

Consider the opening scenario with Bill and Beverly. Bill might effectively use this theory with Beverly because she arrived at her first class with a store of aviation facts. Building upon this knowledge, Bill can teach her how to keep the aircraft in straight and level flight while he reinforces what she knows about basic aerodynamics via demonstration and discussion. Since aerodynamics is a constant thread in the flight lessons, Bill is also able to employ the spiral curriculum concept in future lessons by repeatedly revisiting the basic concepts and building upon them as Beverly's skill and knowledge increase.

A group of educators led by Benjamin Bloom tried to classify the levels of thinking behaviors thought to be important in the processes of learning. [Figure 3-4] They wanted to classify education goals and objectives based on the assumption that abilities can be measured along a continuum from simple to complex. The result, which remains a popular framework for cognitive theory, was Bloom's Taxonomy of the Cognitive Domain. The taxonomy (a classification system according to presumed relationships) comprises six levels of intellectual behavior and progresses from the simplest to the most complex: knowledge, comprehension, application, analysis, synthesis, and evaluation. For more detailed information about the taxonomy, see Domains of Learning.

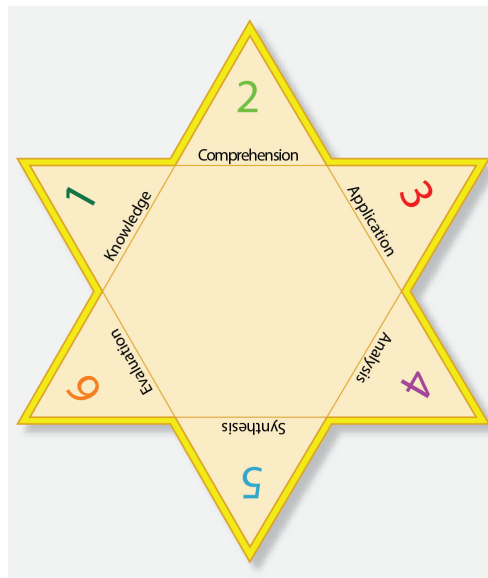


Figure 3-4. Bloom's Taxonomy of the Cognitive Domain.

Continued research into cognitive theory has led to theories such as information processing and constructivism. This is the basis of the organizing a lesson methods discussed in Chapter 5, The Teaching Process.

Information Processing Theory

Information processing theory uses a computer system as a model for human learning. The human brain processes incoming information, stores and retrieves it and generates responses to the information. This involves a number of cognitive processes: gathering and representing information (encoding), retaining of information, and retrieving the information when needed.

This learning system has limitations and needs to be operated properly. A computer gets input from a keyboard, mouse, etc., whereas the human brain gets input from the senses of sight, hearing, touch, taste, and smell. The amount of sensory input the brain receives per second ranges from thousands to millions of bits of information according to various theories. Regardless of the number, that is a lot of information for the brain to track and process.

One way the brain deals with all this information is to let many of the habitual and routine things go unnoticed. For example, a pilot who uses the rudder when entering a turn is usually unaware of pressing the pedal, even though it involves moving a leg, exerting pressure on the pedal, etc. The human unconscious takes charge, leaving conscious thought processes free to deal with issues that are not habitual.

Since information processing theorists approach learning primarily through a study of memory, this learning concept is revisited during the discussion of memory.

Constructivism

A derivative of cognitive theory, constructivism is a philosophy of learning that holds that learners do not acquire knowledge and skills passively but actively build or construct them based on their experiences. As implied by its name, constructivism emphasizes the constructing or building that goes on during the learning process. Therefore, it creates a learner-centered environment in which they assume responsibility for their own learning.