

Chapter II

Learning Theory and Technology: Behavioral, Constructivist, and Adult Learning Approaches

Educational technology is hampered by the absence of a theory of the structure of symbols and their effects or function relating to the mediation of cognitive processes. For example, it is still not clear how the structure of information in film differs from that in pictorial representation or in language (Saettler, 1990, p. 263).

This chapter briefly reviews the history of educational technology, surveys learning theory, and sketches out directions that might contribute to the needed theory Saettler points to above. In order to understand fully educational software, one needs to have a sense of the history of educational technology. Learning theories that have been applied to computer environments also need close examination because they provide the rationale for specific approaches and learning strategies. In particular, we will see in this chapter the important influence behavioral and constructivist theoretical models have had on software design. Additionally, adult learning theories are investigated because of their relevance to educational software in post-secondary education. Finally, cooperative learning and learning style theories are outlined because of their relevance to specific computer-based teaching methods.

According to Paul Saettler (1990), one of the leading historians in the field, educational technology in a broad sense can be traced back to when tribal priests presented systematized knowledge and used early sign writing to pass on knowledge. He points out that the more advanced the culture, the more complex educational technology became. Saettler observes that there is wide disagreement concerning theories in the field of educational technology. Furthermore, he argues that learning theory is a key to the field because behavioral sciences applied to problems of learning and instruction are fundamental to an evolving educational technology. Saettler traces the beginning of educational technology in America to the use of lantern slides for educational purposes in the American Lyceum and Chautauqua movements. Particularly in the Chautauqua educational programs aimed at adults wanting to continue their education, the slides were an integral part of the way programs were presented to large audiences.

Later, what became known as the Visual Instruction Movement promoted visual approaches to teaching to combat what they labeled “verbalism” in the classroom. One influential figure in this movement was Edgar Dale, who developed a schema he called the “Cone of Experience” emphasizing experiential learning over verbal symbols. The Visual Instruction Movement was concerned primarily with the use of specific media, while educational technology is oriented more towards psychological principles and the total teaching-learning process.

In addition to the Visual Instruction Movement, Saettler identifies the Lancasterian method of instruction involving systematic instruction around memorization and drill as an early influence on educational technology, particularly behaviorist approaches. Behaviorism emphasized behavior of the learner and reinforcement, and was first introduced by John B. Watson in a 1913 article, and then developed most extensively later by B.F. Skinner. Skinner saw the curriculum as forming behavioral objectives, or the arrangement of contingencies of reinforcement. In relationship to the progressive and constructivist learning theory, Saettler identifies Thorndike as the first modern instructional technologist, replaced later only by John Dewey in influence. The Dewey-inspired Progressive Movement provided the philosophical grounding for what later became constructivism. So we can see that early on there were two main techniques for the use of media in the classroom: one concentrating on behavior, and another focusing on process and wholistic, experiential-based learning.

EDUCATIONAL AND INSTRUCTIONAL FILM

A pioneer in film technology and an intellectual interested in education, Thomas Edison was a regular participant in Chautauqua Movement education programs and was one of the first to produce films for classroom use. In 1911 he released a series

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