Imagine a large container filled with bits and pieces of digital resources. In it you might find simulations and electronic calculators, animations, text entries, Web sites, and audio and video clips. Reach in a little deeper, and you might discover photographs, illustrations, diagrams, graphs, maps, and charts. The bits and pieces come in all shapes and sizes. Some are large pieces of information organized from much smaller pieces. Some are simply those smaller pieces, such as a video image of a hand on a piano keyboard in a single-chord formation.

What makes the container interesting is not so much its content; that could describe almost any repository. What make this container interesting are the following: the bits and pieces can come together in just-in-time fashion to enhance learning, they can be used and reused, they can be arranged in any number of combinations with other bits and pieces, and they can be applied to any number of learning situations or topics. Most impressive, though, is that the bits and pieces can come together in whatever form you find useful depending on what you need to know right now.

Welcome to the world of learning objects, one of the hottest topics across disciplines and within institutions of higher education today. Three sessions at the NLII annual meeting in New Orleans pulled apart the subject of learning objects and addressed issues ranging from definitions to the challenges of technical interoperability, to learning objects’ impact on the transformation of teaching and learning.

While a specific and agreed-upon definition of learning objects has been the subject of debate and discussion since at least 1997, the most common definition is by David A. Wiley of Utah State University (http://www.usu.edu/), who in a seminal paper titled Connecting Learning Objects to Instructional Design Theory: A Definition, a Metaphor, and a Taxonomy (see item 1.1 on Wiley’s site, http://reusability.org/read/) defined
learning objects as any digital resource that can be reused to mediate learning. Susan Metros of Ohio State University (http://www.osu.edu/index.php) added a set of characteristics to that basic definition in an NLII featured session titled, “Landscape or Portrait? An Ontology for Learning Objects” (see the presentation, including a concept map representing a new ontology for learning objects, at http://www.educause.edu/asp/doclib/abstract.asp?ID=NL0335). The characteristics expand the definition of learning objects to mean pieces of information or media that are reusable; stand-alone; media independent; searchable; interoperable; sharable; digital; modular, with assigned ownership; and peer evaluated.

But learning objects are more than just pieces of information thrown into a virtual container and available through the Internet. According to Metros, the information itself is valuable only if it has some kind of outcome; that is, the data should lead to information, which leads to knowledge. “Knowledge should be our most important focus, but we don’t have champions for knowledge like we do for devices that support the management of data,” she said.

With knowledge at the center, learning objects take on an expanded ontology. They become less bits and pieces of useful information and more like objects that can range from simple to complex but that are tied together by characteristics that show relationship. “By chunking the issues, we can begin to identify patterns,” said Metros.

While the pursuit of knowledge may be the philosophical engine driving our visualization of the potential of learning objects, the technology that underlies their use is a subject of ongoing speculation and concern. According to copresenter Lorcan Dempsey of the Online Computer Library Center Inc. (http://www.oclc.org/home/), learning objects will ultimately appear in many repositories alongside other traditional resources, such as books and journals. Technical standards and specifications will enable objects to interact within a systems management environment. And because people will want to search across repositories, there’ll be a need for a search intermediary. Still, there are costs
involved in creating these environments and costs involved in embedding and managing the data. And the issues are likely to become even more complex.

Dempsey says learning objects will be subject to different terms and conditions for use depending on where they originate. In addition, he says, they’ll curate over time in many versions and recombinations, subject to unknown long-term management and cost issues and will become “variably valuable” as part of the long-term scholarly record. “As we create these repositories, we are going to encounter a variety of management issues that will become increasingly problematic over time,” he said.

While learning technologies may, in the words of Metros, “offer great value in terms of saving time and money in course development,” what are the experiences of learning objects in the real world? And where do faculty—who very often resist making the effort to adopt new technologies—fit in?

As representatives from OSU and the University of Arizona (http://www.arizona.edu/) said in their session titled, “When Learning Object Theory Meets Practice: Functionality of Emerging Standards in the Real World” (http://www.educause.edu/asp/doclib/abstract.asp?ID=NLI0310), this type of technology works best within a preferred teaching practice. At Ohio State, learning objects sometimes take the form of animations that assist students in understanding complex topics and can be reused often—both for foundational knowledge and for interactive understandings. The problem, though, is that faculty are hesitant to use learning objects that are not created to be shared, even if they were placed in a repository or referatory—like MERLOT (http://www.merlot.org/Home.po)—for sharing. True reusability would mean designing objects for modularity and not simply going to an object embedded in another faculty member’s course materials.

The University of Arizona realized that in order to reach all faculty members who are interested in what they refer to as rapid instructional design, what was needed was automation of the decision-making process. A series of questions helped the university
learn more about its targets and made it possible to define outcomes. The result is MOATS—the Modular Organizer and Teaching System—a dynamic system that leads faculty through the process of designing, organizing, and forming instructional models.

At a session titled, “Decentralized Collaborative Approach to Learning Object Development” (http://www.educause.edu/asp/doclib/abstract.asp?ID=nli0328) and in the belief that learning objects foster “a certain interdisciplinarity,” Brian Lamb of the University of British Columbia (http://www.ubc.ca/) described the university’s interest in the promise of learning objects. Faculty members got together and began questioning the idea of sharable objects. “Learning objects seem to demand radical change across the institutions,” said Lamb. “They demand new pedagogy, new instructional design systems, sharing, possibly even reconceptualizing relationships between learners, instructors, and content. The potential of learning objects is that they can foster the exchange of ideas and disseminate knowledge.”

Interest in learning objects has grown into a formal project at the university, one that can best be described as a hybrid of decentralized and centralized organizational principles. Eight distinct campus units—five faculties, Distance Education and Technology, the University of British Columbia Libraries, and Information Technology Services—submitted a joint project proposal to develop a learning object infrastructure. Recognizing the benefits of organizing itself in both a centralized and a decentralized fashion, the project is able to cater to larger faculties, who wish to preserve their autonomy within the larger project and who require customized branding, interface, and experience design; specialized metadata schemata; and secure departmental hosting of resources. But the project also recognizes that centralized solutions may be more appropriate for smaller faculties such as those that lack the resources to maintain their own repositories and that have the need for a central one-stop portal to search for objects.

According to a description of the project, the key to balancing those seemingly contradictory directions is to adapt the strategies of larger learning-object projects to the campus level, such as adhering to shared standards and developing a robust set of
interrepository communication protocols. Ultimately, the project leaders hope to achieve a robust learning object ecology that fosters resource exchange on campus and among national international colleagues.

Still a relatively new concept in the world of educational technology, learning objects raise a number of interesting questions for the audiences that are pushing the concept forward: How do we get to the next place where we develop information that describes learning within the object? Are learning objects simply media doohickeys? For some, that may be the case. And only when we have a way of annotating objects will a sense of purpose be associated with the object. Reusability is more than the modularization that allows an object to stand alone. The concept of reusability may also encompass the language of applicability and meaning.

Until now, the discussion around learning objects has tended toward the what, rather than the how and why. Responsibility to the community of practice in teaching would mean a shift in the nature of intellectual property. Perhaps a doohickey will not be defined as a learning object if embedded in a course Web site in such a way that others would find it difficult to reuse. On the other hand, the learning should include the author’s information on learning context and instructional design as well as content. Metadata—embedded information that describes technical and, to some extent, the instructional nature of a learning object—addresses some of those concerns, but the meaning and intent of metadata elements vary across systems.

As with all new technologies that are intended to change the way we do business, learn, and interact, the learning objects container may for now contain more questions than content.
NLII Activities for 2003: Learning Objects

NLII 2003 fellow Patricia McGee is exploring how pedagogical designs support learning within objects and how objects are used within other systems. Building on NLII 2002 fellow Colleen Carmean’s Deeper Learning Principles (http://www.educause.edu/nlii/keythemes/lcp/), McGee is looking for evidence of these in the development process as well as in the design and implementation of learning objects within learning environments (see http://educ3.utsa.edu/pmcgee/nlii/).

In addition, the NLII has chartered a Learning Objects working group, cochaired by Metros and McGee, to conduct an inventory of learning-object projects and organizations with which the NLII should coordinate efforts, begin the development of a conceptual framework and extend its ontology, identify patterns and relationships, conduct informal research, and collect case studies. McGee is also cofacilitating the Learning Objects Virtual Community of Practice, LOVCOP (http://www.educause.edu/vcop/learningobjects/), which is designed for practitioners in this area, to inform and reveal strategies, policies, and solutions to the challenges of developing and using learning objects. The purpose of the LOVCOP is to describe the current state and practices related to learning-object design, development, and use. The community is open to any interested party.

For more information about these activities and other resources, see the NLII Learning Objects Key Theme page: http://www.educause.edu/nlii/keythemes/LearningObjects.asp.