



**Capitalizing on the Learning Object Economy**  
***The Strategic Benefits of Standard Learning Objects***

**White Paper**

***Brian Degen***

***July 16, 2001***

Contact: Brian Degen  
V.P. Professional Services  
Learning Objects Network, Inc.  
4402 Main Street  
Waitsfield, VT 05673-0510  
802-496-9940

email: [Brian.Degen@LearningObjectsNetwork.com](mailto:Brian.Degen@LearningObjectsNetwork.com)

# TABLE OF CONTENTS

<b>INTRODUCTION .....</b>	<b>1</b>
About Learning Objects Network.....	1
<b>SCALE, MOMENTUM &amp; CRITICAL MASS .....</b>	<b>2</b>
The Scale of eLearning .....	2
The ADL Initiative .....	2
The SCORM's Role .....	3
<b>THE VISION .....</b>	<b>3</b>
<b>THE GOAL: INCREASING THE VALUE OF CONTENT .....</b>	<b>4</b>
<b>THE STRATEGIC NATURE OF STANDARD OBJECTS .....</b>	<b>5</b>
Key Concepts .....	5
<b>CASE STUDIES .....</b>	<b>6</b>
Financial Services Example: Standard Language Objects .....	6
Market Research Example: Online Selling & Derivative Products .....	7
<b>STRATEGIC BENEFITS.....</b>	<b>7</b>
Revenue Opportunities.....	8
Operational Efficiencies.....	8
Customer Value.....	8
<b>CONCLUSION.....</b>	<b>9</b>

## INTRODUCTION

Advances in the fields of computer science, cognitive learning theory, artificial intelligence, and interactive multimedia have converged to enable highly effective on-line learning systems. These systems are simultaneously increasing learner skills and knowledge while reducing development and delivery costs as compared to traditional methods of instructor-led training.

Dramatically increased computing power, the rapid penetration of PC's into homes and workplaces, and the worldwide distributed access capabilities of the Internet and new wireless networks have extended these capabilities by creating a significant opportunity to make knowledge and learning available anywhere, at anytime.

At the same time, the need for a highly competent geographically dispersed workforce has never been greater.

However, due to legacy content structures left over from the world of paper and ink and the proprietary nature of authoring and delivery systems, we have only begun to realize the potential of these innovations to distribute knowledge and enhance performance.

Ever since scribal monks hand-copied sacred texts in the monasteries of ancient times, content has been assembled together by authors in large collections (documents, text books, courses) for dissemination to broad audiences. While large containers were the most economical way to share an author's ideas in the physical world, they have limited opportunities for reusing knowledge and information in the digital realm.

In addition, digital content has been inextricably linked to technology platforms and vendor products through proprietary systems that limit portability and interoperability. This is as true in the world of eLearning as it has been in the world of document management and electronic publishing.

The result has been isolated successes at the enterprise level but missed opportunities to leverage and distribute knowledge in its most usable form on a global level. Standard learning objects hold the key to overcoming these obstacles.

The purpose of this white paper is to describe the magnitude of international efforts to achieve the vision of advanced distributed learning, outline the key principles involved, and summarize the strategic benefits to be gained by implementing learning object business practices and technologies.

### **About Learning Objects Network**

Learning Objects Network, Inc. (LON), is a knowledge-based technology company focused on creating the infrastructure to manage the secure exchange of high value knowledge objects across the Internet. By creating an efficient marketplace for the identification, acquisition, purchase and reuse of online business knowledge, eLearning content, media assets, and other high value content objects, LON is playing a leadership role in developing an object-oriented knowledge management layer for the Internet.

This infrastructure is based on international standards recently released by IEEE/IMS, ADL's SCORM and others and consists of distributed content repository systems, a registry of Learning Objects and transaction systems.

## SCALE, MOMENTUM & CRITICAL MASS

### The Scale of eLearning

Market researcher IDC recently published figures that estimate the corporate outsourcing market for eLearning will be over \$11 billion by 2003. This represents an average annual growth rate of nearly 80%. This figure does not include the amount of eLearning development being done internally by corporations, academia, or government agencies. IDC's analysis sites eLearning's convenience, effectiveness, and ability to dynamically target content as key contributors to growth. It's most strategic benefit, according to IDC, is being able to decrease the amount of time it takes employees to become productive.

### The ADL Initiative

While the concept of interchangeable learning objects is not new, the mass of organizations supporting current efforts to implement it was organized by the **Department of Defense** (DoD) and the **White House Office of Science and Technology Policy** (OSTP). In 1997 these two organizations launched the **Advanced Distributed Learning (ADL)** initiative whose mission is to accelerate large scale development of innovative learning methods to meet the learning needs of the military as well as the nation's commercial workforce. Their goal is to maximize human performance and effectiveness through advanced learning technologies while simultaneously reducing development and delivery costs.

To accomplish their mission, the Department of Defense established the **ADL Co-Laboratory** (Co-Lab) in Alexandria, Virginia in 1999. Its charter is to integrate progress being made in the fields of knowledge management, eLearning, and performance support and to foster "research, development, and assessment of common tools, standards, content, and guidelines" in support of the ADL initiative.

Executive Order 13111 expanded the scope of the ADL initiative by tasking the DoD with taking the lead in "working with **other government agencies** and the private sector to develop common specifications and standards for technology-based learning" in support of both military and commercial interests. The **Department of Labor** (DoL) and the **National Guard Bureau** (NGB) have since joined the Co-Lab as "contributing sponsors" to the effort.

In addition to the initial Co-Lab in Alexandria, two other labs have been established. In October 1999 a Co-Lab was established in Orlando, Florida primarily to promote collaborative ADL efforts with DoD components and military services. In January 2000, an independent Academic ADL Co-Lab was established with the University of Wisconsin and the Wisconsin Technical College System to promote collaboration among **academic institutions**.

The scope of the ADL initiative and the three Co-Labs is thus to foster the collaborative efforts of the U.S. military, federal agencies, international standards bodies, technology companies, the academic community and a multitude of commercial companies to advance the science and application of learning technology.

### **The SCORM's Role**

In order to achieve its objectives, the ADL initiative has been integrating the disparate efforts of numerous organizations and standards bodies that have been working on different but highly related aspects of advanced learning methods and technologies. The **Sharable Content Object Reference Model** (SCORM) is a set of guidelines composed of interrelated specifications for technologies and practices that, when implemented consistently by technology vendors, content owners, and content users, will achieve the goals of the ADL. These standards describe the necessary conditions for content created by different organizations to be interoperable with delivery systems created by different technology companies. See <http://www.adlnet.org/> for a more detailed description of the SCORM.

In the process of creating the evolving SCORM standard, the ADL is working closely with **international standards bodies** that play an important role in the development and implementation of advanced learning practices. These include but are not limited to:

- Alliance of Remote Instructional Authoring & Distribution Networks for Europe (**ARIADNE**)
- Aviation Industry CBT (Computer-Based-Training) Committee (**AICC**)
- IEEE Learning Technology Standards Committee (**IEEE LTSC**)
- IMS Global Learning Consortium, Inc. (**IMS**)

It should be noted that the SCORM standard is not a theoretical model. It is a specification that bridges the gap between research and development activities and practical industry adoption. Representatives from over 100 industry-leading organizations from around the world recently met at the ADL Co-Lab in Alexandria Virginia to test their learning content and software for compatibility with the SCORM standard. Those in attendance at the May 29, 2001 event included 23 content providers, 18 learning software providers, and 6 authoring tool providers with a desire to install, test, and demonstrate the interoperability of their products.

Large organizations including Sun Microsystems and Microsoft have already adopted the SCORM standards for their on-line training programs and Microsoft, Oracle, IBM, and other technology industry leaders are implementing SCORM standards in a number of their applications. Microsoft's new Office-XP PowerPoint and FrontPage versions support the SCORM standard.

## **THE VISION**

Learning Objects Network envisions a distributed network of systems with the ability to customize the delivery of exactly the right content, at the right time, in the right amount of detail, via the right device (Web, mobile phone, PDA), to the right place, in the right way *to meet the specific needs of*

*an individual.* To accomplish this, we see authors and content providers creating small packages of content (learning objects) that are cataloged with industry-standard meta-data tags to simplify search, retrieval, and reuse. These objects will be stored in a distributed network of SCORM-compliant repositories that are accessible through Internet browsers, telephones, televisions, and wireless devices of all kinds. Content publishers, courseware providers, and others will then use industry-standard tools to flexibly combine, structure, and format learning objects into whole courses, manuals, eBooks, or other collections of knowledge and make these aggregations available through the distributed repositories. Content users will subsequently use industry-standard delivery and “run-time” systems (e.g., Learning Management Systems) to seamlessly navigate information of interest to them in highly customized ways.

Once a critical mass of reusable learning objects is reached, a worldwide learning economy will emerge. High quality content creators will be rewarded by a mass market of publishers, learning providers, and academic professionals who will flexibly develop a variety of products to meet the needs of unique and ever narrowing market segments.

## THE GOAL: INCREASING THE VALUE OF CONTENT

The ultimate goal of content providers and producers is to increase the value of their content to maximize return on investment. They can best do this by helping the military, academia, and corporations achieve their goals of disseminating useful knowledge and maximizing human performance at the lowest possible costs.

The value of content may be increased by making it more accessible, interoperable, reusable, and durable. Each of these is described below.

- **Accessibility:** the ability to search, identify, access, and retrieve content that is widely distributed.
- **Interoperability:** the ability to use content developed by one organization on a given platform with one set of tools at a completely different organization on a different platform with another set of tools.
- **Reusability:** the flexibility to reuse content objects for multiple purposes, in different applications, in different products, via varying access devices, for numerous markets.
- **Durability:** the ability to transcend technology (platforms, tools, access devices, products, vendors) changes without requiring redesign or redevelopment.

At the core of achieving these criteria is defining standard learning objects that are cataloged with meta-data for search and reuse, and achieving universal agreement on how those objects are created, stored, retrieved, assembled, and delivered to individuals in a distributed fashion. The SCORM defines the technical specifications required to make this a reality and the collaborative ADL process is designed to obtain the consensus to make it universal.

## THE STRATEGIC NATURE OF STANDARD OBJECTS

Exploiting standard reusable objects to achieve operating efficiencies, product flexibility and competitive advantage is not a new concept.

Until the early 19<sup>th</sup> century, products were hand-crafted by skilled artisans. Each product was individually made and thus parts were not interchangeable or multipurpose. But then a French gunsmith named Honore Le Blanc proposed making guns from standardized patterns for parts that could be more efficiently manufactured and more easily replaced. Thomas Jefferson realized the potential of the idea, brought it to America, and passed it along to Eli Whitney who is largely credited as the man who introduced the standardized manufacture of interchangeable parts to American industry.

Bicycle, sewing machine, clock, and typewriter manufacturers quickly adopted the technique that became known worldwide as the *American System of Manufacture*. By the end of the 19<sup>th</sup> century, American industry was out-producing every other industrial country including the leading powers of Great Britain and Germany thanks in part to the significant efficiencies and flexibility enabled by standardized interchangeable parts.

This approach has since been adopted by virtually every major industry with notable success in automobile manufacturing and most recently, the software industry with Object Oriented Analysis and Design (OOAD).

The power of standards-based object orientation is now also being applied to the rapidly evolving fields of eLearning, performance support, knowledge management, electronic publishing, and digital asset management.

### **Key Concepts**

The strategic benefits of standard parts as applied to learning content derive from a number of key principles:

- **Object orientation:** products are assembled from small standalone components that have value as units that can be flexibly combined in multiple ways to create new products.
- **Standardization:** there must be industry-wide consensus about how objects are created and cataloged with standard meta-data so that they may be consistently produced, readily identified, profitably exchanged, and seamlessly integrated across products, technologies, and companies.
- **Customization:** since objects are stored digitally, they can be copied and reassembled in infinite variations with almost no variable cost. By identifying the special needs of a particular individual at a particular point in time, learning objects may be dynamically configured to satisfy those needs uniquely.
- **Portability:** learning objects are designed to be easily moved or copied from one repository to another and accessed through any delivery system that conforms to the SCORM specification.

## CASE STUDIES

While it is true that companies are just now starting to implement SCORM-compliant learning objects in their businesses, the power and strategic benefit of object orientated content management may be illustrated by a few recent successes in the corporate publishing arena.

### **Financial Services Example: Standard Language Objects**

Like other firms in the mutual fund business, Fidelity Investments updates and republishes a prospectus document for each of its over 200 mutual funds every year. In 1992, Fidelity spent approximately \$11 million on shareholder reporting activities which also included production and distribution of semi-annual reports to their over ten million customers.

Until the implementation of **object-oriented publishing** techniques, Fidelity's legal department maintained the contents of each prospectus in a document that was updated once a year by a legal product manager. During the course of this updating process, the legal product manager negotiated standard language changes with the Securities and Exchange Commission (SEC) that would be incorporated into the prospectus being updated.

One of the most challenging aspects of updating a prospectus was keeping track of all the other negotiations that had taken place between other legal product managers and the SEC because there was a relatively high degree of commonality of language across prospectuses. When the SEC agreed to a standard way of disclosing something (e.g., junk bond investment policy), they expected that same language to be implemented not only in the prospectus under review, but also in all the other prospectuses that contained similar language. Consistently managing standard language in over 90 prospectuses that were updated at different times during the year was a significant challenge that was littered with opportunities for error.

So Fidelity reengineered their prospectus creation process. They broke each of the over 90 prospectuses into small content objects that represented the standard language for a specific investment policy. They identified the commonality of that language across prospectuses and indexed each of the content objects with meta-data fields that specified the types of prospectuses in which it needed to appear in (retail vs. institutional funds, taxable vs. non-taxable, equity vs. money market, etc.). And then they stored these content objects in a new "standard language library" where content could be updated once, in one location, and then automatically incorporated into each prospectus as it was being updated during its annual cycle.

The result was a completely different way of viewing the annual prospectus update cycle: from one of updating prospectus documents, to one of updating standard language in a single standard language library. The newly engineered prospectus process increased control over standard language, improved quality and consistency, increased legal product manager productivity by 40%, and reduced process time from three weeks to approximately 2 hours. And when Fidelity wanted to introduce a new mutual fund, they could generate its prospectus in a matter of minutes by specifying the unique meta-data fields of the new fund (retail vs. institutional, etc.) and automatically creating a new document.

## **Market Research Example: Online Selling & Derivative Products**

Industry-leading IT market research firm IDC disseminates the insights of its over 770 analysts in 50 offices around the world to their customers by publishing thousands of market research documents annually. The larger reports range from 50 to over 400 pages in some cases. In a paper world, these large reports are printed, mailed, and cataloged in binders organized by technology segment (e.g., operating systems, local area networks, printers). The original target market for these reports was primarily corporate market analysts or product managers who needed deep insight into very specific technology areas.

In 1995, when IDC began to distribute its content electronically to its customers via Lotus Notes, CD-ROM and eventually the Internet, it recognized an enormous opportunity to a) sell more of its existing research content to the same market and b) create a new market for existing content. It accomplished these objectives by breaking their large research documents down into standard objects and repurposing these objects to meet the needs of individual audiences.

Large research documents were separated into a table of contents, an abstract, an executive summary, and the body of the research. Each of these items was stored separately as an independent object which gave IDC the flexibility to provide secure access to select objects for unique customers. When customers were searching for research of value to them, they were allowed to view not only the document's title, author, and date (as before), but they were also given the opportunity to view the document's abstract and table of contents. This added information acted as valuable sales collateral that enhanced the usability of IDC's assets and increased sales.

The executive summary objects were leveraged to create a whole new product for their existing content assets. Long and content-rich market research reports were primarily used by marketing professionals needing *deep* market information. By repackaging all the executive summaries for all of IDC's research into a new Executive Summaries product, IDC created immense value to CIO's and CTO's who had need for *broad* market trends and information. And since these executives' interests often extended beyond a cursory level view, the Executive Summaries product also increased sales of research reports to companies that previously wouldn't have known they existed.

By leveraging existing content stored as individual objects, IDC increased profitability in two important ways. They increased sales of market research reports by providing additional information critical to the purchase decision at *no additional cost*. And they introduced the new Executive Summaries product that sold for approximately \$50,000 per annual subscription and generated significant new revenues that had essentially no costs associated with them.

## **STRATEGIC BENEFITS**

The strategic benefits of standards-based learning objects derive from increasing the reusability and portability of valuable content assets. Companies benefit first by creating *new revenue* opportunities by leveraging existing content while simultaneously achieving *operating efficiencies* in several key areas. And the most successful companies who realize that their livelihood depends on continuously improving the value of their products to *their customers* will benefit by being first to market with innovations that make their products more accessible, flexible, and useful.

## **Revenue Opportunities**

- **Create new products and penetrate new markets:** by flexibly repurposing existing content from both internal and external sources to meet the evolving needs of unique and ever more granular market segments.
- **Accommodate multiple channels:** since content is stored independent of delivery logic and format, it can be seamlessly repurposed to be delivered via print, web, and mobile devices.
- **Eliminate content piracy:** through secure access and digital rights management.
- **Participate in the Learning Object Economy:** as a critical mass of SCORM-compliant objects reaches maturity, new opportunities will be created for the secure exchange of high value content over the Internet.

## **Operational Efficiencies**

- **Increase leverage of valuable content:** link multiple isolated silos of content to provide a virtual aggregation of content that is usable at the enterprise level.
- **Increase productivity:** by reducing the amount of time finding & retrieving sharable content objects or whole aggregated units.
- **Decrease product development effort and time:** the time to create new products that leverage existing internal and external assets will be drastically reduced. The amount of time spent recreating assets from scratch to meet the needs of new audiences will also be reduced.
- **Streamline content revisions:** the process of updating or republishing content will be greatly simplified by easily locating, modifying, and republishing a single object as apposed to the whole unit (course, book, report).
- **Enable customer self-service:** by storing content assets in accessible SCORM-compliant repositories and automating digital rights management and license tracking, companies will enable customers to obtain content objects themselves without assistance from company personnel.

## **Customer Value**

- **Increase accessibility:** content will be widely distributed throughout the Internet, stored in SCORM-compliant repositories, and indexed with standard meta-data fields. This makes it easier for customers to identify, retrieve, and incorporate valuable content from a multitude of trusted sources.
- **Lower costs through reusability:** since content from high quality producers is stored in accessible, reusable, and customizable components, customers will spend less effort creating new content from scratch and focus more on aggregating existing assets to meet the specific needs of their audience. Since content objects created by high quality producers will have significantly larger markets, they will be motivated to simultaneously increase investment in the sophistication of their content while also reducing their prices (note the similarity to Henry Ford's strategy with the Model T). The economics of this environment are significant.

- **Lower costs and increase flexibility:** since content is stored independent of structure and logic, it does not have to be redesigned or redeveloped when using it with a different Learning Management system or upgrading to a more advanced Learning Management system. Customer demand for this capability is one of the most significant driving forces for standards-based learning objects.
- **Increase usability:** when content architectures are standardized through industry- or community-based meta-data models and taxonomies, the resulting consistency will make navigating and using content more intuitive.
- **Increased information currency:** since the use of standard interchangeable objects makes it easier and more economical to revise and update content in real-time (without having to republish the entire collection), customers can be assured they are getting the latest, most up to date information. Automation tools that support this activity will also have a significant impact on reducing operating costs by making it easier to identify and edit the object affected, determine where the object is used, and notify and/or automatically update distributed content repositories.
- **Enable personalization:** content that has been separated from structure, logic, format, and presentation is infinitely customizable to match the unique requirements of a particular situation. This is likely to be one of the most significant benefits of the learning objects economy – the ability to customize the delivery of exactly the right content, at the right time, in the right structure and sequence, via the right device (Web, mobile phone, PDA), to the right place, in the right way *to meet the unique needs of an individual*. When this is achieved, learning, knowledge management, content management, electronic publishing, and performance support converge into an extremely powerful vehicle to increase knowledge and enhance performance.

## CONCLUSION

Advances in computing infrastructures, learning theory, and distributed communications have created an enormous opportunity to effectively distribute knowledge and learning to individuals with unique needs. Department of Defense initiatives have provided the organizing force and critical mass necessary to establish a unifying vision and gain universal agreement on practices to achieve that vision. And Co-Lab tests over the last year have demonstrated that the vision is realistic and achievable.

Significant benefits will be achieved by those organizations that capitalize on this opportunity to liberate their content from inflexible proprietary structures to thrive in the new learning object economy. Most significant of these benefits is the ability to leverage content assets to flexibly create a whole new class of products that meet the unique needs of individual users anytime, anywhere.

An object oriented approach to creating and disseminating information extends the value of information to content providers and users and supports the goal of economically enhancing the knowledge, skills, and performance of a geographically dispersed population. The development of the learning object network provides both the marketplace and the delivery systems to enable a new and dynamic object economy to flourish.