As you read through each chapter, you will learn about behavior, cognitive, and constructivist psychology principles. Write a paper to compare and contrast these principles, including how they apply to instructional design. Limit your response to three pages maximum (double-spaced, one inch margins, 12 point font).

Behavioral Philosophy

Study of observable behavior

Instructional Systems Design is based largely on behavioral psychology

Emphasis on:

Behavioral objectives (by end of lesson student will be able to…)

Analyzing learning tasks and activities

Teaching to specific levels of learner performance

Proponents:

Edward Thorndike (1913) – operant conditioning: the use of rewards and punishment to modify behavior

Ivan Pavlov (1927) – classical conditioning: conditioned stimulus = conditional response

B.F. Skinner (1938, 1969, 1974)

Operant conditioning:

- ***Positive reinforcement*** (behavior that is followed by positive environmental effects increases in frequency)
- ***Negative reinforcement*** (behavior that is followed by the withdrawal of negative environmental effects increases in frequency)
- ***Punishment*** (behavior that is followed by negative environmental effects decreases in frequency)
- ***Extinction*** (when behavior that was previously increased in frequency through reinforcement is no longer reinforced it decreases)
- ***Principle of intermittent reinforcement*** (behavior that is always rewarded increases rapidly in frequency, but after the reward ceases the behavior also extinguishes rapidly. Behavior that is rewarded intermittently increases in frequency more slowly, but is more long lasting or resistant to extinction)

Detractors:

“treated the learner as a bucket into which knowledge about the world was poured” (p17 pp1).

Ignores unobservable aspects of learning (such as thinking, reflection, memory, and motivation)

Overlooks or even ignores unintended outcomes

Too much emphasis on instructor and instructional materials and too little on the learner

"Radical constructivists argue that educational institutions are in grave danger if they continue to function based on behavioral or cognitive principals and that our educational systems must be redesigned along constructivist principals" (p17 pp2).

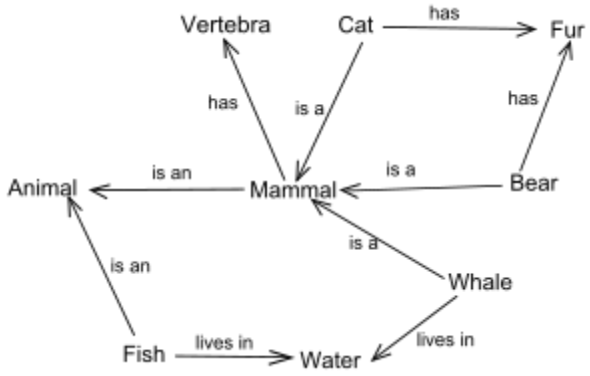
Cognitive Philosophy (began in 1970s)

Information Processing:

- Most dominant approach
- studies how information In the world:
  - Enters through our senses (modality)
  - Becomes stored in memory (short-term & long-term)
  - Is retained or forgotten (transfer)
  - Is used (applied)

Semantic networks:

- tries to parallel how biologists view the connections of the human brain.
- Nodes of information connected by links characterized by similarity



Schema Theory

Sir Frederick Bartlett (1932)

Areas of cognitive theory most related to multimedia design:

- **Perception and attention**
  - Learning begins with attention to and perception of information in the learner's environment

- Three main principles
  - Information (visual or aural) must be easy to receive
  - The position (spatial or temporal) of information affects our attention to and perception of it
  - Differences and changes attract and maintain attention
- For perception of lesson elements to occur
  - Attention must be initially attracted and maintained throughout lesson
  - Attnetion is affected and maintained by many characterisitics of the learners themselves including:
    - Level of involvement in lesson
    - Personal interest in topic
    - Pior knowledge about content
    - Difficulty of the lesson for them
    - Novelty or familiarity of the information

- **Encoding of Information**
  - Lesson must be transformed into a format that can be stored in the brain
  - Encoding depends on a number of factors including:
    - The format of the information in the environment
    - The medium of the information
    - Interrelationships of different information elements
  - Principals of particular relevance to interactive multimedia
    - Dual coding (Clark & Paivio, 1995)
      - Learning is enhanced when complementary information is received simultaneously
        - Visuals with complimentary narration (good)
        - Narration while viewing conflicting text (bad)
    - Multimedia effect (Mayer, 1997; Mayer, Steinhoff, Bower, and Mars, 1995)
    - Multiple symbol systems (Dickson, 1985)
- Memory
  - Ensuring the important information can be recalled
  - Principle of organization
    - Information is better retained if it is organized
    - More powerful than principle of repetition
    - Not always appropriate or convenient
      - When information has no inherent organization
      - When remembering large amounts of information
      - When automaticity is required
      - When motor or psychomotor skills are being learned
  - Principle of repetition
    - Information is better retained the more it is practiced or used
  - Affected by motivation and relevance of information to the learner

- Comprehension
    - Classify it, apply it, evaluate it, discuss it, manipulate it, and teach it to others
    - Verbal information: being able to restate in own words or explain it to someone else
    - Concepts: being able to distinguish examples from non-examples, including difficult discriminations and gray areas
    - Rules and Principals: knowing when they apply and demonstrating correct application
- Active learning
    - Emphasis of cognitive approach
    - People Learn not only from observation but also by doing
    - Demonstrates importance in interactive multimedia programs
    - Difficult to design interactions that are:
        - Frequent
        - Relevant
        - Interesting
        - Appropriate level of difficulty
- Motivation
- Locus of control
- Mental models
- Metacognition
- Transfer of learning
- Individual differences

Proponents:

Detractors:

"Unscientific" (p17 pp2).

Constructivist Philosophy (began in 1980s)

Proponents:

"Views learners as active creators of knowledge, who learn by observing, manipulating, and interpreting the world around them" (p17 pp1).

Radical constructivists argue that educational institutions are in grave danger if they continue to function based on behavioral or cognitive principals and that our educational systems must be redesigned along constructivist principals

Detractors:

"more philosophy than science" (p17 pp2)

"majority of learning psychologists, educators, and instructional designers prefer to merge various principals of behavioral, cognitive, and constructivist paradigms into one integrated approach" (p17 pp2).