain basic elements in common. They are,

Fig. 6: Diagramatic Representation of Basic elements of Multisensory Instructional Package
Focus on a single concept

In a package, the students know precisely what the focus is and can decide if it is appealing as a new type or useful in reinforcing a previously learned skill. The cover and title always reveal what the package contains.

Use of maximum senses

At least four senses are used to learn the contents. A typewritten script that is repeated by the taped voice of the teacher gives clear directions to students to construct, manipulate, piece together, write, draw, complete, play and in several ways use their sense of touch and their entire bodies in kinesthetic activities related to the package's objectives.

Feedback and evaluation

Tests are included in the package and students may respond by writing, typing, or showing results. Correct answers and responses may be checked as the items to be learned are completed. The directions allow for immediate feedback and self evaluation. Mistakes can be corrected through repetition of the taped and printed directions and by comparing the student's answers with ones prepared for the games and activities.

Individual learning styles

Only the teacher and the student know how well the youngster is doing. Self-image and success are enhanced as progress increases without peer
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competition for the slower students. The multisensory approach, colourful materials and packaging, working alone, motivating choices, selection of when, where and how, and the ability to move about and to eat if necessary make the instructional package an effective one for many students.

2.8.2. Learning Style Characteristics to which Instructional Packages Can be Accommodated.

Instructional packages can be taken to wherever the light, temperature and design at the physical environment are exactly as the student wishes them to be. Because instructional packages are portable and may be worked on alone, the choice of where to use these resources belongs to the student, who may selected the amount of light, the degree of temperature and the kind of design in which he or she feels most comfortable.

Motivation is often developed or stimulated through these packages because of,

1) the choice that students have in their selection or in the topic that will be studied.

2) the way the packages accommodate to the environmental and physical elements of learning style

3) the control that youngsters exercise over the amount and pace of learning in which they engage at a given time and
4) the academic progress that is virtually assured by the package's multisensory repetition.

Three other important aspects of learning style – intake, time of day and mobility are accommodated by instructional packages.

It is easy to take advantage of intake while working independently on an instructional package. Raw vegetables, nuts, rasins or other nutritious foods can be available in a bowl where the youngster is working, provided that rules have been established beforehand for access, eating, discarding and the care of the premises.

Packages may be used at any time of the day or night without interfering with others and without interrupting other scheduled activities. Therefore, students can select the most appropriate and effective time to complete a package.

Many growing youngsters cannot sit still or work in one place for a long time. Packages allow total mobility. A student may take the package with him, spread it out, walk away, then come back, sprawl, kneel, or just sit. Since the activities themselves provide action and movement, mobility is well served by this method.

2.9 CONTRACT ACTIVITY PACKAGES (CAP)

Contract Activity Packages (CAPs) are a form of individualized learning and independent study in which students are responsible for planning
what is to be learned, how they will learn it and for identifying how that learning is to be assessed. They may in this process draw upon self-learning materials but this is not an essential element of the approach. A learning contract is prepared by a student who then shows it to a teacher. Negotiation on the details of the contract takes place between the two parties and when they agree on the final version, the student proceeds to study in the ways indicated in the contract document. Study may take any form whatsoever from participation in conventional classes to individual projects, community placements or other forms of experimental learning. Assessment of learning takes place in the manner specified in the contract using the criteria which have been agreed.

Contract activity packages may be used as one component of a subject, as a whole course, or for an entire programme of study for a degree. The key factors in learning contracts are that individualization occurs through students taking responsibility for directing their own learning and that such learning is validated through a process of mutual negotiation which leads to a contract to which both parties are bound. (Berte 1975). A scheme of learning contracts can be implemented in a variety of ways, with varying degrees of rigidity. Some practisioners stress the need for renegotiation of contracts on demand, others for the building of contracts through a sequence of short draft contracts before setting longer ones in order to assist students to develop the skills necessary for planning their own learning.

Knowler (1975), one of the main proponents of learning contracts has described their use in situations in which these are used as a substitute for
teaching a particular course. He draws attention to the conditions which must surround the introduction of learning contracts to students unfamiliar with the idea. The first stage is to set a climate conducive to self-directed learning. These range from individual project work which is now common place in most course to student participation in research and the all embracing approach which has developed in western Europe since the early 1970’s under the title of project orientation (Cronwall and Schmithals 1976).

Today there has been little research directed towards assessing the impact of learning contracts and other forms of student-planned learning. There is a fundamental difficulty in conducting comparisons between the outcomes of these approaches and those of conventional teaching. They are pursuing different aims. The proponents of student planned learning do not regard this primarily as a means of making the teaching of present course more effective, although this may result through students becoming more committed to learning those things, which they have identified for themselves.

One of the main aim of student planned learning is to involve students more fully in their education so that they may know what it is they study and develop the skills, which they need in learning once they have departed from the educational institution. In conventional institutions these ideas are having a modest impact and elements of contracting or student planning in some advanced courses can be observed.
2.9.1 Basic Principles of Contract Activity Packages

According to Knowler (1975), the basic principles of contract activity packages are,

2.9.1.1. Simply stated objectives

Simply stated objectives that itemize exactly what the student is required to learn.

2.9.1.2 Multisensory resources

Multisensory resources that teach the information that the objectives indicate must be mastered.

Students are given a list of available resources that they may use to learn the information required by their objectives. The resources should be multisensory, visual materials such as books, films, film strips, study prints or transparencies auditory materials such as tapes, records, cassettes, or movies, tactual material such as task cards, learning circles and games and interesting kinesthetic learning experiences. The resources are suggested sources of information, but the students are free either to use them or to identify other materials through which they may learn. If students use resources that have not been listed in the contract activity package, they must identify them by direct reference when demonstrating the knowledge they have gained. Because youngsters are free to select the materials through which they will learn, the
choices are called "resource alternatives". It is important of course to help students to recognize their perceptual strengths so that they use materials that respond to their strongest sense to introduce information and materials that respond to their next strongest sense to reinforce what they have learned.

2.9.1.3 Series of activities

Series of activities through which the information that has been mastered is used in a creative way. When experimenting with alternatives to CAP’s we found that if we add two procedures to the existing system, we could increase student ability to remember information that has been learned by approximately 20%. The first was a series of activities in which students were required to use the information they have learned in a creative way. Based on Mager and Mc Can’s studies completed in 1962, we permitted students a choice of the activities they would complete. This section of the CAP is thus called "activity alternatives". The second section that tends to increase retention for peer-oriented students is called "reporting alternatives".

2.9.1.4 Series of alternative ways

A series of alternative ways in which creative activities developed by one student may be shared with one or more but no more than six to eight classmates. When students engage in a creative activity they often want to share it with their peers. The sharing serves as either an introduction or a re-inforcement of the material to the person who is being shown the activity but it also provides the person who created it, reinforcement and a sense of
accomplishment. This sharing or reporting increases retention of what has been learned and in addition serves as a self-fulfilling experience.

2.9.1.5 Small group techniques

Individualization does not imply that children must work or learn in isolation. Rather it suggests that each student’s learning style be identified and that each learner permitted to learn in ways that complement his or her style. Since many students prefer to work in small groups or in a pair and since others evidence this performance when their small group techniques are added to each contract Activity package, so that sections of the CAP that are difficult may be attacked by a few students working together.

Although the small group requirements are not mandated for every youngster, they do serve to act as an aid for students who find it difficult to complete intrinsic tasks or to learn difficult concepts by themselves.

2.9.1.6 Pre-test, self-test and post-test

Each CAP has a single test attached to it. This test may be used to assess the student’s knowledge of the information required by the CAP’s behavioural objectives before the CAP is assigned, so that students who have already mastered those concepts and skills need not be burdened with the same subject matter again.

The assessment device also may be used by the students to identify how much of the information required by the behavioural objectives he or she
has already mastered and how much remains for the student to learn after he or she completes the CAP self-assessment builds "ownership" of the contract and its objectives.

2.10 SELF-DIRECTED LEARNING SYSTEMS (SDLS)

The Self-Directed Learning System was developed at the University of Texas Health Science Center, Dental Branch (UTDB) at Houston. Through the Co-operative efforts of UTDB administration faculty and the director of instructional development, the SDLS curriculum was initiated.

Formerly, courses were conventionally developed and presented by individual departments. Now there are integrated teaching topic committees involving twenty five departments each have converted the 180 semester-hour curriculum to 152 modules. These four year's worth of modules are grouped into eighty topics and arranged under 20 phases. The faculty is scheduled in time blocks to be available to students are guided by performance objectives stated in the modules. The self-directed curriculum allows student's self-pacing, with time guidelines and faculty supervision.

This modular teaching system maximizes the use of human resources as well as material resources. A basic medium for distributing learning resource is colour television. The UTDB system has 180 viewing locations, each of which is connected to the electronic switching control unit. Information is
therefore at student's fingertip in the library, in the classroom, halls, clinics, laboratories and special study room.

UTDB does most of its own media production, as well as its instructional writing. Multimedia instructional material is included in the modules, and for convenience, different media formats are often converted to videotape. Microfilm, models, transparencies and printed handouts round out the material packets. Instructors provide small-group and one-to-one instruction. Comprehensive validated study guides developed by participating faculty members accompany each module.

2.11 THE AUDIO TUTORIAL APPROACH / INSTRUCTION

The audio tutorial approach was developed from 1961 onwards by Wait and his colleagues (1972) in a biology course at Purdue University. The main element of this system is the use of audio-tape to provide students with individual guidance on how they should study a particular course. The audio-tutorial takes place in a specially designed booth or carrel in which are available the taped instructions, a set of objectives for the unit, illustrative materials, laboratory manuals and other audio visual materials as appropriate. The taped instructions are a form of study guide rather than a lecture which is logically sequenced to enable students to learn effectively from the materials at hand. A number of booths are available in a learning center which is open for an extended period of time and to which students can go at times convenient to themselves.
In addition to work in the learning center there are what are known as general assembly sessions in which the kinds of activity best done in a large group take place. Lectures are given as film shows and conducted examinations. Small group sessions also take place. These terminate a week work and students meet with an instructor to take a short oral and written test and engage in structured discussion. Other activities can include short research projects and the preparation of papers. The use of audiotapes enhances the contract a student has with the instructor and enables students to feel a degree of personal contact which is missing from the written word.

2.12 INDIVIDUALLY PRESCRIBED INSTRUCTION (IPI)

Individually Prescribed Instruction (IPI) was developed by the Learning, Research and Development center at the university of Pittsburgh and research for better schools in philadelphia. One characteristic of IPI that distinguishes it from ordinary forms of instruction is that it requires the entire curriculum of each school subject area to be broken down into relatively small instruction units. With mathematics for example several hundred specific instructional objectives been identified and grouped into certain units, each with its own specific objectives and criterion measures of success and accomplishment and all to be completed in predetermined order.

The results of pre-testing at the beginning of the school year reveal the competencies and levels of competence of each student and suggest special
needs in selected areas. Upon this basis an appropriate study plan containing possible unit sequences is designed. Each individual is assigned only the particular units that he or she is judged to need; there are some options. Work on each unit is usually performed as independent study and something in a specially equipped learning laboratory. Assistance from the instructor is readily available to the student, as required.

IPI procedures involve a sequence of activities that call for uses of many different kinds of educational media, including specially prepared worksheets and self-test.

When a student completes a unit, the teacher assess achievement, usually by means of a written unit test and assigns another unit appropriate at that point, in the total study sequence. This assignment-study-complete-test process, which is usually repeated daily, may occupy up to half of a student’s schedule.

2.13 PROGRAMME FOR LEARNING IN ACCORDANCE WITH NEEDS (PLAN)

Programme for learning in Accordance with needs (PLAN) was developed during the period from 1967 to 1971 under the leadership of John Flanagan and was a joint effort of the American Institute for Research, the Westinghouse Learning Corporation and fourteen Co-operating School district (Flanagan et al. 1975).
PLAN's behavioural objectives cover overall twelve grades in the areas of language, arts, social sciences, science and mathematics. In all, PLAN includes a total of more than six thousand objectives for more than any one student can handle during the school years, since each objective takes about two or three hours for an average student to master. Students and teachers therefore use the PLAN pool of objectives to design programs of study that fit individual tastes and needs.

PLAN follow a diagnostic prescriptive teaching cycle. The teachers first find out what the pupil knows and then provide learning materials that are appropriate for the pupils. After the pupil works individually with the materials, the teacher assesses progress and mastery and finally requires additional work and additional evaluation if the pupil has not reached the mastery level. Because this diagnostic prescriptive cycle is basic to each system, each contains extensive provision for student testing. IPI materials for example include placement test, which the teacher uses to assign each child at the beginning of the year to a particular unit. Unit pre-test which show whether a child can skip work on certain objectives. Curriculum embedded tests and post test which the child uses to demonstrate the mastery of an entire unit. The systems also provide key lesson materials and methods to each instructional objectives.

The developers of PLAN list The Commercial Materials appropriate for each objective in learning activity package referred to as teaching learning unit.
2.14  INDIVIDUALLY GUIDED EDUCATION (IGE)

Individually guided education (IGE) was initially developed in 1965-66 at the university of Wisconsin’s Research and Development Center for cognitive learning under the direction of Klausmeir (1975). IGE soon proved to be one of the most influential individualized systems and by 1976 there were some three thousand IGE elementary and middle schools in the United States. Klausmeir defines IGE as a total system with seven inter related parts. These include among other such feature as a programme of home school communications and a program of continuing research and development. At the heart of the system, however are instructional programming for individual student and the people who run IGE schools.

2.15  HAWAII ENGLISH PROGRAM (HEP) (Multi-mode, Multi-media)

Because of several unique characteristics, the Hawaii English program (HEP) may be considered to be the most comprehensive, complete and systematic curriculum get developed in the United States. Reasons for this status include the fact that HEP originated as a decision of a state school system to concentrate massive effort on a curriculum project considered to be of highest priority to the English program. The outcome is a totally developed program from grades ‘k’ through ‘b’ based upon tested learning theory and teaching techniques, further the program includes all elements required in a system goals and objectives, specified outcomes, student and teacher roles, a
vast bank of materials, a specified learning environment and a diverse system of evaluation and record keeping (Brown 1989).

The important characteristic of the HEP is that it can be replicated with desirable results. The HEP system is,

- A total instructional system in language skills, literature and the nature of language.
- A total individualization of learning in terms of pacing and alternatives in learning modes and patterns.
- A multimedia, multimode contract presentation plan as opposed to one using a single text to accommodate all students.
- A plan based on proper use of a great variety of learning resources developed by teachers and curriculum specialists or selected by them and acquired from commercial sources.
- A structured management and record keeping system that produces qualitative and quantitative evaluations.

Furthermore the HEP system,

- Offers numerous opportunities for student choices self direction, self instruction and self-evaluation.
- Emphasizes inquiry and discovery, activity centered learning experiences such as games, simulations, creative drama, improvisations, art activities and writing.
- Utilizes peer tutoring to the benefit of both the learner pupil and the tutor pupil
- Is carried out in an environment that promotes dynamic ever-changing patterns of activities, acceptance of individual responsibility and co-operative effort.