# PROGRAMMED INSTRUCTION

## 1. INTRODUCTION

- Programmed Instruction or Programmed Learning is one of the important innovations in the teaching-learning process.
- The term *'Programmed Learning'* has been coined from principles of operant learning, developed in psychological laboratories on the basis of experimental studies conducted on animals by B.F Skinner of Harvard University (1943).

## 2. DEFINITIONS

- "Programmed *learning refers to the arrangement of instructional material in progressive sequences".*

  *-Harold W.Bernard*

- *"Programmed learning is a systematic, step by step, self-instructional programme aimed to ensure the learning of stated behavior".*

  *-Edger Dale*

- *"Programmed learning is the first application of laboratory technique utilized in the study of the learning process to the practical problems of education".*

  *-Skinner*

## 3. CHARACTERISTICS OF PROGRAMMED LEARNING

- The content is broken into small step and each step is presented in several sentences, each step is called a *frame.*
- The frames are arranged sequentially.
- Most of the frames require that the learner makes some kind of responses-an answer to a question, an activity to demonstrate the understanding of the material.
- The student is provided with immediate confirmation of the right answers (i.e.) the learner is provided immediate reinforcement.
- In case he is correct, his response is reinforced and if he is wrong, he may correct himself by receiving the correct answer.
- It is the interaction between the learner and learning material which is emphasized in programmed learning. Here, the learner is active and is motivated to learn and respond.

## 4. FUNDAMENTAL PRINCIPLES OF PROGRAMMED LEARNING

Basic principles of programmed learning are as follows:

a. Principle of Small steps
b. Principle of Active responding
c. Principle of Immediate confirmation
d. Principle of Self-pacing
e. Principle of Student evaluation or Student testing

***a. Principle of Small steps:***

- The subject matter is broken down into a sequence of small step.
- A student can take a step at a time.
- He has to read a small step by being active.

***b. Principle of Active responding:***

- Programmed learning is based on the principle of active response.
- A student learner better if he actively participates in the lesson and he learns best if he is actively responding while learning.

***c. Principle of Immediate confirmation:***

- The student learns the best if this confirm his response immediately.
- The confirmation provides the reinforcement to the learner.

***d. Principle of Self-pacing:***

- In programmed learning each student proceeds at his own rate or pace.
- Some students naturally learn more rapidly or more slowly than others.
- One learns most effectively if one learns at one's own pace.
- This principle is based on individual differences in the process of teaching and learning.

***e. Principle of Student evaluation or Student testing:***

- It helps the students to learn and grasp the material given in each frame.
- The aim of this arrangement is not to test the student but to improve the quality of programmed materials through checking the number of errors at each step.

## 5. TYPES OF PROGRAMMED LEARNING

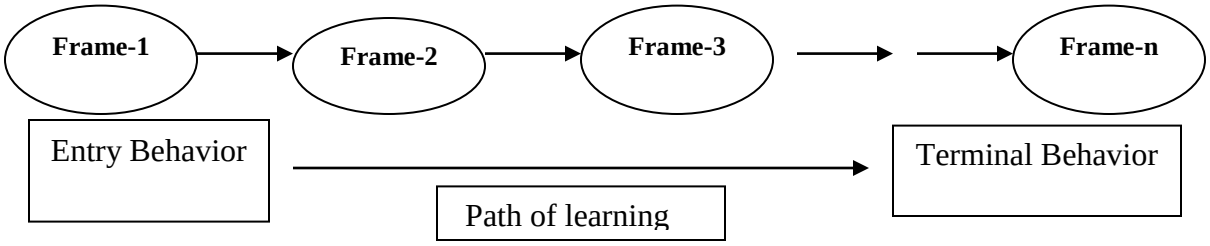
5.1. Linear Programming/ Skinnerian Programming

5.2. Branching Programming/ Crowderian Programming

### 5.1. Linear Programming/ Skinnerian Programming

- This was developed and used by B.F Skinner and his associates (1954).
- In this type of programme, every learner starts from the initial frame and ends at the terminal frame following the same sequence.
- Every student must go through each and every frame in a straight line fashion- hence it is called as a linear programme.
- It is also called single track programme.

***Structure of Linear Programme***




### 5.1.1. PRINCIPLES OF LINEAR PROGRAMMING

1. Principle of Small steps
2. Principle of Active responding
3. Principle of Immediate confirmation
4. Principle of Self pacing
5. Principle of Student testing

### 5.1.2. CHARACTERISTICS OF LINEAR PROGRAMMING

1. A linear programme is a single track or a straight line programme.
2. In this programme, learning material is presented into a series of small steps (frames).
3. Every learner follows the same path in a linear programme.

4. In a linear programme, the learner is given a small programme and a small amount of information.
5. The sequence of steps remained unchanged.
6. The learner is expected to compose his own answer to each question.
7. The learner is expected to respond actively to each step or frame.
8. The responses of the learner get immediate reinforcement.
9. Linear programme provides for self pacing i.e. one can learn according to one's own speed.
10. It moves slowly but a steadily in leading a learner from initial to terminal behavior.
11. In a linear programme, the programmer controls the response of the learner.
12. In a linear programming, the linear learners by avoiding the error.
13. Immediate knowledge of results acts as a great motivator and release anxiety and tension.

### 5.1.3. LIMITATIONS OF LINEAR PROGRAMMING

1. In linear programming every learner has to follow the same linear path.
2. It can be used only to achieve the lower cognitive objectives. The psychomotor and affective objectives can not be realized by linear programming.
3. It doesn't provide the freedom to the learner for emitting the responses. It generates controlled learning situation.
4. The linear programme does not suit to the creative or bright students. (Crowder says that linear programming is an insult to intelligent students).
5. It is difficult and time consuming process to develop and prepare a good programmed instruction material.
6. It encourages guessing.

## 5.2 BRANCHING PROGRAMMING/ CROWDERIAN PROGRAMMING

- Branching programme was developed by Norman. A Crowder, hence it is also known as Crowderian Programme (1954).
- In comparison to linear programming the frame size and amount of information given is more and is followed by multiple choice type of question.

- ❖ Out of the choices, only one answer is correct.
- ❖ If the learner chooses the correct answer he is informed of the correctness of the answer and is motivated to proceed to the next frame along the main path of learning of the programming.
- ❖ If the answer is wrong the learner is told why he/she is wrong and he/she either returns to the main line or he/she is routed back to the original frame to reread along a remedial frame till he chooses the right answer.
- ❖ In a branching programme all the learners do not follow frame route. Rather the route depends on the response made but the learner. Thus learners branch acc. to their responses.

### 5.2.1. PRINCIPLES OF BRANCHING PROGRAMME

The branching programme is based on the three fundamental principles:

1. ***Principles of Exposition:***
   - The learner should perceive whole phenomena which should be so exposed to him.
   - It means a student learns better if the whole concept is presented to him.
   - The complete information is provided on *Home Page*/or paragraph or a page.
2. ***Principle of Diagnosis:***
   - This principle refers to identify the weakness of learner.
   - After exposition it is assessed whether he could learn the concept or not, if he could not learn what the causes are for it.
   - A multiple choice format is used to diagnosis the weakness of the learners.
3. ***Principles of Remediation:***
   - The diagnosis provides the basis for remediation.
   - The remedial instructions are provided on wrong page.
   - If a learner chooses wrong alternative, he has to move to a wrong page.
   - Where remedial instruction is provided to him a direction to return to home page. He is asked to choose the right response. It is known as principle of remediation.

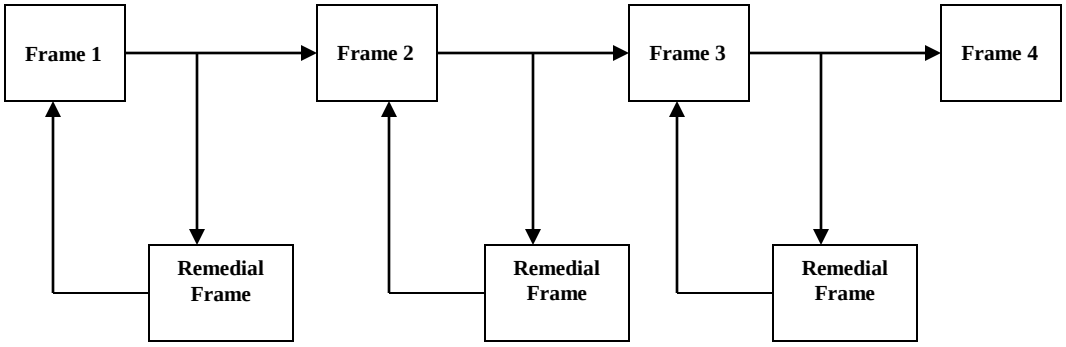
### 5.2.3. CHARACTERISTICS OF BRANCHING PROGRAMMING

1. The instructional material is divided into frames in each frame, information running into one/two paragraphs or even a page is provided.
2. After going through the frame, the learner has to respond to a multiple choice question. He has to discriminate among the choices provided and choose a correct response.
3. The learner moves forward if he answers correctively but is diverted (branched) to remedial frames if he chooses the wrong answer.
4. This cycle goes on till the learner passes through the entire material at his own pace.
5. Branching programme can be produced in a teaching machine or in a book form. The book will be in the form of a *scrambled text* as the matter does not follow a normal sequence.

### 5.2.4. TYPES OF BRANCHING PROGRAMME

a. Backward Branching
b. Forward Branching

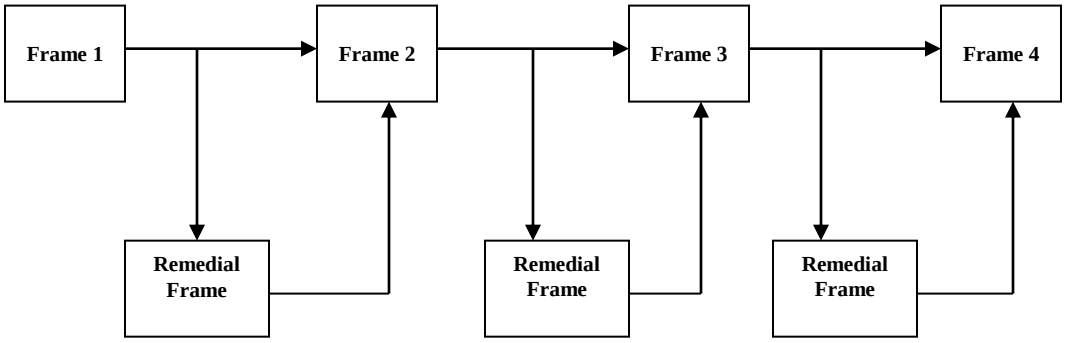
**a. Backward Branching:**




- As shown in the diagram the learners of frame No.1 of the stream goes to frame No.2 of the main stream only if he makes a correct choice.
- But if he makes a wrong choice, he is led to a remedial frame where in he is given some more help in understanding the concept and in solving the solution by a better logic.

- He will be then directed to the original frame No.1. So that he can read it again and answer it correctly in the light of the remedial materials he has received.
- So the learner who has committed error goes through the same frame twice. (Once before the remedial material and once the after the remedial material).

**b. Forward Branching**




- In this type of programming, the learner is always going forward to a new page irrespective of his choosing the right or wrong answer.
- When he makes a wrong choice, he is directed to a remedial frame where his mistake is explained.
- At times the learner is asked another parallel question and then after he gives the correct answer the learner proceeds to a new page.

**5.2.5. LIMITATIONS OF BRANCHING PROGRAMMING**

1. The multiple choice questions provided in this programming may lead to guess work on the part of the learner and he may not understand the subject matter on the frame.
2. The setting of appropriate multiple choice questions suiting to the entire materials of the frame proves a difficult task.
3. The cost of branching programme is very high when compared with traditional teaching approaches.

4. It is difficult to cover the entire subject matter.
5. It is suitable only for high school (older) children, not suitable for small children.

**DIFFERENCE BETWEEN LINEAR AND BRANCHING PROGRAMME**

| Aspect | Linear Programme | Branching Programme |
|---|---|---|
| *1.Propenet* | *B.F Skinner(1954)* | *Norman A. Crowder (1954)* |
| *2.Learning theory* | Operant conditioning based on response centered approach | Configuration theories based on learning i.e. Stimulus centered approach |
| *3.Principles* | Five fundamental principles: Small steps, Active responding, Immediate confirmation, Self pacing & Student testing. | Three fundamental principles: Exposition, Diagnosis, Remediation. |
| *4.Application* | Modification of behavior | Remedial to the difficulties of the learner. |
| *5.Frame size* | Small steps-1 or 2 sentences | Large step-one or two paragraphs /one page. |
| *6.Number of steps* | Large | Small |
| *7.Response* | Constructed response-controlled by programmer (fill up the blanks type) | Multiple choice-choosing controlled by learner. |
| *8.Purpose of response* | Fixing of learning | Measurement/ Diagnosis of learning. |
| *9.Reinforcement* | Confirmation of correctness of response- wrong response is ignored. | Correct response is confirmed and approved and wrong response is remedied. |
| *10. Utility and appropriateness* | i) Lower classes.<br>ii) Knowledge & understanding objectives.<br>iii) Normal & less intelligent students. | i) Higher classes.<br>ii) Higher order teaching objectives i.e. analysis, problem solving etc.<br>iii) Talented & creative pupils. |