

Learning Content Management System (LCMS)

Sonja Irlbeck, EdD, faculty, Capella University
(sonja.irlbeck@capella.edu) and

Joanne Mowat, doctoral candidate, Capella University; president,
The Herridge Group (herridge@herridge.ca)

Learning Objectives

By reading this chapter, you should be able to:

- Define the three categories of applications for storing and tracking learning content
- Describe the core functionality of each category
- Analyze the similarities and differences among the categories
- Suggest which category of application is most suited to the management of eLearning in general and reusable learning objects specifically.

In this chapter concepts will be clarified and reinforced through examples in case studies. Included will be a discussion about which category of application is most suited to the management of eLearning (i.e., learning delivered via internet technology) in an organization, and which is better suited to the management of reusable learning objects.

Executive Summary

Content Management Systems (CMS), Learning Management Systems (LMS), and Learning Content Management Systems (LCMS) enterprise applications are often found to be competing for the same organization resources. The reality is that each application has very specific strengths and abilities that may complement each other; but one often is the best fit. Organizations need to specify their business requirements and then carefully consider the functionality of each of the enterprise applications before making the investment.

In general, the average organization can meet its eLearning management requirements with an LMS which will also provide robust classroom and learner management functionality. An organization interested in moving to a learning object approach or one also interested in capturing intellectual capital through knowledge management should consider an LCMS which will provide the required content management and storage (data warehousing) capabilities.

Introduction

Effective training and education creates costs for organizations in terms of direct and indirect costs and employee time. Decision makers require information on how much and what kind of training is being delivered in their organizations, the results of the training, student progress and employee qualifications, and training requirements to support organizational goals. Finding ways to help store and track information about types of training, content, and when training is taken will help organizational leaders in their strategic and tactical planning efforts.

As all forms of learning become more costly, ... management will want more information not only on the performance of the learners, but on who is learning what, how many qualified (or certified) employees are available for any specific assignment (Rosenberg, 2001, p.161).

Organizations benefit from focused applications that manage learning, administration, tracking, and reporting functions. At the same time, employees need easy access to information to plan and manage their professional development. A variety of applications are available to help organizations manage course and learner administration, content, and key organizational information. In response to requirements such as those previously listed, three categories of enterprise applications have emerged.

Rather than focus on finding and presenting instructional content from a neutral source, a proposed approach is for the enterprise applications to promote

... a strong orientation toward learning from one's own experiences and those of others. This involves a pedagogical shift, away from an emphasis on learning as acquisition of predetermined content, toward a balance that includes or even emphasizes learning as participating and contributing to the learning experience in a way which can be captured and reused by others (Collis & Strijker, 2002, p. 3).

Finding a way to organize, present, store and efficiently update these learning experiences is what has promoted the evolution of three enterprise-wide applications:

- Content management systems (CMS)
- Learning management systems (LMS)
- Learning content management systems (LCMS)

"For contribution-based reusability to grow in an institution, specific technical tools and user interface functionalities are critical" (Collis and Strijker, 2002, p. 4). The evolution of these applications has been made possible as a result of the growth of internet and intranet capabilities and has been driven by the need to efficiently sort and distribute large amounts of information for large distributed organizations.

Understanding the Applications

The three categories of enterprise applications being considered in this chapter are learning management systems (LMS), content management systems (CMS), and learning content management systems (LCMS). While these three types of applications share common characteristics, each also has unique capabilities that may make it a better choice for a particular situation. For example, as more organizations look to reusable learning objects (RLO) to support the capture, control, and management of learning and information, a desirable characteristic would be the capability to store and manage these objects. This section will begin with a brief review of RLO in order to understand the context in further discussions of the characteristics of the three applications.

Reusable Learning Objects (RLO)

Reusable learning objects (RLO) are covered in detail in a related chapter, so they will be quickly reviewed here in order to provide context to the three applications. RLO are relatively new to the instructional design field, having been introduced in the late 1990s. Reusable learning objects are context independent, transportable and reusable pieces of instruction that are digitally managed and delivered. Designs using RLO allow parts of learning to be reused rather than recreated from scratch each time the content is needed. This design approach supports fast, cost-effective development of learning that provides a consistent message while reducing learning maintenance costs. Largely because of benefits such as these, RLO are emerging as the “technology of choice in the next generation of instructional design, development, and delivery, due to its potential for reusability, generativity, adaptability, and scalability” (Wiley, 2000, p. 3). In discussing the likelihood of universities sharing objects, Stephen Downes (2001) makes the point that

The economies are relentless. It makes no financial sense to spend millions of dollars producing multiple versions of similar learning objects when single versions of the same objects could be shared at a much lower cost per institution. There will be sharing, because no institution producing its own materials on its own could compete with institutions sharing learning materials. (p. 2)

Learning objects definitions can be found in the beginning of this book, which is a comprehensive text explaining the term. A number of definitions are included there. Derived from work in several disciplines, RLO are a technological construct that has been operationalized and are now being successfully applied in corporations and in higher education institutions. In actuality, this is not a new concept. What is new is that educators and instructional designers now have access to technology that provides the “potential to share, adapt and reuse a wider variety of learning resources to create and enhance learning than ever before. Learning resources are now referred to as learning objects” (Lowerison, Galant, & Boyd, 2003, p. 1). A paradigm shift has occurred as educators begin to think in terms of learning objects or learning assets rather than the broader scope of learning resources.

Relationship to Content Management Application

RLO provide untold opportunities for easy access to tailored learning and are beginning to be implemented in corporations and universities. Hodgins (2000) maintains that the new conceptual model that includes learning objects allows for unprecedented efficiency in the design, development and delivery of content. He maintains that learning objects “are destined to forever change the shape and form of learning” (p.1). These opportunities rely on supporting technology to be actualized. Understanding the concept of RLO enables one to begin to understand how these information "chunks" can be systematically managed for efficient and optimum application within content management systems.

Content Management System (CMS)

Content management is “the collection of policies and technologies that guide and enable corporations to contribute, manage, and share their structured and/or unstructured information” (Barnes in Falla, 2001, p.1). Content management systems (CMS) are data repositories that may also contain authoring, sequencing, and content aggregation tools, with an objective to “simplify the creation and administration of online content” (Nichani, 2001, p. 2). Originally developed and used by the newspaper industry and adapted in the mid-1990s to manage large volumes of content required for robust websites, CMS incorporate a workflow process and manage information based on search and retrieval criteria (Jones, 2001, pp. 22-25). CMS can support content being created once (content components or RLO) and used many times. An example is the image that is used in several different newspaper articles targeted at different audiences. Or an organization chart used throughout the corporation and housed in the CMS so it need only be updated at one location.

Robertson (April 2003) states that CMS manage small, interconnected units of information where each unit is defined by its location on a site. CMS are focused primarily for web-page creation and editing with cross-linkages between pages. The CMS provide tight integration between authoring and the repository (i.e., a database that stores and manages pieces of information or learning) along with a powerful publishing engine (p. 1). While Hall (2002b) maintains that a CMS “stores and distributes the right content to the right learner at the right time” (p. 248), Duncan Lennox from WBT Systems believes that

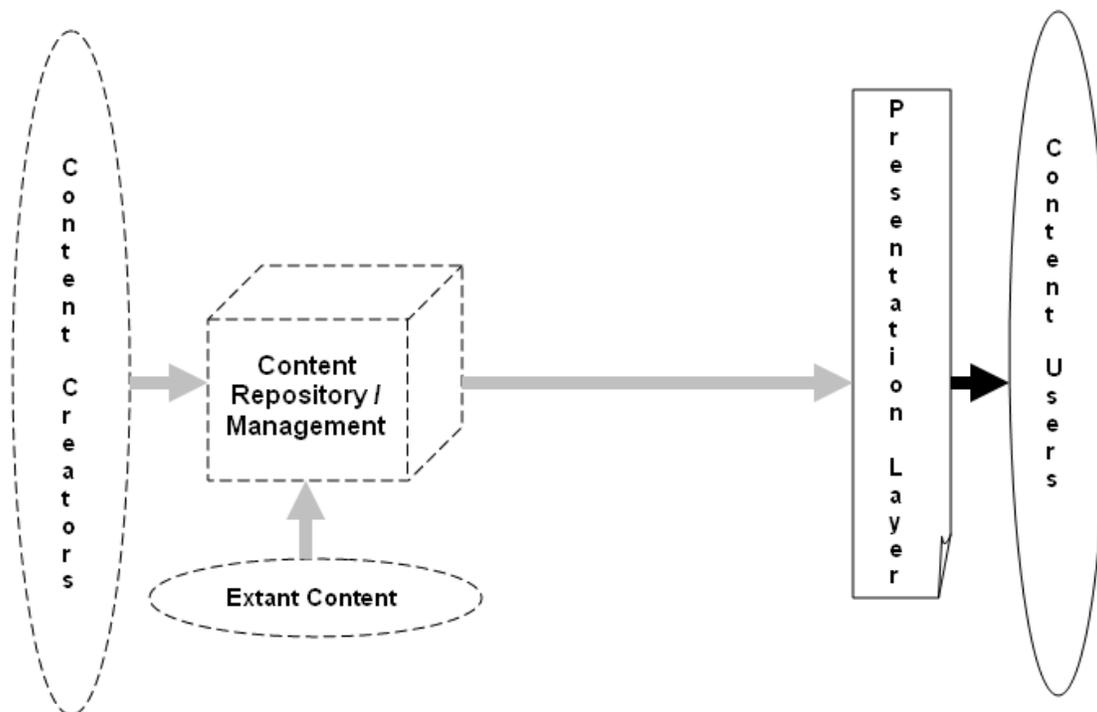
CMSs do not work well for learning because they are designed for basic information transfer. They simply identify the user and deliver pieces of content associated with that user. E-learning, on the other hand, requires systems that account for such complexities as a course’s level of difficulty, whether a learner has completed the necessary prerequisites and whether that person learns best by reading, listening, or doing (Jones, 2001, p. 24).

Lennox reinforces the idea that the focus of a CMS is to provide centralized storage for small information chunks for easy retrieval, revision and distribution. Robertson reiterates that "the most important part of a CMS is the content itself" (January 2002, Ideas Box Section). A sampling of the types of content that can be stored and distributed via a CMS includes:

- simple pages
- complex pages, with specific layout and presentation
- dynamic information sourced from databases, etc
- training materials
- online manuals (policy & procedures, HR, etc)
- general business documents
- thousands of pages in total
- extensive linking between page (Robertson, January 2002, para. 7)

Figure 1 illustrates the components that comprise a typical content management system, illustrating the basic nature of content "chunks" or components and a process for the combination of content. Essentially, content is created in a format that is compatible with the content repository system. A digital presentation format enables the users of the content to search and view the content chunks. Content users typically do not revise the content but alert the creators if there is a need for revision.

Figure 1: CMS Components



Content management systems are sometimes confused with course management systems. Course management systems are more sophisticated than CMS in that "Course-management systems..... integrate content delivery, communication, learner activities, collaborative work, feedback, testing, portfolio development, groupware tools, and administrative tools for the instructor" (Collis & Strijker, 2003, p. 1). CMS – that is *content* management systems - are focused on content, with a purpose to store information and provide access to the information. Additionally, CMS are used for the broader purpose of organizational knowledge management. "While a CMS itself is not the source of knowl-

edge, it can be a very valuable enabler in knowledge-capture processes” (Robertson, May 2003, p. 1). As a summary, Table 1 found later in this chapter reinforces the principle that a CMS is best at managing content, providing a database and capability to search for the content and a way to locate and deliver the content to the appropriate user. The CMS stores and manages the content, but does not analyze, organize, or distil content into knowledge. Those tasks are the function of a Learning Management System (LMS) and/or Learning Content Management System (LCMS), described in the next sections.

Learning Management System (LMS)

While the goal of a CMS is to store and distribute content, the goal of a learning management system (LMS) is to "simplify the administration of learning/training programs within an organization" (elearningpost, 2001, para. 3). LMS allow a learner to launch eLearning. LMS help manage the interactions between the learner and the eLearning and other related resources. LMS help learners plan and monitor their progress in their learning journey. LMS are “software that automate[s] the administration of training events” (Hall, 2002b, p. 249). The automation of administrative functions via LMS can lead to considerable time, personnel, and resource savings. An LMS has significant administrative functions, which help an organization to "target, deliver, track, analyze, and report on..... learning" (elearningpost, para. 3). These robust administrative functions enable organizations to track completion of mandated training (e.g. safety, hazardous materials), currency of professional certifications (e.g., continuing education units for medical and education professionals), and mandatory human resource related programs (e.g. sexual harassment, diversity) (Hall, 2002a, p. 5).

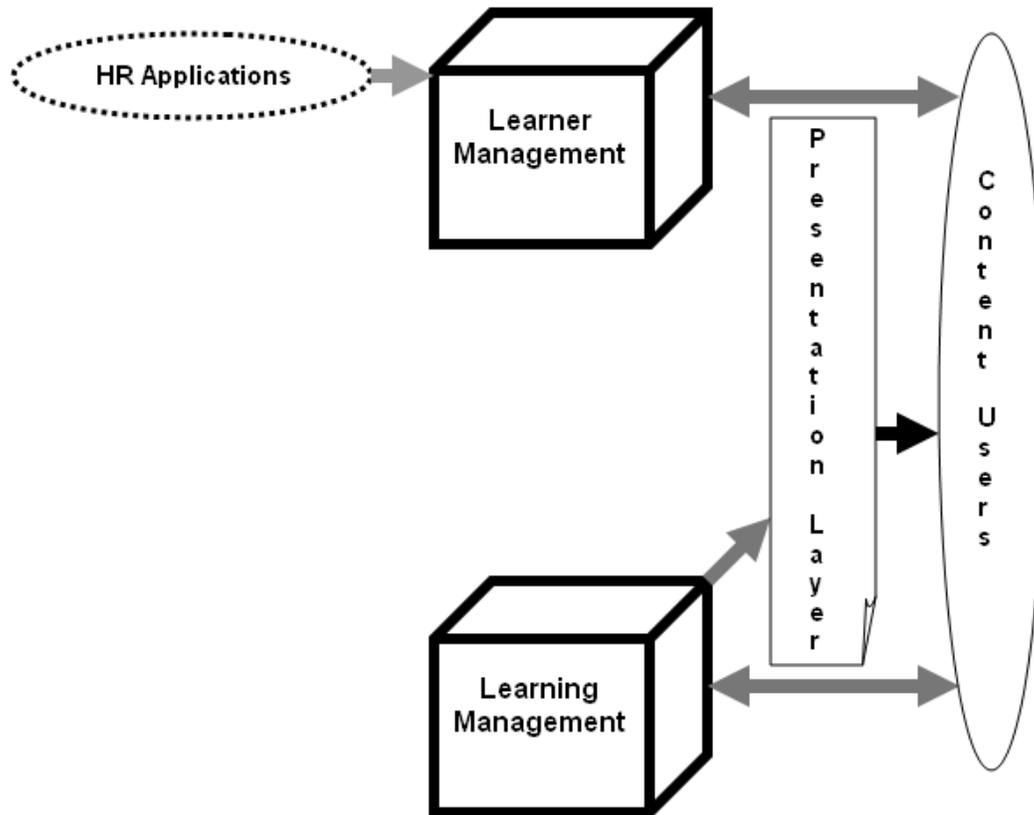
LMS integrate tools to manage the tracking of learners and the content along with appropriate work flow processes. This combination of tools and processes allows an LMS to support the delivery and management of learning and tracking the results. As Robbins (2002) explains, learning management systems “enable companies to plan and track the learning needs and accomplishments of employees, customers, and partners” (p. 1). Every LMS should have the ability to display a catalogue, register learners, track learner progress, and provide reports. LMS must “be capable of handling various delivery modes – online, instructor-led, self-paced, collaborative, facilitated, nonfacilitated, and the like” (Singh, 2001, p. 3).

LMS are either installed on an organization's intranet or housed off-site at service providers. When using services providers, LMS are accessed through either an extranet, which is a "private network that uses Internet protocols and public telecommunication system to share a business's information externally" (GetNetWise, 2004) or the internet, which is comprised of "inter-connected networks using TCP/IP protocols" (GetNetWise, 2004). The Internet is external to a corporate intranet. Rosenberg (2001) emphasized that “A learning management system uses Internet technologies to manage the interaction between users and learning resources” (p. 161), which implies that these technologies are applied whether the LMS is operated internally or externally to a corporation.

Figure 2 depicts the relationship of the components that comprise a learning management system. An LMS has the capability of managing learners and their records as well as

managing the learning process. Within an LMS, the users interact with their learner data and with learning management information. The learning content is not a part of this configuration.

Figure 2: LMS Components



Some LMS may have a degree of content management ability, but this is not their main focus. According to Rosenberg (2001), although LMS differ from vendor to vendor in their focus on one or more of their features, they all have core capabilities: online course catalogue; online registration system; competency assessment; ability to launch and track eLearning; learning assessment; learning material management; customizable reporting; collaborative and synchronous learning tools; and ability to integrate with other enterprise applications (p. 162-164). To reinforce, the goal of LMS is to manage processes related to delivery and administration of training and education. LMS are structured around the course rather than course content. Table 1, found later in this chapter, reinforces Rosenberg's list that LMS support many learning management functions, but do not manage, create, or search for content for the learner. Collaborative tools within LMS include capabilities that allow learners to work simultaneously with other learners using an internet/intranet/extranet technology coupled with CMS. The next section describes the combination of content and learning management via the LCMS.

Learning Content Management System (LCMS)

Remember that the goal of an LMS is to help administer learning-related activities and is focused on the course. Learning content management systems (LCMS) allow online content to be stored, managed, and reused through integrated database functionality. The LCMS is a “complex piece of software that labels learning objects ... then organizes and delivers them in infinite combinations” (Jones, 2001, p. 21). The core components of a LCMS are 1) an authoring tool suitable for non-programmers; 2) a dynamic delivery interface that delivers content; 3) an administrative component that manages learner records, launches courses, and tracks progress; 4) a learning object repository that is a central database that houses and manages content (Donello, 2002, p. 1).

The central database or repository either delivers learning objects (RLO, learning assets or shareable content) to learners individually or combines objects into learning modules. These objects and modules are presented to learners through the interface which tracks users, provides links to information, and handles assessment and feedback (Brennan, Funke & Anderson, 2001, p. 4). The administrative application manages learner information, launches courses from a catalogue, and tracks and reports on learner progress. The authoring application provides templates that automate storyboarding. “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” (Brennan, et al., 2001, p. 5). So an LCMS can support the creation and management of RLO.

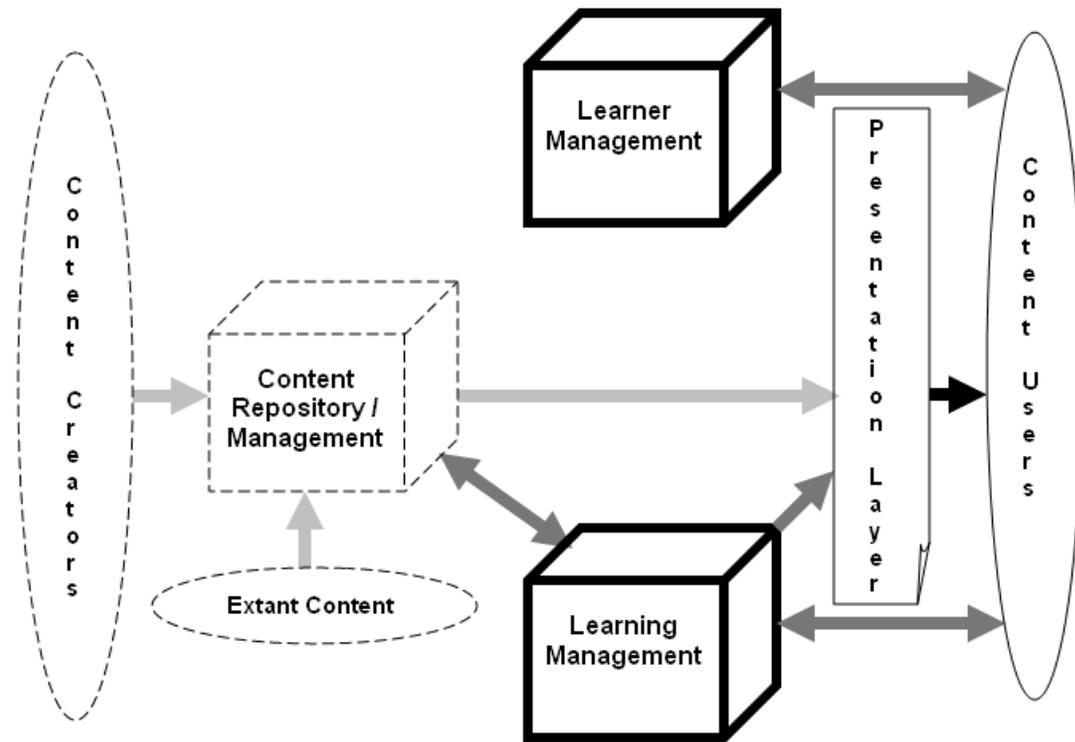
Williams confirms that LCMS address many of the challenges an organization faces in managing and exploiting the knowledge of and for their employees or students. "An LCMS simplifies and accelerates many of the tedious and time-consuming aspects of capturing information, assembling courses and publishing knowledge so training departments can be more productive and focus more resources on higher value activities like instructional design" (2002, para 3).

An LCMS captures information in a variety of original formats and packages it in a way that

facilitates modularizing, elaborating upon, sharing, re-using, managing and presenting it in the context of training courses, an online reference library, online job aids, presentations and other forms of business communications (Williams, 2002, para 4).

The following figure depicts the elements that comprise a typical LCMS. The content is created and stored in a repository that is accessed by the learning management system and distributed to the users (i.e., learners). The individual learner data is also managed by the system and is accessible to the individual user. So one begins to comprehend the integration of content, managing the content for distribution, and managing learner data.

Figure 3: LCMS Components



Although 81% of the LCMS reviewed in a recent Brandon Hall report (Hall, 2003, p. 1) incorporated some LMS functionality, this is not their main focus. The same study also found that 100% of LCMS reviewed were described as “interoperable with third-party learning management systems” (p. 1). In other words, they purportedly can operate seamlessly with LMS created by other companies. LCMS are based on a reusable learning object model allowing content to be reused within or across courses or programs (Hall, 2003, p. 2). To accomplish this, LCMS manage content separately from the media (technology interface) in which the content will be delivered. RLO are assembled into learning chunks or accessed as individual pieces of information or instruction and delivered to the learner.

The successful and efficient deployment of an LCMS "relies largely on effective development and use of learning objects, which are reusable, media-independent chunks of information organized by a meta data classification system" (Ellis, 2001, para. 5). LCMS were not created with the intention of replacing LMS. LCMS and LMS can be complementary and each solves a uniquely different challenge. Feldstein emphasized that "organizations that purchase LCMS's typically start looking at these tools because they are faced with the challenge of producing and maintaining a daunting amount of customer e-learning content" (2002, p. 1). LCMS are particularly suited to handling large amounts of content for e-learning efforts. An effective LCMS will enable an organization to organize courseware without programming expertise.

With the distinctions among CMS, LMS and LCMS clarified, how does one decide which system is most appropriate? The next section will attempt to make that clearer as the capabilities of the enterprise-wide applications are compared.

Comparing Applications

Each of the three categories of enterprise-wide applications increases the amount of information available to decision makers. Applications in all three categories have individual capabilities that make them appropriate for specific situations. In addition, all of the applications should strive to meet certain criteria including:

- Authoring tool neutrality, meaning that content can be authored using any tool
- Vendor neutrality, meaning that the application can manage content authored by any vendor
- Browser neutrality, meaning that the application must appear and function the same no matter what browser is being used
- Platform neutrality, meaning that the application can run on any platform (PC, MAC, etc.) with any operating system (Windows, Linux, etc.)
- Scalability, meaning that the application can scale larger or smaller to meet the organization’s needs; includes a firewall (hardware or software that provides security to a company’s internal systems by blocking unauthorized access) and includes an intuitive interface. (Rosenberg, 2001, p. 166).

The three categories of enterprise applications have many capabilities and features in common. Table 1 provides a summary of key features that organizations require to fully manage their content and learning function and indicates whether each is part of the functionality provided by a CMS, LMS and/or LCMS. Each feature may have greater or lesser application for each category. For example, a feature may have a robust (R) application for LCMS and a limited (L) or no functionality for CMS or LMS. The list in Table 1 is a compilation of possible features from Donello (2002) and Hall (2003) and impact learners, content presentation, competencies, delivery assessment, and integration with other applications in the organization. Use this table as a guide to the information in the following sections.

Table 1: Features of CMS, LMS and LCMS

Feature	Functionality		
	CMS	LMS	LCMS
Manage Learners		R	L
Manage Content	R		R
Create Content	L		R
Manages Instructor-led Sessions		R	
Course Catalogue		R	L
Registration System		R	L
Competency Management		R	L
Launch and Track eLearning		R	L
Assessment Creation, Evaluation, and Feedback		R	R

Searchable Library of Reusable Content	R	R
Collaboration / Synchronous Learning Tools		R
Integration with Human Resources Applications		R
Locate and Deliver Specific Content to a Learner	R	R

Note: Adapted from “Theory & practice: Learning content management systems” by Jill Donello, 2002 and from “Learning management systems and learning content management systems demystified” by Brandon Hall, 2003.

Comparing CMS and LCMS

Recall that the focus of a CMS is on information storage and transfer, but not on getting information to the virtual classroom door or managing experiences inside the classroom. In a corporate setting, a CMS “supports the creation, management, distribution, publishing and discovery of corporate information” (Robertson, June 2003, p. 1). The CMS can streamline the authoring process, provide consistency, support decentralized authoring, and reduce duplication of information, which is similar to a LCMS. The difference is that the LCMS manages learning through a robust set of tools while the CMS manages discrete pieces of information.

CMS create and manage content components defined as “the smallest self-contained piece of information” (Nichani, 2001, p. 3). Recall that in the learning world, the smallest piece of instruction that makes sense on its own is often called a sharable content object or reusable learning object (RLO). These are managed as reusable learning content through a LCMS. Both CMS and LCMS can support knowledge management by capturing tacit and explicit knowledge in the form of examples, best practices, procedures, etc., sometimes called knowledge artifacts. These artifacts “are the currency for both knowledge management and learning/training work” (Hall, 2001, p. 1). Knowledge artifacts (content components or sharable content objects) can be employed to ensure consistency of communication, information, and learning across national or global organizations. The use of a single content repository “ensures that organizations are consistent in spreading their learning messages to disparate audiences. Moreover, meta-tagging accounts for different languages when the audience is global” (Brennan, Funke & Anderson, 2001, p. 8). With the content separated from the presentation layer, as the figures illustrate, localization of presentation is far more cost effective.

From a technical point of view, the LCMS has CMS at the core of its architecture, and both LCMS and CMS use a programming language called extensible mark-up language (XML) to code content. XML allows content to be stored separately from the presentation layer, simplifying the updating of content.

The primary difference between a CMS and a 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 a 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. (Brennan, Funke and Anderson, 2001, p. 11)

A LCMS “combines the administrative and management dimensions of a traditional LMS with the content creation and personalized assembly dimensions of a CMS” (Nichani, 2001, p. 4). The next section distinguishes the LMS from the LCMS.

Comparing LMS and LCMS

LMS focus on making learning available and tracking learners. LCMS focus on stored online content to be managed and reused through integrated database functionality. While there is some overlap in the functionality between a LMS and a LCMS, the two enterprise applications have a different focus:

LMSs make the process of scheduling classes, creating catalogs and registering learners more efficient. LCMSs on the other hand, focus only on delivery. In the broadest terms, the LMS helps get you to the classroom door and the LCMS manages the experience inside the classroom. (Jones, 2001, p. 23)

To put it another way, “the primary objective of a learning management system (LMS) is to manage learners... By contrast, a learning content management system (LCMS) manages content or learning objects” (Hall, 2003, p. 1) in order for learners to learn efficiently. It should be noted, however, that many LCMS have some learner management capabilities.

As mentioned earlier, a learning management system can save money by reducing learning administration costs. “The value proposition of a LMS is cost-efficient training administration” (Brennan, Funke & Anderson, 2001, p. 9). The LMS cannot, however, support content sharing and the attendant savings realized through the use of learning objects nor can it provide the same level of learning control or personalization of learning. Schelin explains that, “the initial benefits of a LMS are cost-displacement issues, whereas the LCMS space is all about focusing on the notion of what we call reducing time to performance” (2001).

When considering the functionality that overlaps between the two applications, LCMS authoring and content management tools are far more robust than those found in LMS. And yet, LMS have many more course administration and management features than LCMS offer. “Together, the LMS and LCMS provide a way for organizations to inexpensively and efficiently create and reuse content, deliver that content, assess and track users, and gather important user data” (Jacobsen, 2002, p. 2). Why not create a single system to manage content and user information? Experts tend to predict that at this time with the present technological constraints, such a large robust system would require such a huge organizational effort and is still too large and complex for the requirements of most educational and training operations. However, as LCMS develop their influence on, and efficiency for e-learning, instructional design may increase to such a point that it will be beneficial for developers to explore new learning techniques to modularize and manipulate content. The following table summarizes the differences between LMS and LCMS.

Table 2: Differences between LMS and LCMS

Learning Management Systems	Learning Content Management Systems
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Used by training managers, instructors and administrators.	Used by content developers, designers and project managers.
Manage course catalog, schedule, student registration, and to capture learner profile data.	Author learning content as learning objects, practice and assessment items, simulations and other learner interactions.
Store data on courses and students.	Store content in a learning object repository.
Provide reports for training results and competency mapping/skill gap analysis.	Offer content management tools (e.g., search for learning objects, access rights and version control).
Support the launch to eLearning courses.	Deliver learning content in multiple format (e.g. eLearning, CD-ROM, paper-based materials and performance support).
Capture and track knowledge elements.	Develop multiple courses using RLO.
Share learner data with ERP system.	
Offer ability to create and administer tests.	Offer learning features (e.g. adaptive learning paths, skill gap analysis, asynchronous collaboration via email and discussion groups, assessment).

(adapted from Donello, 2002, p. 2)

Both LMS and LCMS track content delivery and student progress. However, each tracks to a different level of granularity.

A LMS concentrates on course-level tracking, particularly completion status and rolled-up scores. In contrast, a LCMS employs detailed tracking at the learning-object level not only to trace user performance and interactions at a finer granularity, but also to provide the metrics that help authors analyze the learning object's clarity, relevance, and effectiveness. (Rengarajan, 2001, p. 3)

Consequently, the selection of an application is determined by the functionality required to serve the requirements of the organization. The next section describes some of the uses and functionality for the three applications.

When to Use Different Applications

Understanding the functionality of the various applications enables one to make wise decisions about selecting the applications that best suit an organization's needs. Corporations and universities need applications to manage their learning administration, tracking, and reporting functions. At the same time, employees and students require easy access to the information needed to plan and manage their professional and educational development. In response to these requirements, enterprise applications have emerged over the last few years. Each of these applications focuses on addressing particular aspects of the challenge.

Each of the application categories has a distinct focus that makes them appropriate for specific functions. In some situations, one type of application may complement another to meet a corporation's requirements. In other cases, combining two or more of the applica-

tions would be redundant. For example, a CMS may be quite effectively combined with a LMS if the goal is to reduce the cost and increase the efficiency of classroom and eLearning delivery while capturing and tracking knowledge artifacts that will be used as information or transformed into learning. A LCMS would be quite effective when teamed with a LMS should an organization require strong learning administration and tracking while at the same time wanting to garner the benefits of delivering learning using RLO. However, there may be little or no benefit in combining a CMS with a LCMS since the LCMS can manage content components as well as sharable content objects in a more robust manner while also providing other key functionality.

When considering whether to invest in an application and, if so, which type, organizations must first clearly define the corporate strategies driving the implementation, how the strategies will be operationalized into business goals, what functionality is required to achieve the goals, and then select the application or applications that will provide the identified functionality.

The following table provides some ideas about when a CMS, LMS and/or LCMS may be the best option.

Table 3: When to use a CMS, LMS or LCMS

If you are primarily concerned with...	Then you ...
Managing student access and records for courseware that has already been developed.	Probably need LMS only.
Storing and disseminating content.	May be able to use CMS
Managing student records for courses developed within the LCMS.	May be able to use the LMS functions of your LCMS and may not need to purchase a separate LMS.
Capturing and tracking knowledge elements while reducing cost and increasing efficiency of classroom and eLearning delivery.	May combine CMS and LMS
Developing multiple courses using RLO and needing to manage both online and off-line learning events.	May need both LMS and LCMS in order to get the best system for both content authoring and course/student management.

(adapted from Donello, 2002, p. 2)

Applying Criteria to Select an Application – Managing eLearning

The research department at Thinq (2003) believes that “Learning Management Systems (LMS) are critical to facilitating the widespread adoption of e-learning” (p. 1). To manage eLearning on an enterprise-wide basis, an application would need to be able to store, launch, track, manage embedded learner assessments, and report on progress through

eLearning topics, lessons, and modules. An instructional designer analyzed the needs of Thing to first identify the eLearning requirements and then match the requirements to the functionality of CMS, LMS or LCMS. The instructional designer reported possible options as shown in the following table. As can be seen, LMS had all the elements required to manage eLearning effectively. LCMS had most of the functionality but were less robust, and CMS did not meet any of the eight requirements to manage eLearning.

Table 4: eLearning Requirements

eLearning Requirements	Functionality		
	R = Robust Functionality L = Limited Functionality		
	LMS	CMS	LCMS
Manage Learners	R		L
Course Catalogue	R		L
Registration System	R		L
Competency Management	R		L
Launch and Track eLearning	R		L
Assessment Creation, Evaluation, and Feedback	R		R
Collaboration / Synchronous Learning Tools	L		R
Integration with Human Resources Applications	R		

Note: eLearning requirements adapted from “Theory & practice: Learning content management systems” by Jill Donello, 2002 and from “Learning management systems and learning content management systems demystified” by Brandon Hall, 2003.

Applying Criteria to Select an Application – Managing Learning Objects

A learning development organization used the services of a consultant experienced in the implementation of RLO, CMS, LMS and LCMS. Through analysis it was discovered that they need a way to store and catalogue their many learning components. In considering the appropriateness of each of the applications to manage RLO it became apparent that LMS did not meet the most basic requirement: LMS do not contain a content repository. Without a repository there is nowhere to store the objects and no way to manage them. CMS may appear, on the surface, to meet many of the requirements for managing RLO. However, as mentioned earlier, CMS are horizontal applications managing information in discrete chunks along a linear publishing path, which do not have the layers of functionality required to manage RLO. LCMS, as also established earlier, are robust vertical applications that include authoring tools, dynamic user interfaces, learning object repositories, and administrative, tracking, and reporting functions. LCMS met all nine of the RLO requirements, as shown in the following table, making this category of application an appropriate choice to manage learning components for the learning organization.

Table 6: Reusable Learning Object Requirements

	Functionality		
	R = Robust Functionality		

Content/Learning System Requirements	L = Limited Functionality		
	LMS	CMS	LCMS
Manage Content		R	R
Create Content		L	R
Launch and Track eLearning	R		L
Assessment Creation, Evaluation, and Feedback	R		R
Searchable Library of Reusable Content		R	R
Locate and Deliver Specific Content to a Learner		R	R
Manage Sharable Content Objects from Multiple Sources Created in XML		R	R
Store, Search, and Retrieve Content based on Tags		R	R
Display Content in Multiple User Interfaces		L	R

Note: Adapted from “Theory & practice: Learning content management systems” by Jill Donello, 2002 and from “Learning management systems and learning content management systems demystified” by Brandon Hall, 2003.

Case Study Applications

In this section, three case studies are presented for your consideration. The case studies help you further understand and apply the information and criteria in reaching a decision about which application is the best choice to meet the functionality requirements for the situation.

Case One: WeDeliver Call Center Representative Training

Background

WeDeliver is a courier company with offices in over fifty cities in the northern United States and Canada. 80 call center representatives, working in four locations, are responsible for booking and tracing deliveries, as well as handling customer questions and complaints. The success of the company depends on the ability of the representatives to handle customer interactions quickly, consistently, professionally, and in accordance with corporate standards. Since there is a high rate of turnover in the call centers, quickly moving new employees to competence is a key metric for WeDeliver. The company has over 1,000 employees in other roles ranging from management to drivers, and each position has its own unique training requirements.

Pat, the training manager at WeDeliver, is finding it difficult and costly to effectively manage scheduling, registration, learner records, course data, and reporting by using manual processes. Pat is currently investigating technical tools to support the training management's efforts and knows that the solution will need to be scalable to accommodate growth, able to be integrated with the company's enterprise-wide human resources application, and should make testing and certification easier. About 80% of courses are leader-led; 15% are eLearning; and, 5% are internet-based self-study. Pat contacted an expert to help sort out the issues.

First study the features WeDeliver needs and compare them to the appropriate Tables in this chapter. What were Pat's Criteria? Should Pat be investigating a CMS, LMS, or LCMS? What would be your recommendation to the training manager?

- 1.
- 2.
- 3.

Expert Opinion

Expert opinion recommends that Pat look for a Learning Management System since an LMS will manage learner and course data; course catalogues, scheduling, and registration; and testing and evaluation. A LMS can also launch eLearning and will integrate with existing human resource systems.

Case Two: Serving Learners at ULearn Community College

Background

ULearn is a community college with locations in six North American cities offering eleven core programs to over 10,000 learners who attend on-site and to over 6,000 virtual learners. The virtual market is growing rapidly and the number of courses offered through eLearning increases each semester. To reduce costs and have faster access to a wider range of eLearning offerings, ULearn wants to collaborate with other community colleges to share course content packaged as learning components.

Reducing costs and providing faster access will require a technical infrastructure that can support the storage, dissemination, and management of eLearning and learner data via internet technology. The chosen technology should also facilitate content creation since several of ULearn's professors are eager to put their existing courses on-line. ULearn discusses the options with its leading instructional designer.

Identify ULearn's criteria and compare it with the appropriate Tables in this chapter. What were ULearn's criteria? Should ULearn be looking for a CMS, LMS, or LCMS? What would be your recommendation to ULearn?

- 1.
- 2.
- 3.

Expert Opinion

The expert opinion of the instructional designer is that ULearn should be looking for a Learning Content Management System since an LCMS uses internet technology to: support the sharing of content between like applications; manage content, content creation, course catalogues, registration; and launch and track learning.

Case Three: PLG International Insurance Company Employee Training

Background

PLG is an international insurance company with over 7,000 employees that insures large commercial ventures around the world. The management team at PLG has several concerns: There is a considerable amount of knowledge and information, important to the successful operation of the business, which is not easily found or accessed. Some of this knowledge and information disappears with every employee who leaves the company. The annual cost of managing and delivering training is increasing. Although there are several applications in place to manage training in specific locations, they are not integrated and do not communicate with one another.

The requirements for defensible records for the auditors on regulatory training differ from country to country and are all increasingly more stringent. Fines for non-conformance have also been increasing.

A new competency-based model has been successfully implemented by the corporate training department. The model clearly defines each role in the company, the knowledge and skills required. PLG plans to link compensation to mastery of the competencies. An enterprise-wide application is required to manage the competencies, their match to roles, and the role match to individuals, as well as to track completion of training related to each competency for certification and audit reporting.

Currently there is a lack of consistency in the message across training products regarding competencies and mastery. The same role in different locations may receive different training yet the incumbent is expected to perform to the same standards in all locations. The training department contracted a vendor to investigate a CMS.

Compare the needs of PLG with the features in the appropriate Tables in this chapter. What are PLG's criteria? Should PLG be looking for a CMS, LMS, or LCMS? If you were the vendor, what would be your recommendation?

- 1.
- 2.
- 3.

Expert Opinion

The vendor reviewed the current situation and the functionality required, and two sides to PLG's needs were apparent: knowledge management and training management. While a CMS would address the knowledge management requirements, choosing a robust LCMS would allow PLG to use one application to meet both sets of needs. The vendor needed to present the rationale for changing from the idea of a CMS to the solution of a LCMS.

Implications

Each of the enterprise applications discussed in this chapter has a distinct focus that makes it appropriate for specific functions. In some situations, one type of application may be able to complement another in order to meet an organization's requirements. In other cases, combining two or more applications would be redundant and counterproductive. For example, a CMS could be quite effective combined with a LMS if the goal was to reduce the cost and increase the efficiency of classroom and eLearning delivery while capturing and tracking knowledge artifacts that will be used as information or transformed into learning. A LCMS would be quite effective when teamed with a LMS should an organization require strong learning administration and tracking while at the same time wanting to garner the benefits of delivering learning using RLO. However, there would be little or no benefit in combining a CMS with a LCMS since the LCMS can manage content components as well as RLO in a more robust manner while also providing other key functionality.

A clear understanding of the features and functions of CMS, LMS, and LCMS enable decision makers to make reasoned decisions about the best use of each application. When considering whether to invest and in which application to invest, organizations must first clearly define the corporate strategies driving the implementation, how the strategies would be operationalized into business goals, what functionality is required to achieve the goals. The final step is to identify the application or applications that will provide the identified functionality.

Conclusion

CMS, LMS, and LCMS could each be an appropriate solution depending on the needs of an organization. By clearly understanding the differences, the core functionalities of each, and the benefits of combining or keeping applications separate, training and education professionals can help guide decision makers toward the best solution for the organization. Matching the right solution to meet the needs will help organizations effectively allocate their education dollars through focused applications to manage the learning, administration, tracking, and reporting functions.

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Sonja A. Irlbeck, EdD

Sonja Irlbeck, faculty for Capella University, a fully online accredited university, has more than twenty years of experience in instructional design and human performance improvement interventions. Her early interest was in the effective use of computers for learning as soon as the pc was a reality. She has worked over the years to help bring education and training to the learner. Her recent interest has been in providing leadership for distance education decision makers.

Sonja holds a doctorate in Training and Performance/Distance Education from the School of Education and a masters degree in Curriculum and Instructional Systems from the University of Minnesota, Minneapolis, MN, USA. Her recent writing has focused on leadership in distance education and helping doctoral learners improve their scholarly writing skills.

Joanne Mowat, doctoral candidate

Joanne Mowat, President of The Herridge Group Inc. has more than seventeen years of experience in the design, development, delivery, and management of learning and performance interventions. She specializes in content management strategies, learning object design, eLearning, and integrated performance support systems and is a regular presenter at several international conferences on these topics.

Joanne holds a Masters degree in Educational Technology from Concordia University, Montreal, Quebec, Canada (specializing in integrated performance support) as well as a Management Certificate and a Bachelors Degree from McGill University, Montreal, Quebec, Canada. She is currently a Doctoral candidate in Design of On-line Learning at Capella University in Minnesota (specializing in the instructional design of learning objects).