



Chapter II

Organizing Knowledge for Instruction

Introduction

What is intelligence? What do we know about knowledge? Are design and technological knowledge unique? Do different types of knowledge demand different organizations? How can we employ cognitive skills in the resolution of technological problems? This chapter provides an introduction to current theories of intelligence and knowledge with an emphasis on instructional organization. We will discuss learning theories and theories of cognition in Chapter VI. In the previous chapter, we acknowledged that despite the proliferation of communication and information technologies, communication skills for most people have atrophied. At the same time this proliferation of new technologies has created conditions for what we experience as information overload. For this reason, it is extremely important that teachers develop effective skills and techniques for the communication, organization, and presentation of information and knowledge. It is essential that teachers develop working understandings of current theories of knowledge and skills. Our understandings of technological knowledge and literacy along with the theories that we act on determine the way we teach about, through, and for design and technology. Current theories of intelligence, or cognitive pluralism, and the organization of knowledge are fundamental to effective instruction. This chapter builds on the basic communication and organization techniques provided in Chapter I. The effective organization of instruction requires the effective organization of knowledge.

Intelligence

Intelligence is no longer merely associated with the reasoning skills necessary to successfully complete an intelligence test. The twentieth century began with very narrow notions of intelligence that differentiated among people in extremely biased ways. According to Binet-Simon intelligence exams, students were found to be imbeciles, morons, retarded, sub-normal, normal, or geniuses according to their intelligent quotient or IQ. Even while scientists argued that intelligence, or a “general mental adaptability to new problems and conditions of life,” was both innate and environmental, most of the scientists leaned toward the genetic side rather than the cultural side. Not very surprisingly, many students from poor and working class families were below average intelligence. Students found to be below average intelligence were believed to be stupid for life. By the 1960s however, both the exams and the scientists were found to be racially biased. One result of research into intelligence practices was that intelligence is no longer measured in terms of exams and IQs. Fairly recent changes in cognitive science have led researchers to re-think customary notions. In effect, intelligence has been democratized. Everyone is intelligent in some way. Intelligence can generally be defined today as “the capacity to solve problems or to fashion products that are valued in one or more cultural settings” (Gardner & Hatch, 1989). The difference between this and earlier definitions is the qualification that connects intelligence to specific cultural settings. Intelligence theories continue to suggest that intelligence results from an interaction of biological and cultural forces and functions.

According to Howard Gardner (1983, 1993), each and every human has the capacity to be intelligent in one or a number of nine areas that correspond with ways of resolving problems. Multiple intelligence involves nine capacities: bodily-kinesthetic, existential, interpersonal, intrapersonal, musical, logical-mathematical, linguistic, naturalist, and spatial. Most of us in technology directly involve bodily-kinesthetic, logical-mathematical, and spatial capacities in very complex ways. You could say that we have developed high levels of intelligence; we have high levels of bodily-kinesthetic, logical-mathematical, and spatial intelligence. This is not to say that these three intelligences are the only significant intelligences for practice in design and technology. In fact, teaching typically requires high levels of existential, interpersonal, and intrapersonal intelligence, or as we will explain in the next chapter, high levels of emotional intelligence. When we are creative, as we will discuss in Chapter V, we integrate a wide range of intelligences to the resolution of problems.

Why should we consider Gardner’s theory of multiple intelligences (MI) to be a breakthrough? Is it a tenable theory? Does it resonate with your own experiences? One of the primary reasons MI is such a breakthrough is that it validates practice in design and technology. MI puts the ball back into the central offices of schools and governments. No longer is it sufficient to provide for merely one or two intelligences

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