Semester V — Educational Technology

Unit I: Educational Technology

Course Code: EDU0500104
Course: Educational Technology
Credit: 4
Total Marks: 100 — Internal 40 + External 60

The prescribed Unit I covers three major areas: (1) meaning, nature and scope of Educational Technology; (2) approaches to Educational Technology—Hardware, Software and Systems approaches, together with Edgar Dale's Cone of Experience; and (3) Programmed Instruction—meaning, characteristics, fundamental principles, and linear and branching programming.

1. Introduction to Educational Technology

Education is a purposeful process concerned with bringing desirable changes in the knowledge, skills, attitudes and behaviour of learners. Technology, in its broader sense, means the systematic application of knowledge, techniques, methods and resources for solving practical problems.

When we apply technological principles, systematic methods, and appropriate resources to education, we arrive at the concept of Educational Technology.

A simple way to introduce it in the classroom is:

Education + Systematic Application of Knowledge, Methods and Resources = Educational Technology

Educational Technology should therefore not be understood merely as the use of computers, projectors or digital devices in the classroom. It is much broader.

2. Meaning of Educational Technology

Educational Technology refers to the systematic application of scientific and technological knowledge, principles, methods, techniques and resources for

improving the teaching-learning process and achieving educational objectives effectively.

It involves systematic consideration of:

Objectives → Learner → Content → Method → Media/Resources → Learning Activities → Evaluation → Feedback

Thus, Educational Technology is concerned with the whole process of teaching and learning, not simply with educational machines.

3. Two Important Dimensions

Educational Technology can initially be understood through two dimensions:

Technology in Education

Use of technological devices and media in educational activities.

Examples:

- projector;
- television;
- computer;
- audio equipment;
- multimedia resources.

Technology of Education

Systematic application of principles derived from areas such as psychology, communication and learning theory for improving teaching and learning.

Examples:

- programmed instruction;
- reinforcement;
- systematic instructional design;

- evaluation and feedback.

Blackboard Point

Educational Technology ≠ Only Machines

Educational Technology = Technology in Education + Technology of Education

4. Nature of Educational Technology

The nature of Educational Technology can be explained through the following characteristics.

1. Scientific

It applies systematic knowledge and principles to educational problems.

2. Systematic

Teaching-learning activities are planned in an organised sequence.

3. Goal-Oriented

Technology is selected according to educational objectives.

4. Learner-Centred

The learner's characteristics, abilities and learning needs are important considerations.

5. Process-Oriented

Educational Technology is concerned not only with educational products or devices but also with the process of teaching and learning.

6. Dynamic

It changes with developments in:

- educational psychology;
- communication;
- media;

- technology;
- instructional practices.

7. Interdisciplinary

It draws knowledge from different fields, such as:

Education + Psychology + Communication + Technology + Management

8. Evaluation-Oriented

Learning outcomes are assessed to determine whether objectives have been achieved.

9. Feedback-Based

Evaluation provides feedback for improving instruction.

10. Problem-Solving

Educational Technology attempts to find systematic solutions to educational and instructional problems.

Formula

Plan → Teach → Evaluate → Feedback → Improve

5. Scope of Educational Technology

The scope of Educational Technology is extensive.

A. Formulation of Educational Objectives

It assists in identifying and specifying learning outcomes.

B. Analysis of Learner Characteristics

Instruction should consider:

- previous knowledge;
- ability;
- interests;

- individual differences;
- learning needs.

C. Selection and Organisation of Content

Educational Technology helps organise content logically and systematically.

D. Selection of Teaching Methods

Appropriate methods are selected according to objectives, learners and content.

E. Use of Teaching-Learning Resources

It includes effective utilisation of:

- visual aids;
- audio aids;
- audio-visual aids;
- digital resources;
- other instructional materials.

F. Instructional Design

Teaching-learning activities are systematically planned.

G. Evaluation

Learning outcomes are measured and assessed.

H. Feedback

Evaluation findings are used for instructional improvement.

I. Individualised Learning

Educational Technology can facilitate learning according to individual pace and needs.

J. Teacher Education

It contributes to improving teaching competencies and instructional practices.

Blackboard Formula

Scope = Objectives + Learner + Content + Methods + Media + Instruction + Evaluation + Feedback

6. Importance of Educational Technology

Educational Technology can contribute to:

- systematic teaching;
- clearer educational objectives;
- appropriate selection of methods;
- effective use of resources;
- active learning;
- individualisation of instruction;
- evaluation and feedback;
- improvement of teaching-learning processes.

The central purpose is:

To make teaching and learning more systematic, appropriate and effective.

PART II — APPROACHES OF EDUCATIONAL TECHNOLOGY

The syllabus prescribes three approaches:

Educational Technology I — Hardware Approach

Educational Technology II — Software Approach

Educational Technology III — Systems Approach.

7. Educational Technology I — Hardware Approach

The Hardware Approach refers mainly to the use of machines, equipment and technological devices for educational purposes.

It emerged largely from developments in physical sciences, engineering and communication technology.

Examples

- radio;
- television;
- projector;
- computer;
- audio equipment;
- video equipment;
- multimedia devices.

Basic Formula

Hardware Approach = Machines/Equipment Applied to Education

8. Characteristics of Hardware Approach

1. It emphasises physical devices.
2. It is associated with technological equipment.
3. It can extend the reach of instruction.
4. It can present information through different sensory channels.
5. It can support large-group instruction.
6. It can make some abstract information more concrete through appropriate presentation.

Example

A teacher explains the solar system and uses a projected animation.

The projector/computer/display equipment represents the hardware dimension.

9. Advantages of Hardware Approach

It can:

- attract learner attention;
- present audio-visual information;
- improve demonstration;
- support large groups;
- provide access to recorded resources;
- support distance and technology-mediated learning.

However:

Hardware alone does not guarantee effective learning.

The quality of the instructional content and method remains essential.

10. Limitations of Hardware Approach

Possible limitations include:

- cost;
- maintenance;
- dependence on electricity/infrastructure;
- requirement for technical competence;
- inappropriate use of equipment;
- overemphasis on devices rather than learning.

Important Examination Point

Technology should serve educational objectives; educational objectives should not be determined merely by available technology.

11. Educational Technology II — Software Approach

The Software Approach refers to the application of principles of learning, psychology, communication and instructional design for improving teaching and learning.

Here, “software” should not be understood merely as computer software.

It includes:

- instructional principles;
- learning strategies;
- reinforcement;
- sequencing of learning;
- programmed learning;
- instructional materials.

Formula

Software Approach = Learning Principles + Instructional Strategies + Teaching Materials

12. Psychological Foundation of Software Approach

The software approach draws heavily upon knowledge of how learners learn.

Important ideas may include:

- stimulus;
- response;
- reinforcement;
- motivation;
- feedback;
- individual differences;
- sequencing of learning experiences.

Thus:

Understanding Learning → Designing Instruction → Facilitating Learning

13. Characteristics of Software Approach

1. Based on learning principles.
2. Concerned with instructional processes.
3. Emphasises organisation of learning experiences.
4. Gives importance to learner behaviour.
5. Uses feedback and reinforcement.
6. Helps individualise instruction.
7. Focuses on effective presentation of content.

14. Hardware and Software Approaches — Comparison

Basis	Hardware Approach	Software Approach
Main emphasis	Equipment/machines	Learning and instructional processes
Foundation	Physical science/engineering/communication technology	Psychology and learning principles
Concern	Technological devices	Instructional design and strategies
Examples	Projector, television, computer	Programmed instruction, reinforcement, structured learning material

Basis	Hardware Approach	Software Approach
Primary question	What device can assist instruction?	How should learning be organised?

Memory Technique

Hardware = Tools

Software = Teaching-Learning Principles and Processes

Effective Educational Technology frequently requires an appropriate combination of both.

15. Educational Technology III — Systems Approach

A system consists of interconnected components working together towards a common objective.

In education:

Educational System = Interrelated Components Working towards Educational Objectives

The Systems Approach therefore views teaching-learning as an organised system rather than as isolated activities.

16. Components of a Teaching-Learning System

INPUT

Includes:

- learners;
- objectives;
- teachers;
- content;

- resources.

↓

PROCESS

Includes:

- teaching;
- methods;
- activities;
- interaction;
- use of media.

↓

OUTPUT

Includes:

- learning outcomes;
- knowledge;
- skills;
- attitudes.

↓

FEEDBACK

Information about results is used to improve the system.

Formula

Input → Process → Output → Feedback

17. Steps in the Systems Approach

A useful classroom sequence is:

Step 1 — Identify the Problem/Need

What educational need must be addressed?

Step 2 — Specify Objectives

What should learners achieve?

Step 3 — Analyse Learners

What are their characteristics and previous knowledge?

Step 4 — Select Content

What should be taught?

Step 5 — Select Methods and Media

How should it be taught?

Step 6 — Implement

Conduct the teaching-learning activities.

Step 7 — Evaluate

Determine whether objectives have been achieved.

Step 8 — Obtain Feedback

Identify strengths and weaknesses.

Step 9 — Improve

Modify the system accordingly.

Need → Objectives → Inputs → Process → Output → Evaluation → Feedback → Improvement

18. Importance of Systems Approach

The Systems Approach:

- makes education systematic;
- clarifies objectives;

- connects different components;
- encourages rational resource use;
- facilitates evaluation;
- provides feedback;
- enables continuous improvement.

Classroom Example

Suppose students are performing poorly in English grammar.

A systems-oriented teacher does not simply conclude:

“Students are weak.”

Instead, the teacher examines:

Objectives → Previous Knowledge → Content → Teaching Method → Resources → Practice → Assessment → Feedback

This illustrates Educational Technology as a problem-solving process.

19. Comparison of Three Approaches

Approach	Central Emphasis	Key Word
Hardware Approach	Machines and equipment	Devices
Software Approach	Learning principles and instructional processes	Learning
Systems Approach	Total organised instructional system	System

Memory Formula

H – S – S

Hardware → Software → Systems

or:

Device → Learning Process → Whole System

PART III — PSYCHOLOGICAL BASES FOR HARDWARE AND SOFTWARE TECHNOLOGIES

The syllabus specifically includes Edgar Dale's Cone of Experience under the psychological bases for using hardware and software technologies.

20. Edgar Dale's Cone of Experience

American educator Edgar Dale developed the Cone of Experience to organise learning experiences by their degree of concreteness and abstraction.

The basic movement is:

Concrete/Direct Experience → Representational Experience → Increasingly Abstract/Symbolic Experience

It helps teachers think about the relationship between direct experience and different forms of mediated representation.

21. Broad Structure of Dale's Cone

For classroom understanding, the experiences can be visualised broadly as moving from:

More Direct/Concrete

Direct Purposeful Experiences

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Contrived Experiences

↓

Dramatised Experiences

↓

Demonstrations

↓

Field Trips

↓

Exhibits

↓

Motion Pictures

↓

Recordings/Radio/Still Pictures

↓

Visual Symbols

↓

Verbal Symbols

More Abstract

The central educational idea is that learning experiences range from direct participation to symbolic representation.

22. Direct Purposeful Experiences

These involve direct participation in real activities.

Example:

A student actually grows a plant while studying plant development.

The learner is directly engaged with the phenomenon.

23. Contrived Experiences

These involve models or simplified representations of reality.

Examples:

- globe;

- model of the human heart;
- model of the solar system.

They are useful when direct experience is:

- impossible;
- dangerous;
- expensive;
- too large;
- too small.

24. Dramatised Experiences

Learners represent situations through:

- role play;
- drama;
- simulation.

These can provide experience of situations that cannot easily be encountered directly.

25. Demonstrations

A teacher or another person shows how to do something.

Example:

Demonstrating a science experiment.

The learner observes the process rather than performing every part directly.

26. Field Trips

Students observe objects, processes or situations in their natural or real-life settings.

Example:

Visiting a museum or educational institution.

27. Exhibits

Objects, displays, models or visual arrangements are organised for observation.

28. Motion Pictures and Audio-Visual Experiences

Video or film can represent:

- events;
- processes;
- places;
- demonstrations

that learners cannot directly experience.

29. Visual Symbols

These include representations such as:

- maps;
- graphs;
- charts;
- diagrams.

They are more abstract than direct experiences.

30. Verbal Symbols

Words—spoken or written—represent a highly abstract form of experience.

Examples:

- definitions;
- written explanations;
- verbal descriptions.

31. Educational Significance of Dale's Cone

The Cone reminds teachers that:

1. learners can encounter knowledge through different kinds of experience;
2. more concrete experiences may sometimes support abstract ideas;
3. teaching should not depend exclusively on verbal explanation;
4. appropriate media can help represent experiences unavailable directly;
5. Instructional resources should be selected according to objectives and content.

Important Caution

The Cone of Experience does not provide scientifically established percentages of how much people remember by reading, hearing, seeing or doing. Popular “10%–20%–30%–90% retention” diagrams should not be attributed to Edgar Dale.

This is important for academically accurate teaching.

32. Cone of Experience and Educational Technology

Dale's model helps explain why Educational Technology uses different media.

Example: Teaching “Volcano”

A teacher may use:

Words

- Diagram
- Video
- Model

Each provides a different type of learning experience.

Therefore:

Objective + Learner + Content → Appropriate Experience/Medium

not:

“Always use the most concrete medium.”

PART IV — INSTRUCTIONAL STRATEGY: PROGRAMMED INSTRUCTION

The syllabus prescribes Programmed Instruction: meaning, characteristics, fundamental principles of programming, and extrinsic/intrinsic programming (linear and branching programming).

33. Meaning of Programmed Instruction

Programmed Instruction is a systematically organised form of individualised instruction in which learning material is arranged in carefully sequenced steps, the learner responds actively, receives feedback, and progresses through the programme.

Basic Formula

Small Step → Learner Response → Feedback/Reinforcement → Next Step

34. Background

Behavioural learning theories strongly influenced programmed instruction.

B. F. Skinner is closely associated with linear programming, while Norman A. Crowder is associated with branching programming.

The emphasis is on systematic organisation of learning and learner response.

35. Characteristics of Programmed Instruction

1. Clearly Defined Objectives

The expected learning outcomes are identified.

2. Small Steps

Content is divided into manageable units or frames.

3. Logical Sequence

Frames are arranged systematically.

4. Active Responding

The learner must respond rather than read passively.

5. Immediate Feedback

The learner receives information about the correctness of the response.

6. Self-Pacing

Learners can often proceed at their own pace.

7. Individualised Learning

The programme allows substantial independent learning.

8. Continuous Evaluation

Learner responses provide continuous evidence of progress.

36. Meaning of a Frame

A frame is a small unit of programmed learning material.

A frame may contain:

Information → Question/Task → Learner Response → Feedback

Several systematically organised frames form a programme.

37. Fundamental Principles of Programming

The following principles are central to programmed instruction.

Principle 1 — Small Steps

Learning material is divided into small, manageable steps.

Simple → Complex

Principle 2 — Active Responding

The learner should actively respond to the learning material.

Principle 3 — Immediate Confirmation/Feedback

Learners should know promptly whether their responses are appropriate.

Principle 4 — Self-Pacing

Learners progress at their own pace.

Principle 5 — Student Testing/Evaluation

The programme continually gathers evidence of learner progress and can be revised where difficulties are identified.

Memory Formula

S – A – F – S – E

Small Steps

Active Response

Feedback

Self-Pacing

Evaluation

38. Types of Programming

The syllabus refers to extrinsic and intrinsic programming, corresponding to linear and branching programming, respectively.

A. Extrinsic Programming — Linear Programming

Associated with B. F. Skinner.

B. Intrinsic Programming — Branching Programming

Associated with Norman A. Crowder.

39. Linear Programming

In Linear Programming, learners generally proceed through the same sequence of frames.

Structure

Frame 1

↓

Frame 2

↓

Frame 3

↓

Frame 4

↓

Frame 5

Every learner follows essentially the same path, though learners may proceed at different speeds.

40. Characteristics of Linear Programming

- small steps;
- fixed sequence;

- active learner response;
- immediate reinforcement/feedback;
- self-pacing;
- error minimisation.

Example

Frame 1:
Water freezes at ___ °C under standard conditions.

Learner responds:

0°C

↓

Receives confirmation

↓

Moves to Frame 2.

41. Advantages of Linear Programming

- simple structure;
- supports self-paced learning;
- provides immediate feedback;
- encourages active responding;
- reduces dependence on continuous teacher presence;
- useful for systematically sequenced content.

42. Limitations of Linear Programming

- all learners generally follow the same route;
- very small steps may become monotonous;

- complex learning may not always suit a strictly linear structure;
- preparation requires careful planning.

43. Branching Programming

Branching Programming, associated with Norman A. Crowder, provides different learning paths depending on the learner's response.

The learner is commonly presented with information followed by a question with alternative responses.

Structure

Main Frame

↓

Question

↙ ↓ ↘

Response A / Response B / Response C

↓

Correct response → Continue

Incorrect response → Remedial/Explanatory Frame → Return/Proceed

Thus:

The learner's response determines the next learning path.

44. Characteristics of Branching Programming

- frames may be comparatively larger;
- multiple-choice responses are commonly used;
- learner errors are diagnostically important;
- incorrect responses may lead to remedial material;

- different learners can follow different routes;
- feedback is built into the programme.

45. Example of Branching Programming

Main Frame

Which approach of Educational Technology primarily emphasises machines and equipment?

A. Software Approach
B. Hardware Approach
C. Systems Approach

If the learner selects:

B — Correct

Proceed to the next main frame.

If learner selects:

A — Incorrect

The programme explains that the Software Approach emphasises learning principles and instructional processes, then redirects the learner appropriately.

Thus:

Response → Diagnosis → Appropriate Branch → Learning

46. Linear and Branching Programming — Comparison

Basis	Linear Programming	Branching Programming
Associated with	B. F. Skinner	Norman A. Crowder
Syllabus terminology	Extrinsic	Intrinsic

Basis	Linear Programming	Branching Programming
Path	Same basic sequence	Different paths possible
Frames	Usually smaller	Usually comparatively larger
Response	Often constructed response	Often multiple choice
Errors	Attempts to minimise errors	Uses errors diagnostically
Remedial route	Limited	Important feature
Learner route	Linear	Branched

Memory Technique

Skinner → Straight Line

Crowder → Choice Creates Branch

47. Educational Importance of Programmed Instruction

Programmed instruction can:

- individualise learning;
- permit self-pacing;
- encourage active responses;
- provide immediate feedback;
- organise content systematically;
- support independent study;
- provide continuous evaluation.

48. Limitations of Programmed Instruction

It may face limitations such as:

- considerable time required for programme preparation;
- difficulty programming some complex learning outcomes;
- possible monotony;
- reduced social interaction when used alone;
- excessive dependence on predetermined responses.

Therefore, programmed instruction is best understood as one instructional strategy, not a replacement for all teaching.

49. Relationship among the Main Concepts of Unit I

The entire unit can be connected as follows:

EDUCATIONAL TECHNOLOGY

↓

THREE APPROACHES

Hardware

- Software
- Systems

↓

PSYCHOLOGICAL/EXPERIENTIAL BASIS

Dale's Cone of Experience

↓

INSTRUCTIONAL STRATEGY

Programmed Instruction

↓

Small Steps + Active Response + Feedback + Self-Pacing

↓

TYPES

Linear — Skinner

and

Branching — Crowder

↓

SYSTEMATIC IMPROVEMENT OF TEACHING AND LEARNING

50. Classroom Activity — Identify the Approach

Give students the following situations:

Situation A: Teacher uses a projector and video.

→ Hardware Approach

Situation B: Teacher organises learning through reinforcement, carefully sequenced materials and feedback.

→ Software Approach

Situation C: Teacher identifies objectives, analyses learners, selects methods/resources, evaluates outcomes and modifies instruction.

→ Systems Approach

Then ask students to explain why, rather than merely name the approach.

51. Classroom Activity — Design Programmed Frames

Ask students to prepare five linear frames on:

“Meaning of Educational Technology.”

Each frame should contain:

Information → Question → Response → Feedback

Then ask another group to prepare a branching frame with:

- one question;
- three alternatives;
- one correct branch;
- two remedial branches.

This converts the theoretical concept into practical understanding.

52. Common Examination Confusions

Do Not Confuse	Correct Understanding
Educational Technology = computers	ET is much broader
Hardware = all Educational Technology	Hardware is only one approach.
Software approach = computer software	In this classification, it primarily concerns instructional/learning principles.
Systems approach = use of computer systems	It means viewing instruction as an interconnected system.
Dale's Cone = retention percentages	Dale did not propose the popular percentage-retention pyramid.
Programmed instruction = computer programming	It is a systematically sequenced instructional strategy.
Linear = different paths	Linear follows essentially one sequence.
Branching = one fixed path	Branching permits response-dependent routes.

53. Key Takeaways

1. Educational Technology is broader than the use of electronic equipment.

2. It systematically applies knowledge, methods and resources to education.
3. It is scientific, systematic, goal-oriented and evaluation-based.
4. Its scope extends across the teaching-learning process.
5. Hardware Approach emphasises machines and equipment.
6. Software Approach emphasises learning principles and instructional processes.
7. Systems Approach considers the whole teaching-learning system.
8. Input, process, output and feedback are important systems concepts.
9. Hardware and software approaches can complement each other.
10. Dale's Cone organises learning experiences from more direct/concrete towards more abstract/symbolic forms.
11. Dale's Cone should not be associated with unsupported retention percentages.
12. Direct purposeful experience involves direct participation.
13. Models provide contrived experiences.
14. Words and verbal descriptions are relatively abstract symbolic experiences.
15. Programmed instruction is systematically sequenced instruction.
16. Content is organised into frames.
17. Learners respond actively.
18. Immediate feedback is important.
19. Self-pacing is a major characteristic.
20. Linear programming is associated with Skinner.
21. Branching programming is associated with Crowder.
22. Linear programming follows a common sequence essentially.
23. Branching programming provides response-dependent routes.

24. Educational Technology ultimately aims at systematic improvement of teaching and learning.

54. Short-Answer Questions

1. Define Educational Technology.
2. Explain the meaning of Educational Technology.
3. State four characteristics of Educational Technology.
4. Mention four areas within the scope of Educational Technology.
5. What is meant by technology in education?
6. What is technology of education?
7. Define the hardware approach.
8. Give four examples of educational hardware.
9. Explain the Software Approach.
10. What is the Systems Approach?
11. What are input, process and output in an educational system?
12. Why is feedback important in the Systems Approach?
13. Distinguish between hardware and Software Approaches.
14. What is Dale's Cone of Experience?
15. What are direct purposeful experiences?
16. What are contrived experiences?
17. What are verbal symbols?
18. Define Programmed Instruction.
19. What is a frame?
20. State the fundamental principles of programming.
21. What is linear programming?

22. Who is associated with linear programming?
23. What is branching programming?
24. Who is associated with branching programming?
25. Distinguish linear programming and branching programming.

55. Long/Essay Questions

1. Explain the meaning, nature and scope of Educational Technology.
2. Discuss the Hardware, Software and Systems approaches to Educational Technology.
3. Distinguish between Hardware and Software approaches with suitable examples.
4. Explain the Systems Approach to education and discuss its importance.
5. Explain Edgar Dale's Cone of Experience and discuss its educational significance.
6. What is Programmed Instruction? Discuss its characteristics and fundamental principles.
7. Explain Linear Programming with its characteristics, advantages and limitations.
8. Explain Branching Programming with suitable examples.
9. Compare Linear and Branching Programming.
10. Discuss the role of Programmed Instruction as an instructional strategy in Educational Technology.

56. Analytical Questions

1. “Educational Technology is much more than the use of machines in education.” Explain.

2. How do Hardware and Software approaches complement each other?
3. Why is feedback central to the Systems Approach?
4. How can the Systems Approach help a teacher solve a classroom learning problem?
5. Why should teachers use different levels of experience while teaching abstract concepts?
6. Critically explain why Dale's Cone should not be interpreted as a fixed hierarchy of learning effectiveness.
7. How does Programmed Instruction promote individualised learning?
8. Why does branching programming treat learner errors differently from linear programming?
9. Compare the role of the learner in conventional lecture teaching and Programmed Instruction.
10. Design a simple instructional situation integrating Hardware, Software and Systems approaches.

57. High-Priority Examination Areas

Topic	Essential Preparation
Educational Technology	Meaning, nature, scope
Hardware Approach	Meaning, characteristics, examples
Software Approach	Meaning, psychological foundation
Systems Approach	Meaning, steps, Input–Process–Output–Feedback
Three approaches	Comparative answer
Dale's Cone	Levels and educational significance

Topic	Essential Preparation
Programmed Instruction	Meaning, characteristics and principles
Linear Programming	Skinner, features
Branching Programming	Crowder, features
Linear vs Branching	Comparative table

58. One-Page Blackboard Revision

UNIT I — EDUCATIONAL TECHNOLOGY

EDUCATIONAL TECHNOLOGY

Meaning → Scientific & Systematic Application to Education

↓

NATURE

Scientific + Systematic + Goal-Oriented + Learner-Centred + Dynamic + Evaluative

↓

SCOPE

Objectives → Learner → Content → Method → Media → Evaluation → Feedback

THREE APPROACHES — HSS

H — HARDWARE

Machines + Equipment + Devices

S — SOFTWARE

Learning Principles + Instructional Strategies

S — SYSTEMS

Input → Process → Output → Feedback

DALE'S CONE OF EXPERIENCE

Direct/Concrete Experiences

↓

Representational Experiences

↓

Symbolic/Abstract Experiences

No “retention percentage” interpretation

PROGRAMMED INSTRUCTION

Small Steps

↓

Active Response

↓

Immediate Feedback

↓

Self-Pacing

↓

Evaluation

TWO TYPES

Linear → Skinner → Straight Sequence

Branching → Crowder → Response-Based Routes

FINAL MEMORY MAP

Educational Technology
↓
Hardware + Software + Systems
↓
Dale's Cone of Experience
↓
Programmed Instruction
↓
Linear + Branching
↓
Systematic and Effective Teaching-Learning

For classroom and examination purposes, I would give the greatest attention to meaning–nature–scope, the three approaches and their comparison, Dale's Cone of Experience, and especially Programmed Instruction, with the distinction between Skinner's linear and Crowder's branching programming, since these collectively cover the complete prescribed Unit I.