



The Learning Content Management System

A New eLearning Market Segment Emerges

An IDC White Paper

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The Challenge

Over the past twenty years or so, industrial society has gone from being deprived of data to being overwhelmed by it. This turn of events has largely been the result of more affordable computer hardware and software, and, more recently, ubiquitous Internet penetration. The transition corporations have made from mainframes to client/server to networked computers has resulted in knowledge workers spending more time sorting through information than actually using it to do their jobs better. In this current state, a user who sets out to learn something that will truly increase productivity and provide the organization with competitive advantage often comes up empty-handed. This inability to access data usually happens for one of two reasons — either the information is improperly stored and indexed or the user overlooks it among the clutter.

Corporate investment in information technology has also led to a new delivery method for corporate training that both rivals and complements classroom-based instruction: elearning. While some companies employ elearning to realize cost savings (e.g., reduction in travel expenses, opportunity costs of taking someone offsite, fewer instructors and administrators needed), others are using the technology to take a new approach to or view of learning. Training and human resources (HR) departments have gone from purchasing one-off elearning courses for a select few to implementing learning management systems that keep track of what large audiences within an organization have learned in online and offline classes and what individuals need to learn to perform better.

Up to this point, most elearning has been consumed by learners in the form of full, off-the-shelf, or slightly customized courses. The experiences provided by these courses are instructionally sound and typically general enough to provide content vendors with large prospective customer bases — a build-once, sell-many model. However, corporate customers also need a way to efficiently turn their proprietary knowledge into effective elearning content. Although general knowledge provides a necessary baseline, proprietary knowledge provides companies

with competitive advantage. Furthermore, organizations need a mechanism for managing and delivering elearning content in a digestible form to the end user who can immediately apply it to perform better — enter the learning content management system to help speed individuals' time to performance and perpetuate organizational success.

This paper provides IDC's definition of a learning content management system (LCMS) and discusses how such a tool can provide organizations with a competitive edge by helping to mitigate certain business problems with measurable results. IDC discusses the effect of learning object-based LCMSs on corporate elearning and the positive impact they can have on businesses. The document also distinguishes LCMSs from learning management systems (LMSs) and content management systems (CMSs) used for general Web-based content. To gather data for this paper, we leveraged existing IDC research and collected supply-side information from several LCMS vendors. Companies that contributed information include:

- Avaltus
- Global Knowledge
- Knowledge Mechanics
- LeadingWay Knowledge Systems
- Peer3
- WBT Systems

Learning Objects

Before we define what a learning content management system is, we need to develop the concept of learning objects. IDC defines a learning object as a standing piece (a.k.a. "chunk") of education that contains content and assessment based on specific learning objectives and that has descriptive metadata wrapped around it (see Figure 1).

The following sections provide a description of each of the elements that make up a learning object.

Learning Objectives

The object is assembled to help learners achieve specific educational goals. The degree of specificity of these objectives will be a major determinant of how often an object is viewed.

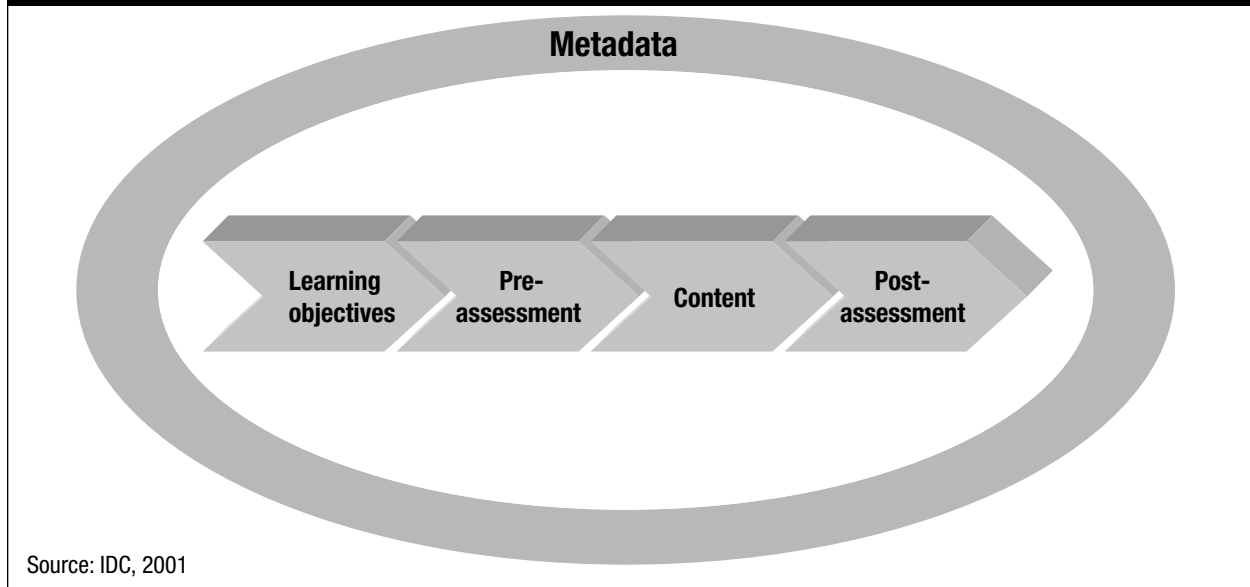
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Figure 1
Learning Object



Source: IDC, 2001

Assessment

Before working with the content, users may undergo a pre-assessment to ensure that they have the prerequisite knowledge necessary to complete the learning task at hand. Often, as a result of pre-assessment, the learner's path within the course can be personalized to show what objectives have already been mastered and where the learner should concentrate his efforts. This capability provides a more targeted learning experience because the learner can "skip over" those topics(s) he has already mastered as indicated on the pre-assessment. After working with the content in an object, users typically undergo some form of testing (i.e., post-assessment) to appraise whether or not they have sufficiently accomplished the objectives of the learning object.

Learning Content

Content is essentially the material used to convey the subject matter. It may include text, graphics, audio, some form of interaction, and concept application. Content is not tied to any code and may be created using any number of tools from Microsoft Office to Dreamweaver.

Metadata

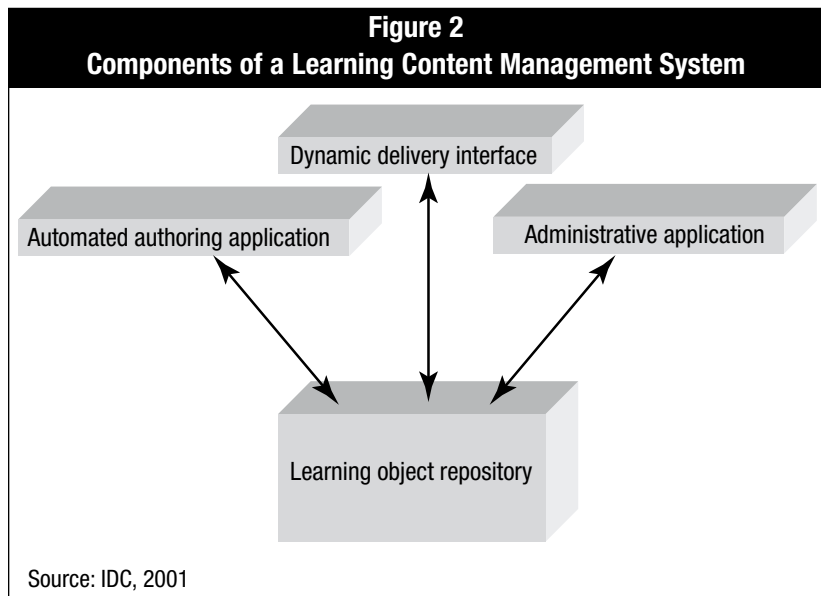
Metadata is used to describe what the object contains — much like a label lists the ingredients and nutritional value of a box of cereal. Objects are catalogued using subject-specific metadata and can be indexed, searched, and reused. Metadata typically includes information about the educational content, such as how long the material will take to complete, the language in which it is written (e.g., Spanish versus Japanese), and any prerequisite knowledge required to work with the

object. Metadata may also be used to assign different levels of access depending on the sensitivity of the information contained within the object (e.g., employees will typically have access to objects that customers do not).

Learning Content Management System Defined

IDC defines a learning content management system as a system that is used to create, store, assemble, and deliver personalized elearning content in the form of learning objects.

However, not all LCMSs are the same. Providers of these systems differentiate their offerings via unique features and functions, the ease with which they integrate with other enterprise systems, and the degree to which they customize their offerings for an enterprise's needs. Despite their differences, they do share the components depicted in Figure 2.



Learning Object Repository

The learning object repository is a central database in which learning content is stored and managed. It is from this point that individual learning objects are either dispensed to users individually or used as components to assemble larger learning modules or full courses, depending on individual learning needs. The instructional output may be delivered via the Web, CD-ROM, or printed materials. The same object may be used as many times and for as many purposes as is appropriate. The integrity of the content is preserved regardless of the delivery platform. XML serves this function by separating content from programming logic and code.

Automated Authoring Application

This application is used to create the reusable learning objects that are accessible in the repository. The application automates authoring by providing authors with templates and storyboarding capabilities that incorporate instructional design principles. Using these templates, authors may develop an entire course by using existing learning objects in the repository, creating new learning objects, or using a combination of old and new objects. Authors may be subject matter experts, instructional designers, media production artists, or community of practice leaders. The tool may also be used to rapidly convert “libraries” of an organization’s existing content, typically adding media, customized interfaces, and instructional methodologies. An author may reside within an organization or at an outsourced provider.

Dynamic Delivery Interface

To serve up a learning object based on learner profiles, pretests, and/or user queries, a dynamic delivery interface is required. This component also provides user tracking, links to related sources of information, and supports multiple assessment types with user feedback. This interface may be customized for the organization using the LCMS. For example, content may be presented on Web pages emblazoned with the company logo and a look and feel designed to reflect the desired corporate image. The look and feel may also be localized to the region in which users reside.

Administrative Application

This application is used to manage student records, launch elearning courses from course catalogs, track and report student progress, and provide other basic administrative functions. This information can be fed into a learning management system designed with more robust administrative functionality. The relationship between learning content management systems and learning management systems is discussed later in this paper.

Training and Beyond: Solving Business Problems with Learning Content Management Systems

Organizational structures are flatter today than they were 15 years ago. Enterprises are more open to sharing information with all of their constituents (e.g., suppliers, partners, and customers). IDC believes that the LCMS tool can be used to facilitate communication to all these audiences through effective learning experiences. From a business perspective, an LCMS may benefit the enterprise in the following ways:

- **Learning in context.** An LCMS selects the learning objects and puts them in a sequence determined by the learner’s query, job role, prior experience, and/or some kind of pre-assessment. Content presented to a learner reflects the individual’s needs and

organization's objectives. This approach ensures that knowledge workers spend time learning the information they need, not looking for it or sitting in a classroom hoping the instructor will eventually present it. An LCMS allows for nonlinear "search learning"; that is, a user who has a learning need can immediately seek the requisite information to fulfill that need and subsequently be directed to other relevant resources.

For example, consider a management consultant who is on an engagement and needs to know how to analyze the financial statements of a real estate investment trust. The consultant could seek a learning object or sequence of learning objects to do just that. This approach is certainly more desirable than the alternative of thumbing through financial statement analysis books or attempting to find a classroom-based course that covers such a specific topic. If the consultant is lucky enough to find the course, he may need to sit through a lot of material he already knows before getting to what he really needs to know. The learning object that covers financial analysis may contain content that another consultant created after successfully working on a similar project. Not only is the object targeted, relevant, and valuable, but it may also point the learner to the original author of the content for further insight. Immediately after working with the object, the consultant can apply what he learned to move the client engagement forward.

- **Keeping tacit knowledge from walking out the door.** What if the consultant who originated the content in the example above leaves the company? The consultant working on the project needs the tacit knowledge of the original consultant but may not be able to contact her. Yet, the consultant can access the learning object that captured the knowledge his predecessor used to make the project a success. Learning content management systems not only allow current members of the enterprise to share best practices, but they may lengthen the shelf life of proprietary best practices created by former members. Just because the goose left the pen does not mean that she did not leave behind any golden eggs.
- **Using one application to educate disparate audiences.** A clear benefit of an enterprise having a central repository of learning objects is that certain objects will be applicable to different learning audiences. The launch of a new product, or a new release of a software product, is a good illustrative example of this benefit. Traditionally, the process of developing and delivering education for a new product has been disjointed. The training department creates classroom content that it pushes onto sales and marketing personnel. In turn, the marketing department creates brochures and online demos for the benefit of resellers and prospective customers. Customer service representatives answer questions from potential customers and provide post-sale support to software buyers.

Moreover, the software application may even come with some form of electronic performance support attached to it that will help customers when they are having trouble using the application to perform a specific task. Since an LCMS manages content primarily in the form of XML, it becomes much easier to automate translation from elearning to other forms of structured knowledge such as company white papers, marketing brochures, and product data sheets.

An LCMS can add consistency and enhance efficiencies of new product education. Since much of the software information needed by the different audiences described above is the same (e.g., price, value to the customer, features, and functions), many learning objects need only be developed once. These objects can then be disseminated to different audiences. The same object used to teach resellers about the new file sharing function of the application as part of a classroom-based course may be published in a manual used by customer support to answer incoming calls and may be called up from the repository by the software's electronic support system when users run into trouble. The LCMS acts as a single source that can be leveraged by the enterprise to create, manage, and update content for all these learning events rather than leading separate development efforts.

- **Future-proofing an organization's content.** By separating content from the presentation layer through the use of XML, the content will still be reusable even if delivery methods change radically down the road (i.e., a disruptive instructional technology is developed). So the content in an off-the-shelf Accounting 101 course will not have to be reinvented just because a new delivery medium is adopted by the organization.

This separation also allows authors to update courses without having to know how to write code. They need only know how to use the templates provided by the authoring application. In the software product example above, a learning content management system can be leveraged to efficiently develop and manage learning content for a future release of that product. Typically, a course designed for the new version will contain many of the same elements as the course designed for the previous version. Rather than creating a new course from the ground up, authors may use many of the same objects while eliminating those objects that are no longer relevant and replacing them with new objects created by a person or persons who were properly trained to use the authoring tool. This is an example of the proverbial 80/20 rule.

- **Increasing organizational know-how and performance through massive content conversion.** Cost-effective conversion allows legacy content that previously would have gone unused to become an

asset that can potentially benefit a company's income statement. An example of cost savings is a customer care center that has spent a significant amount of time and money on developing and delivering classroom-based courses to thousands of agents. Much of the content in these courses may be proprietary and thus unavailable in an "off-the-shelf" vendor course offering. This process tends to be difficult to execute successfully in terms of logistics and expenses when there is high turnover among the pool of employees. However, new employees need to be trained on the organization's policies and procedures if they are to become productive.

An LCMS saves companies money when it is used to develop new elearning courses rapidly using existing classroom-based content while updating and modifying only the content that needs to be updated. In this case, money is saved on two fronts: by saving the time and resources used in delivering classroom-based courses to thousands of learners and by decreasing time to productivity for the agents.

The availability of the company's elearning content allows employees to train at times compatible with their schedule. For example, agents may access certain objects within a course they have completed if they need to refresh their skills.

- **Ensuring consistency of learning in a global enterprise.** Centralizing learning object management using a single repository ensures that organizations are consistent in spreading their learning messages to disparate audiences. Moreover, metatagging accounts for different languages when the audience is global. While centralization seems to imply rigidity, an LCMS' authoring application and dynamic delivery interface help mitigate the issue by allowing for localization, which may increase learner retention.

For example, a large auto manufacturer that is drastically changing the design of its best-selling sport utility vehicle may need to communicate the implications of the changes to its windshield wiper suppliers. Part of this communications effort might be teaching the engineers who design these wipers about new windshield specifications and the consequential need for new wipers. This effort may involve developing a course that uses many of the same video elements but requires text- and audio-based content to be done in different languages because wiper suppliers are located in Germany, Japan, and India. Different objects may be used for each supplier, and the delivery interfaces may also reflect disparate stylistic and learning preferences of local cultures. However, the material and the quality of the learning experience will be consistent.

Learning Content Management Systems and Learning Management Systems Are Different and Complementary

Does adding a “C” to the LMS acronym make the LCMS a different animal? No, but the distinct strengths of the two clearly set them apart. Simply put, LCMSs and LMSs do different things. The value proposition of an LMS is cost-efficient training administration. An LMS takes a centralized, organizational approach to learning in that it schedules and registers students for full online and offline courses, launches elearning courses, and tracks learner progress through these courses. User success is determined by a linear, sequential path through course content and assessment. It also provides learning administrators with the ability to track classroom-based resources (e.g., ensuring that the appropriate lab equipment is available for a hands-on networking class).

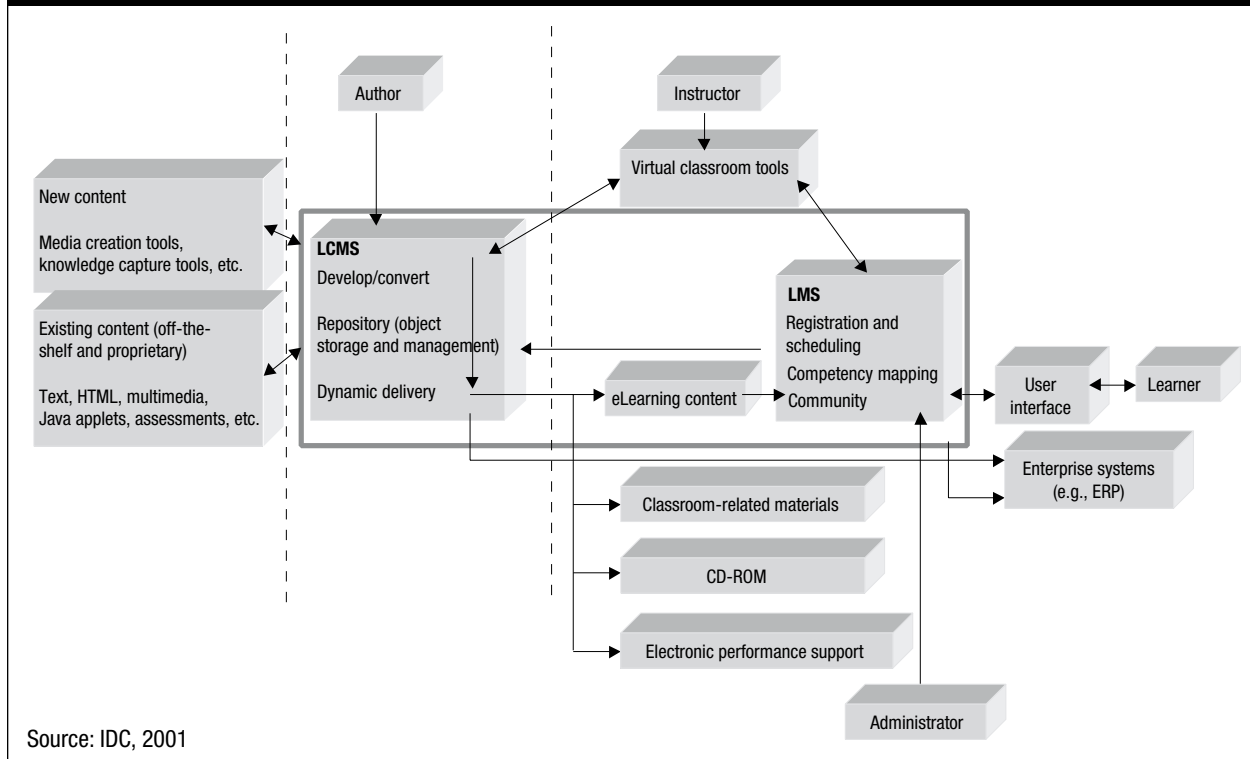
More sophisticated LMSs allow for competency mapping. An LMS measures an individual’s competency level via skill-assessment tests and then guides the user to the most appropriate course(s) to fill any skill gaps. In this way, an LMS automates the traditionally time-consuming and labor-intensive process of manually matching individuals, and it may even provide a tangible, comprehensive career development path for members of the organization.

While LCMSs do offer organizations some basic catalog and registration functions, these functions are not as robust as those offered by an LMS, and they are focused solely on elearning content. However, an LCMS allows an organization to do more extensive tracking of learners’ interaction with this content than the top-level tracking allowed by an LMS. Tracking in an LMS is typically limited to course completion and rudimentary test results. The focus of an LCMS is to manage and deliver content that the learner needs when he needs it. The LCMS tracks individual user access to every learning object, allowing organizations to determine how people are learning and to filter out content that is either not being used or not instructionally sound.

LCMSs and LMSs are not only distinct from one another, they also complement each other well. When tightly integrated, information from the two systems can be exchanged, ultimately resulting in a richer learning experience for the user and a more comprehensive tool for the learning administrator. An LMS can manage communities of users, allowing each of them to launch the appropriate objects stored and managed by the LCMS. In delivering the content, the LCMS also bookmarks the individual learner’s progress, records test scores, and passes them back to the LMS for reporting purposes. The highlighted portion of Figure 3 depicts the relationship of the two integrated systems in an elearning environment.

If the integration depicted above is to work smoothly, the LMS and LCMS must be interoperable. Two of the key benefits of using learning objects, interoperability and reusability, are based on XML standards and described by standard metadata defined by learning standards bodies.

Figure 3
LMS-LCMS Integration in a Learning Ecosystem



Source: IDC, 2001

The origin of learning standards can be found in government, which has historically demonstrated a need for standardization of design and implementation of training solutions, many on a large scale. The inter-related specifications developed by several of these bodies, including the Advanced Distributed Learning Network (ADLNet), the Aviation Industry CBT Committee (AICC), the Institute of Electrical and Electronics Engineers (IEEE), and the Instructional Management System Global Learning Consortium (IMS) have resulted in the Sharable Content Object Reference Model (SCORM). This standard, of which several revisions are forthcoming, is designed to enable the interoperability of Web-based learning content so that it may be used and reused across multiple environments and products.

Several large enterprises already recognize the benefits of utilizing best-of-breed content across platforms regardless of who created it. The federal government has already declared that any elearning provider that wants to do business with it must be SCORM-compliant, thus driving its acceptance as the de facto standard for elearning. LCMS vendors realize the importance of standards to the success of their products and services, and they have been active participants in the standards efforts.

Learning Content Management Systems Are Unique in Their Focus

The primary difference between a CMS and an LCMS is that the former is a horizontal software application and the latter is a vertical market software application. The two are architecturally similar in that they take content through the entire process of organization, maintenance, security, and protection. However, an LCMS, as a vertical market application, requires development and deployment layers that cannot be addressed by the generalized content management features found in a CMS.

First, LCMSs emphasize the development layer, or front end, as the operating piece in rapidly building substantial content, importing it, and converting it for storage and management. LCMSs are also customized with a back end, or deployment layer, to handle the specific needs of learners such as the instructional outputs that include CD-ROM, classroom-based materials, and Web-based training.

In addition, learning objects will further the LCMS' position as a highly customized vertical application. Learning objects use specialized processes, business methodologies, and presentation rules for learning tasks that are important to an LCMS yet are not present in a horizontal CMS. Some of the characteristics of learning objects that are specific to LCMSs include:

- Learning objects contain inherently ordered and structured information.
- Learning objects involve extensive tracking capabilities.
- An LCMS has assessment and certification components.

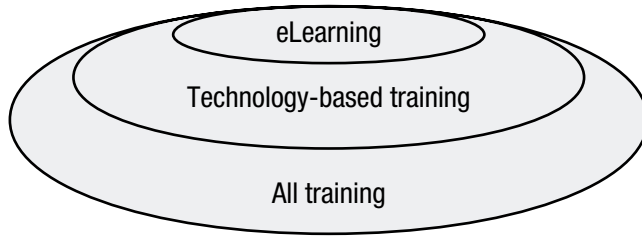
It may seem obvious, but the differences described above are the result of focus. LCMSs are designed with prescribed learning in mind.

Learning Content Management: A Link Between Knowledge Management and eLearning

At IDC, the phrase elearning refers to the enablement and delivery of asynchronous or synchronous education and training content (e.g., multimedia presentation, simulations, and assessment) over an intranet, extranet, or the Internet to an end-user device.

To put that definition in context, we note that elearning is a subset of technology-based training (TBT) that also includes CD-ROM and other technology-delivered training. TBT is a subset of all training, which also includes instructor-led training (ILT) and text-based training (see Figure 4).

Figure 4
The Relationship of eLearning to All Training



Source: IDC, 2001

Vendors, analysts, and chief knowledge officers (CKOs), among others, are now calling for the convergence of knowledge management and elearning. However, IDC believes that major ideological distinctions currently exist between the two areas of practice:

- Perhaps the most fundamental difference lies in the way learning content and knowledge content are packaged. Knowledge content neither contains the precise behavioral objectives for which learning content strives nor employs the instructional design methodologies that learning content does.
- Different metrics are used to evaluate the success of elearning and knowledge management initiatives. eLearning uses learner tracking and formal assessments while knowledge management uses personnel's contribution of information to determine success if any metric is used at all. According to IDC research, three out of every four organizations that purchase knowledge management software and services do not use formal measures to gauge their success.
- eLearning and knowledge management are often inspired by different levels in the organization. eLearning is viewed as a tactical solution to a specific problem and is often initiated at the sub-executive level. Knowledge management on the other hand is viewed as strategic, is less specific in its objectives, and is often initiated at the highest level of the enterprise (or by a large consulting firm that has the ears of C-level executives).

IDC defines knowledge management as a formal “process” that evaluates an enterprise’s organizational processes, people, and technology and develops a solution that leverages the relationships between these components to collect and share the right information with the right people at the right time.

The following factors dramatically enhance the effectiveness of a knowledge management solution:

- Content management
- Learning
- Expert tracking
- Collaboration

An LCMS can contribute to each of these aspects of a knowledge management program in the following ways:

- **Content management.** A formal process of converting, collecting, and organizing intellectual assets of a corporation in one location in the form of learning objects is essential to ensuring that knowledge is captured and disseminated efficiently. This process reduces the time and costs spent by individuals replicating work others have done and the time spent searching for specific information or expertise within the organization. It also prevents this know-how from leaving the enterprise due to turnover.
- **Learning.** Since the intelligence of people is both the raw material and end product of any knowledge management system, it is in the best interest of the organization to ensure that an efficient and flexible learning environment is available to its members. The “just-the-right” learning delivered by an LCMS is clearly beneficial to an organization’s knowledge management program.
- **Expertise tracking.** If an enterprise is to take advantage of its human capital, it must determine who knows what and where the individual can be found. An LCMS can help learners locate content authors.
- **Collaboration.** Formal and informal interactions between these experts and “greenhorns” often result in a conveyance of knowledge. An LCMS can facilitate collaboration by providing the user of a learning object(s) with the author’s contact information. Then, the user can follow up to discuss unresolved issues and share new insights.

In these ways, an LCMS bridges a gap between knowledge management and elearning, particularly when dealing with an organization’s proprietary learning content. With an LCMS, members of the enterprise may act as both content authors and users. An author may be, among other things, a subject matter expert, a knowledge manager, a trainer, or a business unit manager within the organization. An LCMS’ efficiencies (e.g., learning content reusability, portability, accessibility, and speed of conversion) and the targeted nature of the learning experiences it delivers make it an ideal component of any enterprise-scale knowledge management program.

Conclusion

Vendors in the LCMS segment can further entrench elearning into the corporate backdrop by allowing organizations to leverage one application to educate a variety of student communities — employees, partners, suppliers, and customers. An LCMS compresses the time required to develop learning content. Through the use and reuse of learning objects, this technology delivers targeted learning, thus shortening a learner's time to proficiency. The net result of this is increased organizational productivity.

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