Programmed learning is the most appropriate example of the latest concept of instructional technology. It is educational innovation and auto-instructional device. It is not only a technique for effective learning but also a successful mechanism of feedback device for the modification of teacher-behaviour.

Programmed learning has arrived on the educational scene mainly due to the laboratory experiments of Prof B.F Skinner. Prior to Skinner the concept of "Conditioning" as presented by pavlov and Watson and the 'Law of effect' as formulated by Thorndike are the main historical links in the developing chain of important events.

The procedure for shaping behaviour as developed by Skinner was called 'operant conditioning' and this finally becomes the basis for programmed learning technology. Now it has become an established form of technology of teaching.

According to Prof. Gagne, programmed Learning consists of making teaching models which take into account the initial and terminal response of the student, are graded in accordance with a detailed schedule and permit intermediate assessment of the strategies employed.

programmed learning is a practice of breaking down a body of subject matter into its constituent elements and requiring the pupil to master one step before proceeding to the next It allows for more pupil involvement in the learning process.

Basic Concepts of Programmed -Learning:
Programmed learning is based on certain basic concepts which have been derived from experimental work of Operant Conditioning.

These are as follows:
1. Stimuli & Responses:

A stimulus is that aspect of an environment which guides or controls the behaviour of an individual. It is any condition, event, or change in environment of an individual which produces a changing behaviour. For example, a question is asked by a teacher, is a very familiar stimulus in the class-room teaching.

A response is a part of, or a change in a part of behaviour. The example of a response is the' answer' given by students when faced with a question.

2. The Transfer of Stimulus Control:
When the learner's responses from the stimuli of initial behaviour, get transferred to the appropriate stimuli, this is called transfer of stimulus control.

3. Prompting:
A prompt is a supplementary stimulus added to the another stimulus for facilitating an errorless response.

4. Gradual Progression:
It means step presentation of material in a logical sequence.

5. Reinforcement:
Generalisation means responding to similar elements in different leaning situations. Discrimination is differentiating between two or more stimuli and making an appropriate response.

7. Extinction:
Extinction means weakening of a response. When a response occurs and remains unreinforced, the response does not become firmly connected to the stimuli present

8. Concept Formation:
It is a process of generalization within certain specific limits and discrimination of one stimulus from another within that limit

9. Successive Approximation:

It means approaching the terminal behaviour in a step by step sequence by a cumulative effort on the part of the learner.

10. A frame or a Didule:

It is a unit of subject matter which the learner handles at one time. It has three parts: stimulus (stimule), response (respule) and feed-back (corrule).

11. Operant Span:

It is the number of responses that a student can handle in one frame or didule.

12. Terminal behaviour:

The behaviour that the student is expected to have acquired at the end of a programme sequence is called terminal behaviour.

PRINCIPLES OF PROGRAMMED LEARNING

1. Objective specification:

Which means identifying the terminal behaviours that the learner will be able to perform when he has completed the programme.

2. Small Step Size:

Which involves dividing the information to be communicated into small units.

3. Overt Responding:

It means that pupils must act on each unit of information by means of exercises provided to assimilate it.

4. Success or Minimal Error:

This means that error and failure must be avoided at all costs because they are construed as obstacles to learning.

5. Immediate feedback:

In order to ensure success and satisfaction, the pupil must know that his action is correct.

6. Logical, graded progress:

It implies two things-relevance of content and its graded presentation.

7. Self Pacing:

It is used for programme development and validation.

<mark>Steps in Programming:</mark>

1. Topic Selection:

The programmes should select the most familiar topic; otherwise he has to take the help of a subject expert.

2. Content Outline:

After topic selection, its outline may be prepared which cover all the materials, one plans, to teach. For this programme one has to refer to examine relevant books and materials.

3. Instructional Objectives:

Instructional Objectives must be formulated which involve both task description and task analysis. The former is the description of terminal behaviours which the learner is expected to achieve and the latter is the series of component behaviours that he is required to acquire in the process of achieving terminal behaviour.

4. Entry Skill:

The learner should have some pre-reqisite ability and skill to understand properly the new programme. This background experience is called the entry skill and a suitable programme cannot ne prepared without proper assessment of the entry skill.

5. Presentation of the Material:

Suitable format is to be decided for presenting the material from the educational point of view. Then the programmed material should be presented in a sequence of frames arranged as steps towards terminal behaviour.

6. Student Participation:

On analysis of the terminal behaviour one will find the critical responses of the students.

7. Terminal Behaviour Test:

The effect of programme can be ascertained by administering the terminal behaviour test. It is also known as performance assessment. This provides feedback to the programme and shows the effectiveness of the instructional materials.

8. Revision:

Lastly the programme may be revised on the basis of feedback. The instructional materials may be edited and modified according to the needs and requirements of the target audience.
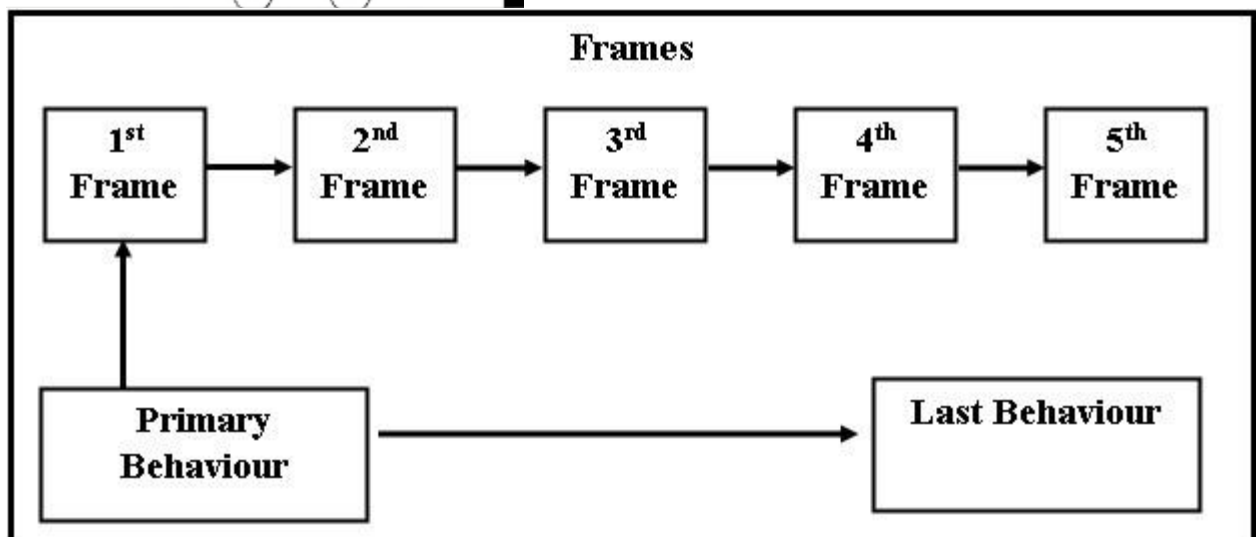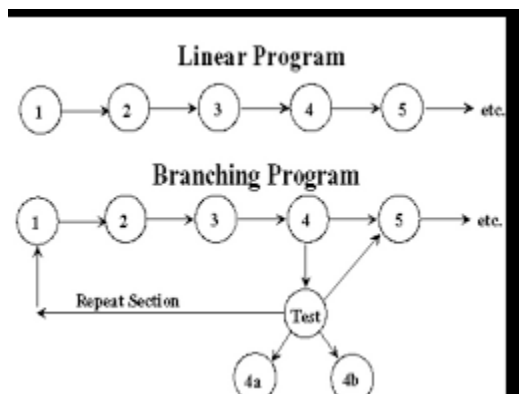
Types of Programmed Instruction
There are three types of this teaching strategy

1. **Linear Programming.** It is being used for teaching all subjects. In programed teaching strategy progressive chain elements are presented.

Last step is at the mastery level. It is based on five fundamental principles.

i. Small steps
ii. Active responding
iii. Immediate confirmation
iv. Self-pace
v. Student testing

2. **Branched Programming.** It is generally used in mechanical fields.

3. **Mathematics.** Retrogressive chain of elements is presented. First step is the master level while the last step is the simplest element.

Advantages of Programmed Instruction

Following are the advantages of this teaching strategy

1. The main emphasis is on individual differences and students' involvement.
2. There is not fixed time interval for learning. Students may learn at their own pace.
3. Learning by doing maxim of teaching is followed to involve learners in the learning process.
4. Students are exposed only to correct responses, therefore, possibility to commit errors in reduced.
5. Immediate confirmation of the results provides reinforcement to the learners and encourages the learners to proceed further. Feedback is provided to wrong answers, so that learner is able to develop mastery over the content.

Disadvantages of Programmed Instruction

1. It is very difficult to develop an instructional programme
2. Only cognitive objectives can be achieved
3. Due to tight schedule of time table, students cannot be left to learn at their own pace. It would be very difficult to learn the content the subject matter in a limited period of time.
4. There is no chance for students' creativity, their responses are highly structured.
5. Development of programme is not economical in terms of cost and time
6. In absence of the teacher, students may spoil the disciplinary tone of the class, or they will be helpless when any problem arises.
7. It cannot be applied at primary level of education or at higher education