Chapter XXII
Learning Objects, Learning Tasks, and Handhelds

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ABSTRACT

The main idea behind learning objects is that they are to exist as digital resources separated from the learning task in which they are used. This allows a learning object to be reused with different learning tasks. However, not all learning objects operate in similar ways, neither are all learning tasks the same, and this exposes the problem that current recommendations from literature fail to link learning objects and their reuse in varied learning tasks. In this chapter, we explore definitions of learning objects and learning tasks. We also suggest that appropriate matches would lead to more effective pedagogical applications that can be used as set of recommendations for designers of learning objects and teachers who plan learning tasks and select learning objects for student learning activities. In addition, we discuss applications of learning objects delivered by emerging technologies which may change how digital resources are accessed and used by students in and out of classrooms.

LEARNING OBJECTS

Initially, the idea behind learning objects was that the curriculum content of a course could be broken down into small, reusable instructional components and each addressed a specific learn-ing objective. These components could be tagged with metadata descriptors and deposited in digital libraries for subsequent machine-defined reuse into larger structures such as lessons and courses (see Cisco Systems, 2001; E-learning Competency Center, 2003; IMS Global Learning Consor-

tium, 2002; L'Allier, 1998; Wiley, 2000). These early ideas largely emerged from a partnership between information technology and traditional instructional design communities who believed that information could be packaged into learning objects, and that when the learning objects were arranged according to a set of rules in a particular sequence, learning would result (Jonassen & Churchill, 2004). More recently, learning objects have been viewed as a promising strategy to support technology-based learning especially in the design, management, and reuse of educationally useful resources (Churchill, 2006). Learning objects emerged within a variety of frameworks for understanding the design of student-centered learning such as constructivist learning environments (Jonassen, 1999), problem solving (Jonassen, 2000), engaged learning (Dwyer, Ringstaff, & Sandholtz, 1985-1998), problem-based learning (Savery & Duffy, 1995), rich environments for active learning (Grabinger, 1996), technology-based learning environments (Vosniadou, De Corte, & Mandl, 1995), interactive learning environments (Harper & Hedberg, 1997), collaborative knowledge building (Bereiter & Scardamalia, 2003), 3D virtual world explorations in Quest Atlantis (Barab, Thomas, Dodge, Carteaux, & Tuzun, 2005), situated learning (Brown, Collins, & Duguid, 1989), and WebQuests (Dodge, 1995). Common to these frameworks, students must engage and interact with a task where knowledge is created and applied and the learning object is critical to this outcome.

Learning objects can be described as interactive, multimedia curriculum resources purposely designed to achieve learning outcomes (Le@rning Federation, 2007). Alternatively, learning objects can be described in more general terms as a representation designed to afford use in different educational contexts (Churchill, in press a). Learning objects can be distinguished from a *digital resources* which refer to pertinent multimedia resources that can be woven into learning objects, sequences, or activities. Digital resources normally refer to images, movie clips, and audio files sourced from diverse collections of cultural and scientific institutions. If learning objects are to be uniquely effective, they must replace, supplant, or advance other forms of representation and thus contribute to a "disruptive pedagogy" in which the digital representation replaces all previous representations (Hedberg, 2006). The concept of disruptive pedagogies suggests that to result in effective learning, digital resources should represent ideas in ways that are difficult if not impossible with previous nondigital forms. In this context, learning objects utilize representation capabilities of contemporary technologies and merge these into a set of educationally useful displays of data, concepts, and ideas. The definition should be considered together with the intended uses of educationally relevant material that they display: presentation, practice, simulation, conceptual models, information, and contextual representation objects (see Table 1). The traditional approach to computer-based learning is not rejected by this classification but incorporated in the classification primarily under the presentation objects category. Presentation objects can be combined with practice objects into larger structures that resemble computer-based instructional modules.

Usually, learning objects reside in digital repositories, ready to be retrieved and utilized by those involved in generating educational activities (e.g., teachers and students). These representations address: key concepts from disciplines, in visual and often interactive ways (conceptual models); information (information objects) and situated data (contextual representation objects) that can be useful in the context of developing discipline-specific thinking, a culture of practice, a spirit of inquiry, theoretical knowledge, and information; presentation of small, instructional sequences and demonstrations that deliver encapsulated descriptions and illustration of some aspects of subject matter (presentation objects); provide opportunity for practice (practice objects); and simulations

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