Recycling Knowledge With Learning Objects

By Ruth Colvin Clark

Peter Drucker—who coined the phrase *knowledge worker*—suggests that the strategic capital of the 21st-century organization relies on intangibles. Those include such intellectual property assets as brand-name recognition, patents and copyrights, corporate databases, and people's expertise.

The drain on human expertise—caused by reengineering, imminent baby-boomer retirement, and rapidly evolving technologies—points to a growing need for smarter ways to define, store, and disseminate knowledge and skills. A traditional training approach that rests on detailed job analysis and on static, monolithic courses no longer meets the performance requirements of modern organizations. It's too slow, general, and expensive. At the same time, technology that delivers knowledge and skills widely via intranets and the Internet opens new channels for information distribution.

Those changes make organizations ripe for using learning objects. You can think of learning objects as knowledge granules created by specialists throughout an organization and that are accessible to many others in the organization. As small bytes of stored information, they're tagged in databases in such a way that they can be assembled into flexible structures—such as personalized training modules, documentation, reference databases, and wizards for performance support.

Learning objects can be stored as text, graphics, or sound. Trainers can use these granules of stored information to generate courses and job or performance aids. Others in the organization (such as marketing and IS staff) can use the learning objects for such products as promotional brochures and technical manuals.

One of the challenges of learning objects is how to best define and tag them. I would suggest at least two types of learning objects—1) information or knowledge objects and 2) instructional objects that can be stored in different ways. Information objects are unique presentation granules needed to deliver these types of content:

- facts
- concepts
- processes
- procedures
- principles.

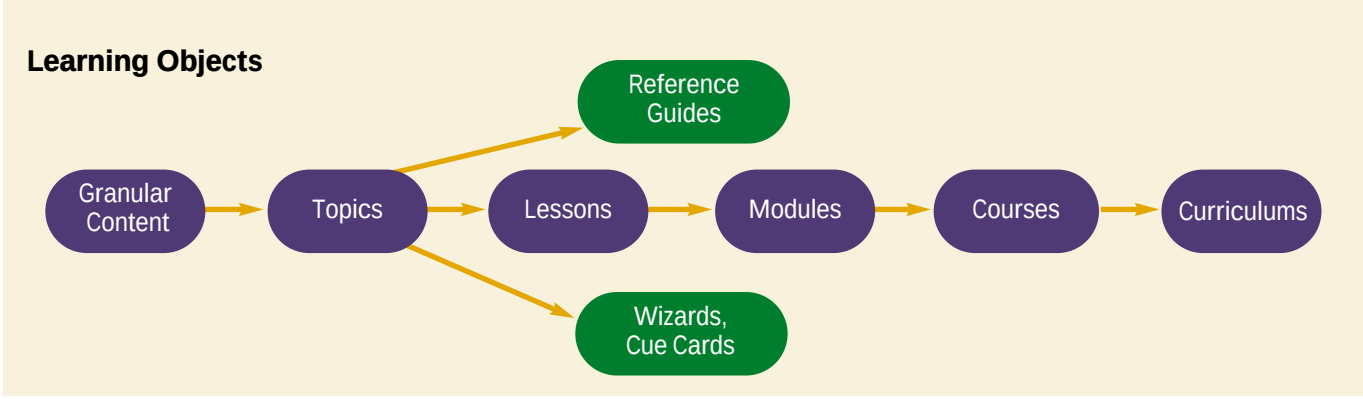
Each of the content types requires specific information objects. For example, for the operational objective "to monitor defects and defective" in a manufacturing environment, you need access to information and skills on defects and on how to construct and interpret control charts. To research a concept such as "defective," you need to provide a definition, several examples, and (sometimes) analogies. Those information objects can be stored in several formats, including text and pictures. They can also be tagged by their domain (for example, "quality management") and content type (concepts).

A person at another organization who is also producing training on defects can use the same definition of *defective* to research the database but may want to modify the learning objects given in order to reflect the specific products being measured.

For learning purposes, however, you need instructional objects—such as learning objectives, practice exercises, and feedback—in addition to the information objects. The instructional objects can also be stored in visual or auditory modes. Visual objects can be iconic (text) or analogic (picture). Analogic, visual objects can be further classified as "still" or "moving." Auditory objects can include music and different languages and sounds.

A value of database technology is the use of "parent-child" relationships to define hierarchies. If small units—such as definitions, examples, or procedural steps—are stored in text, audio, and animation tagged to specific domains, content types, and learning processes, then the small units can be integrated into larger units such as lessons.

Lessons can be integrated into modules, modules into courses, and courses into curriculums. Depending on the flexibility of each level, you can create unique object combinations to tailor lessons. Course developers can construct training sequences from the learning objects, but individuals can also access information or training tailored to their needs.



A recycling scenario

Say, for example, that a technology company is ready to release a new product upgrade—the XJ3000. The engineering department has created information objects—mostly text and still pictures of product drawings and specifications. The marketing department needs to summarize the product benefits and features from a customer's perspective. To create online and printed product brochures, the marketing department can edit some of the information objects created by the engineering department.

The sales manager can use the information objects to create a course to be delivered to the salesforce via the company's intranet. The course would integrate the information objects from marketing and engineering with new ones on handling customers' concerns. The course would also add instructional objects (including learning objectives), video demonstrations of skills, and self-tests.

In another part of the company, the support services group helps service technicians diagnose and repair the XJ3000. Rather than develop a new course, the support services group can use many of the visuals and information objects on specifications to create a diagnostic and repair wizard and a reference guide. Wizards are made up of animation, audio, and three-dimensional still graphics. A wizard repurposes (recycles) information or knowledge objects as decision aids. In this case, the technicians can use a wizard to input symptoms and receive directions for product repairs. The technicians can also use a reference guide for technical information on the product upgrade.

During this product launch, four departments build, recycle, and reassemble knowledge objects to support processes linked to the launch. The knowledge or information objects can form the basis for traditional classroom or multimedia-delivered training, but they can also be repurposed to serve other needs. Further, individuals can access information tailored to their jobs or knowledge background.

That scenario is happening today as organizations, such as Oracle Corporation, build databases for tagging, storing, and assembling information objects that can be updated, reassembled, and recycled to meet knowledge and skill needs. The traditional distinctions between documentation, training, and memory support increasingly blur as content-type information objects make people's access to knowledge and skills more flexible.

Because knowledge objects are small, many different combinations can provide information, build skills, and create performance-support work aids such as cue cards and wizards. For example, in the product launch just described, experienced technicians use a wizard or an electronic advisor to troubleshoot product problems, rather than take a training class. Technicians access help at the customer site just when they need it. However, to better understand how a product upgrade works, they also use an instructional module.

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Looking ahead

One of the challenges of using learning objects will be aligning so much information to organizational goals. It will be critical to use a needs assessment to define specific information and training requirements based on an organization's operational objectives. Procedural training will rely increasingly on a combination of guides, embedded computer help, and training in which learners use a reference guide to complete training tasks.

Information that will be changing frequently can be stored in electronic references—allowing for quick updates and widespread organizational access. Principle-based tasks such as effective sales techniques, management skills, and software design will be served best by collaborative training. In many cases, the training will be classroom-based, although Internet learning groups will augment the face-to-face learning.

Many training and documentation organizations will transform into groups of professionals similar to information-technology specialists. These knowledge-management groups will work to identify, tag, and combine knowledge resources and to help operational areas define and meet their information and skill needs. Such groups will work to align training, documentation, and performance support with the company's operational goals. The group members will need expertise in consulting, documenting, training, and marketing. They will also need to be familiar with traditional and cognitive techniques for knowledge transfer and human performance improvement methodologies.

As we move into the next millennium, learning objects will provide one piece of the infrastructure needed to turn companies into learning organizations. Other factors supporting that shift include the critical role of intellectual assets; the drain on those assets (caused by human resource shifts and rapid technology changes); the capability of database and intranet technology to tag, store, and disseminate learning objects; and an understanding of human performance requirements.

Further Resources

- *Working Knowledge: How Organizations Manage What They Know*, by Thomas H. Davenport and Laurence Prusak. Harvard Business School Press, 1997
- *Intellectual Capital*, by Annie Brooking. International Thomson Publishing Education Group, 1996
- *Intellectual Capital: Realizing Your Company's True Value by Finding its Hidden Roots*, by Leif Edvinsson and Michael S. Malone. Harperbusiness, 1997

Ruth Colvin Clark *is a principal of Clark Training & Consulting, Cortez, Colorado; rcclark@primenet.com. She is also the author of* Developing Technical Training *and* Building Expertise: Cognitive Principles of Training and Performance (ISPI).

Email comments, queries, and questions to ttalk@astd.org.