Overview

- Ausubel’s Meaningful Reception Learning Theory
- Schema Theory
- Advance Organizers
- Managing Essential Processing
- Application to the design of multimedia learning materials
• What is the fundamental difference between objectivist and constructivist epistemologies?
How can Ausubel’s Meaningful Reception Learning Theory and Schema Theory be used to inform the design of meaningful learning for the following projects?

- Characterize your environment in terms of reception learning v. discovery learning
- Describe subsumption (derivative, correlative) and superordinate v. combinatorial learning in your module
- Describe learning activities designed to facilitate schema accretion, tuning, and restructuring
Ausubel

- Reception learning (expository instruction)
- Discovery learning (experiments, labs, ...)
- Rote learning
- Meaningful learning
Ausubel

- **Cognitive Structures**: Set of ideas organized in hierarchical structure (propositional model with hierarchy)
- **Anchoring ideas**: specific, relevant ideas in the learner’s cognitive structure that provide the entry points for new information to be connected
Derivative subsumption: learning of new examples or cases that are illustrative of an established concept or previously learned proposition, existing idea remains unchanged

Correlative Subsumption: elaboration, extension or modification of previously learned concepts or propositions by the subsumption of the incoming idea; existing idea is changed/expanded through new idea
Superordinate learning: synthesis of established ideas. New, inclusive proposition or concept is learned under which already established ideas can be subsumed.

Combinatorial learning: new concept or idea is neither more inclusive nor subordinate to relevant anchoring ideas in cognitive structure. New idea is not relatable in a specific sense to an existing anchor but is generally relevant to a broad background of information.
Data structure for representing the generic concepts stored in memory

Represent our knowledge about all concepts:
- underlying objects,
- situations, events,
- sequences of events,
- actions, and
- sequences of actions (Rumelhart, 1980)

Mental models are schemata that represent:
- one’s knowledge about a subject matter
- perceptions of task demands and task performances
- guide and govern performance
Mental Models

– Mental models are incomplete
– People’s abilities to control their models is limited
– Mental models are unstable
– Mental models do not have firm boundaries
– Mental models are unscientific
– Mental models are parsimonious

Norman (1983)
Schema acquisition and modification

**Accretion**: similar to fact learning, information is remembered that was instantiated within a schema as a result of text comprehension or understanding an event.

**Tuning**: existing schemata become more consistent with experience, incorporates minor schema modifications.
Schema acquisition and modification

**Restructuring**: Creation of entirely new schema which replace or incorporate old ones;

**Schema induction** – new schema is configured from repeated consistencies of experience; or:

Restructuring through **learning by analogy**, new schema is modeled after existing one and then tuned.
Advance organizer (Ausubel, 1960)

- Relevant and inclusive introductory materials, provided in advance of learning materials
Advance organizer (Ausubel, 1960)

Advance organizers should:

– Have a short set of verbal and visual information
– Be present prior to learning of a larger body of to-be-learned information
– Contain no specific content from the to-be-learned information
Advance organizer (Ausubel, 1960)

–Means of generating logical relationships among elements of new information,
–Influence learner’s encoding process:
  –Provide a new general organization as an assimilative context
  –Activate a general organization from learner’s existing knowledge that would not have normally been used to assimilate the new material
Cognitive Science

Example

• Life in the Universe

Advance Organizer
Cognitive Science

Advance Organizer

Example

• OLIT 501
Cognitive Science

Advance Organizer

Example

• Una Carta a Dios
Example

- CyberBuch
Managing Essential Processing

How can essential processing be assured, i.e., cognitive overload in processing the key information in multimedia learning materials be avoided?

• Pretraining Principle
• Segmenting Principle
• Modality Principle

Mayer (2005)
Managing Essential Processing

**Pretraining Principle**
People learn more deeply from a multimedia message when they know the names and characteristics of main concepts.

**Segmenting Principle**
People learn more deeply when a multimedia message is presented in user-paced segments rather than as a continuous unit.

**Modality Principle**
People learn more deeply when text in a dynamic visual representation is presented as narration rather than as on-screen text.
Revise your project design by adding an advance organizer and applying methods to manage essential processing.

1. Identify what should be introduced using the AO
2. Determine which methods to manage essential processing should be applied, and how that could be done.