Cognitive Theory of Multimedia Learning (Mayer)

Summary: A cognitive theory of multimedia learning based on three main assumptions: there are two separate channels (auditory and visual) for processing information; there is limited channel capacity; and that learning is an active process of filtering, selecting, organizing, and integrating information.

Originator: Richard Mayer

Key terms: dual-channel, limited capacity, sensory, working, long-term memory

Cognitive Theory of Multimedia Learning (Mayer)

The principle known as the “multimedia principle” states that “people learn more deeply from words and pictures than from words alone” (Mayer, p. 47). However, simply adding words to pictures is not an effective way to achieve multimedia learning. The goal is to instructional media in the light of how human mind works. This is the basis for Mayer’s cognitive theory of multimedia learning. This theory proposes three main assumptions when it comes to learning with multimedia:

1. There are two separate channels (auditory and visual) for processing information (sometimes referred to as Dual-Coding theory);
2. Each channel has a limited (finite) capacity (similar to Sweller’s notion of Cognitive Load);
3. Learning is an active process of filtering, selecting, organizing, and integrating information based upon prior knowledge.

Humans can only process a finite amount of information in a channel at a time, and they make sense of incoming information by actively creating mental representations. Mayer also discusses the role of three memory stores: sensory (which receives stimuli and stores it for a very short time), working (where we actively process information to create mental constructs (or ‘schema’), and long-term (the repository of all things learned). Mayer’s cognitive theory of multimedia learning presents the idea that the brain does not interpret a multimedia presentation of words, pictures, and auditory information in a mutually exclusive fashion; rather, these elements are selected and organized dynamically to produce logical mental constructs. Futhermore, Mayer underscores the importance of learning (based upon the testing of content and demonstrating the successful transfer of knowledge) when new information is integrated with prior knowledge.

Design principles including providing coherent verbal, pictorial information, guiding the learners to select relevant words and images, and reducing the load for a single processing channel etc. can be entailed from this theory.

For more information, see the following recommended resources:

- Richard Mayer’s book: Multimedia Learning
- The Cambridge Handbook of Multimedia Learning (Cambridge Handbooks in Psychology)