

# W E L C O M E

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## 2. Programmed instruction

# **Programmed Learning – Main Features of Programmed Learning. Its Basic principles**

# Programmed Learning

- The origin of modern programmed instruction is from the psychology of learning and not from technology.
- It is an application of 'operant conditioning' learning theory to teaching-learning situations.
- It got historical momentum only after the publication of "the science of learning and art of teaching" articles by B.F. Skinner in 1954.

# Meaning and Definition

- highly individualized instructional strategy for the modification of behaviour.
- Used for instructional purpose it can also be employed as a mechanism of feedback device for improving teaching efficiency.
- student is active, proceeds at his own pace and is provided with immediate knowledge of result.
- The physical presence of teacher is not essential in this strategy.

- Susan Markle defines
- "It is a method of designing a reproducible sequence of instructional events to produce a measurable and consistent effect on behaviour of each and every acceptable student."

# Principles of Programmed Instruction

- 1. Principle of Small Step
- 2. Principle of Active Responding
- 3. Principle of Immediate Confirmation
- 4. Principle of Self-Pacing
- 5. Principle of Student-Testing

# Objectives of Programmed Instruction

- (a) To help the student to learn by doing.
- (b) To provide the situation to learn at his own pace.
- (c) To help student to learn without the presence of a teacher.
- (d) To present the content in a controlled manner and in logically related steps.
- (e) To study by himself and assess his own performance by comparing with it the given answer.



# **Steps in Development of Programmed Instruction**

- **1. Selection of the topic to be programmed.**
- **2. Identification of the objectives.**
- **3. Content analysis for developing the instructional procedure.**
- **4. Writing objectives (Entering and Terminal) in a behavioural terms.**
- **5. Constituting criterion test.**
- **6. Deciding appropriate paradigm and strategy of a programme.**
- **7. Writing programme frames and individual try out.**
- **8. Group try out, editing the programme and preparing final draft.**
- **9. Master validation or evolution of programmed instruction in terms of internal and external criteria.**
- **10. Preparation of a manual of the programme.**

**Types of programmed learning –  
Linear Programming ,features,  
Limitations**

# Linear Programme

- The application of operant conditioning model of teaching
- *'Linear Programming' or 'Skinnerian Programming' or Extrinsic Programming.*
- B.,F. Skinner (1954) prof, of psychology developed *'Operant Conditioning* theory of learning
- Programmed learning grew out of the model of operant conditioning.
- Associates and co-workers *of Skinner* gave momentum to programmed instruction.
- It is being used for solving the following problems of education

- **1. Individual Differences**
- **2. Learning by Doing**
- **3. Remedial Learning**
- **4. Reinforcement**
- **5. Knowledge of Success**

# Characteristics of Linear Programmed Instruction Material

- 1. Programmed Instruction is individualized
- 2. Programming device presents material to be learnt in minimal increments. It operates the principle that we learn better in small steps
- 3. Teaching material is carefully ordered.
- 4. Students' progress at their own pace. His rate of working is establishing by the performance alone.
- 5. The student's answer is checked simultaneously against the correct response, which appears before the next question is asked.

# Types of Linear Programme Frames

- **1. Introductory Frames** — The main function of introductory frame is to relate entering behaviours of learners to terminal behaviours
- **2. Teaching Frames**—The main purpose of teaching frames to impart new knowledge. The responses of teaching frames are related to terminal behaviours.
- **3. Practice Frames** — The purpose of practice frames is to practice the acquired new behaviours through teaching frames.
- **4. Testing Frames**—The main focus of testing frames is to assess as to how much have the students learnt. These frames are related to terminal behaviours.

# Characteristics of a Good Linear Programme

- 1. It is precisely written in transparently communication media and optimum size.
- 2. Its printing is neat and clean and it is free from mistakes.
- 3. It is accompanied with a self-explained set of instructions
- 4. Its items are arranged in a logical sequence in order of increasing difficulty and complexity of concept.

- **5. It controls the individual difference of the learners.**
- **6. It provides reinforcement to the learners**
- **7. It is designed in logical sequence of content structure**
- **8. It provides the learning by doing situation.**
- **9. In it difficult concepts can be taught effectively,**



# Limitations of linear Programming

- 1. Every learner has to follow the same linear path.
- 2. It may be used only to achieve the lower cognitive objectives.
- 3. It may be used to teach the conceptual and explanatory content but factual content cannot be taught.
- 4. It generates controlled learning situation.
- 5. It does not suit the creative and bright students. *Norman A. Crowder* says that Linear programming is an insult to intelligent students.
- 6. It is a difficult and time consuming process to develop and prepare good programmed instruction material.
- 7. It does not provide social motivation to learner which is important in human learning.

**Branching programme – features,  
Backward branching and Forward  
Branching, Advantages  
& Limitations.**

# Branching programme

- **Objection Against Linear Programming**
- **Linear programming is based on the learning principles formulated by conducting experiments on animals**
- **Linear programme is an insult to the intelligent or bright students**
- **The development of an effective linear programme is a far more difficult task**
- **linear programming provides psychological reinforcement; to the learner, there is no place for social motivation.**
- **In linear programming every learner has to follow the same linear path**

# Origin of Branching Programming

- In 1954 *Norman Crowder*,
- psychologist with United State Air force.
- He was asked to investigate the training of aircraft maintenance men.
- These technicians were being taught to 'trouble shoot' or repair faults, in a bomber navigation system;
- Branching programming started by way of an ordinary practical training problem.

- **Branching programming makes no assumption about the nature of learning process**
- **It has no the theoretical basis about how education should be conducted.**
- **The student is given a short discussion of the material to be learnt, followed by a multiple choice question designed to test the point just discussed.**
- **Each answer alternative has a page number beside it The student chooses what he believes is a correct answer to the question.**
- **He turns to the page number given for that answer.**
- **If he has chosen correctly he is led to next item.**
- **If he has chosen incorrect answer, he is directed to a page wherein the reason for incorrectness is dismissed.**
- **Crowder's approach is based on the psychology of individual differences**

# Basic Theory of **Branching** Programming

- **Branching provides more information per frame.**
- **It employs multiple choice response pattern.**
- **A student is required to discriminate and choose the one right answer which is presented along with a number of other plausible but incorrect answers**
- **the assumption in branching programming is that a wrong response does not necessarily hinder in learning of a correct response.**
- **In a branching programme, the response takes the form of a choice of various answers**
- **Branching programme is arranged in a logical sequence of information**

**Branching programming is also termed as '*intrinsic programming.*'**

- learning process is pure internal or intrinsic.
- After exposure to the programme material the student has to discriminate a correct answer from the given multiple-choice questions. This process is within the learner.
- The major rationale for the word 'intrinsic' is that the student's response is controlled by himself internally

# Fundamental Principles of Branching Programme

- **1. Principle of Exposition**
  - The learner should perceive the whole phenomena exposed to him.
- **2. Principle of Diagnosis**
  - It refers to identifying the weakness of learner.
- **3. Principle of Remediation**
  - Diagnosis provides the basis for remediation. Remedial instructions are provided on *Wrong page*.



# Characteristics of Good Branching

## Programming

- 1. Individualized Instruction
- 2. Freedom to respond
- 3. Remedial
- 4. Tutorial.
- 5. Compared to—Linear programme is easier to develop branching programme frames or instructional material.
- 6. Branching—Programme has its roots in human training and techniques whereas linear programming is based on psychological experiments conducted on animals rats and pigeons.

- **7. Cognitive**
- **8. Multisided—Branching programming is effectively use for teaching as well as remedial purpose.**
- **9. Motivation**
- **10. Content—It can be used for conceptual as well as descriptive content of teaching.**
- **11. Teaching—The branching is mainly concerned with teaching and instruction rather than learning.**

# Structure of Branching Programme Frame

- In this strategy content is not presented in small steps but whole unit or concept is presented.
- The size of step may be a paragraph or two or whole page.
- The learner perceives the whole concept and tries to comprehend.
- He has not to follow the sequence pages.
- Therefore, branching programming text is known as 'Scrambled text'.
- It consists of two types of pages.
  - 1.Home page
  - 2.WrongPage

# Homepage

Page-1 Information

(a) ..... .. .. See Page X

(b) . . . .. See Page Y

(c) ..... .. See Page Z

# The home page involves four activities

- Teaching
- Response
- Diagnosis
- Reinforcement

# Wrong page

- Page 9 from page 1
- Confirmation
  - Your response is not correct
- Remediation
  - Because .....
- Guidance
  - Now you go back to page (1), and try to choose the correct response

# Backward branching and Forward Branching

- Frame 1 – choosing the answer– if it wrong – go to wrong page – diagnosis – coming back to the frame 1 – again next attempt.
- Thus coming back and going forward
- Frame 1 – choosing the answer– if it wrong – go to wrong page – diagnosis – remedial – going to the second frame.
- Thus not coming back and going forward

# Advantages

- serves four functions—(a) Teaching, (b) Diagnosis (e)" Remediation, and (d) Reinforcement.
- based on the principles of problem solving. It generates appropriate situation of learning.
- Based on individual difference the scrambled text-book operates as tutorial strategy
- Home pages consists of presentation and diagnosis with the help of multiple-choice question.
- The focus of scrambled text is to provide remedial instruction and teaching.



# Limitations

- The learner has to select a response from given multiple-choice alternatives. He may select his response by guessing without comprehending the concepts
- The scrambled text-book cannot be used effectively for primary students.
- It has no sound theoretical formulation or theory.
- It cannot be used for preparing instruction material in every school subject

