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Expanding the Idea of the Learning Object

Introduction

Initially the idea behind the computer-based learning objects was that the content of a course could be broken down into small, reusable instructional components and each addressed a specific learning objective. These components could be tagged with metadata descriptors and deposited in digital libraries for subsequent reuse into larger structures such as lessons and courses (see Cisco Systems, 2001; IMS Global Learning Consortium, 2002; Jonassen & Churchill, 2004; L'Allier, 1998; and Wiley, 2000). More recently learning objects begun to emerge within a variety of contemporary pedagogical frameworks that promote constructivist learning, e.g., problem solving, engaged learning, problem-based learning, rich environments for active learning, technology-based learning environments, interactive learning environments, collaborative knowledge building, situated learning (Churchill, 2007). Common to these frameworks, students must engage and interact with a task where knowledge is created and applied, and the learning object is seen as a tool and a cognitive supplement that facilitates completion of this task. To overcome potentially conflicting conceptualization of the learning object, there is a need for a broader definition that serves perspective of diverse communities interested in this idea (e.g., computer scientists, education professionals, and corporate instructional designers).

Broader Definition of the Learning Object

The author describes the learning object in broad terms as a multimedia representation designed to afford uses in different educational contexts. In this context, the learning object utilizes representational capabilities of contemporary technology to deliver educationally useful displays of data, information, concepts, and ideas. Supplementing this definition is a classification of learning objects into the following types: presentation, practice, simulation, conceptual models, information and contextual representation objects (see Table 1).

Learning objects might reside in digital repositories, ready to be retrieved and utilized by those involved in generating educational activities (e.g. teachers and students). They can be tagged with suitable metadata descriptors that indicate types of learning objects, and accordingly suggest suitable reuse. Some of the learning objects from the classification can be combined with other objects into direct instruction products supporting traditional pedagogies (e.g., computer-based tutorials). Other learning objects are more appropriate in the context of student-centered pedagogical approaches as resources to be deployed in learning tasks designed by teachers. Through all these forms, representation and interaction are key attributes.

Task-driven Reuse of the Learning Object

Traditional instructivist framework assumes that learning occurs through contact with learning material, processing/internalization of principally presented content and demonstration of behavior that shows achievement of learning objectives. It is believed that multimedia messages, when effectively designed, arranged and presented, can enable learners to memorize material, while interactivity allows repetitive drill and practice until the desired performance is achieved. It is possible for reuse of the learning objects to be machine-driven based on data such as learners' pre- or post-test results. For example, Cisco's Reusable

learning Objects (RLO) strategy describes such machine-driven reuse (see Cisco Systems, 2001).

Learning Object Type	*Explanation*	*Simple Example*
▪ Presentation object	▪ Direct instruction or presentation resources designed with the intention to transmit specific subject matter	▪ A presentation or an instructional sequence on classification of triangles
▪ Practice object	▪ Drill and practice with feedback, educational game or representation that allows practice and learning of certain procedures	▪ Quiz question requiring a learner to use representation of a protractor to measure angles and answer a question regarding ration between base and height of the right-angled triangle
▪ Simulation object	▪ Representation of some real-life system or process	▪ Simulation of a compass allowing learner to draw a geometric shape (e.g. equilateral triangle)
▪ Conceptual model	▪ Representation of a key concept or related concepts of subject matter	▪ Representation that allows manipulation of parameters of a triangle, which in turn changes displayed modalities such as visual representation of a triangle, and numerical values of sizes of its angles and sides, and displays a graph showing changes in relationship between sides or angles
▪ Information object	▪ Organized display of educationally useful information where the organized form assists in understanding	▪ Representations that allow learners to change angles and sizes of a triangle and, based on configuration, to obtain information such as the type of triangle illustrated, a picture showing it in real-life and a short description of its properties
▪ Contextual representation	▪ Data displayed as it emerges from represented authentic scenario	▪ Representations that show real-life examples of triangle (e.g. roof of a building) and allow a learner to use representation of a tool (e.g. tape measure) to collect data about dimensions of these triangles.

Table 1: Basic types of learning objects (from Churchill, 2007)

In contrast, the constructivist framework assumes that learning occurs within a task that results in experiences leading to knowledge construction (e.g., conceptual changes, development of coherent knowledge representations, internalization of social constructed and negotiated meanings, accommodation and assimilation of new concepts in existing knowledge). A suitably designed task is an ill-structured, dynamic and authentic engagement that requires students, for example, to solve problems, conduct inquiries, work with information and data, collaborate, deliver products and presentations and in other ways apply emerging understanding through strategic decisions, as well as engaging in meta-thinking and reflection (Churchill, 2006). Hedberg and Churchill (2008) describes four types of general tasks: (1) the learner might be practicing the use of *rules* or standard processes to achieve a solution; (2) the learner might explore a *incident* or scenario and argue for a particular course of action; (3) the task might include a new design so that the focus is built upon the *strategy* through which it is achieved; and (4) the situation might require the analysis of different perspectives and hence the challenge is seen in terms of a particular *role* that the student might take. The role of a teacher is to design learning tasks that will require students to work

with material and produce artifacts that demonstrate their learning achievements. Once a learning task is planned, suitable learning objects to enable students' learning are supplied.

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