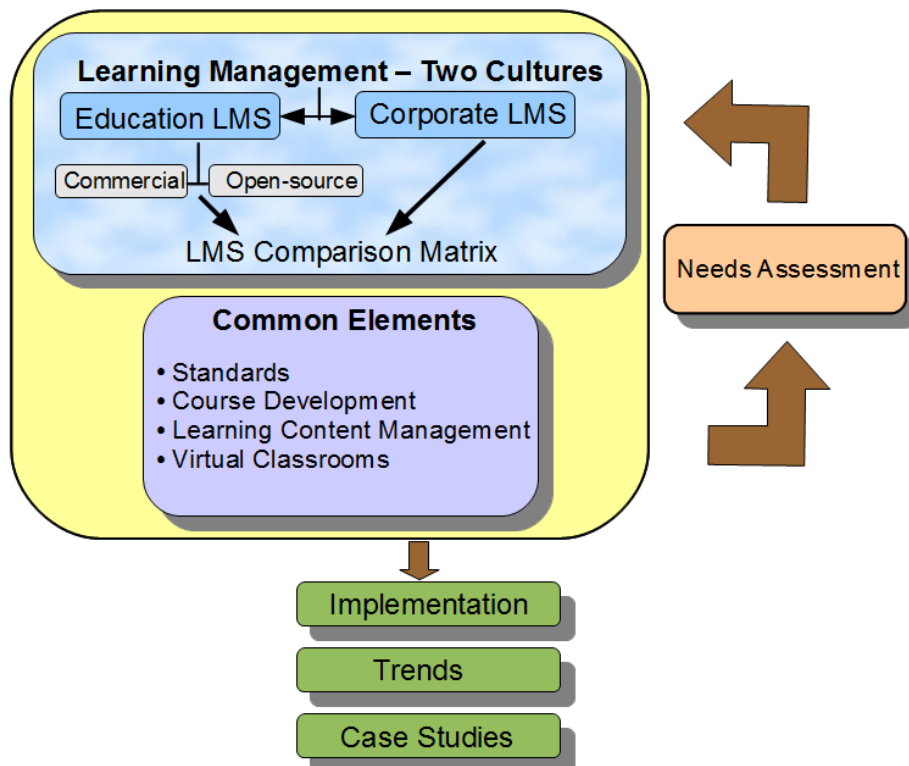


Learning Management Systems

Don McIntosh with contributions from Kevin Kelly, Patricia Delich, and Randy Labonte

Technology is a tool and like all tools it should fit your hand when you pick it up, you shouldn't have to bio-re-engineer your hand to fit the tool. - Snowden (2009, ¶ 3)



Learning Objectives

After completing this chapter, you should be able to:

- Describe the functions of learning management systems (LMS) for formal education and corporate training.
- Conduct a needs analysis, select an appropriate LMS for your environment and manage the implementation and change process successfully at least 50 percent of the time.

Introduction

"I truly believe that the Internet and education are the two great equalizers in life, leveling the playing field for people, companies, and countries worldwide. By providing greater access to educational opportunities through the Internet, students are able to learn more. Workers have greater access to **e-learning** opportunities to enhance and increase their skills. And companies and schools can decrease costs by utilizing technology for greater productivity." John Chambers, CEO of Cisco Systems (Chambers, 2002)

What are learning management systems?

Learning management systems (LMSs) are electronic platforms that can be used to launch and track e-learning courses and enhance face-to-face instruction with online components. Some also manage classroom instruction. Primarily they automate the administration of learning by facilitating and then recording learner activity. They may or may not include tools for creating and managing course content. As the systems have evolved, they have added new features such as **e-commerce**, communications tools, skills tracking, **performance management** and **talent management**.

LMSs have evolved quite differently for formal education and corporate training to meet different needs. The most common systems used in education are *WebCT*, *Blackboard* (these are now effectively one) and *Moodle*. They are often called **course management systems**. That term, however, is easily confused with **content management system**, so I will use the term LMS to describe the solutions for both educational and corporate environments. They will be identified as corporate LMS vs. education LMS. Education LMSs are also known as **virtual learning environments** (VLE).

This chapter will be a non-technical look at the features of these systems and the processes of selecting and implementing them. It will address the different functionalities of the systems and consider **open-source** systems (also discussed in chapter ??) as an option to commercial proprietary ones. It will discuss needs analysis to help you begin the process of selecting an appropriate system, and the change management process to address the implementation issues. Current trends will be identified and case studies will be provided for illustration.

Comment [DKM1]: Need correct chapter number here.

Occasionally certain vendors and products or services are mentioned by name. These are not intended to be endorsements in any way but simply to serve as familiar examples. Vendors and products that are mentioned are usually the best known or the ones with the greatest market penetration. There is no single “best” solution. The ideal solution is the one that fits your needs and environment.

Learning Management: The Two Cultures

There are two main thrusts in formal learning: academic education (schools and post-secondary institutions) and corporate training (including government and the non-profit sector). In educational institutions, the learning model has courses of fairly long duration (weeks to months) for the long-term educational benefit of the learner. In corporate training, the model is usually short courses (hours to days) for immediate updates, with specific focus on job functions and objectives. Some corporations try to emphasize the importance of their training services by calling them “universities” such as McDonald’s University and General Motors University. As part of their long-term development plans, many businesses also provide support for their employees to attend educational institutions for longer courses and degree programs. For centuries, both systems have relied upon classroom-based, instructor-led facilitation in which a live teacher leads the process.

Distance learning by correspondence has been with us now for many decades. When e-learning became a reality over 10 years ago (first on CD-ROM and then over the Internet), it extended the opportunities for distance learning, and new options and models became possible. Education and corporate training e-learning has evolved separately and somewhat differently.

In the online education environment, it is generally assumed that an instructor leads the course. It is available by chat (**synchronous**), via email and discussion groups (**asynchronous**), and sometimes via **virtual classrooms**. In the corporate online learning environment, there is a high degree of dependence on **self-directed** learning often using courses that have been purchased off-the-shelf from third-party vendors. Only occasionally is an instructor present. As a result, the communication/collaboration tools for email, chat, and group activity are well developed in education LMSs while they are less so in corporate LMSs. Recently corporate trainers have begun to see the benefit of using these tools to encourage the development of informal learning and have begun to adopt them quickly.

Education LMSs are primarily for the delivery of instructor designed online learning and include course content creation (or course authoring) capability as well as some tools to manage the course content. They generally do not include tools for the management of classroom instruction because educational institutions usually have registration systems already in place.

Corporate LMSs typically provide features to help manage classroom instruction as well as e-learning. The e-learning is often assumed to be primarily asynchronous, self-directed courses. Many of such courses are purchased from off-the-shelf courseware vendors. As a result, corporate LMSs do not typically include course authoring or content management features. The larger corporate vendors do often offer suites of tools that do include these capabilities.

It is essential that LMSs can communicate with other systems. Education LMSs must be able to accept data from and send data to the registrations system. Corporate LMSs must be able to communicate with the human resources information system.

The focus of both education and corporate LMSs often tends to be more on the administration and technical requirements of the organization rather than on the dynamic facilitation of learning. Some instructors and designers are frustrated by the constraints (both technical and learning) of using these systems and would prefer more dynamic learning support systems such as student **weblogs** and learning **wikis**. (See Chapters ?? and ?? for further discussion of these tools). Some of the open-source systems, especially when combined with social learning tools, are more student-centered than the commercial ones.

Comment [DKM2]: Need correct chapter numbers here.

Online and classroom learning each offer different advantages for different learners. Many people argue that classroom learning is better. Some believe that the classroom offers interactivity – a dynamic exchange of information, questions and opinions between students and instructor and among students. Unfortunately interactivity in a classroom often involves a minority of students who choose to participate and for others it may not be interactive at all. We have been conditioned since the age of five to believe that learning only happens in a classroom. The reality is that we are continuously learning in all situations. One benefit of the classroom is the social structure of schedule, deadlines, the physical presence of the instructor, and other learners. Many learners need this structure and the support of the instructor and other learners to learn effectively. Self-directed online courses offer the obvious advantages of time flexibility – they can be done almost anywhere and at any time at the convenience of the learner, and they can be repeated several times if necessary. Well-designed online courses can be more effectively interactive than many classrooms in that they require active learning on the part of every student in responding to questions, doing an activity, getting feedback—there is no back of the classroom in an online course.

Tip:

There are more than 200 LMSs available for business and at least 50 available for education. Many of the latter are open-source. Although they offer different features, it is best not to ignore the LMSs from the other sector.

Features of Education Learning Management Systems

The original educational learning management system was probably PLATO, which was developed in the early 1960s. In the late 1970s there were initiatives like the Open University (UK) Cyclops system and CICERO project, Pathlore's Phoenix software, and Canada's Telidon project. Wikipedia has an extensive listing of initiatives in the article, History of Virtual Learning Environments (Wikipedia, 2009).

In formal education LMSs were first used to support distance education programs by providing an alternative delivery system. They are also now used as platforms to provide online resources to supplement regular course material and to provide courses for students who require additional flexibility in their schedules, allowing them to take courses during semesters when they are not physically present or are not attending on full time basis. This also benefits students who are disabled or ill and unable to attend regular classes.

Education LMSs primarily support e-learning initiatives only. Systems for regular classroom support are usually already in place.

In formal education, an instructor usually creates an online course using web-based tools to upload the necessary materials for the students, and sets up collaborative tools such as:

- email
- text chat
- bulletin board presentation tools (e.g., a 'whiteboard' for collaborative drawing and sketching)
- group webpage publishing.

Students access the course materials on the Web, do both individual and collaborative assignments, and submit them to the instructor.

Most education LMSs offer the following features:

Tools for instructors:

- course development tools – a web platform for uploading resources (text, multimedia materials, simulation programs, etc.) including calendar, course announcements, glossary, and indexing tools
- course syllabus development tools with the ability to structure learning units
- course content management for reusability
- quiz/survey development tool for creating tests, course evaluation, etc.
- grade book
- administrative tools to track student activity both as individuals and in groups.

Tools for students:

- password protected accounts for access to course materials
- course content bookmarking and annotation
- personal webpage publishing

- accounts for access to the collaborative tools (email, discussion groups, collaborative webpage publishing)
- access to grades and progress reports
- group work areas for collaborative webpage publishing
- self-assessment tools.

Administrative tools:

- management of student and instructor accounts and websites
- monitoring and reporting activity
- e-commerce tools for sale of courses
- communication and survey tools.

Some may also offer, maybe at extra cost, some of the following features:

- e-portfolios
- file and workflow management
- streaming audio and video
- virtual classrooms
- access to electronic libraries.

Blackboard now offers an e-commerce module, and Moodle integrates with PayPal to allow for customers to pay online.

Many innovative instructors are frustrated that LMSs tend to focus on administration rather than on learning and have gone their own way using wikis and weblogs (**blogs**) for their courses. More and more of the LMSs are adopting these tools in their systems as well.

In most cases it is assumed that the teacher provides the content, but some system vendors are now selling content as “e-Packs” or “cartridges” that can be uploaded by teachers. It is also possible to purchase course materials from other institutions. Using courses from other sources, however, may be challenging if they are not compatible with your LMS, consistent with the instructor’s approach, or accessible by students with disabilities. This may improve with the development and application of operating and accessibility standards.

Commercial systems

The most widely adopted commercial systems are *WebCT* and *Blackboard*. *WebCT* was originally developed by Murray Goldberg at the University of British Columbia, beginning in 1995. In 1999 the company was purchased by Universal Learning Technology of Boston, and became WebCT, Inc. *Blackboard* was originally developed at Cornell University. The company was founded in 1997 by Matthew Pittinsky, and is based in Washington, DC. *WebCT* and *Blackboard* currently control about 80 percent of the LMS market in higher education (Sausner, 2005, 9). *Blackboard* purchased *WebCT* in 2005, making it the dominant force in the market. The *WebCT* products are currently being merged and re-branded as *Blackboard* products.

In August, 2006, *Blackboard* received a controversial patent for certain features in its learning management technology, and, on the same day, proceeded to sue *Desire2Learn* (one of its main competitors) for patent infringement.

Desire2Learn has denied the allegations in the law suit, and both *Desire2Learn* and the Software Freedom Law Center (SFLC) appealed the patent. In January, 2007 the United States Patent and Trademark Office (USPTO) ordered re-examination of the patent. On Feb. 1, 2007, *Blackboard* announced its patent pledge, which is a promise by the company to never assert its issued or pending course management system software patents against open-source software or home-grown course management systems. In 2009, the judgment against *Desire2Learn* was overturned but *Blackboard* is still fighting it.

It is hard to say what the effect of this will be on current and potential *WebCT* and *Blackboard* customers. Some will want to go with the market leader regardless, others will stay with what they have, and many may move to open-source solutions. Cornell University, the birthplace of *Blackboard*, is reconsidering whether *Blackboard* is the most appropriate software for Cornell professors and students.

Some other education oriented systems offered by commercial vendors:

- *Desire2Learn*
- *ANGEL* (also purchased by *Blackboard* in 2009)
- *eCollege*
- *Jenzabar*
- *Odyssey Learning Nautikos*
- *WBT Systems Top Class* (now appears to be targeting the corporate sector)
- *Centrinity First Class* (now a division of *Open Text*)
- *GeoMetrix Training Partner* (primarily a corporate LMS but often used by educational institutions for distance learning programs with a business orientation).

Notes:

- *IBM/Lotus Learning Space* no longer seems to be a viable contender in the education market. It is now called *Workplace Collaborative Learning*, and appears to be targeted to the business market.
- *Prometheus* was purchased by *Blackboard* in 2001 and is no longer supported.

Tip:

If you currently are using a commercial education LMS, you may find costs escalating, and a continual demand for upgrades. For these and other reasons, many educational institutions are considering open-source systems as an alternative.

Open-source systems

Open-source software is computer software whose source code is available free “under a copyright license ... that permits users to study, change, and improve the software, and to redistribute it in modified or unmodified form.” (http://en.wikipedia.org/wiki/Open-source_software, Feb. 2007). Open-source LMSs are gaining ground in the education market as a reaction to increasing costs for the commercial systems, and because of the greater flexibility and more student-centred learning approaches in the open-source systems. Some

instructors, particularly those with technical expertise, will prefer these systems because of fewer constraints, a greater sense of control, and generally better communication tools. Other instructors won't like them because they prefer more rule-based systems with full administrative features.

There are numerous open-source systems available. Some of the better known ones are:

- *Moodle*
- *ATutor*
- *Sakai*
- *Bodington*
- *Claroline*
- *Magnolia*

Although the software is free, open-source solutions are not without their costs. They need continuous support and maintenance, which require either a strong and supportive internal IT group, very dedicated instructors, or a contract with outside vendors who will do it for you. Open-source software is maintained by an active community of users who are constantly upgrading the code. These code changes can affect the operability of courses unexpectedly, and require more local maintenance. The "hidden" costs of the time of the IT people and the instructors may or may not outweigh the cost of a license for a commercial system.

There are useful discussions of open-source systems at <http://www.funnymonkey.com>, <http://openacademic.org/> and in Chapter ?? of this book.

Comment [DKM3]: Need correct chapter number here (if applicable).

Other aspects of LMSs

Some educational institutions have built their own LMS, and have not chosen to market them. Although it is possible for anyone to do the same, it is an expensive process, and it may be vulnerable if one person is the primary developer. Some of the open-source systems have been built by an institution or a group of institutions and then shared. *ATutor* was developed at the University of Toronto. The *Sakai* initiative is a collective effort by 65 academic partners.

Course development: Course development tools (also called course-authoring tools) are an integral part of most education LMSs. Some instructors also like to use some of their own tools such as web authoring/HTML editors (e.g., *Dreamweaver*, *FrontPage*, *GoLive*), word processing (e.g., *Microsoft Word*) and presentation tools (e.g., *Flash*, *PowerPoint*). The LMS should be capable of working with such tools. See Section 1.5

Virtual classrooms/web conferencing: Virtual classrooms (also known as web conferencing tools) add audio, video, and graphics to synchronous classes over the Internet. Such tools are not usually included as part of an LMS but are available separately. See Section 1.6.

Learning content management systems (LCMS) provide a means of storing developed courseware in learning repositories (databases) as learning objects where it can be retrieved and used by others. Most education LMSs have at least some learning content management capabilities. See Section 1.7.

Most LMSs are primarily administrative tools, and it is up to the instructors and designers developing the courses to address the issues of the learning model, but many of the LMSs lack the tools to support more student-centered learning. The integration of social learning tools such as wikis and blogs with an LMS can help create a more dynamic learning environment.

Social learning is closely related to social networking and social computing and is the essence of what is being called Web 2.0. It is the use of wikis, blogs, podcasting, etc., by individuals and groups to create content instead of simply being the recipients. Web 1.0 was about downloading; Web 2.0 is about uploading - participating rather than passively downloading information.

Web 2.0 is defined not only by technologies (blogs, wikis, **podcasts**, **vodcasts**, and **RSS** feeds are a few examples), but also by the social networking that it enables. Web 2.0 tools can scaffold learning environments for enhanced communication among students as well as between students and the instructor. Creating learning opportunities that harness the power of Web 2.0 technologies for collaborative learning, distributed knowledge sharing, and the creation of media-rich learning objects can further the scope of what students can learn by fostering a constructivist environment, and putting learning in the control of the students. Both students and instructors are embracing these tools at a phenomenal rate. Examples are *Facebook*, *Twitter*, *Wikipedia* and *YouTube*. LMSs are quickly adopting similar features to their offerings.

Tools for adding social learning to LMSs include:

- *Learning objects* <http://www.learningobjects.com/> (Oct. 2009) is a commercial product, and targets users of large-scale course management platforms.
- *Elgg* <http://elgg.net/> (Feb. 2007) - open-source
- *Drupal* <http://drupal.org/> (Feb. 2007) - open-source
- *MediaWiki* <http://www.mediawiki.org/> (Feb. 2007) - open-source

It is interesting to note that the University of Phoenix, one of the largest e-learning organizations in the world with nearly 200,000 students online simply used *Outlook Express* newsgroups for its courses for many years. It now has put into place an LMS which it has developed internally, Other early online universities like Pepperdine University also used newsgroups extensively.

Tip: Adult and continuing education departments tend to follow a business model. If you are seeking an LMS for this application and need registration and payment features, consider some of the more reasonably priced business LMSs. (see below).

Websites Mentioned in this Section

- Wikipedia - History of Virtual Learning Environments
http://en.wikipedia.org/wiki/History_of_virtual_learning_environments
- *Blackboard* (Blackboard, WebCT) <http://www.blackboard.com>
- *Desire2Learn* <http://www.desire2learn.com>
- *ANGEL* (purchased by Blackboard in 2009)
<http://www.angellearning.com/>
- *eCollege* <http://www.ecollege.com/>
- *Jenzabar* <http://www.jenzabar.com/>
- *Odyssey Learning Nautikos* <http://www.odysseylearn.com/>
- *WBT Systems Top Class* <http://www.wbtsystems.com/> (now appears to be targeting the corporate sector)
- *Centrinity First Class* (now a division of *Open Text*)
<http://www.firstclass.com/>
- *GeoMetrix Training Partner* <http://www.trainingpartner.com/>
- *Moodle* <http://moodle.org/>
- *ATutor* <http://www.atutor.ca/>
- *Sakai* <http://sakaiproject.org/portal>
- *Bodington* <http://bodington.org/>
- *Claroline* <http://www.claroline.net/>
- *Magnolia* <http://www.magnolia-cms.com/home.html>
- *FunnyMonkey* <http://www.funnymonkey.com>,
- *OpenAcademic* <http://openacademic.org/>
- List of education and corporate LMSs and other tools
<http://www.trimeritus.com/vendors.pdf>
- *Adobe* (Flash, Dreamweaver, Director, GoLive, etc.)
<http://www.adobe.com>
- *Microsoft* (Office, Word, PowerPoint, FrontPage, Outlook Express, etc.)
<http://www.microsoft.com>
- *Facebook* <http://www.facebook.com/>
- *Twitter* <http://twitter.com/>
- *Wikipedia* <http://wikipedia.org/>
- *YouTube* <http://www.youtube.com/>
- *Learning objects* <http://www.learningobjects.com/>.
- *Elgg* <http://elgg.net/>
- *Drupal* <http://drupal.org/>
- *MediaWiki* <http://www.mediawiki.org/>

Features of Corporate Learning Management Systems

The major corporate LMSs manage classroom and **blended learning** as well as e-learning, and are intended to function as complete registration systems for corporate training departments. Some of the larger ones such as *SumTotal Systems*, *Saba* and *GeoMetrixTraining Partner* actually evolved from registration systems. A few very basic corporate LMSs manage only e-learning, and then usually only for pre-packaged, self-directed courses.

Corporate LMSs usually offer the following features:

Classroom course management:

- registration
- course scheduling and set-up (instructors, facilities, equipment)
- email status notification
- tracking.

E-learning management:

- registration
- delivery
- email status notification
- tracking
- interoperability with third party and custom courseware
- testing and evaluation
- communication tools.

Blended learning management combines e-learning course content with classroom activities and communication tools such as discussion groups and virtual classrooms.

Support for e-learning standards such as **AICC** (Aviation Industry Computer-based training Committee) and **SCORM** (Shareable Content Object Reference Model) enable interoperability between third party courseware and the LMS and between different LMSs. These standards do not guarantee the interoperability, but they are a step in the right direction. The origins of many of these standards are from engineering, the airline industry, and the U. S. military. They use a corporate training model so they are less relevant to education courseware, but may conformance to the standards may help if you are switching platforms or making courses available to others using different platforms. See Appendix D and **Chapter ??**.

Comment [DKM4]: Need correct reference here to the chapter on standards.

Competency and performance management:

- Identify needed competencies for individuals and groups in order to perform the necessary work.
- Track performance for both individuals and groups and identify where improved performance is needed.
- Link to human resource systems. This is another feature not directly relevant to an education environment.

Reporting and analytics:

- Ability to generate reports on group and individual participation, assessments, etc.
- Includes standard and custom reports.
- Reports generated in graphical form.
- Financial analysis.
- Survey generation and analysis.
- Regulatory compliance tracking.

Multiple language support: Multinational corporations usually require different languages. Many LMSs provide for multiple languages now, but this does not necessarily include true **localization** which requires adaptation of the content and design to fit local cultures. True localization is far more extensive than translation, and requires substantial additional work.

The following functions are usually offered as separate capabilities or as part of a suite. Often the **course authoring** and web conferencing tools are supplied by third party vendors.

- **Course development/authoring:** A means of creating online courses. Many of the tools used in business are designed for creating interactive, self-directed courses complete with tests and assessments. Examples of such tools include *ToolBook*, *Lectora*, *ReadyGo*, and *Outstart Trainer*. Other tools offer so called rapid e-learning development – conversion of *Word*, *PowerPoint*, etc. documents into interactive courseware. Examples include *Articulate*, *Elicitus*, *Impatica* and *KnowledgePresenter*. See section 1.5.
- **Virtual classrooms/Web conferencing:** Synchronous instructor-led classes over the Web. Tools include *Microsoft Live Meeting*, *Elluminate*, *Adobe Acrobat Connect Professional* (formerly *Macromedia Breeze*), *LearnLinc*, *Webex*, and *Saba Centra*. See section 1.6.
- **Learning content management (LCMS)/learning object repository:** A means of storing developed courseware in learning object repositories (databases) so that it can be retrieved and reused. In addition to suites offered by the major LMS vendors, notable others include *Outstart* (merged with *Eedo*) and *Cornerstone OnDemand*. Most LCMSs include course development tools which enable collaborative authoring but are not available separately. See section 1.7.

The main distinguishing feature between corporate and education LMSs is that most business LMSs provide fairly complete registration systems for classroom instruction as well as e-learning. Classroom registration systems usually already exist in educational institutions.

LMSs sometimes offer e-commerce capabilities that allow both internal and external people to pay for courses. These features for managing both classroom instruction and e-commerce are not usually part of education LMSs. The exceptions to this rule are *Blackboard*, which does offer a commerce solution for educational institutions, and *Moodle*, which integrates with *PayPal* for this purpose.

In the corporate environment, there is a great deal of reliance on pre-packaged, self-directed courses. Many of these will likely be generic courseware available from such suppliers as *SkillSoft*, *Thomson NETg* (*Skillsoft* now owns *NETg*), *ElementK*, and others. The off-the-shelf courseware usually covers such topics as **information technology** (IT) skills, communication skills, business processes, and sales training. In most cases there is also the need for custom courseware for training on proprietary products and solutions, and unique situations. It is extremely important that the LMS can work with all possible third party courseware and tools used to create custom courseware.

Most corporate LMSs are limited in their use of communication tools. Unlike education LMSs, there is no assumption that an instructor will be available via email. This is rapidly changing as businesses recognize the value of informal learning through the use of communication tools, **communities of practice**, mentoring, blogs, wikis, etc.

As corporate LMSs expand their capabilities, they begin to overlap with human resources functions, with terms like performance management, human capital management and **talent management** becoming frequently used by the major vendors.

Major vendors of corporate LMSs:

- *Cornerstone OnDemand*
- *Generation21*
- *GeoLearning*
- *GeoMetrix Training Partner*
- *Intelladon*
- *Mzinga KnowledgePlanet*
- *Learn.com*
- *OutStart*
- *Plateau*
- *Saba*
- *SumTotal Systems*.

These are the ten largest vendors in the corporate LMS market. Open-source systems are not yet a major factor in the corporate environment, but as Linux becomes more popular this may change.

As with any enterprise software system purchases, there are generally two approaches – “best-of-breed” in which companies look for the best possible tools in each category, and the single vendor approach in which all the tools are obtained from a single vendor. The former can give the organization all the functions it needs while creating some integration challenges in getting the tools to work with each other. The latter will probably simplify integration, but may sacrifice some functionality.

Tip: Business LMSs typically include classroom registration features and do not include course development tools. Education LMSs are just the opposite. Education LMSs are also strong on communication tools.

For a detailed comparison of the features of education and corporate LMSs, see Appendix A.

Tip: Corporate LMSs tend to be very expensive for an educational environment but some of the more modestly-priced ones may be suitable, particularly in a continuing education application where registration and e-commerce features may be needed.

Websites Mentioned in this Section

- *SumTotal Systems* (LMS, ToolBook) <http://www.sumtotalsystems.com/>
- *Saba* (LMS, Centra) <http://www.saba.com/>
- *GeoMetrix Training Partner* <http://www.trainingpartner.com/>
- *AICC* (Aviation Industry Computer-based training Committee) <http://www.aicc.org/>
- *SCORM* (Shareable Content Object Reference Model) <http://www.scorm.com/>; <http://www.adlnet.gov/>
- *Trivantis* (Lectora) <http://www.trivantis.com/elearning-authoring-software/lectora-publisher>
- *ReadyGo* <http://www.readygo.com/>
- *Outstart* (Trainer, EEDO, LCMS) <http://www.outstart.com/>
- *Articulate* <http://www.articulate.com/>
- *Elicitus* <http://www.elicitus.com/>
- *Impatica* <http://www.impatica.com/>
- *Kookaburra KnowledgePresenter* <http://www.knowledgepresenter.com/>
- *Microsoft Live Meeting* <http://office.microsoft.com/en-gb/livemeeting/>
- *Illuminate* <http://www.illuminate.com/>
- *Adobe Acrobat Connect Professional* <http://www.adobe.com/products/acrobatconnectpro/>
- *iLinc* (LearnLinc) <http://www.ilinc.com/>
- *Webex* <http://www.webex.com/>
- *Blackboard* <http://www.blackboard.com>
- *Moodle* <http://moodle.org/>
- *PayPal* <https://www.paypal.com>
- *Eedo* (now merged with Outstart) <http://www.outstart.com/>
- *Cornerstone OnDemand* <http://www.cornerstoneondemand.com/>

- *SkillSoft* (includes NETg) <http://www.skillsoft.com>
- *ElementK* <http://www.elementk.com/>
- *Generation21* <http://www.inmediuslearning.com/>
- *GeoLearning* <http://www.geolearning.com/>
- *Intelladon* <http://www.intelladon.com/>
- *Mzinga KnowledgePlanet* <http://www.mzinga.com/>
- *Learn.com* <http://www.learn.com>
- *Plateau* <http://www.plateau.com/>

Standards

E-learning technical standards

Technical, design, and accessibility standards for e-learning are in a constant state of flux. Technical standards continue to be developed to provide for compatibility between systems and courseware, and for the definition and use of learning objects. Several different international organizations are working on these standards.

The **AICC** (Aviation Industry Computer-based-training Committee) standard was initially developed more than 10 years ago when the aviation industry (one of the early adopters) recognized the problem of interoperability among systems.

SCORM (Shareable Content Repository Reference Model) is a collection of technical standards developed by the Advanced Distributed Learning (ADL) initiative of the US Department of Defense. SCORM was begun in 1997, and the model continues to evolve. Many LMS vendors and courseware vendors claim to be standards-conformant, but that does not yet guarantee that the systems will be interoperable. Some course designers are against standards altogether, claiming that it constrains creativity and the facilitation of learning.

See Appendix B for a list of standards bodies and links. See **Chapter ??** for more information on this topic.

Comment [DKM5]: Need correct chapter reference here. It was chapter 17.

Tip: Claims of standards conformance do not yet guarantee interoperability. Tools and courseware should be tested with the LMS to be sure.

Instructional design standards

At least as important as technical standards is the quality of the instructional design. This includes factors of usability, interactivity and learning effectiveness. Instructional design certification was offered by **ASTD** (American Society for Training and Development) until December 31, 2008 when it was retired. That doesn't leave many options for official certification.

One remaining certification is *eQcheck*. "The eQcheck is designed to ensure that a product will give satisfactory performance to the consumer. The standards on which the eQcheck is based are the Canadian Recommended E-

Learning Guidelines - the CanREGs, published and copyrighted by *FuturEd Inc.* and the Canadian Association for Community Education (2002).” (eQcheck, n.d. ¶ 2).

ISPI (International Society for Performance Improvement) offers numerous publications and awards addressing design standards for e-learning.

Accessibility standards

Standards for accessibility relate directly to general Web accessibility, particularly for the visually impaired. The initiative is led by the Web Accessibility Initiative (WAI) of the World Wide Web Consortium (<http://www.w3.org/WAI/>). There is also the Web Standards Project, which “is a grassroots coalition fighting for standards which ensure simple, affordable access to web technologies for all.” (<http://www.webstandards.org/>). In the U.S., Section 508 of the Rehabilitation Act requires access to electronic and information technology procured by Federal agencies. See **Chapter ??** where this is discussed extensively.

Comment [DKM6]: Need correct chapter reference here. It was chapter 11.

Websites Mentioned in this Section

- AICC <http://www.aicc.org/>
- SCORM/ADL (Advanced Distributed Learning) <http://www.adlnet.org/>
- American Society for Training and Development (ASTD) <http://www.astd.org/>
- Update on certification <http://www.astd.org/content/education/certificatePrograms/ECC/>
- International Society for Performance Improvement (ISPI) <http://www.ispi.org/>
- eQcheck <http://www.eqcheck.com>
- Web Accessibility Initiative (WAI) of the World Wide Web Consortium <http://www.w3.org/WAI/>

Course Development

Course development is also described as course authoring. Courses made available on the Web are simply collections of web pages designed to help people learn. They may be a group of resources to which a learner is referred, or they may be carefully crafted sequences of learning events that include interactivity, tests and assessments, animations, screen simulations, video, and audio. It is possible to create web-based learning courses by using templates or by programming directly in HTML or Flash but there are many course authoring tools available which are designed to simplify the process.

In education LMSs course authoring capability is usually included. Some instructors may prefer to use additional tools. Course authoring is not usually included in corporate LMSs, but is available separately. as part of an LCMS or as part of a suite of products.

Course authoring tools like *Adobe/Macromedia Authorware* (now discontinued) and *SumTotal ToolBook* have been around since before the World Wide Web, and have evolved with it. They are desktop tools which require installation on each computer. Other popular desktop tools include *Trivantis Lectora*, *Harbinger Elicitus*, *Maxit Dazzlermax*, *OutStart Trainer* and *ReadyGo Web Course Builder*. In contrast to these, the tools included in LCMs are usually available on a server or the Web and provide for collaborative authoring.

The more complex tools require considerable expertise and can benefit from programming experience. Simpler ones are easier to use but may be somewhat limited in capability. Some are designed for converting *PowerPoint* presentations or *Word* documents to web code. They are often referred to as “rapid e-learning” development tools. Popular examples include *Articulate Presenter*, *Kookaburra KnowledgePresenter* and *Impatica*. Other tools are specialized to produce tests or simulations.

Course development in Education LMSs

In education LMSs course development tools provide the means for teachers to perform the following types of activities:

- **Provide and organize resources related to the learning objectives:** Most education solutions allow instructors to create simple text pages or web pages. These can be used for a syllabus, a project outline, assignment instructions, grading guidelines, and much more. LMSs usually provide support for multi-media materials such as video and audio streaming or modules or simulations built in other software tools. If instructors are using tools such as *Dreamweaver*, *Flash*, or other authoring tools, it is important to obtain an LMS that supports the code generated by these products particularly for any rich media, interactivity, and for recording scores on tests.
- **Set up communication tools for the students to use:** LMSs often give instructors and students the ability to send email to one another via the LMS. Instructors can also set up group areas, discussion forums, wikis, and other tools to allow students to communicate about general topics with little to no facilitation by the instructor or teaching assistant. For example, you can use a discussion forum as a way for students to introduce themselves, to provide technical support to each other, or to continue an interesting discussion if you run out of time in the classroom. Many LMSs also provide a calendar to which students, instructors, and the LMS itself can add events. Students can schedule study groups, instructors can remind students of special events such as field trips, and the LMS itself will mark events such as quiz dates or assignment due dates.
- **Facilitate and manage online interactivity related to the learning objectives:** Those same communication tools, and several others, can be used to facilitate online interactivity related to coursework. Depending on the LMS, instructors can use single-question polls to gauge student attitudes or knowledge about a reading, discussion forums to have students analyze a lab procedure before entering the lab, wikis to have

students collaboratively solve a problem or work on a project, or chat to let small groups discuss required field work in real time.

- **Assess student performance:** LMSs provide avenues for students to submit assignments and for instructors to evaluate different types of student performance. For example, students can submit written essays in several ways, including, but not limited to, digital drop boxes, discussion forum threads, discussion forum attachments, wikis, or "assignment" modules. Instructors can require students to use different submission pathways to create different types of assignments. You might use a discussion forum to allow peer review, wikis to engage students in collaborative writing exercises, or assignment modules to make it easy to collect all the essays.

LMSs usually provide tools for creating and delivering quizzes as part of the courses. Instructors may also use other tools for this purpose such as *Questionmark Perception*, *Respondus*, *Hot Potatoes*, and test banks that publishers provide. If you plan to use these tools, it is important to be sure that your LMS can work with the code generated by these third party software solutions.

- **Assess teaching effectiveness:** Many LMSs contain survey tools to allow instructors to collect feedback about specific topics, including teaching effectiveness (see [Chapter ??](#) for more information on this topic). Some LMSs allow anonymous student responses and some contain specific survey instruments for teaching effectiveness. If the LMS does not do everything you want, you can always link to an external survey tool on the Web. For example, the *Free Assessment Summary Tool* (<http://getfast.ca>) allows instructors to use a database of more than 350 teaching effectiveness questions, to create twenty questions per survey, and to download the results as an Excel spreadsheet, all for free.

Comment [DKM7]: Need correct chapter reference here.

Tip: Be sure your LMS will work with the additional tools that instructors are likely to use for course development.

Course development in corporate LMSs

Course authoring tools are not usually included as part of a corporate LMS, but are available separately or as part of an LCMS.

For corporate training there is a strong reliance on pre-packaged, self-directed courses. These can be purchased from third party vendors like *Skillsoft*, *Thomson NETg* (now a part of *Skillsoft*, making *Skillsoft* the single largest vendor of such courseware by a substantial margin), *ElementK* (now owned by *NIIT*), and *Harvard Business School Publishing*. Generic courseware is available for learning skills in communication, business, leadership, management, finance, information technology (IT), sales, health and safety, and more specialized topics.

Most companies also have a need to develop courses for unique situations and proprietary products and services. There are more than 200 sources for software that can be categorized as course authoring tools. Most of these are designed primarily for creating self-directed online courses, but they can also be used to develop classroom materials.

Some examples of popular course authoring tools:

- *SumTotal ToolBook*
- *Adobe Authorware* (now discontinued), *Flash*, and *Dreamweaver*.
- *Trivantis Lectora*
- *Elicitus*
- *ReadyGo Web Course Builder*
- *MaxIT DazzlerMax*
- *Outstart Trainer*.

LCMSs also usually have built in authoring tools which facilitate collaborative authoring. Some of the above vendors are emphasizing the creation of mobile learning and some provide web access to their tools for collaborative authoring.

Course development can be very time consuming. There is a lot of material already available in *Microsoft Word* or *PowerPoint*. So-called rapid development, or rapid e-learning tools are designed to quickly convert these documents to e-learning courses. Examples include:

- *Articulate*
- *Impatica*
- *Adobe Presenter* (formerly *Macromedia Breeze Presenter*)
- *KnowledgePresenter*.

Most of these tools (with the exception of *Impatica*) convert *PowerPoint* and *Word* documents to *Flash* because it is web-friendly and so widespread. (According to Adobe, *Flash* is already installed in 97 percent of browsers.)

Software simulation tools

There are numerous tools designed specifically for the simulation of computer screens by recording screen interactions. For example:

- *Adobe Captivate* (formerly *Macromedia RoboDemo*)
- *TechSmith Camtasia*
- *Qarbon ViewletBuilder*.

Many of these also do PowerPoint to Flash conversion.

Test and assessment tools

Most course authoring tools can create and deliver tests and quizzes as part of the courses. Instructors may also want use test banks that publishers provide, and/or other, more powerful tools built specifically for testing. For example:

- *Questionmark Perception*
- *Respondus*
- *Hot Potatoes*

When choosing an LMS, be sure that it can support any third party generic courseware or content authoring tools being used. Particular attention should be paid to the LMS's ability to launch the courses, and track and record interactions and responses to quizzes. Support for standards helps, but it is no guarantee. You should test the LMS with the tools and courseware that you will be using. You should also determine how accessible the file formats are for students with disabilities. (See Section 1.4 and Chapter ?? for more information about accessibility).

Comment [DKM8]: Need correct chapter reference here.

Tip: Be careful with rapid development tools. Speed of delivery can be very important but make sure you are not just converting bad Word or PowerPoint documentation into even worse e-learning courses.

Websites Mentioned in this Section

- *Adobe/Macromedia Authorware* (discontinued)
<http://www.adobe.com/products/authorware/?promoid=DJDVW>
- *SumTotal ToolBook* http://www.sumtotalsystems.com/products/content-creation/tb_index.html
- *Trivantis Lectora* <http://www.trivantis.com/multimedia-elearning-software/lectora-pro-suite>
- *Harbinger Elicitus* <http://www.elicitus.com/>
- *Maxit Dazzlermax* <http://www.dazzlersoft.com/>
- *OutStart Trainer* <http://www.outstart.com/products-desktop-trainer.htm>
- *ReadyGo* <http://www.readygo.com/>
- *Articulate Presenter* <http://www.articulate.com/>
- *Kookaburra KnowledgePresenter* <http://www.knowledgepresenter.com/>
- *Impatica* <http://www.impatica.com/>
- *Adobe Presenter* (formerly *Macromedia Breeze Presenter*)
<http://www.adobe.com/products/presenter/>
- *Adobe Captivate* (formerly *Macromedia RoboDemo*)
<http://www.adobe.com/products/captivate/>
- *TechSmith Camtasia* <http://www.techsmith.com/camtasia.asp>
- *Qarbon ViewletBuilder*. <http://www.qarbon.com/>
- *Questionmark Perception* <http://www.questionmark.com/uk/perception/>
- *Respondus* <http://www.respondus.com/products/respondus.shtml>
- *Hot Potatoes* <http://hotpot.uvic.ca/>

Virtual Classrooms/Web Conferencing

Web conferencing tools can bring a new dimension to your programs. They add presentations, audio, video, graphics, synchronous chat and voice interactions to meetings and classes at a distance. They can effectively complement online courses where some live interaction is called for and where there is an immediate need for new information or skills. Recordings can often be made to enhance asynchronous distance education programs. In an education/training mode, they are often referred to as virtual classrooms.

With a few exceptions, virtual classrooms are not included as part of an LMS, either for education or business, but are available separately. Some LMS vendors partner with web conferencing software vendors to integrate the products so they will work well together.

There are more than 50 vendors of these products. In most cases, these systems can support either corporate or education needs. Some of the best known include:

- *Centra Live* (now owned by Saba)
- *Citrix GoToMeeting*
- *Illuminate*
- *Wimba*
- *iLinc LearnLinc*
- *Adobe Acrobat Connect Professional* (formerly *Macromedia Breeze Live*)
- *Microsoft Live Meeting* (formerly *Placeware*)
- *Tapped-In* (a free text-only based conferencing system) -
- *WebEx Training Center*

Licensing of these products varies from annual subscriptions (*Illuminate*) to pay-as-you-go (*WebEx*) to free (*TappedIn*). If they are only used occasionally, then the pay-as-you-go option is probably the best choice. However, that can rapidly get very expensive.

For an extensive list of features of these products, see Appendix E.

Tip: As with any instructional approach, it takes considerable skill and practice to facilitate an online session effectively.

Websites Mentioned in this Section

- *Centra Live* (now owned by Saba) <http://www.saba.com/products/centra/>
- *Citrix GoToMeeting* <https://www2.gotomeeting.com/>
- *Illuminate* <http://www.illuminate.com/>
- *Wimba* <http://www.wimba.com/>
- *iLinc LearnLinc* <http://www.ilinc.com/>
- *Adobe Acrobat Connect Professional* (formerly *Macromedia Breeze Live*) <http://www.adobe.com/products/acrobatconnectpro/>
- *Microsoft Live Meeting* (formerly *Placeware*) <http://office.microsoft.com/en-gb/livemeeting/>
- *Tapped-In* (a free text-only based conferencing system) <http://tappedin.org/>
- *WebEx Training Center* <http://www.webex.com/>

Learning Content Management

The management of learning content involves saving developed courseware as learning objects in a learning object repository (database). It is catalogued using

metadata (descriptive tags) so that it can be easily found and retrieved by anyone who has access to it. It supports institutional or corporate reuse of the learning objects. Systems that do this are often called learning content management systems (LCMS). They are specialized content management systems.

Most education LMSs include at least some capability for content management. Some even call themselves learning content management systems.

Learning content management is not usually a feature of the corporate LMS, but some of the major corporate LMSs include content management as part of a suite of programs. It is also available separately. Most separate LCMSs include content authoring and some learning management features as well.

Performance support:

Some corporate LCMSs provide for a feature called performance support. Also called JIT (just-in-time) learning, performance support allows employees to immediately access information (courses, units, and learning objects) that enables them to do their job better “in the moment”. For example, if an employee working on a task cannot remember exactly how to do something, he or she can quickly access a course, or parts of a course, that will show how to perform the operation. This requires managing the course content as learning objects, and making them easily accessible to all learners. Such systems when available separately are often called **EPSS** (electronic performance support systems) but are now sometimes included as part of an LCMS. This is another concept which does not really apply in the education environment.

See Appendix C for a listing of LCMS features.

LMSs that include LCMS capability as part of a suite include:

- *Cornerstone OnDemand*
- *Generation21*
- *GeoLearning*
- *KMx*
- *LearnCenter*
- *Plateau*
- *Saba*
- *SumTotal Systems*.

Some examples of separate LCMSs are:

- *dominKnow LCMS* (formerly Galbraith Media)
- *Eedo/Outstart* (now merged)
- *SuddenlySmart SmartBuilder*

Tip:

Be careful about learning content management. Everyone thinks, “What a great idea - save the course materials in a way that they can be reused easily.” But too often it doesn’t happen. Some organizational cultures do not support the value of sharing. LCMSs are great tools if used but expensive mistakes if not used.

Websites Mentioned in this Section

- *Cornerstone OnDemand* <http://www.cornerstoneondemand.com/>
- *Generation21* <http://www.inmediuslearning.com/>
- *GeoLearning* <http://www.geolearning.com/>
- *KMx* <http://www.kmsi.us/>
- *LearnCenter* <http://www.learn.com>
- *Plateau* <http://www.plateau.com/>
- *Saba* <http://www.saba.com/>
- *SumTotal Systems* <http://www.sumtotalsystems.com/>
- *dominKnow LCMS* (formerly Galbraith Media)
<http://www.dominknow.com/>
- *Eedo/Outstart* (now merged) <http://www.outstart.com/>
- *SuddenlySmart SmartBuilder* <http://www.suddenlysmart.com/>

Needs Assessment

Choosing an LMS is not a technology decision. It is primarily a leadership and change management decision. No matter what system you adopt, it will change the way you do things. Even if you adopt a system that supports your basic learning model specific aspects of the system will change your procedures. It is a major decision that calls for a careful assessment of your needs.

Before you even talk to LMS vendors or open-source LMS community members, form an expert committee of people consisting of educational leaders and administrators and instructors--people who understand how online learning works. Be sure to include some IT personnel to enlist their ideas and support and their understanding of the technology.

Consult with end users, both instructors and students, by questionnaires, surveys, interviews, and/or focus groups to determine their needs, desires, willingness, and abilities. They can identify the desirable features of the system and give some indication of the change management factors that need to be addressed. Be careful of scope creep. When asking people what they would like to see, they will tend to ask for everything. Distinguish between the things that are truly needed and the “nice-to-haves”.

Consult with people in other organizations like yours that have already gone through the process. Find out what they are using and how they like it. Read the literature and attend conferences.

Are you looking at an LMS simply to initiate e-learning? You may not actually need to do this. Online courses are just a collection of web pages that do not require an LMS to run them. The primary purpose of an LMS is to provide a working platform and administration for tracking the results. If you don't need to track the results, or if instructors will do it manually, then you don't need an LMS.

LMSs tend to constrain people to do things in certain ways. Some instructors and designers are frustrated by the constraints (both technical and learning) of using these systems and would prefer more dynamic learning support systems such as student weblogs and learning wikis, and even just email or newsgroups. You may prefer to give them more creative freedom. Wikis and blogs don't require an LMS but they are hard to track. Instructors can track activity manually and assign grades but it limits the analysis you can do, for example to find out to what degree students participate, how students perform on individual questions, etc. Wikis and blogs can be altered easily, so are not ideal for formal assignments (other than perhaps a team assignment to build a wiki). Individual and team essay assignments are probably best submitted to instructors via direct email messages and attachments. This would still not require an LMS to track as the instructors would be marking and tracking such assignments manually.

Tip:

Obtaining an LMS will change the way you work. Choosing one is not a technology decision. It is about leadership and change.

Steps in the needs assessment process

1. Conduct primary research

Survey, interview and conduct focus groups among your expert committee, instructors, and students to determine the primary needs of your system. Don't ask general questions like, "What do you need?" or you will get a wish list that may not be practical. See Appendix F for suggestions about questions to ask.

2. Conduct secondary research

1. What LMSs are other organizations using?
 - a. Is the organization similar to your own, or have similar needs?
 - b. What made them choose that particular solution?
 - c. How satisfied are they with it?
 - d. What features do they like and not like?
 - e. What feedback have they had from students and instructors?
2. What does the literature say?

If you are looking for an education LMS, a good source of information is the website of the Western Cooperative for Educational Telecommunications: Online Educational Delivery Applications: A Web Tool for Comparative Analysis (<http://www.edutools.info/>). This website contains reviews and comparative data on a large number of education learning management systems.

You may also wish to attend conferences where LMSs are featured and profiled.

Good corporate conferences are:

- Elliott Masie's Learning 2009 (<http://www.learning2009.com/>)
- Training (<http://www.trainingconference.com/>)
- American Society for Training and Development (ASTD) (<http://www.astd2009.org/2010.html>)
- The Performance Improvement Conference 2010. International Society for Performance Improvement (ISPI) (<http://www.ispi.org/ac2010/>)

Good educational conferences include

- Association for Educational Communications and Technology (AECT) (<http://www.aect.org/events/>)
- E-Learn 2009/2010/2011 (Association for the Advancement of Computing in Education - AACE) (<http://www.aace.org/conf/>)
- Canadian Network for Innovation in Education (CNIE) (<http://www.cniercie.ca/>)
- Canadian Association for University Continuing Education (CAUCE) (<http://www.cauce-conference.ca/>)

You can expedite the process by attending virtual trade shows and online demonstrations. Check out the possibilities at <http://www.virtualtechfair.com/> and vendors' websites.

Tip:

For reviews of education LMS software, check out <http://www.edutools.com>

If you are looking for a corporate LMS, you can check out the reports by Brandon Hall at <http://www.brandon-hall.com>, Bersin & Associates at <http://www.bersin.com/> or by using the comparison tool at <http://learning-management.technologyevaluation.com/>.

Other good sources of information include the eLearning Guild (<http://www.elearningguild.com/>) and Chief Learning Officer magazine (<http://www.clomedia.com/>).

An evolving, fairly complete list of both corporate and educational LMS vendors can be found at <http://www.trimeritus.com/vendors.pdf>.

Once you have determined your requirements and have documented them carefully, prioritize them to determine the critical needs.

Tip:

Be careful of scope creep. When asking people what they would like to see, they will tend to ask for everything. Distinguish between the things that are truly needed and the "nice-to-haves".

3. System identification

Now you can begin to research vendors and/or open-source solutions. Looking at different products can open up new possibilities, but, again, be careful of scope creep, and of being sold something just because it is the latest hot item.

Use your documented requirements and priorities to identify a manageable list of solutions (perhaps 10) from the more than 100 vendors.

4. Request for proposal (RFP)

Requests for proposals (RFP) follow fairly standard industry forms. At <http://www.geolearning.com/rfp> there is a template specifically for LMS selection but be careful about templates that are just lists of features. Include only those features that you really require. Use your documented requirements and develop use case scenarios and scripts to paint a clear picture of your LMS vision so that a vendor can provide a proposal focused on your specific environment/culture. Include reporting functions in your scenarios. Poor reporting capability is a great source of customer dissatisfaction. Be sure to ask questions about post implementation customer service because it is also a key factor in customer satisfaction. Ask vendors for references especially those for organizations similar to your own.

Ask the vendors from your list to submit proposals. When you contact vendors, the more clearly you have identified your requirements, the more attention you will get from suppliers – they will see you as a qualified prospect. A full formal RFP process may not be practical in all situations unless it is required by your organization.

See appendix G for RFP questions for vendors.

5 Review the proposals

Develop a rubric for scoring the proposals you receive from vendors. Make a short list of the top three to ten vendors to be invited to provide demonstrations.

6. Schedule meetings and demonstrations

Ask your short list of vendors or open-source community representatives (who may be members of your own organization) to demonstrate their products either at your location or online. Ask them to demo directly to the use case scenarios and demonstration scripts you developed in the RFP. Invite students, instructors, and IT people to the demos, as well as members of your core committee.

Most vendors will have pre-packaged online demonstrations of their products, but remember that these are mostly designed to show off the good features of the product that may not be relevant in your situation.

Use your rubric to have each participant evaluate the solutions. At the meetings, discuss specific details about how the vendor provides service, maintenance, etc.

7. Pilot test

Try to arrange for a free, in-house trial. If possible, run a small pilot program with a small sample before rolling a solution out to the entire organization.

Note that the needs assessment and selection strategies are also part of your change management strategy. The more input people have in the decision, the more likely they will adopt it.

8. Make the selection

Meet with your review team to consolidate the rubrics and make a selection. The bottom line is selecting the LMS that meets your needs.

9. Five things not to do while selecting an LMS

- "1. It is not an IT system purchase.
2. Do not buy after just a sales demonstration.
3. Do not delegate 'dig deeper' to someone in your team unless he/she is qualified to map requirements to system functionality.
4. Do not sign the order before a full trial access.
5. Do not leave the 'thinking' part to the LMS vendor." (Gautam, A., 2009, October 1)

"The average company doesn't get excited about buying an LMS; it gets excited about managing learning. It doesn't get excited about buying a new e-learning course; it gets excited about changing an employee's performance." (Elliott Masie as quoted by Ellis, R. 2004)

Websites Mentioned in this Section

- Elliott Masie's Learning 2009 <http://www.learning2009.com/>
- Training <http://www.trainingconference.com/>
- American Society for Training and Development (ASTD) <http://www.astd2009.org/2010.html>
- The Performance Improvement Conference 2010. International Society for Performance Improvement (ISPI) <http://www.ispi.org/ac2010/>
- Association for Educational Communications and Technology (AECT) <http://www.aect.org/events/>
- E-Learn 2009/2010/2011 (Association for the Advancement of Computing in Education - AACE) <http://www.aace.org/conf/>
- Canadian Network for Innovation in Education (CNIE) <http://www.cniercie.ca/>
- Canadian Association for University Continuing Education (CAUCE) <http://www.cauce-conference.ca/>
- *Brandon Hall* <http://www.brandon-hall.com/>
- *Bersin & Associates* <http://www.bersin.com/>
- *Technology Evaluation Centers* <http://learning-management.technologyevaluation.com/>
- *eLearning Guild* <http://www.elearningguild.com/>
- *Chief Learning Officer magazine* <http://www.clomedia.com/>

- *Trimeritus* Vendors of Learning Management and E-learning Products <http://www.trimeritus.com/vendors.pdf>
- *GeoLearning* Request for Proposals <http://www.geolearning.com/rfp>
- Five Things Not to Do While Selecting an LMS. (Gautam, 2009) <http://ezinearticles.com/?Five-Things-Not-to-Do-While-Selecting-an-LMS&id=3016753>

Implementation

Some of the factors you need to take into consideration when implementing an LMS are:

1. **Change management:** Implementing an LMS is a major change. In a corporate environment almost everyone will be exposed to it as it becomes part of the intranet portal. The change management issues--the marketing, communication, and training initiatives that will need to be put into place to gain acceptance and appropriate use--are of paramount importance. In an educational institution, the impact will be less widespread, but change management is still important for all the instructors and students who will be accessing the system.
2. **Timelines:** How long will it take to conduct a needs assessment, to run a pilot test, to build a user community within the organization, to build the appropriate infrastructure to support it, etc.?
3. **Cost:** Consider the total cost of ownership (TCO); not just the cost of the software but the complete implementation and maintenance costs.
4. **Customization:** Will you want to brand the system or change it to make it conform to the way you do things? Doing this can be more expensive than the initial licensing and can delay the implementation process significantly.
5. **Internal or external hosting of the application:**
 - a. In-house hosting requires hardware (e.g., servers for application, database, data storage, backup systems), infrastructure (e.g., high-bandwidth connectivity, uninterrupted power supply in case of power outage), and staffing (e.g., technical support staff, training, and user support staff) to maintain the LMS. In some cases, in-house hosting can provide your organization with greater flexibility, security and responsiveness than a third-party hosting facility.
 - b. If the supplier or a third party hosts it for you (SaaS), it may seem more expensive, but you do not have to provide all of the IT support. In most cases, however, you will still need to designate or hire an in-house support person to support instructors and learners, and to be the point of contact with the hosting group. Implementation of externally-hosted LMSs can be quicker. It may, however, be less customizable and take longer to make changes in the system after it is up and running.
 - c. With open-source systems, it may be possible for you to contract with a company to host and maintain the LMS for you but the usual scenario for these will be in-house hosting.

6. **Integration with other systems:** Your new system will need to exchange data with other systems, e.g., registration, student information systems, library or data management systems, and/or human resources systems
7. What kind of **support** will the supplier or community (for open-source solutions) provide during implementation? For example, training, customization, trouble shooting, help desk, etc.
8. **Training** for instructors and students.
9. **Software updates**
10. **Conversion of existing or third party courseware** to run properly on your new LMS.
11. Are there other **initiatives** happening in your organization which your LMS initiative can support so that mutual success can be achieved?

Trends in Learning Management (2009)

Trends in Education Learning Management (2009)

In higher education there are five dominant vendors for Learning Management systems. The *Delta Initiative* (<http://www.deltainitiative.com/>) working with California State University produced the following graph which shows the evolution and market share of these companies as well as the growth in the market.

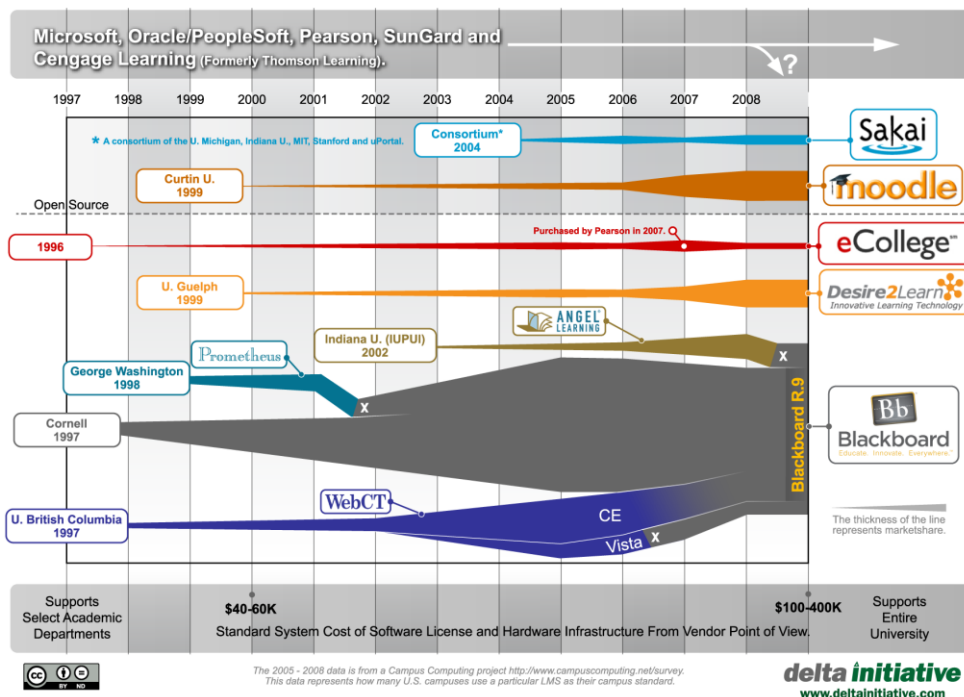


Figure 1: LMS Market Overview (Hill, P. & Nordwall, C., 2009). Reproduced with permission.

As can be seen from the diagram, *Blackboard* remains the dominant LMS for education. It has purchased *Prometheus*, *WebCT* and, very recently, *Angel Learning*. This reflects the consolidation that is happening in the corporate LMS sector but is dominated by this one vendor. In addition to purchasing these systems, *Blackboard* obtained a software patent and immediately sued another competitor - *Desire2Learn (D2L)*. The suit against *D2L* was recently overturned.

Most of the increasing value of LMS is not in numbers of institutions subscribing but in the amount charged for them. The costs have increased by as much as five to ten times over the past eight years. Partly for this reason and partly because of *Blackboard's* competitive strategy, more institutions are looking to open source solutions like *Moodle* and *Sakai*. As the *Delta Initiative* concluded, this is not a panacea for the reasons pointed out on page 6 including the need to host and support them internally.

Comment [DKM9]: Correct page number is needed here.

Large university systems are looking at various centralized and decentralized models for learning management. Some of the larger systems have discovered that the LMSs available are often not sufficiently scalable to meet their needs so they need to use multiple instances. Some of the LMSs get more use than the system ERPs.

As with corporate systems, more and more institutions are having their systems hosted by the vendor or another company (Software as a Service (SaaS)) rather than hosting them internally. Unlike corporate systems, there is little demand for talent management or for mobile learning as yet.

The use of Web 2.0 tools like blogs, wikis, social networking, media sharing, online databases, Google Wave, Microsoft Sharepoint, etc. is being tried by many innovative faculty as an alternative to traditional LMSs because they feel less constrained by them.

Some examples of tools that educators use are listed on the following websites.

- <http://www.teach42.com/2007/03/06/top-10-free-web-20-sites-for-educators-and-a-few-honorable-mentions/>
- <http://school.discoveryeducation.com/schrockguide/edtools.html>
- <http://www.kn.pacbell.com/wired/fil/pages/listweb20s.html>

This is somewhat disruptive to the market and is forcing the LMSs to adopt or integrate the use of these tools.

Another disruptive factor is that the large **ERP/SIS** vendors like Oracle and publishers may be entering the market.

There is a need for more choice of LMSs for educators, customers need to be more demanding and companies need to be more responsive to customers.

In most K-12 school systems, LMSs tend to be used for distance education or "distributed" learning. The Surrey school district and its distributed learning initiative called *Surrey Connect* is one of the largest in British Columbia, Canada. These systems are used by "home schooling families, elite athletes, gifted learners, families traveling around the world, families temporarily relocated in other provinces and countries, students recovering from illness, students with learning disabilities looking for patient support, and learners from the local schools looking to supplement their timetable." (Galy, 2009)

Surrey Connect uses both WebCT and FirstClass. Angel Learning, Scholar360, Moodle, ATutor are also popular choices. The demand for these systems is likely to increase.

Websites Mentioned in this Section

- The *Delta Initiative* <http://www.deltainitiative.com/>
- *Blackboard* <http://www.blackboard.com>
- *Desire2Learn* <http://www.desire2learn.com>
- *Moodle* <http://moodle.org/>
- *Sakai* <http://sakaiproject.org/portal>
- *Google Wave* <http://wave.google.com/>
- *Microsoft Sharepoint* <http://sharepoint.microsoft.com/>
- Other educator tools:
 - <http://www.teach42.com/2007/03/06/top-10-free-web-20-sites-for-educators-and-a-few-honorable-mentions/>
 - <http://school.discoveryeducation.com/schrockguide/edtools.html>
 - <http://www.kn.pacbell.com/wired/fil/pages/listweb20s.html>
- *Surrey Connect* <http://www.surreyconnect.sd36.bc.ca/>
- *First Class* <http://www.firstclass.com/>
- *Scholar360* <http://www.scholar360.com/>
- *ATutor* <http://www.atutor.ca/>

Trends in Corporate Learning Management (2009)

A recent survey by Government Elearning! Magazine indicates that approximately 50 percent of all training provided in major corporations is done through e-learning. (E-learning trends, 2009). It has become a way of life. *TELUS Communications* (the second largest telecom company in Canada with 25,000 employees) recorded 100,000 online learning course completions in 2004. An LMS is a requirement to manage and track this kind of volume.

There are at least 250 corporate LMSs on the market. Many companies and educational institutions have developed their own but do not market them. There are also at least 100 learning management content systems (LCMSs), 250 course authoring tools, and 50 virtual classrooms. There are 10 to 20 major players in each category. For a comprehensive list see <http://www.trimeritus.com/vendors>

Prices of LMSs vary widely from as low as \$5,000 to several hundred thousand dollars (USD) depending on the features they offer and the number of people using them. Some of the simplest LMSs just provide a platform for launching and tracking e-learning.

Most major corporations now have LMSs but some are looking to change because they are not satisfied with the ones they have. More and more medium and smaller enterprises are adopting LMSs.

1. Industry Consolidation

There is an ongoing trend toward consolidation among the major vendors which began a few years ago. Several major mergers took place in 2004 and 2005. In 2004, *Click2Learn* and *Docent* merged to become *SumTotal Systems*. In 2005, *Adobe* purchased *Macromedia*, *Saba* purchased *THINQ Learning Solutions* and *Centra*, and *Blackboard* purchased *WebCT*. *Blackboard's* purchase of *WebCT* made it the single largest vendor of LMSs for the education market. In 2009, *Blackboard* also purchased *ANGEL Learning*.

In 2009, *OutStart* merged with *Eedo* and *Hot Lava*. *OutStart's* merger with *Eedo* strengthens its position in the LCMS market and is essentially a merger between two of the biggest players in the LCMS market. The acquisition of *Hot Lava* increases its mobile learning capability.

In 2008 and 2009, *Mzinga* expanded by purchasing *KnowledgePlanet*, *Shared Insights*, and *Prospero*. *Mzinga* began by offering a virtual classroom, *KnowledgePlanet* allowed it to add an LMS and authoring tools, while *Shared Insights* and *Prospero* allowed it to add Web 2.0 tools. *Mzinga* now offers a suite of social media solutions that includes learning management, learning, marketing, and customer support.

While there are still many minor players in the market, look for more mergers and acquisitions among the major vendors.

2. Web 2.0

With the popularity of Web 2.0 and social networking tools like *MySpace*, *Facebook*, *YouTube*, and *Twitter*, there has been great demand to include similar tools to help people make connections internally in companies. In spite of some unresolved issues concerning security and incorrect information, they have been widely accepted. In the *Government Elearning! Magazine* survey, 40 percent of surveyed enterprises are already using blogs and forums (E-learning trends, 2009, p. 15). LMS vendors have been quick to add these kinds of tools to their features by providing connections to experts, mentors, and communities of practice. This creates a record that can be put into a searchable knowledge database. It is seen as a way of facilitating informal learning or, in some cases, giving it structure or controlling it. Informal learning is unstructured and often occurs between individuals in conversations. It has been estimated that the great majority (upwards of 70 percent) of learning in the workplace is informal (Kim, Hagedorn, Williamson, and Chapman, 2004). *Mzinga* bases its whole

offering on social networking while *Saba* offers *Saba Social*; and *OutStart*, as a result of its purchase of *Participate* in 2004, now offers social business software.

3. Talent Management

The major LMS vendors have long offered performance management and competency management tools. Performance management is the process of setting goals, self-assessment, manager assessment, peer-assessment (also called 360 degree assessments), coaching, development planning, and evaluation. Competencies are the collections of skills, knowledge, and attitudes necessary to do a specific job. Once a company has developed the descriptions of the competencies desired for each position in the company, they are better able to identify who the right people are for each position, provide training, and enable employees to achieve their development and occupational goals. Competency management tools enable both the employer and the employee to track progress.

Recently, the larger LMS providers have expanded into talent management, including career development and succession planning, performance appraisals, recruitment, compensation management, and workforce planning. These are used as planning tools related to training and learning and do not typically provide the day to day transaction processing of human resource (HR) systems.

SumTotal Systems describes talent development as follows:

Talent development is the strengthening of employee productivity through automated and integrated learning, performance, and compensation solutions to drive business results on a daily basis. It helps align your workforce to business goals to create a high-performance culture. Effective talent development can reduce turnover at critical positions, manage succession plans, minimize business disruptions, and reduce the risk of non-compliance, litigation, and lost business reputation (2009, ¶ 3).

Examples of talent management providers include *SumTotal Systems*, *Saba*, *Cornerstone OnDemand*, *Plateau*, *TEDS*, and *Learn.com*. It is interesting to note that *OutStart* has specifically chosen not to enter the talent management space but rather to focus on its strengths in learning content management—where it feels it can offer better value to its customers.

4. Mobile Learning

With more and more employees on the road and working at a distance, there has been a strong demand to make applications accessible via mobile devices—laptops, personal digital assistants (PDAs), and cell phones. In the e-learning world, this is known as *mobile learning* or *m-learning*. LMS vendors have been rushing to add this capability:

- *OutStart*'s recent acquisition of *Hot Lava* is designed to improve its capability for mobile learning.

- Meridian Anywhere, CertpointVLS Mobile Learning, and SyberWorks Mobile Learning are all modules which these vendors have added to their systems for mobile learning.
- SumTotalSystems provides for the creation of mobile learning content in its classic ToolBook authoring software.

The small screens of many mobile devices present new challenges for e-learning designers, but tools are available and the development is evolving quickly (Ryan, 2007). Mobile devices provide learners with

- tests and surveys;
- job aids and just-in-time learning (performance support);
- location-based and contextual learning;
- social-networking tools—access to experts, mentors, and communities of practice;
- educational gaming; and
- language learning.

5. SaaS

There is an increasing trend for companies to outsource the hosting of their LMSs, either to outside companies who provide this service or to the providers of the systems themselves. This is known as *software as a service* (SaaS). This has given an edge to companies like *GeoLearning* and *Learn.com*, which provide these services, but more and more LMS vendors and partners are offering this alternative. *OutStart*, for example, offers *TrainingEdge.com*.

SaaS is a particularly attractive option for small to medium sized businesses (SMBs) with little internal IT support. The main issues include the following:

- The total cost per year will be greater than simply leasing the software.
- The *total cost of ownership* (TCO) of a period of years can be significantly lower because there is no need to maintain an internal IT support service.
- Service may be slower because the vendor is dealing with numerous clients.
- Software upgrades are automatic.
- SaaS may be less customizable.

6. Open Source Software

There are at least 50 open-source LMSs available on the market, including Moodle, ATutor, and Sakai. Most of these are designed for educational institutions, but many corporations are adopting them as well. Blackboard and WebCT have dominated the education market for some time, but as costs increase, more and more organizations are looking for alternatives and open-source solutions are often attractive.

Some prefer open-source systems because of fewer constraints, a greater sense of control, and generally better communication tools. Others won't like them because they prefer more rule-based systems with full administrative features.

Although the software is free, open-source solutions are not without their costs. They need continuous support and maintenance, which requires either a strong and supportive internal IT group, very dedicated instructors, or a contract with outside vendors who will do it for you. Open-source software is maintained by an active community of users who are constantly upgrading the code. These code changes can affect the interoperability of courses unexpectedly and therefore require more local maintenance. The "hidden" time costs of the IT personnel and the instructors may or may not outweigh the cost of a licence for a commercial system. There are useful discussions of open-source systems at [Funny Monkey](#).

Conclusion

As with other enterprise software, LMSs will continue to evolve to meet market demands. Watch for continuing consolidation and the incorporation of many new features in the coming years.

Websites Mentioned in this Section

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List of vendors <http://www.trimeritus.com/vendors/>
SumTotal Systems <http://www.sumtotalsystems.com/>
Adobe <http://www.adobe.com>
Saba <http://www.saba.com>
Blackboard <http://www.blackboard.com>
OutStart <http://www.outstart.com>
Mzinga <http://www.mzinga.com>
MySpace <http://www.myspace.com/>
Facebook <http://www.facebook.com/>
YouTube <http://www.youtube.com/>
Twitter <http://twitter.com/>
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TEDS <http://www.teds.com/>
Learn.com <http://www.learn.com/>
Meridian Anywhere http://www.meridianksi.com/products/mobile_lms/
CertpointVLS Mobile Learning <http://www.certpointsystems.com/>
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Geolearning <http://www.geolearning.com/>
Advantages and disadvantages of mobile learning <http://e-articles.info/e/a/title/Advantages-and-Disadvantages-of-Mobile-Learning/>
Moodle <http://moodle.org/>
ATutor <http://www.atutor.ca/>
Sakai <http://sakaiproject.org/portal>
Funny Monkey <http://www.funnymonkey.com/>

Case Studies

TELUS case study: An e-learning success story - It's about access

TELUS Communications is western Canada's major telecommunications provider and the second largest in the country. It has approximately 25,000 employees across the country. Between 1995 and 1998, BC TEL (prior to the merger with TELUS) developed an extensive Intranet which became a great information tool for employees. Several internal web sites were developed to augment the training courses offered by Learning Services. In 1998, BC TEL contracted with *SkillSoft* for about 20 of its generic, self-directed sales and communications courses to complement its manager training curriculum. The initial license was for 2,000 participants. The interest was much greater than expected. Many employees at all levels of the organization and in all divisions discovered the courses and used the opportunity because they were "free". Within six months, the license had to be increased to 3,500. Then additional

courses were licensed for other subject areas including information technology (IT) from *Smartforce* and *NETg* (now all part of SkillSoft).

One reason for the success of these courses is that upper management had implemented a policy that all employees would maintain a personal development portfolio, and demonstrate steps toward their goals. Because the e-learning courses were free and available to everyone, they became very popular. It is always good to have an e-learning initiative tied to other organizational objectives and initiatives. People are often hungry to get training to improve their skills and advance their careers, but they don't always get the opportunity. E-learning made it accessible.

TELUS management was interested in developing some of their own proprietary courses, so an extensive review of available course authoring tools was made. *Click2Learn ToolBook* software was selected for this purpose. The plan was to enable more than 100 people throughout the organization to create courses using this tool, so ease of use was an important criterion. A training program was put into place to train those people. The tool was found to be useful particularly for training on new products and services. TELUS typically introduces several new products and services each month, and traditional training approaches were simply too slow to address this. One of the first courses developed was on a new feature for telephones called "Talking Call Waiting". The course was made available to sales and customer service people. In this case e-learning made it possible to distribute training to everyone who needed it much more quickly than could have been done by traditional methods.

Another course on **ADSL** (asymmetric digital subscriber line high-speed Internet connection) was made available to everyone and had more than 1,000 hits in the first few days.

Up to this point, only very simple management tools had been used to track the results, and a good deal of work was done manually. TELUS then did a study of LMSs and decided that they would build their own system because they had an extensive and skilled IT staff that had developed parts of such a system for individual departments.

In 2004, TELUS reported that it had developed 300 custom courses for its employees and there were a total of 100,000 course completions for both custom and generic courses. E-learning is now a way of life for TELUS.

San Francisco State University case study: An open source solution
by Kevin Kelly, Online Teaching and Learning Coordinator

In *Images of Organization*, Gareth Morgan (2006) describes double-loop learning, or a process by which organizations go beyond simple behavioral changes to reach goals. They do this by questioning the way they normally do things in an effort to improve. The decision process to move from one learning management system to another might be considered an example of double-loop learning.

San Francisco State University (SFSU) began this process after experiencing some technical difficulties with a commercial LMS. The campus had experienced a number of issues related to an upgrade, including intermittent performance issues and a thirteen-hour outage during finals week. While the vendor worked hard to alleviate the problems, the campus began to discuss the future. Based on feedback from faculty focus groups, the campus decided to investigate alternative LMS solutions.

To begin, academic technology staff members looked at several commercial and open source solutions. During the focus groups, the faculty members provided a simple requirement: "We can't go backward." In other words, any alternative had to have the same capabilities as the existing LMS. After setting up mock courses in more than ten environments, the academic technology team found that Moodle provided the flexibility to meet faculty and student needs quickly, as well as a nearly parallel set of features for online teaching and learning.

After selecting Moodle, the team created the LMS investigation roadmap. At each stoplight on the roadmap, the campus would evaluate the project status. If Moodle was not meeting teaching and learning needs, then the campus would start over with another tool. If faculty and students gave a "green light," then the investigation would continue.

In Fall 2004, SFSU began an alpha test with five instructors and 300 students. One instructor with more than 100 students in the alpha test liked it so much for her large class that she moved several large sections totaling 850 students to Moodle for the beta test. In Spring 2005, the campus ran a beta test with twenty-five instructors and 1500 students. The academic technology team performed extensive outreach to get faculty in all nine colleges to participate in order to evaluate the needs of different disciplines. An Associate Vice President requested scalability tests in Fall 2005 and Spring 2006 with over 100 instructors and 6000+ students and 9000+ students respectively. At each stage, the campus used the roadmap test to verify that it was on the right track.

At the same time, the Academic Technology team worked with the Disability Programs and Resource Center to conduct accessibility testing. This involved more than running a web-based verification program. To make sure that the accessibility testing would address real needs, the campus asked students with disabilities to help test the LMS with assistive technology such as JAWS, a screen reader application, and Dragon Naturally Speaking, a voice recognition program. Similarly, the Academic Technology team worked with an SF State faculty member and a UC Berkeley graduate student in a usability related course to facilitate usability testing with Moodle.

The faculty-run Educational Technology Advisory Committee worked with the team throughout the process and, at the end, made a recommendation to move exclusively to Moodle as the online teaching and learning environment. The recommendations included a list of items for the campus academic technology unit to address, such as improving the gradebook and creating a list of frequently asked questions for support. Based on this recommendation, the

Provost announced that the campus would use Moodle exclusively when the vendor contract expires in Summer 2007.

While the original drivers were technological, the campus also received equivalent pedagogical and administrative benefits. Instructors have been changing the way they teach, and writing articles about the scholarship of teaching and learning. As Moodle is open source software, the campus has created a consortium of regional two-year and four-year colleges and universities to create economies of scale related to software development, training and support, and other forms of collaboration. More is yet to come.

Summary

When considering the purchase of any learning management system it is essential to assess your needs carefully before buying and to implement them properly to ensure success.

Here are a few key points:

- Although there are a few dominant vendors in both corporate and educational LMSs, there are at least 200 LMSs available for business and at least 50 available for education. Many of the latter are open-source. Although they offer different features, it is best not to ignore the LMSs from the other sector.
- There is no single “best” solution. The ideal solution is the one that fits your needs and environment.
- Obtaining an LMS will change the way you work. Choosing one is not a technology decision. It is about leadership and change.
- Be sure your LMS will work with the tools that instructors are likely to use for course development, and that it will integrate with other systems such as HR and registration systems.
- Be careful about learning content management. Everyone thinks, “What a great idea - save the course materials in a way that they can be reused easily.” But too often it doesn’t happen. Some organizational cultures do not support the value of sharing. This is a great tool if it is used, but an expensive mistake if not used.
- When assessing your needs be careful of scope creep. When asking people what they would like to see, they will tend to ask for everything. Distinguish between the things that are truly needed and the “nice-to-haves”

The Future

“We contend that the current technical design philosophy of today’s learning management systems is substantially retarding progress toward the kind of flexible virtual classrooms that teachers need to provide quality education.” (Feldstein, M. and Masson, P., 2006, ¶ 4)

There is a need for third generation learning management systems, based on the **constructivism** theory of learning and social networking in order to support online collaborative learning communities. (See **Chapter ??**). Developing these third generation systems will be a challenge, especially for the corporate models that haven’t figured out yet how to manage simple emails. As of this writing, education LMSs are ahead of corporate LMSs in this respect, but the latter will also need to include more social learning tools (wikis, blogs, etc.). In the immediate future, LMSs will continue to be primarily administrative tools and only secondarily learning tools. Instructors and students will be challenged to find ways to use them so that they make learning easy.

The most used electronic learning tools are Google and other search engines. In the near future almost everything will be available online. Ten years ago a colleague of mine said that everything that is current and worthwhile is already online. This is much truer now. Google and the Gutenberg Project are putting libraries of books online. Google is putting maps on the web. Universities like Massachusetts Institute of Technology (MIT) are making their course materials available online. Communities are creating knowledge repositories with wikis. Blogs are making almost everyone’s opinions available, whether we want them or not.

Distributed learning platforms will enable people to access learning modules and services from anywhere. Mobile learning solutions will enable people to access information on their personal digital assistants (PDAs), and cell phones.

The challenge will be for learners (all of us) to manage all of this. Much of it will happen beyond the scope of any locally installed learning management system. Google and other search engines will evolve to provide management features.

Content will be organized as reusable learning objects much like learning content management systems do, but on a much broader scale. Wikis and folksonomies (also called “tagging”) may help solve this. Wikipedia defines a folksonomy as “an Internet-based information retrieval methodology consisting of collaboratively generated, open-ended labels [or tags] that categorize content such as Web pages, online photographs, and Web links.”

Personalization and context-aware devices such as **GPS** (global positioning system) units will also help. Personalization is the ability of a website to adapt to its users, as Amazon does when it suggests other books you may like, or for the user to adapt the web site for his or her own purposes, as Google does when it allows you to customize its home page. GPS units can locate the user so that information can be customized for that location. For example, a user who lives in Chicago but is visiting New York would receive weather information for New York.

LMSs will continue to exist for company and institutional record keeping, but much of the learning will happen beyond their scope.

Comment [DKM10]: Need correct chapter number here.

Glossary

AICC. Aviation Industry CBT Committee, one of the technical standards to enable interoperability between LMSs and third party courseware. The aviation industry was the first to recognize the need and developed the first standards. (<http://www.aicc.org/>)

ASTD. American Society for Training and Development (<http://www.astd.org/>)

Asynchronous. Literally: not at the same time. In e-learning, usually email or discussion groups, or other communications between participants that do not occur in real time. Self-directed courses which learners do on their own without the presence of an instructor are also asynchronous. Asynchronous communication offers communication at the convenience of the learner, the opportunity to consider responses carefully, review them before replying, and the ability to track and revisit discussions.

Blended learning. A mix of classroom, self-directed, synchronous and asynchronous approaches. Blended courses may also be called “hybrid” courses.

Blog. An abbreviation of weblog, a publicly accessible personal journal that is regularly updated, similar to a personal diary, but shared over the web.

Community of practice. A group of people who share a common interest, need or objective. Online communication tools can facilitate the exchange of information in such a group.

Constructivism. A theory of learning that “acknowledges that individuals are active agents, they engage in their own knowledge construction by integrating new information into their schema, and by associating and representing it into a meaningful way”. (Hsiao, n.d. ¶ 6 (II 2))

Content management systems (CMSs). Computer programs for managing all forms of electronic content in a way that the content can be easily retrieved and reused.

Course authoring/development. Software that facilitates the development of electronically delivered courseware. May include the ability to include audio, video, Flash animations, tests and quizzes, etc.

Course management system (CMS). A term often used for an education-oriented LMS. It differs from a business-oriented LMS primarily by including course authoring capability but not including general registration for classroom courses. An alternative term is virtual learning environment (VLE).

E-commerce. Tools to facilitate online shopping, with an automatic transfer of funds. In the context of this chapter, funds are transferred from learner to institution or between departments. The tools may include a catalogue, a

shopping cart feature and allow secure credit card transactions as well as other forms of payment. Essentially synonymous with e-business.

E-learning. Any learning opportunity delivered electronically, usually through the Internet. Synonymous with online learning and web-based training.

EPSS (electronic performance support systems). Tools built into an LMS to enable employees to access information as they need it. Also called just-in-time learning.

ERP (Enterprise Resource Planning). Large computer programs like Peoplesoft (now owned by Oracle) and SAP which can be used to manage everything in an organization including finances, human resources, supply chain, customer relationships, training, etc. Some educational institutions use them for their Student Information Systems (SIS)

GPS (global positioning system). A satellite based system that determines the receiver's location, speed, and direction.

Information technology (IT). The people, computers and computer software systems that support an organization. Often referred to as ICT (information communications and technology) in an educational context.

ISPI. International Society for Performance Improvement (<http://www.ispi.org/>).

Learning object. Any digital entity (text, graphics, animations, pages, modules, etc.) that can be used, re-used or referenced during technology-supported learning.

Learning management system (LMS). Computer software designed to manage the organization, delivery, and tracking of online courses and people's performance. They are sometimes called virtual learning environments (VLE) or course management systems (CMS). Corporate learning management systems are also designed to manage classroom instruction.

Learning content management systems (LCMS). Content management systems specifically designed for managing learning materials. Typically include a searchable learning object repository or database.

Localization. In software, this includes translation to other languages, but also requires adaptation of the content and design to reflect local cultures. It is much more extensive than just translation and requires substantial additional work.

Metadata. Data that describes other data. Metadata are digital words that uniquely describe other data such as a learning object. Metadata are invisible to the viewer but visible to the system. The most familiar metadata are HTML tags on websites.

Open-source systems/software. Computer software whose source code is available free under a copyright license that permits users to study, change, and improve the software, and to redistribute it in modified or unmodified form.

Performance management. The process of managing the workforce of a company to optimize corporate performance by employing strategies for skills, competencies, training and development.

Performance support. Immediate assistance to employees to help them do their jobs. Sometimes called just-in-time (JIT) learning.

Personalization. The ability of a website to adapt to its users and/or for the user to adapt the web site for his or her own purposes

Podcast. A live or recorded audio presentation over the internet.

RSS. Arguably stands for Really Simple Syndication. It is a way for users to receive updates from websites that they are interested in whenever the information on the website changes.

SaaS. Software as a Service. A vendor or a third party hosts a system for you its servers rather than you hosting it yourself.

SCORM. Shareable Content Object Reference Model. A collection of technical standards including AICC, IMS, etc. to enable interoperability between LMSs and third party courseware.

SIS (Student Information System). Computer program to manage registration processes, maintain student information and records. Sometimes part of a larger system like an ERP.

Self-directed. Any learning done without the direct assistance of an instructor or interaction with other learners.

Synchronous. Classroom, virtual classroom or online chat. Synchronicity offers the benefits of immediate instructor presence and support, and the social structure that many people require for effective learning.

Talent management. The process of managing the workforce in a company to optimize recruiting, retention, performance in conjunction with training and development.

Virtual classrooms/Web conferencing. Computer software that provides for synchronous meetings and training classes over the Internet, and includes audio, whiteboards for presentation and graphics, participant chat, and data sharing.

Virtual learning environment (VLE). Synonymous with LMS or course management system (CMS).

Vodcast. Like a podcast but including video as well as audio.

VOIP. Voice over Internet protocol. Enables direct audio connections over the Internet.

Weblog. See blog..

Wiki. An online collaboration model and tool that allows users to add and edit content of a web site.

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Comment [DKM11]: Not all of these are directly cited in the text so this should more correctly be called a Bibliography.

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Appendix A: LMS Comparison Matrix

This LMS comparison matrix offers a quick, generalized look at how the solutions for educational and corporate uses (Sections 1.2 and 1.3) compare to one another. The general descriptors below do not reflect the situation for every solution in either category. Open-source communities and LMS vendors are constantly updating products, so be sure to look at each product individually when you have narrowed down your list of choices.

Feature	Corporate LMS	Education LMS
Classroom course management	Included	Not included
E-learning management	Included	Included
Blended learning mgmt.	Included	Not included
Course development	Not included; available as an extra	Included
Course content management	Not included; available as an extra	Included but functionality may be limited.
Web conferencing/virtual classroom	Not included; available as an extra	Not included; available as an extra
Grade book	Assessment reporting available in a report format	Included
Quizzes	May be included. Sometimes available as an extra	Usually included
Communication tools – email, discussion groups, etc.	Included but at a lower level of priority than for education LMS	Included
Financial analytics	Included	Not included
Reporting	Some reporting features are included but may be limited.	Some reporting features are included but may be limited.
Performance support	An LCMS feature available as an extra.	Not included
Competency and performance tracking (see above)	Often included	Not included
Support for e-learning standards	Included	May or may not be included
Multiple language support	Often included	May be included
Interoperability with third party courseware	Included but should be tested	Not included but may be possible through standards conformance
Personal web page publishing for instructors and students	Not included	Included
Self-evaluation	Not included	Included

Administration tools	Extensive	Ability to create accounts and monitor activity.
e-Commerce	Often included	Available as an extra.
e-Portfolio	Not included	Available as an extra
File and workflow management	May be included	May be included
Streaming audio and video	May be included	May be included
Access to electronic libraries	May be included	May be included

For a comparison of specific education LMSs, visit the edutools website (<http://www.edutools.info>) generated by the Western Cooperative for Educational Telecommunications (WCET). The site contains an engine that allows you to run a comparison of different versions of about forty different LMSs, including many listed in this chapter.

For a comparison of a few corporate LMSs, visit the Technology Evaluation Centers website (<http://lms.technologyevaluation.com/>).

Appendix B: Standards Bodies and Links

Technical standards:

- **Aviation Industry Computer-based Training Committee (AICC)**
<http://www.aicc.org/index.html>.
- **Canadian Core Learning Resource Metadata Application Resource (CanCore)**
<http://www.cancore.ca/elementset.html>
- **Centre for Educational Technology Interoperability Standards**
<http://www.cetis.ac.uk/>
- **Dublin Core Metadata Initiative**
<http://dublincore.org/>
- **IMS Global Learning Consortium (IMS)**
<http://www.imsproject.org/>
- **International Organization for Standardization (ISO)/International Electrotechnical Commission (IEC) Joint Technical Committee (JTC)1 Subcommittee (SC)36**
<http://jtc1sc36.org/>
- **International Standardization Organization (ISO)/IEC JTC1 SC36**
<http://jtc1sc36.org/>
- **Institute of Electrical and Electronic Engineers Learning Technology Standards Committee (IEEE - LTSC)**
<http://ltsc.ieee.org/>
- **National Institute of Standards and Technology**
<http://www.nist.gov/>
- **Schools Interoperability Framework (SIF)**
<http://www.siaa.net/sif>
- **Shareable Courseware Object Reference Model (SCORM)**
<http://www.adlnet.org/>

Instructional Design Standards:

- **ISPI (International Society for Performance Improvement)**
<http://www.ispi.org>
- **eQcheck**
<http://www.eqcheck.com>

Accessibility standards:

- **Web Accessibility Initiative (WAI)** of the World Wide Web Consortium
<http://www.w3.org/WAI/>.
- **The Web Standards Project**
<http://www.webstandards.org/>.
- **Section 508 of the Rehabilitation Act**
<http://www.section508.gov/>

Appendix C: Learning Content Management System (LCMS) Features

Learning content management system (LCMS) features
Different levels of access for users
Catalog of learning objects and templates
Import capability for third party and custom authoring tool course content
Actions such as import, export, move, delete, relate, contain, status update, and metadata element value updates can be performed on selected single or multiple content objects
Tracking of knowledge assets
Workflow design, use, and management
User definition of levels of learning objects
HTML presentation
XML storage and retrieval
Content, data and user classification
Content based filtering
Portal integration (will work with organizational web portals)
Capture of electronic documents and metadata
Thesaurus/classification scheme
Options for records and documents disposal
Document authoring
Document searching and retrieval
Aggregates groups of records
Cross-references documents
Saves and converts documents of different types
Image scanning
Audits and produces reports on document workflow
Provides for system backup, rollback and recovery
Provides tools for easy author/user access
Provides security and authentication of users
Provides user profiles
Provides password and privilege management
Provides role management
Provides management of digital assets (photographs, animations, video, music, etc.)
Provides mass storage capability
Provides reports and statistical management
Meets reliability and performance standards
Version control
Check-in/Check-out
Version labeling
Rollback and restore
Reporting
Metadata
Creation and editing of metadata (descriptive tags)

Non-technical users can configure and manage metadata
Metadata taxonomy creation and management
Imports metadata conforming to standards
Assigns or automatically captures metadata element values as a single content object is captured or imported
Authors notified of duplicate metadata element values or content during creation
Third party integration (list of enterprise systems and courseware)
Standards support

Appendix D: Course Authoring Tool Features

Course authoring tool features
Fully browser-based web authoring (editing directly in a browser)
Templates
Ability to create and manage templates
Wizards
WYSIWYG (what you see is what you get) editor
In-line cascading style sheet rendering (maintains style sheet layout)
Preview mode
Import content from Word
Import content from PowerPoint
Access to learning objects from a repository
Content editor provides standard word processing editing features
The content editor produces valid HTML/XHTML code
Automatic course menu/map creation
Choice of navigation buttons and scenarios
Glossary/dictionary creation
Bookmarking (provision for students to return to specific points in a course)
Insert hyperlinks
FAQ creation
Manages and updates links
Multiple languages
Workflow to manage content development (tracks versions and has check out, check in for different users)
Can launch third party applications
Version control
Other
Rich media
Rich text (maintains text formatting)
Graphics formats
Animation
Flash
Audio
Video
Editing tools for graphics, audio, video, animation
Interactivity
Pre-tests to build course curriculum
Tests
Branching based on learner responses
Computer screen simulations
Role-play simulations
Hot spots (areas of a web page or a graphic which provides feedback or more information with a mouse rollover or click)

Appendix E: Virtual Classroom/Web Conferencing Features

Virtual classroom/Web conferencing features
Registration
Scheduling of sessions
Registering participants
Email reminders with links to log-in page
Interactive features
Instant text messaging among learners and with instructor
Threaded discussions
Breakout rooms
Video
Notepad for learners
Time remaining clock
Participants can leave temporarily
Indicators for status of other participants
Whiteboard
Anyone can use whiteboard
Text and drawing tools
Clip art
Application sharing
Remote control of applications can be granted
Participants can save whiteboards
Synchronized web surfing
Sound
VOIP (voice over Internet protocol)
Telephone conferencing
Leader can allow anyone to speak
More than one voice at a time
Moderator control
Able to give participants control
Moderator can see what participants are getting
Multiple moderators supported
Feedback tools
During presentation
Following presentation
Applause tool
Speed up or slow down indicators
Emoticons
Polling and testing
Audience polling or testing during presentation
Yes/no, multiple choice, etc.
Reporting results of polling/testing during presentation
Graphing of polling results
Recording
Screen and sound recording

Initiated by participants or instructor/administrator only
Editing of recording
Technical features
Compensation for low speed connections
Interoperability with third party LMS /LCMSs
Support for different platforms – Windows, Mac, Unix, etc.

Appendix F: Needs Assessment Questions

Questions for your expert committee

Overall considerations:

- What are the primary business drivers that bring you to consider an LMS?
- What is your philosophy of learning, and how do you want the LMS to support it?
- Who will make this decision: the committee or a high level individual?
- What are the organization's cultural and internal political factors in this decision?
- Are you primarily interested in facilitating student learning or in tracking the results?
- Do you want to emphasize self-directed, or instructor-facilitated learning?
- Do you want e-learning to enhance or replace existing courses?
- Is return on investment (ROI) important to you? If so, what are your metrics for determining ROI (including both tangible and intangible elements)?
- Are the systems you are considering widely used and supported?
- Do you want the LMS to be used universally throughout your organization or is this for a particular function or department?
- What is your budget? What is the total cost of ownership including implementation, maintenance and upgrading costs?
- To what scale will your organization ultimately use the LMS? (1,000 users? 10,000 users? 50,000 users? More? How many instructors? How many administrators?). Think five or ten years ahead.
- If you wish to consider open-source solutions, do you have a strong and supportive IT department to implement, manage, and support it, or will you seek a hosted solution to provide that support?
- To what extent will the LMS be accessible to instructors and students with disabilities?

Audience:

- Will online learning be an alternative or a requirement for some people?
- If you are an educational institution, will it be just for continuing education or for all students and/or staff?
- Will it be available to students beyond your jurisdiction? Will it be available for customers, suppliers or the public as well as your employees?
- Will prerequisite learning be required?

Features:

- Does it have the features you need?
- Are you interested in blending e-learning with classroom learning?
- Do you want e-learning to be both synchronous and asynchronous?
- Will you need to manage the physical distribution of materials to students as well as providing them with tools online? Will students need to buy hard-copy textbooks or will they be provided online?

- To what extent do you want to include assessments, including feedback and surveys as well as online tests?

Look and feel:

- Is it easy to use for instructors and students?
- How do you want your courses to look? Do you want them to have similar navigation so it becomes intuitive for students?

Extras:

- Will you be purchasing content from outside sources?
- Will you need additional course development tools?
- Will you need web conferencing/virtual classroom capability?
- Will you want to manage your course content and learning objects so that they are reusable by others?
- Will you need to allow students to register for classroom or distance education courses?

E-commerce

- Will you want to share or sell what you are doing to other organizations?
- Will you need some kind of online payment system to allow some students to pay for courses?

Change management:

- Will you want to customize the product to give it your brand, to fit the way you do things, and/or to meet current or future instructional needs?
- What change management strategies will be needed in your organization?
- How much training will be required for students and instructors?
- Who will support students and instructors as they use the LMS?

Technical issues:

- To what extent do you want a system to integrate with existing systems--registration systems, HR software, email systems, authentication processes, etc?
- Do you want to have the system hosted internally or would you prefer to outsource the hosting?
- How important is the support of standards (SCORM, AICC, IMS, etc.)?
- What kind of technical support can you provide? What will you expect of the vendor, hosting provider, or open-source community?
- To what extent is security (for students and data) a concern?
- Is it platform compatible (PCs vs. Macs)?
- Will it work with all the browsers likely to be used without requiring special settings?
- Will it enable the uploading and downloading of files without difficulty?

Questions for instructors:

1. If you have never been involved with e-learning courses, would you be interested in developing and/or facilitating such courses? What tools do you believe you would need?
2. Have you ever facilitated an e-learning/online learning course, blended learning course, or a face-to-face course supplemented by online activities?

- a. If yes, are you interested in continuing to be involved in online courses?
 - b. If no, would you be interested in leading some online courses?
3. If you have facilitated an online course, did you create the course yourself?
4. Did you use an LMS as the platform for your course?
 - a. If so, which LMS did you use?
 - b. If not, how was your course delivered?
5. Were you satisfied with the LMS that you used?
6. If you were not satisfied, in what ways did you find it lacking?
 - hard to learn
 - missing features
 - too administrative, did not facilitate student learning
 - lack of support
 - took too much time
 - prefer other systems you have seen
 - other _____
7. Would you be interested in trying another LMS?
8. Did you use any other software to help in the creation of the course itself, course materials, activities, or assessment strategies?
9. In a corporate environment, are you interested in selling the courses that you have created?
10. What kind of training should be provided for instructors if we adopt a system?
11. From the following list of features, choose the list of features that you have used:
 - assignment modules
 - branching lessons
 - calendar
 - chat
 - conferencing
 - course development
 - email
 - discussion forums
 - glossary
 - grade management
 - group projects, presentations, and management
 - student progress tracking and management
 - student self-evaluation
 - student surveys
 - quizzes
 - single-question polling
 - wikis and blogs.
 - a. Have you used these and would you use them again?
 - b. What features were most useful and least useful?
 - c. What other features would you like to see?

12. Can you describe a successful and an unsuccessful online learning initiative?

Questions for students/employees:

1. Have you ever taken an online course, blended learning course, or a face-to-face course supplemented by online activities?
 - a. If so, would you do it again?
 - i. If so, why
 - ii. If not, why not?
 - b. If not, would you be interested in trying it?
 - i. If so, why
 - ii. If not, why not?
2. Was the online learning environment easy to use and to find your way around?
3. Did you receive any training in the use of the systems?
 - a. If so, was the training sufficient?
 - b. If not, were any support materials available for training yourself?
 - c. In either case, what would you recommend for training?
4. From the following list of features, choose the ones you have used.
 - assignment modules
 - branching lessons
 - calendar
 - chat
 - conferencing
 - course development
 - email
 - discussion forums
 - glossary
 - grade management
 - group projects, presentations, and management
 - student progress tracking and management
 - student self-evaluation
 - student surveys
 - quizzes
 - single-question polling
 - wikis and blogs.
 - a. Have you used these and would you use them again?
 - b. What features were most useful and least useful?
 - c. What other features would you like to see?
5. Describe your experience
 - a. What did you like best about the experience?
 - b. What did you like least about the experience?
 - c. What suggestions would you make?

Be prepared to ask and record open-ended questions. Prompting may be necessary, especially for students. For example, you might ask whether they were able:

- a. to work by themselves,
- b. to work in small groups over distance,
- c. to work on their own schedule,
- d. to redo portions of the coursework,
- e. to keep to deadlines.

A needs assessment checklist for educational institutions is available at http://www.caucus.com/inf_needs.shtml

A needs assessment checklist for corporate LMSs is available at <http://www.geolearning.com/main/tools/assessment.cfm>.

Appendix G: Request for Proposals Questions

Questions for LMS vendors and hosting providers:

1. List all of the features you are looking for with priorities indicated. Be sure to include reporting functions and capabilities. How and to what extent does the vendor's product implement the features that you have on your list?
Examples:
 - Does the system meet your regulatory compliance needs?
 - Does the administration allow different levels of access and can that be changed?
 - Is email notification provided and can certificates of completion be generated?
 - Can you set deadlines for course completion?
 - Does it include current collaboration, Web 2.0 and talent management tools?
 - Does the system include testing tools? Can grade criteria be set? Can people retake tests?
 - Do they provide courses? Custom development of courses?
2. How scalable is the LMS? Will a single instance completely serve the needs of a large, widespread organization?
3. What is the cost? The costs of LMSs vary by a factor of more than 10 to 1, from roughly \$10,000 to \$200,000 per annum and even more. Be sure to identify clearly what functionality, implementation costs, technical support, upgrades, etc., you are paying for. There are several different costing models: leasing, one-time purchase, annual subscription, fixed cost based on size of organization, variable cost based on number of registered users, based on the number of administrators who need access to the system, etc. Read the fine print on costs - be sure you understand the fee structure. Explore all the possibilities, and negotiate.
4. What are the hosting options: in-house hosting, vendor hosting, third party hosting?
5. Can the company provide ROI (return on investment) figures? Do participant costs decrease as numbers increase?
6. Do the reporting functions meet the need of my organization? Can custom reports be created? Can reports be generated automatically and instantly?
7. What are the Implementation issues? How much support does the vendor provide, and what are the costs? Ask specifically about post implementation technical and customer support.
8. List the third party systems and courseware that you will be using and ask the vendor about their experience with these products. If you have in-house developed courseware ask if you can test it with their LMS.

9. Obtain references from other companies that have used the LMS especially from those organizations similar to your own. Different vendors target different industry sectors and size of implementations.
10. Will they be available to demonstrate the software in-person or online? Will they demonstrate according to scripts you have developed which reflect your own working scenarios?
11. Is it possible to arrange a free trial or small pilot?

A free template for an RFP for a learning management system is available at www.geolearning.com/rfp. They also have a number of other very useful resources available.