



# Networker

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## Using Learning Objects in Four Instructional Architectures

Chuck Barritt • Internet Learning Solutions Group • Cisco Systems

When designed and implemented correctly, Learning Objects (LOs) have many benefits for both authors and performers. It is possible that a single LO can support many solutions; such as e-Learning, classroom instruction, virtual seminars, and performance support tools. Performers can search for LOs that meet their needs, have LOs prescribed to them, or bookmark LOs for future use. Authors can leverage existing LOs to speed the creation of new performance solutions. However many in the HPT field have expressed a concern that Learning Objects are being delivered as structured, controlled learning environments, that tend toward a directive style of delivery, or at worse, receptive page turning 1980's era-CBT.

### The Instructional Architectures

In order to discuss how LOs can move beyond this perceived delivery limitation, I would like to reference Ruth Clark's **Four Architectures of Instruction** (Performance Improvement, v.39 #10, pages 31-37). In her article, Dr Clark describes four architectures; receptive, directive, guided discovery and exploratory. My goal is to describe how Learning Objects can be used in each of these architectures when designed and implemented correctly. To get started however, I would like to briefly define each architecture in the context of learning objects.

**Receptive.** In the receptive approach instruction is presented in a fixed, linear path from beginning to end. Little or no

Performer control is offered. The Performer is forced to proceed at a predetermined pace. Examples of this type of delivery include, video training, lectures, or any environment where the Performer cannot "skip around" in the "course."

**Directive.** In the directive approach the path through the learning experience is suggested through a hierarchy or "learning path." The Performer is encouraged to use the "course" as designed, from start to finish through a number of visual or audio clues. Examples include books and web-based training where there is a "page turning" approach to delivery. It may also be found in simple role-plays or simulations where the number of branches or choices for the Performer is limited and little deviation is allowed.

**Guided Discovery.** During guided discovery architectures Performers are encouraged to explore a learning environment. There is often a job scenario or problem presented to the Performer to

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### Board Opening: VP Membership

This is an opportunity to increase your professional contacts and contribute to the Chapter's growth through outreach, membership experience programs and marketing. You will work with our Database Administrator and Board members - bright, enthusiastic HPT professionals. Your great ideas and can-do attitude are needed! Contact Jane Macdonald, 408.863.5003, [jmacdona@rational.com](mailto:jmacdona@rational.com), or any Board member.

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frame the exploration toward the discovery of new skills and knowledge. Examples of Guided Discovery applications include rich multimedia simulations, case studies and scenarios where the Performers solve problems or complete tasks as they would on the job.

**Exploratory.** Lastly, the exploratory architecture allows the Performer to freely search and “jump” in the content to find knowledge and information that meets their need. Successful exploratory learning is based largely on the Performer’s motivation to find what they need to perform a skill or acquire new knowledge. Examples include the World Wide Web, corporate information database, libraries, or “on your own” environments. While it’s hard to avoid some structure (table of contents for example), the Performer is free to go and do anything they feel necessary to meet their needs.

### What are Learning Objects?

With these four architectures in mind, ask yourself how each is used in conjunction with Learning Objects. Before I attempt to answer this question, it is helpful to have a common definition of Learning Objects (as there is no standard in place at this time).

There are many ways to define the size and function of a Learning Object (LO). An LO can be as large as a course or as small as a specific piece of content such as a definition. In fact, the size and shape of an “object” is open to your organization to define, as there isn’t an industry standard at this time.

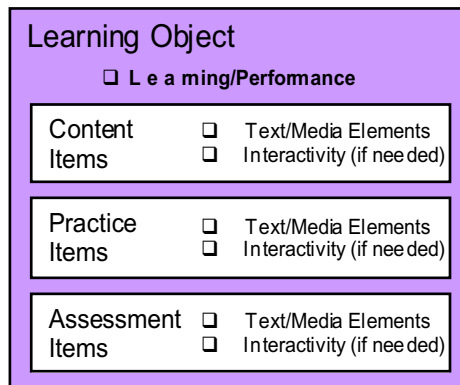


Figure 1: Learning Object Structure

Most would agree however, that an LO is based on a single learning or performance objective that is presented through content, practice and assessment items (see Figure 1). Content, practice items and assessment items are built out of text and media elements and may have interactivity. These elements, or building blocks of the LO, may function like any other object in they are available for reuse by the authors and can be delivered to the performers.

Just as elements are combined to form a learning object, learning objects in turn can be combined to form a hierarchy. For example the LO may be placed into a Lesson, Module, Unit, Course and then Curriculum. It is also possible that the LOs are used in a performance support system, job aid, help system, or exploratory learning environment.

### Cisco’s Learning Objects

The Internet Learning Solutions Group (ILSG) at Cisco Systems, Inc. has created the following hierarchy for their learning objects: Course – Module – Lessons – Sections. ILSG defines “Lessons” as Reusable Learning Objects (RLOs) and “Sections” as Reusable Information Objects

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## Silicon Valley Chapter of ISPI 2002 Board

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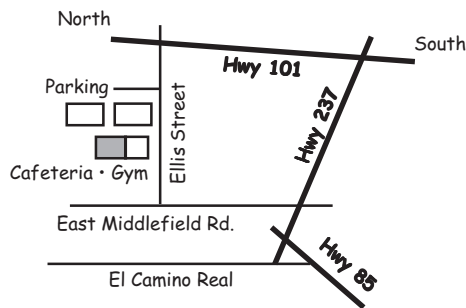
### Write for the Networker

Share your war stories, successful intervention, research, HPT tool or book review with your ISPI peers. Submit articles to Chuck Barritt cbarritt@cisco.com

## Meeting Location

### VERITAS

320 Ellis Street, Mountain View  
(in the Veritas Cafeteria)



From Hwy 101

- Exit on Ellis Street
- Head away from Moffet and the bay
- Look for VERITAS sign at 350 Ellis
- Park in front of the main buildings
- Walk around the corner to Cafeteria (towards Middlefield • same building as the Gym)

Lost? page Chuck Barritt at 800.365.4578

## Meeting Agenda

6:45	Registration and Networking
7:00	Announcements
7:15	Short Topic on an HPT Issue
7:30	Keynote Presentation
9:00	Jobs and Networking
9:30	End of Meeting

## Meeting Fees

SV-ISPI Members .....	no charge
First-Time Guests & Visitors .....	\$10*
Students .....	\$5*

\* Fee is applied to your membership within 30 days

## Chapter Membership

Individual member .....	\$ 60
Organizational member (5+) .....	\$ 50
Full-time student (6+ units) .....	\$ 30
Corresponding member .....	\$ 30

## Advertising Rates

	Member	Non-Mem.
Credit Card	\$ 15	\$ 30
1/4 page	\$ 38	\$ 75
1/2 page	\$ 75	\$ 150
Full Page	\$ 150	\$ 300

## Keynote Presentation for July 18, 2002

### The HPT Guide to Intellectual Property

Presented by:

Tim Scudder, CPA, CEO  
Personal Strengths Publishing

**W**hat is intellectual property really? How can it be protected? How should it be valued? What can be done to prepare for eventual conflict over it? When conflict over intellectual property arises, how can it be managed to create value for all parties? Answers to these questions will be explored along with the implications for your organization. Case histories of actual disputes that were resolved by creating value-added solutions for all parties will be featured. This presentation will highlight a proven, systematic and reproducible method of resolving cases of intellectual property infringement. The method has generated net revenue and created lasting client relationships between the owner of intellectual property and the former infringers. Significant time and cost savings have resulted from the use of this method and additional business opportunities have been leveraged.

Objectives:

- Distinguish between the 3 major types of protected intellectual property: copyrights, trademarks, patents and trade secrets.
- Identify valuable intellectual property and implement some basic steps to ensure that intellectual property rights – both yours and others’ – are not violated.
- Protecting Intellectual Property: How to mark IP correctly, register it and keep it.
- Valuing Intellectual Property: discussion of traditional financial valuation methods vs. market value
- Prepare for eventual conflict over intellectual property. Conflict Management Strategies: specific strategies to manage conflict over IP outside the legal system and create a positive results for all parties.
- Implement a process for resolving intellectual property disputes without litigation. Measured results from case experience with several IP dispute resolutions.

About the Speaker:

Tim is responsible for the creation, identification, valuation and tracking of IP for the company. His background as a CPA is helpful in assessing the financial value of intellectual property, and measuring the financial impact of IP disputes within his own organization. Tim has made presentations at international conferences including ISPI and ASTD. His presentations at the 2001 ISPI Con-

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(RIOs). These RIOs are built out of a single learning objective containing content, practice and assessment items (see Figure 2).

To build a Lesson or RLO, five to nine RIOs are combined with an Overview and Summary. To aid in content standardization, ILSG has chosen to further classify each RIO as a concept, fact, procedure, process, or principle. Each of these RIO types uses an instructional template for content, practices and assessments. Details on the RLO Strategy can be found at [www.cisco.com/warp/public/10/wwtraining/elearning/implement/guides.html](http://www.cisco.com/warp/public/10/wwtraining/elearning/implement/guides.html).

Note that this article simplifies ISLG's terminology by using "Learning Objects" for both RIOs and RLOs.

### Applying LOs to the Architectures

Hopefully you have a good understanding of learning objects and can relate their design and scope to your own learning hierarchy and structures. With that in mind, let us look at how

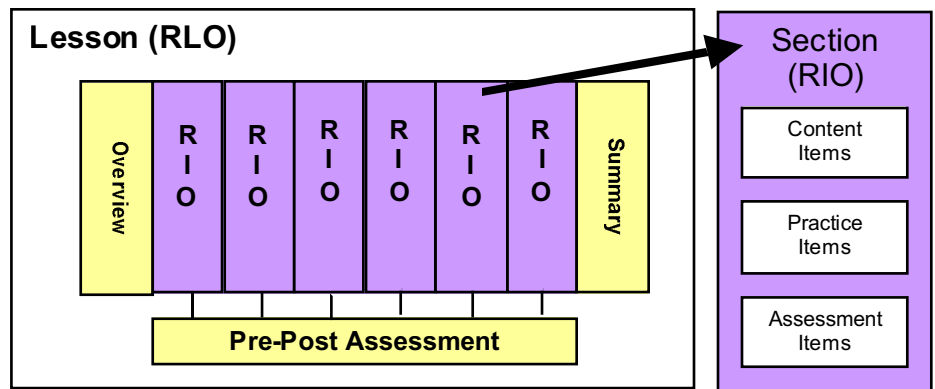


Figure 2: Cisco's RLO and RIO Structure

LOs may be utilized in Receptive, Directive, Guided Discovery, and Exploratory learning architectures.

### Receptive LOs

An author/designer can place a number of LOs on a fixed path or structure by combining related LOs. The possible combinations are limited by the number of LOs that fit together without the need for branching while still meeting the Performer's needs. For example, the author can assemble a series of LOs on installing memory into a computer, and have the delivery system present all those LOs without navigation controls aside from "exit." In this way, the Author prevents the Performer from taking control of the speed and pacing of the learning experi-

ence. Whether this is a good application of LOs is not the point, simply realize that LOs do support receptive architectures as needed.

### Directive LOs

One of the most common LO based architectures found in e-Learning delivered via the web is the Directive architecture. Typically a series of related LOs are connected through a hierarchical menu with navigation is done through forward and backward buttons. Groups of learning objects are combined to form larger groupings, such as a Lesson, Unit, Module, or Course. While branching and exploration by the performer is possible, the course designer assumes a logical progression through the training materials. This progression may move from simple skills to more complex, or from a beginning to ending point in teaching a process or procedure. The structure, visual cues, and other devices all suggest how the performer should progress through the series of LOs.

The challenge in designing LOs to support this architecture is in ensuring that each LO can stand alone and be removed from its current hierarchy. This allows the

About Tim – from page 3

ference were: 99 Seconds - Relationship Intelligence™, Setting and Managing Performance Expectations, Understanding Conflict and Motivation and 360-Degree Feedback.

Tim is the CEO of Personal Strengths Publishing®, a global supplier of relationship building tools and services. He has resolved several instances of intellectual property violation for Personal Strengths Publishing, some with international implications. All cases were resolved outside the judicial system and most cases resulted in the establishment of a client relationship with the violator. He is active with ISPI at the local and national levels and is an internationally recognized speaker.

author and learner to use that LO as part of the other architectures.

### Guided Discovery Using LOs

The Guided Discovery architecture is a bit more complex to design and deliver than the other architectures. In this case learning objects are looked upon as resources that are accessed by the Performer during the guided discovery experience. The overall learning experience is built to encourage the performer to find the skills and knowledge they need to successfully complete their job task or learning goal.

A common application of this approach is a job-based simulation, where a performer may find a simulated desk, computer system, filing cabinet, customers, job related tasks, and real-life distractions. LOs are used as resources to support each component used in the simulation. For example, if the performer is given a task during the simulation, that task could be an LO. Likewise, the resources the performer accesses in completing that task, such as the computer system, telephone, customer, peer, or manager, would each be an LO stored in the database.

Guided Discovery environments are usually constructed using authoring tools or programming languages such as ToolBook, Authorware, Director, or C++. These tools connect the referenced LOs from a common database, making them available during the guided discovery experience (i.e. simulated work environment). As you know the higher the fidelity of these simulations, the higher the cost of both design and programming. The savings however

is in accessing existing LOs, and creating new elements as LOs that are stored in the common database for other architectures to utilize.

Ideally, all the LOs needed for a Guided Discovery architecture already exist in the database and are being used in the other architectures. The instructional designer could search or mine the database and repurpose LOs to build a Guided Discovery based learning experience. Once designed, a programmer could build the performance solution with the links to those LOs. The benefit to this approach is that the LOs can be updated once, and the changes would appear across all the architectures that utilize that LO.

### Exploring for LOs

Finally, LOs can easily be used in an exploratory architecture. Because LOs are stored in a database, and are created with rich search data (metadata), tools

can be built to allow the performer to access any LO found in the database. The search engine allows exploration based on any number of criteria, including content type, job task, interests, media, language, or related LOs. In fact, accessing existing LOs is limited only by the search data attached to each LO and the search tools the performer has during delivery.

An assumption is that each LO used in the exploratory architecture has been created and stored in a common database. If an LO was found missing from the other architectures (and therefore not in the database) the author could build the needed LO, tag it with search data, and deposit it in the database (see Figure 3, page 7).

Like all LOs that are referenced and linked in a common database they can be dynamically updated as needed. This gives the per-

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# Job Bank

Contact Kay T. Wood at 408.733.7213 or ktwood@ix.netcom.com for contact & company information (members only). Kay can also help if you're a company with a job to post to our web site and place in the Networker.

## 1. Senior Course Developer

7.10.02 San Jose

Immediate need for a Senior Course Developer to Design and Develop Training Labs for an operating system used for semiconductor testing. ONLY candidates with the EXACT skill requirement match will be considered.

### Required Skills

- MUST have experience with programming in at least one high level language or strong familiarity with programming languages. (ie: C, C++, Java)
- Experience with GUI helpful.
- MUST also have experience in either semiconductor or electronics.
- Should also have Framemaker experience.

## 2. Instructional Designer(s)

07.03.02 San Jose

Innovative Learning Solutions is a privately funded company located in Mountain View, California specializing in providing a comprehensive set of tailored learning solutions. We are looking for a Senior to Mid level Instructional Designer with Siebel experience. Must be more Instructional Designer than Siebel technical (75% ID and 25% Siebel). All travel and expenses will be paid.

## 3. Instructional Designer, Innovative Learning Solutions

07.06.02 Mountain View

Innovative Learning Solutions is a privately funded company located in Mountain View, California specializing in providing a

comprehensive set of tailored learning solutions. ILS uses an ASP model that combines technology and proven instructional design methodology to create and deliver comprehensive dynamic learning solutions. ILS is a single source for design, development, delivery and administration of e-learning content. In short, we are a one-stop shop for web-based learning solutions.

## 4. Project Manager - IT Operations Training Initiative

06.26.02 Richardson, TX

Our Fortune 500 Client is currently searching for an experienced IT Training Project Manager to work on the following project. This position involves researching, interviewing, and gathering data for several phases of the IT Operations Training Initiative (ITO career development program, skills/needs assessment, training vendors, training content delivery). Our Candidate will be required to interview individuals about skill sets and job requirements for IT job positions in each of the ITO Centers of Excellence. Required to analyze the data and prepare training documentation (i.e. the IT Training Resource Guide).

## 5. Donna Davis Associates

6.26.02 Various Locations

The following positions are available through Donna Davis Associates. For more information about these openings please contact Glenn Werner at glenn@donnadavis.com, 1-201-592-6000.

- Manager of Training and Development, 85-120K + bonus
- Manager of Learning and Development, 80-90K + bonus

Organizational development, and performance management, 125-150K + bonus

Trainer, Salary 70K + bonus  
Instructional design. Consumer products company, 60-70K + 10%bonus

Instructional design. Develop technical and functional training, 100K + bonus  
Director of Workforce Development and Organizational Effectiveness, 100K + bonus

## 6. Instructional Designers needed for Military Aviation

6.13.02 Oceanside, CA and Jacksonville, NC

D. P. Associates Inc. is looking for experienced Instructional Designers to help design Computer-Based-Training for Marine Aviation.

- Must have 10 yrs exp in training system analysis, design development, and implementation of aviation training systems
- Two yrs exp in CBT and one-year project management
- Excellent writing and QA skills desired
- MS in Instructional or Educational Technology Preferred
- Must qualify for a Secret Clearance

## 7. Instructional Designer-Multimedia Course Development

6.13.02 San Francisco

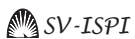
The VitesseLearning instructional designer holds a lead role on the project team in translating client

needs into multimedia courseware designs. This person ensures that instructional integrity is withheld throughout a course's development. The instructional designer works closely with clients, subject matter experts, and partners to identify training needs, establish learning objectives, develop course outlines and flowcharts, and create storyboards for eLearning courseware. Working closely with the project manager and development team, the instructional designer translates client content into effective and engaging online learning objects. Emphasis is placed on creativity and sound instructional design to ensure high quality courseware. 5-10% travel required.

**8. Training Specialists**  
6.13.02 Outside California

We are currently seeking entry and senior level Training Specialist candidates for the Home Loans and Insurance Services division in the following cities/states:  
Palm Beach, FL  
Downers Grove, IL  
Schaumburg, IL  
Lake Success, NY  
Florence, SC

Visit [www.svispi.org](http://www.svispi.org) for a complete listing of the most current job postings.



**Help with FileMaker Pro**

We are web-enabling our membership database, using Filemaker Pro. Anyone with experience in this application willing to impart how-to tips and advice, please contact our Database Administrator, Michelle Cadieux 408-316-4782 [sjtechtrainer@yahoo.com](mailto:sjtechtrainer@yahoo.com)

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former the up-to-date LO regardless of which of the four architectures they are accessing.

**Conclusion**

The two most common LO-based architectures today are Directive and Exploratory. This is largely because of the nature of e-Learning, and the fact that LOs are typically stored in a database that is optimized to deliver structured,

IMS Project. (2002) IMS Meta-data Specification document [on-line]. Available: <http://www.imsproject.org>  
Cisco Systems, Inc. (2001) Cisco's Reusable Learning Object Strategy v4.0 [on-line]. Available: <http://www.cisco.com/warp/public/10/wwtraining/elearning/implement/guides.html>. About the Author

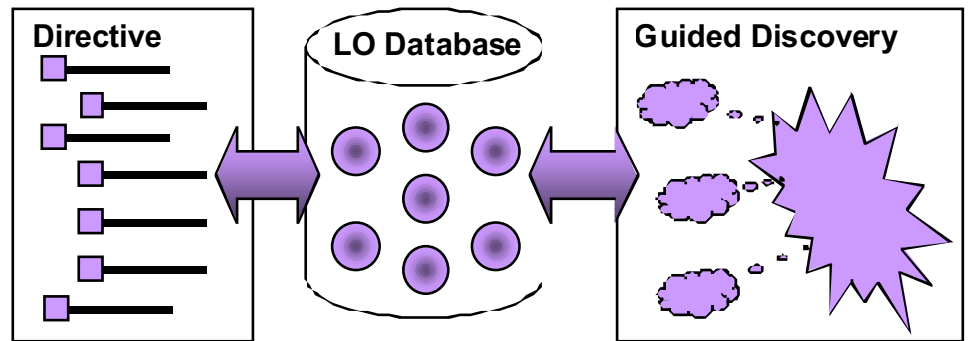


Figure 3: Common Database for all Architectures

hierarchical content with built-in search tools. What is missing is the use of those LOs in all four architectures, especially Guided Discovery. The challenge the human performance technologist is to design applications and interfaces to leverage those existing LOs as Guided Discovery architectures. Leveraging LOs should save money in developing performance solutions, allow for dynamic update of content across architectures, and give the learner a choice between architectures to meet their learning style and performance support needs.

**References**

- Dr. Ruth Clark's Four Architectures of Instruction (Performance Improvement, v.39 #10, pages 31-37).
- Dr. Ruth Clark's web site: [www.clarktraining.com](http://www.clarktraining.com)

**About the Author**

As Program Manager for Learning Object Implementation at Cisco Systems, Inc., Chuck Barritt supports learning object authors by providing instructional methodologies, templates, training and support. Chuck's responsibilities include internal consulting on the Learning Object strategy, authoring support, template creation, and the application of industry learning object standards. Chuck has over 10 years of experience in all forms of e-Learning, instructional design and performance support systems. He holds a Masters of Arts in Instructional Technology from California State University, Chico.

You can reach Chuck Barritt at [cbarritt@cisco.com](mailto:cbarritt@cisco.com), 408-525-6520

