Chapter 5.10

Behaviorism and Developments in Instructional Design and Technology

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INTRODUCTION: THE BASICS OF BEHAVIORISM

The *theory of behaviorism* concentrates on the study of overt behaviors that can be observed and measured (Good & Brophy, 1990). In general, the behavior theorists view the mind as a "black box" in the sense that response to *stimulus* can be observed quantitatively, ignoring the possibility of thought processes occurring in the mind. Behaviorists believe that learning takes place as the result of a response that follows on a specific stimulus. By repeating the *S-R* (stimulus-response) cycle, the organism (may it be an animal or human) is *conditioned* into repeating the response whenever the same stimulus is present. The behavioral emphasis on breaking down complex tasks, such as learning to read, into subskills that

are taught separately, has a powerful influence on instructional design. Behaviors can be modified, and learning is measured by observable change in behavior. The behavior theorists emphasize the need of objectivity, which leads to great accentuation of statistical and mathematical analysis. The design principles introduced by the behavior theorists continue to guide the development of today's computer-based learning. In distance-education courseware and instructional software, key behavior-modification principles are used. For example, a typical course Web site usually states the objectives of the software; uses text, visual, or audio to apply appropriate *reinforcers*; provides repetition and immediate feedback; uses principles to shape, chain, model, punish, and award the learners; incorporates a scoring system as a part of the system; and provides status of the progress of the learner. Major learning theorists associated with behaviorism are the following:

- Pavlov
- Thorndike
- Skinner
- Watson
- Gagné

The major educational technology developments in America that can be attributed to behaviorism are the following:

- The behavioral objectives movement
- The teaching machine phase
- The programmed instruction movement
- The individualized instructional approaches
- The computer-assisted learning
- The systems approach to instruction

Major instructional design theorists associated with behaviorism are as follows:

- Glaser
- Gagné and Briggs
- Dick and Carey
- Mager

BACKGROUND: BEHAVIORISM AND LEARNING THEORIES

The advent of behavioral theories can be traced back to the elder Sophists of ancient Greece, Cicero, Herbart, and Spencer (Saettler, 1990). Behaviorism, as a learning theory, can be traced back to Aristotle, whose essay "Memory" focused on associations being made between events such as lightning and thunder. Other philosophers that followed Aristotle's thoughts are Hobbes (1650), Hume (1740), Brown (1820), Bain (1855), and Ebbinghause (1885). Franklin Bobbitt developed the modern concept of behavioral objectives in the early 1900s. More recently, the names associated with the development of the behaviorist theory include Pavlov, Thorndike, Watson, and B. F. Skinner.

Pavlov (1849-1936)

The Russian physiologist Ivan Petrovich Pavlov is the precursor to behavioral science. He is best known for his work in classical conditioning or stimulus substitution. Pavlov's experiment involved food, a dog, and a bell. His work inaugurated the era of S-R psychology.

Pavlov placed meat powder (an unconditioned stimulus) on a dog's tongue, which caused the dog to automatically salivate (the unconditioned response). The unconditioned responses are natural and not learned. On a series of subsequent trials, Pavlov sounded a bell at the same time he gave the meat powder to the dog. When the food was accompanied by the bell many times, Pavlov found that he could withhold the food, and the bell's sound itself would cause the dog to salivate. The bell became the *conditioned stimulus* that caused the conditioned response of salivating (Thomas, 1992). In 1904, he was awarded the Nobel Prize for his research on digestive processes.

The stimulus and response items of Pavlov's experiment can be summarized as follows:

- **Food:** Unconditioned Stimulus
- **Salivation:** Unconditioned Response
- **Bell:** Conditioned Stimulus
- **Salivation:** Conditioned Response

Pavlov also made the following observations (Mergel, 1998):

- *Stimulus generalization*: Once the dog has learned to salivate at the sound of the bell, it will salivate at other similar sounds.
- *Extinction*: If you stop pairing the bell with the food, salivation will eventually cease in response to the bell.
- *Spontaneous recovery*: Extinguished responses can be "recovered" after an elapsed time, but will soon extinguish again if the dog is not presented with food.

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