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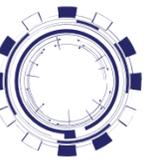
Types of Programmed Instruction



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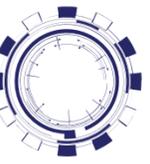
Types of Programmed Instruction



Programmed Instruction (PI) can be presented in different instructional styles depending on how the learner progresses through the content and how feedback is provided. These are known as the styles of Programmed Instruction. Each style reflects a different way of organizing learning experiences.

- **Linear Programming**
- **Branching Programming**
- **Mathetics Programming**
- *Rule System Programming*
- *Computer Assisted Instruction (CAI)*
- *Learner Controlled Instruction (LCI)*

Linear Programming



Linear Programmed Instruction refers to a systematically planned self-instructional teaching method in which learning material is presented to the learner in a fixed and sequential order of small steps called frames. Each learner must proceed through the same series of frames, respond actively to each one, and receive immediate feedback before moving to the next frame.

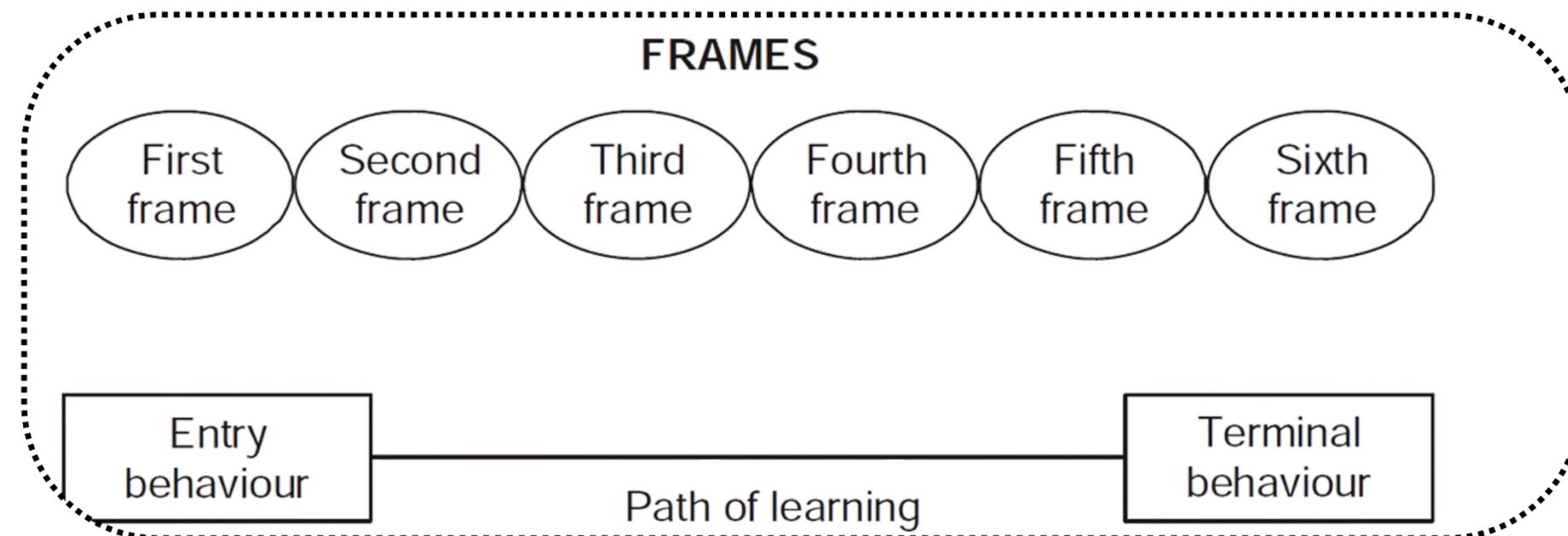
It was developed by [B. F. Skinner in 1954](#).

This type of programming is based on Operant Conditioning, which emphasizes learning through the reinforcement of correct responses. Therefore, linear programmed instruction aims at errorless, step-by-step learning, where the learning path is externally controlled by the programmer and remains the same for all learners.

Process of Linear Programming



- Instructional material is divided into a number of meaningful small steps called frames.
- These frames are arranged in a fixed linear sequence.
- One frame at a time is presented to the learner.
- The learner must actively respond to each frame.
- He gets immediate confirmation about the correctness of his response.
- If correct, he moves to the next frame.
- This continues until the learner reaches the final behaviour.



Characteristics of Linear Programming



- It represents a linear arrangement of content in a single track program.
- Learning material is presented in the form of frames.
- Since frames are sequentially presented, chances of error are reduced.
- Learner gets immediate feedback on his response.
- Learner must respond actively to each frame.
- It is self-pacing and emphasizes self-learning.



Advantages of Linear Programming



- Easy to design and implement
- Reduces fear and anxiety of learners
- Suitable for slow learners
- Ensures mastery learning
- Provides immediate reinforcement



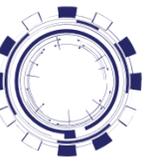
Drawbacks of Linear Programming



- The learning process becomes slow and monotonous.
- Its use is limited to certain topics and subjects only.
- Learner's creativity, thinking, judging and imagination are reduced.
- It may encourage guessing and thus obstruct true learning.
- It can be used mainly for teaching purpose, not for understanding complex ideas.
- It does not provide social motivation or interaction.



Branching Programming



Branching Programmed Instruction refers to a self-instructional teaching method in which learning material is presented to the learner in larger instructional frames, and the learner's progress depends on his responses to multiple-choice questions. Unlike linear programming, learners do not follow a single fixed path; instead, they are diverted to different learning routes (branches) based on whether their responses are correct or incorrect.

It was developed by [Norman A. Crowder \(USA\) in 1954](#).

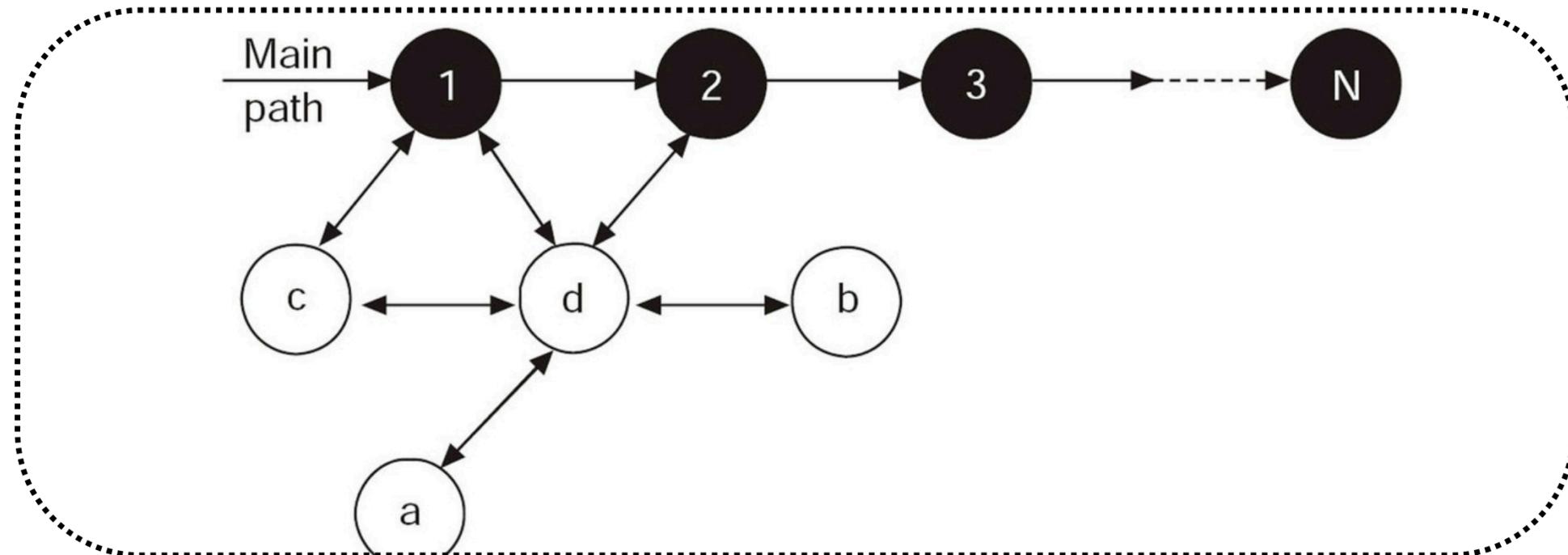
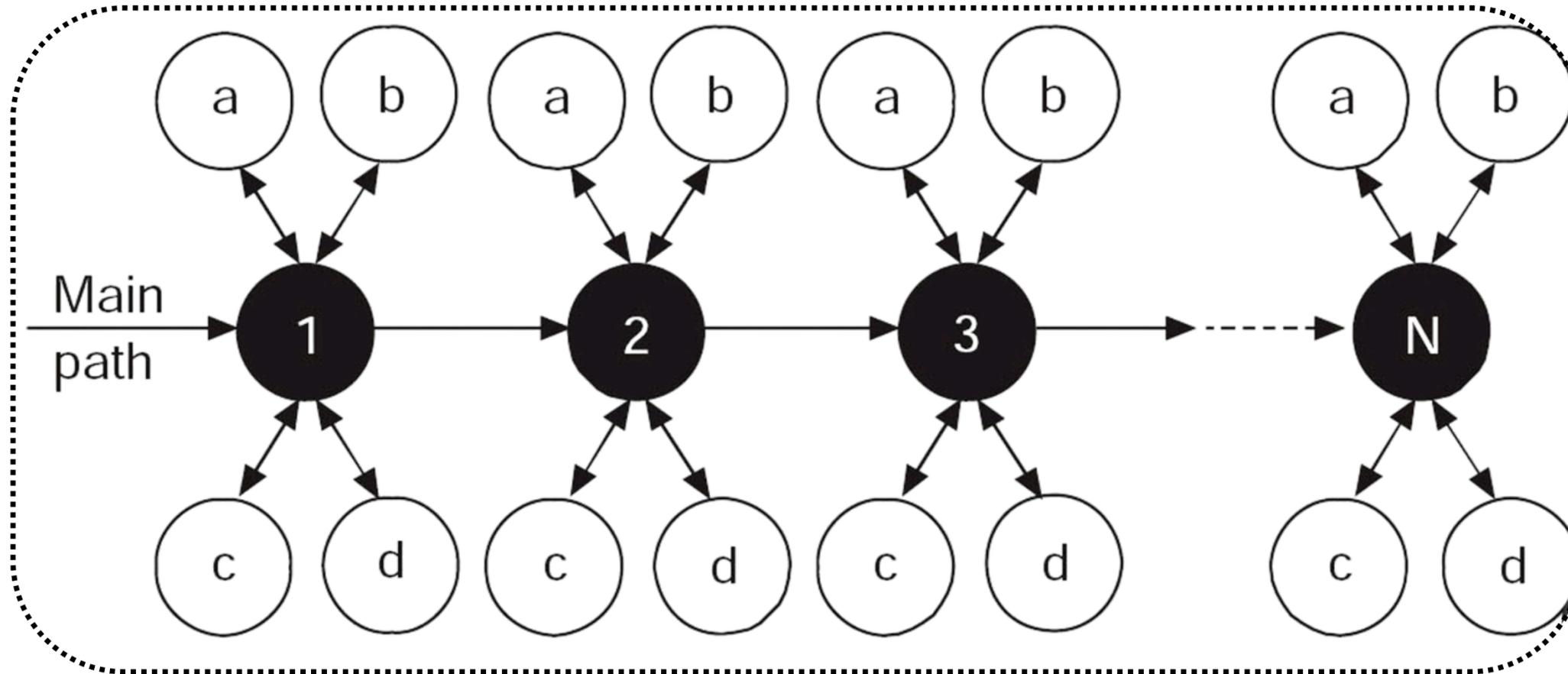
This type of programming is based on the principle that errors are valuable sources of learning. Therefore, branching programmed instruction emphasizes diagnostic and corrective learning, where wrong answers lead to remedial frames that explain mistakes before returning the learner to the main learning path.

Process of Branching Programming



- Instructional material is divided into large frames.
- Each frame is followed by a multiple-choice question.
- If the learner gives the correct answer, he moves forward.
- If the learner gives a wrong answer, he is branched to remedial frames.
- These remedial frames:
 - Explain mistakes
 - Clarify concepts
 - Ask guiding questions
- After correction, the learner returns to the main path.

This cycle continues until the learner completes the whole program at his own pace.



Advantages of Branching Programming



- Promotes meaningful and conceptual learning.
 - Uses errors as learning tools through remedial frames.
 - Caters to individual differences by providing multiple paths.
 - Encourages self-correction among learners.
 - Develops higher-order thinking skills.
 - Makes learning more learner-centred and flexible.
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Drawbacks of Branching Programming



- Difficult and time-consuming to design.
- Learning process becomes slow due to frequent branching.
- Overdependence on MCQs may encourage guessing.
- Not suitable for all subjects, especially drill-based ones.
- May confuse weak learners due to multiple paths.
- Costly and resource-intensive to develop.



Comparison between Linear and Branching Programmed Instruction

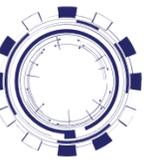


Basis	<i>Linear Programmed Instruction</i>	<i>Branching Programmed Instruction</i>
Developer	Developed by B. F. Skinner (1955)	Developed by Norman A. Crowder (1954)
Learning Path	Single, fixed and straight path for all learners	Multiple, flexible paths depending on learner responses
Frame Size	Frames are small and short	Frames are large and detailed
Sequence of Content	Content is presented in a strict linear sequence	Content sequence varies according to learner performance
Treatment of Errors	Errors are minimized or avoided	Errors are used as diagnostic tools
Handling of Wrong Answer	Learner is shown the correct answer and moves ahead	Learner is branched to remedial frames for correction
Type of Questions	Mainly fill-in-the-blank and short answer	Mainly multiple-choice questions



Learner Control	Very limited control to the learner	High degree of learner control
Role of Programmer	Programmer exercises full external control	Programmer provides structure, but learner controls path
Psychological Basis	Based on Operant Conditioning (Behaviourism)	Based on Tutorial and Cognitive learning theories
Nature of Learning	Mechanical, step-by-step learning	Meaningful and conceptual learning
Learning Style	Emphasizes drill, practice and mastery	Emphasizes diagnosis, understanding and reasoning
Individual Differences	Does not consider individual differences much	Considers individual differences effectively
Social Interaction	No social learning component	Supports self-corrective learning behaviour
Suitability	Best for basic skills, facts, formulas	Best for concepts, problem-solving, analysis
Speed of Learning	Often slow and monotonous	Faster and more engaging

Mathematics Programming



Mathematics Programmed Instruction refers to a type of programmed learning in which instructional material is organized according to a hierarchical sequence of learning tasks, and learners are required to master each step before proceeding to the next. The emphasis is on ensuring complete understanding and skill mastery at every stage of learning.

This type of programming was developed by [Thomas F. Gilbert around 1962](#) and is based on the principle that effective learning occurs when complex skills are built gradually from simpler components. Therefore, mathematics programming focuses on learning hierarchies, continuous assessment, and mastery learning, making it particularly useful for skill-based and competency-based education.

Process of Mathetics Programmed Instruction



- The total learning task is first analysed into smaller sub-skills.
- These sub-skills are arranged in a hierarchical sequence from simple to complex.
- Instructional frames are prepared for each level of the hierarchy.
- The learner responds to each frame and must achieve mastery.
- Regular testing is used to check mastery at every stage.
- Only after mastery, the learner is allowed to proceed to the next level.



Mathematics Programmed Instruction

Step-by-Step Learning from Simple to Complex



Advantages of Mathetics Programmed Instruction



- Ensures mastery learning before moving to the next step.
- Organizes content in a logical hierarchical sequence.
- Promotes deep understanding of concepts and skills.
- Provides continuous assessment and feedback.
- Suitable for skill-based and competency-based learning.
- Reduces learning gaps by focusing on prerequisite knowledge.

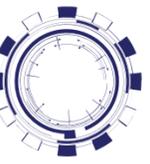


Drawbacks of Mathetics Programmed Instruction



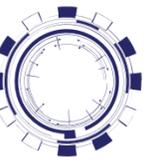
- Complex and difficult to design properly.
- Requires careful task analysis and planning.
- Can be time-consuming for learners.
- Not suitable for open-ended or creative subjects.
- May become rigid and mechanical if poorly designed.
- Needs trained experts and resources for development.

Computer Assisted Instruction (CAI)



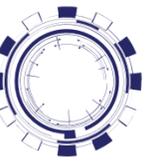
Computer Assisted Instruction (CAI) refers to programmed instruction delivered through computers and digital technologies. It uses multimedia elements, interactive frames, immediate feedback, and automated evaluation to support individualized and self-paced learning. CAI often employs linear, branching, or mathematics programming formats and is widely used in e-learning platforms, online courses, and distance education.

Learner Controlled Instruction (LCI)



Learner Controlled Instruction (LCI) is a form of programmed learning in which the learner has maximum control over the learning process. The learner can decide the sequence, pace, depth, and selection of content according to individual needs and interests. This type of instruction emphasizes learner autonomy and self-direction and is commonly used in adult education, professional training, and open learning systems.

Rule System Programming



Rule System Programming is a type of programmed instruction based on deductive and inductive reasoning, where learning takes place through the application or discovery of rules and principles. In this approach, a perfect rule or example is presented as a stimulus, and the learner responds by applying it to new or imperfect situations. It is considered an extension of linear and branching programming and is especially useful in teaching grammar, mathematics, logic, and scientific laws.



**Thank
You**



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