

The Pedagogy of Medical Education

Instructional Design Principles

The best instruction is that which is:

- **Effective** - facilitates learners' acquisition of the prescribed knowledge, skills and attitudes
- **Efficient** – requires the least possible amount of time necessary for learners to achieve the objective
- **Appealing** – motivates and interests learners, encourages them to persevere in the learning task
- **Enduring** – encoded in long-term memory, accessible and applicable in the future

Instructional Design Principles

- There should be congruence among objectives, learning activities, and assessment.
- The objectives should be the driving force behind decisions about activities and assessment.
- Students must participate actively, interacting mentally as well as physically with material to be learned.
- Learners should be evaluated in terms of how nearly they achieve the instructional objectives rather than how they “stack up” against their fellow students.

Adult Learning Principles

- Capitalize on the experience of participants.
- Adapt to the aging limitations of the participants.
- Adults should be challenged to move to increasingly advanced stages of personal development.
- Adults should have as much choice as possible in the availability and organization of learning programs.

Application of Adult Learning Theory

- Explain why specific things are being taught
- Instruction should be task-oriented instead of memorization -- learning activities in context of common tasks to be performed.
- Instruction should take into account the wide range of different backgrounds of learners; learning materials and activities should allow for different levels/types of previous experience
- Since adults are self-directed, instruction should allow learners to discover things for themselves, providing guidance and help when mistakes are made.

Principles of Andragogy

- Adults need to be involved in the planning and evaluation of their instruction.
- Experience (including mistakes) provides the basis for learning activities.
- Adults are most interested in learning subjects that have immediate relevance to their job or personal life.
- Adult learning is **problem-centered** rather than content-oriented.

Experiential Learning Principles

- Significant learning takes place when the subject matter is relevant to the personal interests of the student
- Learning which is threatening to the self (e.g., new attitudes or perspectives) are more easily assimilated when external threats are at a minimum
- Learning proceeds faster when the threat to the self is low
- **Self-initiated learning is the most lasting and pervasive.**

Cognitive Learning Principles

- Learning activities must provide multiple representations of content
- Instructional materials should avoid oversimplifying the content domain and support **context-dependent** knowledge
- Instruction should be **case-based** and emphasize **knowledge construction**, not transmission of information
- Knowledge sources should be highly **interconnected** rather than compartmentalized.

Constructivist Principles

- Instruction must be concerned with the experiences and contexts that make the student willing and able to learn (readiness).
- Instruction must be structured so that it can be easily grasped by the student (spiral organization).
- Instruction should be designed to facilitate extrapolation and or fill in the gaps (going beyond the information given).

Cognitive Dissonance Principles

- Dissonance theory applies to all situations involving attitude formation and change. It is especially relevant to decision-making and problem-solving.
- Dissonance results when an individual must choose between attitudes and behaviors that are contradictory.
- Dissonance can be eliminated by reducing the importance of the conflicting beliefs, acquiring new beliefs that change the balance, or removing the conflicting attitude or behavior.

9 Events of Instruction

- Gaining attention (reception)
- Informing learners of the objective (expectancy)
- Stimulating recall of prior learning (retrieval)
- Presenting the stimulus (selective perception)
- Providing learning guidance (semantic encoding)
- Eliciting performance (responding)
- Providing feedback (reinforcement)
- Assessing performance (retrieval)
- Enhancing retention and transfer (generalization)

Conditions of Learning

- Different instruction is required for different learning outcomes.
- Events of learning operate on the learner in ways that constitute the conditions of learning.
- The specific operations that constitute instructional events are different for each different type of learning outcome.
- Learning hierarchies define what intellectual skills are to be learned and a sequence of instruction.

Learning Objectives

- Fundamental Rule of Thumb
- **Must be measurable and observable**
- Articulate goal of the training/teaching
- Communicate intent to learner
- Provides means for evaluation
- Assists in selection of materials

Essential Characteristics of Learning Objectives

- Description of **performance** task and results – evidence of achievement: verb and product
- **Conditions** under which performance will take place
- Criterion, **Standards** – minimum acceptable level

Rules of Good Visual Aides

- Easy to read in all circumstances
 - Contrast
 - Font size
- Less is more
 - Rule of 6 (pick a number)
 - Simplicity of graphs and charts
- Illustrate concepts and main points

Development of Instructional Materials for Posting Online

- Small enough to be easily downloaded over modem connection
- Specify software and version in which materials were created

Analysis of Learning Environment

- What are characteristics of the teachers/trainers who will be using these materials?
- Are there existing curricula into which this piece of instruction must fit? If so, what is the philosophy, strategy or theory used in these materials?
- What hardware is commonly available in the potential learning environments?

Analysis of the Learner

- Who is your target audience?
- Cognitive characteristics
 - Specific content knowledge
 - Prior experiences
- Physiological characteristics
 - Age
 - Sensory perception
 - General health
- Psychosocial characteristics
 - Interests
 - Motivations
 - Attitude toward learning
 - Moral development
 - Job position and rank
 - Role Models

References

- Brehm, J. & Cohen, A. (1962). *Explorations in Cognitive Dissonance*. New York: Wiley.
- Bruner, J. (1996). *The Culture of Education*, Cambridge, MA: Harvard University Press.
- Cross, K.P. (1981). *Adults as Learners*. San Francisco: Jossey-Bass.
- Dick, W. & Carey, L. (1990). *The systematic design of Instruction*. (3rd Ed.). London, England. Scott, Foresman and Co. Publishers
- Gagne, R. (1985). *The Conditions of Learning* (4th ed.). New York: Holt, Rinehart & Winston .
- Gagne, R., Briggs, L. & Wager, W. (1992). *Principles of Instructional Design* (4th Ed.). Fort Worth, TX: HBJ College Publishers.
- Knowles, M. (1984). *Andragogy in Action*. San Francisco: Jossey-Bass.
- Morrison, G, Ross, S. & Kemp, J. (2004). *Designing effective instruction*. (4th Ed.). New Jersey.
- Rogers, C.R. (1969). *Freedom to Learn*. Columbus, OH: Merrill.
- Smith, P. & Ragan, T. (1993). *Instructional Design*. Columbus, Ohio. Prentice Hall.

Nancy Clark, M.Ed.

Spiro, R.J. & Jehng, J. (1990). Cognitive flexibility and hypertext: Theory and technology for the non-linear and multidimensional traversal of complex subject matter. D. Nix & R. Spiro (eds.), *Cognition, Education, and Multimedia*. Hillsdale, NJ: Erlbaum.