

e-Learning Technology Survey
Developing a Selection Criteria

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I. Introduction

Objective of Study

The goal of the proponents is to provide a general framework for selecting the right e-Learning technology application for the user. There are certain levels the user needs to understand in order for them to select the right technology applicable to their need. These levels are *User-level criteria*, *technical-level criteria*, and *optional level criteria*. These will be explained further in the sections of this paper.

The accomplishment of the group is the creation of the e-Learning Selection Framework, the criteria matrix (User-Level Criteria and Technical-Level Criteria) based upon survey research on the existing e-Learning technology applications and the application of certain learning theories. Based upon the research of the proponents, the selection criteria of e-Learning can possibly be utilized in terms of the framework proposed by the group. It should be noted, that the basis of the group for the framework is based on an agreement by the group related to their research/survey of existing e-Learning technology applications. This will be further explained on the discussion of the e-Learning Selection Framework.

The structure of the paper is based towards explaining the structure of the framework and the components in which the framework is composed of.

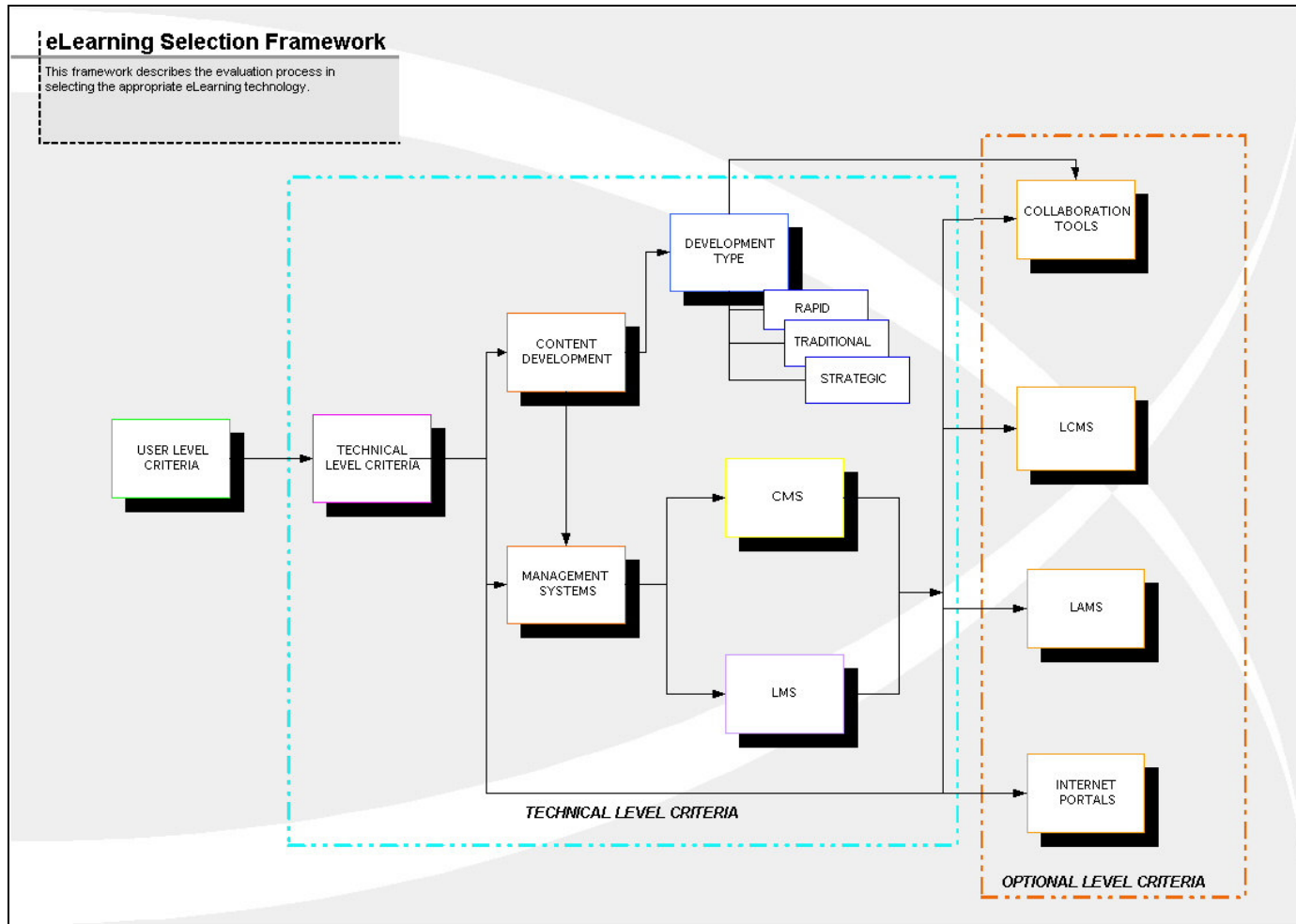
Significance of Study

With the rising industry of e-Learning, it becomes difficult to select the right tools for effective learning with the utilization of the web and information communication technology or ICT. Today, we can observe e-Learning as an established industry with the support of many stabilized existing standards (SCORM and IEEE) to support its growth. With the growing concepts of e-Learning and the growing concepts being developed with the rapid evolving nature of more powerful technology tools, it becomes difficult for users to select the right e-Learning technology. Like any other technology, e-Learning is still growing. While vendors are developing better and better tools, it becomes difficult for users (especially novice users) to catch-up to the current developments.

The aim of the proponents is to survey the e-Learning market to examine the existing e-Learning technology applications. The aim of which will develop a criteria in choosing the applicable e-Learning applications for specific users or organizations.

II. e-Learning Selection Framework

a. Framework Diagram



b. Defining the Framework

Main e-Learning Technology Components

1. Management Systems
 - a. CMS – Content Management System
 - b. LSM – Learning Management System
2. Content Development
3. Collaboration Tools
4. LCMS – Learning Content Management Systems
5. 2nd Generation e-Learning: LAMS – Learning Activity Management Systems
6. Internet Portals (Virtual communities)

Defining the Structure

The framework begins with the user-level criteria. In developing the framework this criteria is the last to be defined, but in a user's point of view, this is what they need to see first. The User-Level Criteria is the product of all technology applications – this is the actual strategy or the learning strategy in which e-Learning technology is based upon. The goal of the group is to understand this criteria. In understanding this criteria, the users will be able to differentiate the different e-Learning technologies available to the user. The end-goal of the user-level criteria is to be able to allow the user to choose the most applicable e-Learning technology to the user. Once the user has chosen the applicable user-level criteria, they will be presented with the technology level criteria. This has 4 main components in which the user will be choosing:

1. Content Development
2. Management Systems
 - a. CMS (Content Management System)
 - b. LMS (Learning Management System)
3. Internet Portals

After an e-Learning technology is chosen, the user will be provided with an option to further enhance their existing e-Learning technology. This is when the selection framework presents the optional level criteria. These are usually known as e-Learning technology add-ons. There are 4 components presented in this criteria:

1. Collaboration Tools
2. LCMS
3. LAMS
4. Internet Portals

It should be noted that Internet Portals can be a main component and a sub component. These will be further discussed in the paper.

Criteria Levels of the Framework

The framework defines 3 levels in choosing the appropriate e-Learning Technology applicable to the organization. The 3 levels are described below.

1. User Level Criteria

This criteria answers the question why the user needs eLearning. The focus is to seek the purpose of implementing eLearning in a language non-eLearning experts or novice eLearning users will be able to understand.

2. Technical Level Criteria

This criteria selection delves deeper into the infrastructure of eLearning applications. There are 2 main concepts of the Technical Level Criteria:

a. Content Development

If this criteria is chosen, by the user is Content Development this is due to the need for customized e-Learning content development. This provides the 3 levels of which e-Learning development would be utilized: Rapid, Traditional or Strategic.

b. Management Systems

If the criteria chosen, by the user is Management System, the user is more concerned with the electronic management of content and/or the learning process. This provides 2 components of CMS and LMS.

- i.** CMS – Content Management System
- ii.** LMS – Learning Management System

It is critical for the user to understand the significant difference between CMS and LMS.

3. Optional Level Criteria

The optional level criteria can be either additional tool, to the existing e-Learning technology the user already has or it could be the *least* e-Learning technology applications they would need. The former is concerned with further developing the existing e-Learning platform of the user, while the latter is more concerned with minimum e-Learning technology needs.

Developing a Selection Criteria

a. Collaboration Tools

Collaboration tools are focused on further enhancing communication. These tools can be used to enhance the virtual classroom and the existing e-Learning platforms in terms of learning and delivery.

b. LCMS

A Learning Content Management System is further enhances the existing LMS and CMS. While LMS lacks the content management, with the utilization of LCMS this problem can be tackled. *Note, that LCMS can only be directly applied to LMS. The purpose of LCMS does not apply to CMS (Content Management Systems).*

c. LAMS

Learning Activity Management System is a revolutionary new tool for designing, managing and delivery online collaborative learning activities. It provides teachers with a highly intuitive visual authoring environment for creating sequences of learning activities. These activities can include a range of individual tasks, small group work and whole class activities based on both content and collaboration.

LAMS is defined as a second generation e-Learning tool, with the primary goal of monitoring individual learning. This can be further enhance the management of learning via LMS and CMS. LAMS is used as an integrated tools to existing LMS and CMS.

d. Internet Portals

If the focus of the user is knowledge-based, then Internet portals could be the solution they are looking for. Internet Portals are composed of such implementations as knowledge portals, enterprise portals, employee portals, supplier portals, etc. The defining factor of an internet portal is creating a virtual community to provide knowledge transfer. This would mean that there is no need for structured learning, the development of a portal is unstructured and the means of learning is guided by the users themselves.

III. Components of the Framework

Main e-Learning Technology Components

- 1.** Management Systems
 - a.** CMS – Content Management System
 - b.** LSM – Learning Management System
- 2.** Content Development
- 3.** Collaboration Tools
- 4.** LCMS – Learning Content Management Systems
- 5.** 2nd Generation e-Learning: LAMS – Learning Activity Management Systems
- 6.** Internet Portals (Virtual communities)

a. Matrix Components

i. User Selection Criteria Matrix

ii. Technical Selection Criteria

Technical Level Criteria

Description of Technical Criteria

Developing a Selection Criteria

User – Selection Criteria Matrix

Level 1

Technology	Institutional Commitment	Direct Benefits	Available Products	Description of Technology	Intended Users	Instructional Design	e Learning Technologies (Functions & Features)	Standard Compliance (Architecture)	Costs Incurred
1 LMS (Learning Management System)	To provide a structured way of managing learning and training in the organization. Ability to monitor and manage the courses taken.	Operational efficiency in learning. Ability to track the learning Less classroom-based learning need to be conducted, hence traveling expenses and unavailability of hired trainers or internal trainers won't be a problem.	ABC Academy, e-Learning in a Box, KnowBase Networks, Blackboard, IBM Lotus, WebCT	LMS should be able to integrate with other departments, such as human resources, accounting and e-commerce, so administrative and supervisory tasks can be streamlined and automated and the overall cost and impact of education can be tracked and quantified.	LMSs were originally designed for workplace learning environments . Other than the most simplistic, basic functionality, all LMSs cater to, and focus on different educational, administrative, and deployment requirements.	LMSs are designed to support a large number of short training events.	Registration Track participation (classroom attendance, sign-ons and sign-offs of online courses) Track of completions (including final scores or grades) Testing Follow-up discussions with participants Aggregated reports, such as the number of people registered for particular courses Transfer of information to other systems, such as human resource information systems Process charges for courses, such as tuition payments and transfer payments among departments Course catalog Skills management.	Open-Source , Closed-Source (Licensed)	Depends on the Options: Direct Purchase Model – the software is purchased, installed and managed in-house Third Party Maintenance Model – the company buys the software and installs it on its own data platform, but maintenance and upgrades are managed by the LMS vendor or another third party ASP – the company buys the software but it is housed and managed remotely by a third party and administrators, content builders, instructors, and learners access the system over the internet.

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Technology	Institutional Commitment	Direct Benefits	Available Products	Description of Technology	Intended Users	Instructional Design	eLearning Technologies (Functions & Features)	Standard Compliance (Architecture)	Costs Incurred
DMS/CMS (Document/Content Management System)	To be able to manage training materials and learning materials and made accessible by the whole organization.	Operational efficiency in managing learning and training materials. Learning and Training materials are made accessible to the whole organization.	Textpattern, Point Dynamics, CES Enterprise v2.0, MeshCMS, Joomla!, Plone, TYPO3, Xaraya, Drag Drop Site Creator	A content management system is a computer software system for organizing and facilitating collaborative creation of documents and other content	The market for content management systems remains fragmented, with many open-source and proprietary solutions available. A very powerful and attractive tool.	Depends on the type of content being created. It can support independent learning (courseware) or dependent learning (teachware). This therefore can support a large repository of learning theories based on the Instructional System Design.	A content management system is sometimes a web application used for managing websites and web content, though in many cases, content management systems require special client software for editing and constructing articles. They can also be used for storage and single sourcing of documentation for a firm including but not limited to operators' manuals, technical manuals, sales guides, etc.	Open-Source , Closed-Source (Licensed)	Licensing, Plug-ins (add-ons to the current application), hardware in terms of server, software installation and maintenance, fast internet access, other hardware components (web cam, microphone)
Content Development	To be able to develop customized e-Learning applications to support the unique learning needs for the organization's employees and clients.	Streamline the process of developing customized content. Ability to produce 5, 10 or 20 training modules per month depending on the targeted volume.	e-Learning courseware development: element-K, Headstrong Inc., Accenture, IBM	Development of customized e-Learning content using state-of-the-art multimedia and web applications. The focus in on the effective development of content using e-Learning, not the communication, collaborating or managing part of learning.	Organizations who need the development of training materials. Usually, tailor-fit to their organization's training needs.	Self-paced learning is the focus of this type of e-Learning development. Adult learning is very critical in developing the approach of the e-Learning application development.	Multimedia Development Tools are the focus of the e-Learning development technologies: Authoring, sound editing, animation, video and web.	Off-the-shelf e-Learning application or customized development	Multimedia development tools (Macromedia Flash, Dreamweaver, Authorware, etc.), Sound editing tools, video editing tools, Vendor-service provider (contractual agreement with Vendor to provide e-Learning application development).

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<p>2</p> <p>LCMS (Learning Content Management System)</p>	<p>To be able to enhance my ability to manage the learning management system by providing better means of authoring, creating, and managing content.</p>	<p>Ability to enhance the content development of the existing learning management system the organization already has.</p>	<p>Centra Knowledge Center, Evolution, ForceTen LCMS, iPerformance, KnowledgeBridge LCMS, Moodle</p>	<p>LCMS is an add-on the existing LMS platform. Since LMS is not focused on content management, LCMS enhances the capability of the LMS in this feature.</p>	<p>Instructors and organizations who would want to have a better ability to manage and develop content based on their existing LMS platforms.</p>	<p>The focus of LCMS is to develop a platform for learning that can be geared towards conversational learning. The underlying principles of conversational learning is applied towards the utilization of e-Learning technology.</p>	<p>Learning Content Management System (LCMS) simplify the task of creating, managing, and reusing learning content, that is, the media, pages, tests, lessons, and other component of courses.</p>	<p>Open-Source , Closed-Source (Licensed)</p>	<p>Licensing, Plugins (add-ons to the current application), hardware in terms of server, software installation and maintenance, fast internet access, other hardware components (web cam, microphone)</p>
<p>3</p> <p>Collaboration Tools</p>	<p>Ability to enhance the ability of my organization to communicate and socialize. Most effective with my teams are offshore and onshore projects.</p> <p>The need to communicate and track, effective during problem-solving using remote means.</p>	<p>Better communication provides operational efficiency.</p> <p>Cheaper way of communication, with global connections.</p>	<p>Sakai, Blogging Tools: Blog Studio, Blogger, DiaryLand, Free Open Diary</p>	<p>Used to enhance the communication of e-Learning platforms. Sakai - <i>World's leading open source collaboration and learning environment. Can Successfully integrates with LAMS. Benefit from highly scalable learning platform combined with the unique "digital lesson planning" of LAMS</i></p>	<p>Teachers and Facilitators, Students/Learners Content Developers Other Communities</p>	<p>Constructive Learning, Conversational learning</p>	<p><i> Blogging tool</i> let you create and write content to a blog, or Web log. <i>Audio conferencing</i> tools let participants talk with one another. <i>Chat and instant messaging</i> allow participants to carry on a text-based conversation in real time. <i>Online discussion</i> allow participants to post messages to a known location where other participants can read and respond to them. <i>Video conferencing</i> tools let participants see and hear one another. <i>Whiteboard</i> simulates the communication that occurs when the instructor draws on a wall-mounted whiteboard and then invites a student to contribute to the drawing.</p>	<p>Open-Source, Closed-source, Service (plugins)</p>	<p>Free Downloads, Resource Intensive, services (as plug-ins)</p>

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<p>5</p> <p>2nd Generation eLearning</p>	<p>To be able to individualize and monitor the learning/training progress of my employees/students .</p>	<p>Ability to provide individualized learning. Monitor the learning progress and address the individual learning and training needs of the learners/employees.</p>	<p>LAMS (Learning Activity Management System)</p>	<p><i>Integration - can be integrated with existing LMS and LCMS technologies.</i> World's leading open source Learning Design system. Revolutionary new tool for designing, managing and delivering online collaborative learning activities.</p>	<p>Teachers and Instructors who intend to monitor the progress of students individually.</p>	<p>Collaborative Learning, Focus is geared toward Intentional Learning which brings the concept of individualized learning.</p>	<p><i>Authoring Capabilities</i> - allows to build a sequence of activities. Extensive toolkit, drag and drop design. <i>Administer Class</i> - select learners to join class. Learner Synchronization - synchronize learners with the activities to learners-specific level. <i>Collaboration Tools</i> - allows for real-time chatting. <i>Monitoring Capabilities</i> - this unique feature allows for individual monitoring of the students progress. This differentiates LAMS from existing LMS and LCMS developments.</p>	<p>LAMS Standard development for Activity Management</p>	<p>Online Access, Fast Server and Internet Access, Free Integration to existing LMS and LCMS platforms</p>
<p>6</p> <p>Other Related Technologies</p>	<p>Provide a community for my organization to share ideas and concepts.</p>	<p>Ability for the employees and learners to feel united. Knowledge sharing and socialization is encouraged, therefore creativity, innovation and new ideas can be developed.</p>	<p>Community Portals (Enterprise Portal, Knowledge Portals, etc.)</p>	<p>Community Portals are aimed towards the development of Knowledge. This therefore is intended for learners who are dependent on learning. They are geared toward learning to support their existing knowledge and build upon it by seeking others with similar goals.</p>	<p>High-level learning. Learner should be experienced in critical thinking as this will be the key aspect of learning that is practiced with the use of this technology</p>	<p>Experiential Learning, Active Learning, Experiential Learning</p>	<p>Virtual Portals. Collaboration Tools. Technology based on the development of enhancing communication.</p>	<p>Communities of Practice, virtual communities, usually open-source although there are private networks (intranet) utilized only by organizations and are not public.</p>	<p>Access to the web. In terms of private use, the use the development of a private network to support the intranet development.</p>

Developing a Selection Criteria

Technical Level Criteria

Level 2

System Requirements		Security	Support	Cost	Ease of Use	Performance
1	Application Server	Audit Trail	Certification Program	Purchase cost	Drag-N-Drop Content	Advanced Caching
2	Approximate Cost	Captcha	Code Skeletons	Installation cost	Email To Discussion	Database Replication
3	Database	Content Approval	Commercial Manuals	Operation Cost	Friendly URLs	Load Balancing
4	License	Email Verification	Commercial Support	Maintenance Cost	Image Resizing	Page Caching
5	Operating System	Granular Priveleges	Commercial Training	Upgrade Cost	Macro Language	Static Content Export
6	Programming Language	Kerberos Authentication	Developer Community	Salvage Cost	Mass Upload	
7	Root Access	LDAP Authentication	Online Help		Prototyping	
8	Shell Access	Login History	Pluggable API		Server Page Language	
9	Web Server	NIS Authentication	Professional Hosting		Spell Checker	
10		NTLM Authentication	Professional Services		Style Wizard	
11		Pluggable Authentication	Public Forum		Subscriptions	
12		Problem Notification	Public Mailing List		Template Language	
13		Sandbox	Test Framework		UI Levels	
14		Session Management	Third-Party Developers		Undo	
15		SMB Authentication	Users Conference		WYSIWYG Editor	
16		SSL Compatible			Zip Archives	
17		SSL Logins				
18		SSL Pages				
19		Versioning				

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20	Flexibility	Adaptability	Reusability	Durability	Commerce	Interoperability
21	CGI-mode Support	Develop ability to incorporate new materials and process on the fly	Granular Privileges	Open-Source Development	Affiliate Tracking	Content Syndication (RSS)
22	Content Reuse	Can you add/remove people?	Sandbox	Closed-Source Development	Inventory Management	FTP Support
23	Extensible User Profiles	Can you split them into groups (whole group, small groups, individuals)?	Versioning	Ubiquitous	Pluggable Payments	UTF-8 Support
24	Interface Localization	Can you create or assign resources or learning activities to individuals?	Asset Management		Pluggable Shipping	WAI Compliant
25	Metadata	Can yo alter the sequencing of a module?	Clipboard		Pluggable Tax	WebDAV Support
26	Multi-lingual Content		Content Staging		Point of Sale	XHTML Compliant
27	Multi-lingual Content Integration		Themes / Skins		Shopping Cart	
28	Multi-Site Deployment		Content Reuse		Subscriptions	
29	URL Rewriting				Wish Lists	
30	Wiki Aware				Scalability	
31						
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Developing a Selection Criteria

Management	Collaboration Tools
Advertising Management	Application Sharing
Asset Management	Blog
Clipboard	Chat
Content Scheduling	Classifieds
Content Staging	Contact Management
Inline Administration	Data Entry
Online Administration	Database Reports
Package Deployment	Discussion / Forum
Sub-sites / Roots	Document Management
Themes / Skins	Events Calendar
Trash	Events Management
Web Statistics	Expense Reports
Web-based Style/Template Management	FAQ Management
Web-based Translation Management	File Distribution
Workflow Engine	Graphs and Charts
	Groupware
	Guest Book
	Help Desk / Bug Reporting
	HTTP Proxy
	In/Out Board
	Job Postings
	Link Management
	Mail Form
	Matrix
	My Page / Dashboard
	Newsletter
	Photo Gallery
	Polls
	Product Management
	Project Tracking
	Search Engine
	Site Map
	Stock Quotes
	Surveys
	Syndicated Content (RSS)
	Tests / Quizzes
	Time Tracking
	User Contributions
	Weather
	Web Services Front End

Technical Level Criteria
Level 2
Description of Technical Criteria

FUNCTION	FEATURES of FUNCTION	DESCRIPTION	FUNCTION	FEATURES of FUNCTION	DESCRIPTION
System Requirements	Application Server	The application server or application environment required to run this CMS	Support	Certification Program	Is there a professional degree or certification for this CMS?
	Approximate Cost	The approximate licensing cost of this CMS. Note that there almost soft and hard costs beyond licensing costs for any CMS		Code Skeletons	Does the system provide code skeletons or code templates to make it easy for new developers to write plugins for it?
	Database	The database engine this CMS uses to store content and setting.		Commercial Manuals	Are there books or other commercially available documentation for this CMS?
	License	The type of license this CMS is distributed under.		Commercial Support	Can support be purchased from commercial organization with trained staff members?
	Operating System	The Operating System this CMS is compatible with.		Commercial Training	Can training be purchased from commercial organization that has dedicated training staff for this CMS?
	Programming Language	The programming language that the CMS is written in and/or can be extended using.		Developer Community	Is there a free on line developer community specifically for this product?
	Root Access	Is root (or administrator) access required to install this application?		Online Help	Is there an integrated context-sensitive help system built in to this CMS?
	Shell Access	Is the shell access required to install this application?		Pluggable API	Can the system be extended through an open and documented application programming interface (API)?
	Web Server	The web servers this CMS is compatible with		Professional Hosting	Is there a vendor supplied professionally tuned hosting environment or has a certified hosting partner program.
					Professional Services

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Security	Audit Trail	Does the system keep track of who made addition, updates or deletions?		Public Forum	Is there a publicly available forum or message board for the system?	
	Captcha	A challenge-response system designed to defeat bots from being able to use user-only features of a system.		Public Mailing List	Is there a publicly available mailing list for the listing?	
	Content Approval	Does the system provide for some level of system-wide content approval		Test Framework	Does the system has an automated test framework that can be used to test the code base to ensure that this is functioning properly?	
	Email Verification	Does the system send an activation key to users to make sure they've entered a valid email address?		Third-Party Developers	Are there third-party developers who manufacture plug-ins for this system?	
	Granular Privileges	Does the system allow read and write privileges on a per page or per content item basis, as a well as separate privileges for other system functions?		Users Conference	Is there an annual users conference for this systems?	
	Kerberos Authentication	Does the system support authentication via Kerberos?				
	LDAP Authentication	Does the system allow the LDAP-based authentication?		Ease of Use	Drag-N-Drop Content	Does the system allows user to position content in a drag and drop fashion?
	Login History	Does the system keep track of who logged in and where?			Email To Discussion	Can messages be emailed to the system so that they automatically appear in community discussions?
	NIS Authentication	Does the system support authentication via NIS?			Friendly URLs	Does the system have human-readable and search engine friendly URLs?
	NTLM Authentication	Does the system support authentication via NTLM?			Image Resizing	Is the system capable of allowing users to resize uploaded images so they need not mess around with an external image editor?
	Pluggable Authentication	Does the system allow additional authentication schemes?			Macro Language	Is there a macro language that allows content managers to place powerful functionality without programming knowledge?

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	Problem Notification	Does the system provide a mechanism for alerting administrators when it detects a problem?		Mass Upload	Does the system have a way of uploading/importing many images and other files all at once to save time?
	Sandbox	Does the system allow for a private area for content for managers to try new content without the worry of affecting rest of the site?		Prototyping	Does the system allow the user to enter to create custom default settings for the different kinds of content objects to save them extra clicks from creating those extra objects types?
	Session Management	Does the system provide a facility for an administrator to see who is logged in, what they are doing, and logged them out if necessary?		Server Page Language	Is there a server page language available?
	SMB Authentication	Does the system support authentication via SMB?		Spell Checker	Does the system have an integrated spell checker?
	SSL Compatible	Can this system be used with an SSL certificate on the web server?		Style Wizard	Does the system have a wizard for generating styles/themes/templates?
	SSL Logins	Can this system be configured to login to SSI mode for logins, and then back to normal HTTP after the login?		Subscriptions	Can the user subscribes to other sections of the site and receive notifications on new/updated content?
	SSL Pages	Can the system be configured to switch to SSL mode for certain pages and then back to normal HTTP for other pages.		Template Language	Is there a template language for powerful layout controls?
	Versioning	Does the system provide for some level of system-wide content versioning?		UI Levels	Is there a means of "dumbing down" the publishing interface for less sophisticated publishers while keeping a more sophisticated interface for power users?
				Undo	Does the system allow users to "undo" operations if they make mistake?
				WYSIWYG Editor	Is there a web-based rich text editor to allow publishers to create formatted content without knowing HTML, CSS, XML or XSL?
				Zip Archives	Does the system allow the user to upload zip full of static content which is then published to the site?

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FUNCTION	FEATURES of FUNCTION	DESCRIPTION	FUNCTION	FEATURES of FUNCTION	DESCRIPTION
Performance	Advanced Caching	Does the system have advance caching mechanisms that go beyond simple page caching?	Collaboration Tools	Blog	Does the system have a blog or web log?
	Database Replication	Can the system take advantage of database replication for better scalability?		Chat	Does the system have an application for real-time on-line chat?
	Load Balancing	Does the system allow you to put a load balancer in front of it to split the load between multiple users?		Classifieds	Does the system have a classified application?
	Page Caching	Does the system have a mechanism for caching the contents of the page so that if it is requested again it can skip most of the work to create the page?		Contact Management	Does the system have a contact management or rolodex type of application?
	Static Content Export	Does the system have the availability to export its contents as static HTML so it may be served up from regional cache servers, or static HTML web servers?		Data Entry	Does the system have an application for creating arbitrary data entry application?
					Database Reports
Management	Advertising Management	Does the CMS have a banner or other management system?		Discussion / Forum	Does the system have a message board?
	Asset Management	Is there a central repository for uploading images and other files so they can be reused throughout the site?		Document Management	Does the system have an application for managing offline document storage and versioning?
	Clipboard	Is there a clipboard system that allows publishers to easily cut and paste content from one area of the site to another?		Events Calendar	Does the system have an application for tracking events and displaying events calendar?
	Content Scheduling	Does the system allow for content to be automatically added or deleted from a site based upon date?		Events Management	Does the system have a way of creating events and allow users to sign up for those events?
	Content Staging	Can content be created in one server and easily "pushed" to another server?		Expense Reports	Does the system have an application for tracking employee expense reports?

Developing a Selection Criteria

	Inline Administration	Is content edited directly in the page that it will be placed?		FAQ Management	Does the system have an application to organize frequently asked questions?
	Online Administration	Can the system be completely managed through a web browser?		File Distribution	Does the system have an application to distribute files including privileges for who is allowed to view/download those files?
	Package Deployment	Can content and applications be packaged so that tedious repetitive publishing functions can easily be deployed time and time and again without the repetition?		Graphs and Charts	Does the system have an application to allow user to generate graphs and charts based upon some data set?
	Sub-sites / Roots	Does the system allow for sub-sites within a site that are self contained with their own navigation and content hierarchy?		Groupware	Does the system have email and calendaring applications?
	Themes / Skins	Does the system have a mechanism to transport styles, templates, etc. between sites so that you can create a theme on one site and reuse it in on many others?		Guest Book	Does the system have a guestbook or graffiti application?
	Trash	Is there a trash system to allow administrators or publishers to recover content that has been removed from the site?		Help Desk / Bug Reporting	Does the system have a trouble ticketing or bug reporting?
	Web Statistics	Does the system have built in web site statistics reporting for things such as pages/content items viewed, number of users per time period, etc?		HTTP Proxy	Does the system have a mechanism to proxy or mirror HTML and other content and applications from other web servers?
	Web-based Style/Template Management	Is there a web based interface for adding styles and templates to the system for design and layout control?		In/Out Board	An intranet application that allows staff to post their status.
	Web-based Translation Management	Can language translation be managed through an easy web based interface?		Job Postings	Does the system have a mechanism for posting job listings?
	Workflow Engine	Is there a full fledged workflow system integrated into the CMS that can be used for business process management?		Link Management	Does the system have an application to manage links?

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Flexibility	CGI-mode Support	Can the system run in CGI mode for development purposes or on low-end systems?		Mail Form	Does the system have an application for creating customizable? Contact Us? Type Forms?
	Content Reuse	Does the system allow content to be mirrored from one location to another on a site?		Matrix	Does the system have a matrix application?
	Extensible User Profiles	Does the system provide the user profiling that can be extended with new profile properties through an administrative interface?		My Page / Dashboard	Does the system have a dashboard application?
	Interface Localization	Is the system localized/internationalized so it can be translated into other languages and take locale preferences like date/time preferences into account?		Newsletter	Does the system have the ability to allow users to add/delete themselves to and from a list so that they can be sent email from the system on various topics?
	Metadata	Does the system support the adding or arbitrary metadata properties to all the content objects?		Photo Gallery	Does the system have an application for displaying a thumbnail/image repository ?
	Multi-lingual Content	Does the system support the creation of sites with multiple languages?		Polls	Does the system have an application for conducting simple single question polls?
	Multi-lingual Content Integration	Does the system support a multi-lingual version of each content object without republishing the content object?		Product Management	Does the system have an application for displaying organized product information?
	Multi-Site Deployment	Is the system capable of hosting multiple sites from one software deployment?		Project Tracking	Does the system have an application for managing project tasks?
	URL Rewriting	Is the system capable of rewriting URL or working with some other URL rewriting mechanism to provide shorter or friendlier URLs?		Search Engine	Does the system have an application for search engine that can index the managed content and allow the user to search the indexed content?
	Wiki Aware	Does the system support wiki or wiki-like functionality?		Site Map	Does the system generate a tree showing all the pages in the system dynamically so is doesn't have to be maintained separately by the content managers?
				Stock Quotes	Does the system have an application for displaying stock ticker information?

Developing a Selection Criteria

			Surveys	Does the system have an application for conducting complex multi-question surveys?
			Syndicated Content (RSS)	Does the system have an application for retrieving and displaying RDF/RSS/XML syndicated content?
			Tests / Quizzes	Does the system have an application for administrating tests and quizzes?
			Time Tracking	Does the system have an application for tracking employee time for payroll or billing purposes?
			User Contributions	Does the system have an application for allowing a user community stories and other content in the site?
			Weather	Does the system have a weather information system?
			Web Services Front End	Does the system have an application for directly interfacing with arbitrary web services like Google API and creating a user templated interface without coding?

Developing a Selection Criteria

Adaptability	Develop ability to incorporate new materials and process on the fly		Cost	Purchase Cost	Actual Cost in buying the system which involves licensing and development cost
	Activities associated with a learning topic should be able to be adapted according to the needs of an individual or sub-groups as revealed by course interaction between the learner and their peers, system or instructor.			Installation Cost	Cost that will be incurred on the installation of the system for implementation such as hardware, infrastructure, and training cost for technical support group and users.
Durability	Open-Source Development	Provided with an open-source architecture, the chances of durability are cannot be forecasted. An open-source architecture means, that there is no one permanently assigned to follow-up on developments, bug-fixes or viruses. There is no one to be held accountable. This is the risk of durability provided a open-source architecture. This is the risk of free software.	Operation Cost	Cost that will needed for the day to day operation of the system which involves utility cost (i.e. electricity, space, internet service providers, salaries and wages of personnels (i.e. content developers, administrators)	
	Closed-Source Development	As oppose to open-source , a closed-source architecture can provide accountability to the organization who is providing the e-Learning services. Since this is profit-based, versioning and close-monitoring is taken into consideration. Therefore organizations, durability is highly regards in closed-source systems as compared to open-source	Maintenance Cost	cost involving depreciation and periodical maintenance of the system (i.e. back up cost)	
	Ubiquitous	Ubiquitous means the ability to be flexible, the ability to be able to perform in numerous types of environments. Provided with this characteristics, it will be able to withstand the different requirements of different platforms.	Upgrade Cost	Cost for upgrades of Infrastructure and for the systems itself	
				Salvage Cost	Cost if the system will be shelved or boxed

b. Instructional Design Theories Applied

1. Prime Learning Theories

Bloom's Taxonomy

Piaget's Development Psychology

Cognitive Learning

The prime learning theories are general learning theories in which almost all (if not all) of the learning theories are applied.

2. Active Learning

Concepts are closely related to transformative and reflective learning.

The theory of active learning is closely related to the concepts of transformative learning. The 2 main kinds of experience are 'observing' and 'doing' in which 2 kinds of dialogue are present: Dialogue with self and dialogue with others.

In dialogue with self the key concept of reflecting upon the situation or problems is the key learning experience. The kind of experience used here is observing as they are trying to analyze the situation based on their own knowledge. This is then followed by dialoguing with others, in which the experience of 'doing' is applied. They try to converse with their own reflection, gained from the dialogue with self and observing.

3. Constructive Learning

Constructive learning is based upon the approach of constructivism. This provides a more exploratory approach of learning in the learner is provided with the situation and/or problem in which the learner will try to learn independently. The instructions are provided and the learner will try to solve the situation on their own. The key aspect of creativity and working on groups is realized in this theory.

4. Collaborative/Cooperative Learning

This supports the learning of socializing and communication. This allows the learner to learn how to work with others and better communicate ideas. The use of technology plays a critical role, if face-to-face communication is not provided.

5. Intentional Learning

Intentional learning is geared towards the focus of individual learning. Its focus is towards contemporary psychology, in which students learn in different ways affected by both an external direction or self-directed learning. Provided with the case, it is not intended that the students who are highly motivated learners and fast learners are better students to cope with the lessons. Slower students need other means of learning, therefore other learning styles and teaching styles should be considered.

The primary factor of this type of learning is by attending to an individual type of learning to learn how the students can best cope with the lessons. This is what 2nd generation learning or Learning Activity Management Systems (LAMS) is focused on.

6. Conversational Learning

This type of learning is closely related to collaborative/cooperative learning. In this theory we examine how the student and teacher closely work together. The teacher will provide a theoretical representation of the subject, while the student will try to conceptual the concept through articulation. The teacher and student will work on this therefore the process of articulation can be that of re-articulation as well. Based on the lesson provided by the teacher, the teacher will then provide as experiential environment where the student's goal-oriented behavior (created by assistance from the teacher) is tested. This will provide an action/feedback conversation piece with the teacher and student. Provided with this, reflection and adaptation between the teacher and student are realized.

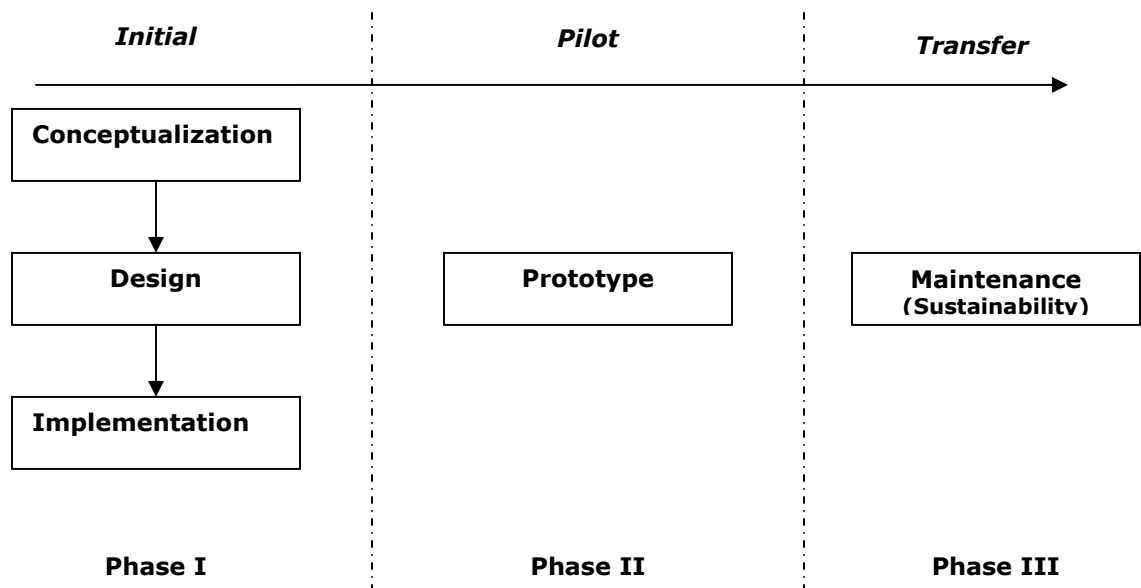
7. Experiential Learning

This type of learning is geared towards critical thinking, in which the learner is assumed to be an independent learner. The criteria of this type of learning, is focused towards the existing knowledge of the learner and their own way of building upon that knowledge. Therefore, a structure for learning is not provided. The task of the student is provided and they will look for the means of finding the solution. Creativity is the key aspect of learning that is being promoted in this learning theory.

IV. Survey of Existing e-Learning Technologies

a. Content Development

When an organization has significant needs of Content Development as oppose to e-Learning management tools, they are more concerned with customized development of e-Learning applications. Customization would entail tailor-fit training materials specifically made for his or her organization. A typical content development process would include the following phases:



Phase I - Initial

The initial phase is critical in responding to the training needs of the organization. This entails three procedures namely conceptualization, design and implementation. The conceptualization phase is takes into consideration data gathering and requirements analysis. The role of an instructional systems designer plays a significant role in this process. The design phase is where the functional specification, design layout and instructional systems design are integrated to develop the application design of the e-Learning system. These take into consideration the platform, tools and media elements that will be utilized. In this phase, the approach of development is also examined. There are 3 types of approach namely rapid, traditional and strategic.

Developing a Selection Criteria

Rapid e-Learning

The two overarching elements of rapid e-learning:

- short time frames
- ease of development

Rapid e-Learning contain 3 unique characteristics:

- Content authoring should be simple and web based.
- In order to minimize the time from content authoring to content publishing, the subject matter experts (SME) must take the primary role instead of the instructional designers.
- Each learning/training organization must have a content sharing platform/database.

Here are some common factors of Rapid e-Learning:

- Programs can be developed in a few weeks
- SMEs act as the primary resource for content development.
- A well-known tool such as PowerPoint or user-friendly templates forms the starting point for courses.
- Media elements that enhance learning but do not create technology barriers may be included (e.g., voice)
 - Common web authoring software like FrontPage, Dreamweaver, and Flash are not being used. Instead, SME use web based authoring tools/platforms to generate digital contents. These contents will then be delivered to the learners as html, flash and other media formats via the web.
- SME needs minimum trainings from using these authoring tools/platforms.
- Modules can be taken in less than one hour and often in less than 30 minutes.
 - The learning contents are in smaller "chunks" usually, say, less than 30 minutes of studying time for each "chunk". Then the course creator will "assemble" these "chunks" into a self contained courseware. These chunks can be viewed as learning objects.
- Simple assessment, feedback and tracking are usually provided, but not always necessary.
- The learning materials can be delivered in synchronous (scheduled or live), asynchronous (self-paced) and mixed mode learning environments.
- The contents must be learner centric instead of the "instructor feeding" style.

Developing a Selection Criteria

- Each content module must have a clear theme which allows the module to be presented as a stand alone learning object thus the production time for each of these objects can be “pumped out” on a efficient time basis.

There also is a trend toward greater incorporation of simulations into rapid e-learning tools.

Traditional e-Learning

While Rapid e-Learning is focused on the fast-pace changing development of content, traditional e-Learning is more focused on the organization’s skills development. The content provided in traditional e-Learning are more permanent as compared to rapid e-Learning where the content is ever-so changing. Therefore the architecture for traditional e-Learning can be developed for a longer period of time to assure the quality of the delivery will be effective in terms of skills development.

Strategic e-Learning

Strategic e-Learning is more concerned with the future developments of the employees of the organization. In this level, e-Learning plays a role in training development of the employees in terms of where they would want to be in the future. This plays a role in how the organization sees their employees in the long-term therefore providing e-Learning applications that will effect the future growth of their employees.

Phase II

In phase II, the prototyping or pilot testing allows for the technology transfer from the e-Learning vendor to the client. This is where the ‘tailor-fit’ approach is put into use. Tweaking of the application and approval of the client to the e-Learning development plays a significant role in this phase.

Phase III

The success of Phase II, is brought about going into Phase III. When the e-Learning content development architecture is complete, sustainability will allow for the organization to work closely with the e-Learning vendor in developing e-Learning applications. In this phase, certain calculations and configurations are already in place. Depending on the client’s needs, the e-Learning vendor has reached its goals of developing e-Learning applications or more commonly called modules. In this phase, whether rapid, traditional or strategic the e-Learning vendor can develop volumes of modules for the organization – 5 modules a week, 10 modules a month, etc.

b. Management Systems

1. CMS – Content Management Systems

From Wikipedia

A **content management system** is a computer software system for organizing and facilitating collaborative creation of documents and other content. A content management system is sometimes a web application used for managing websites and web content, though in many cases, content management systems require special client software for editing and constructing articles. They can also be used for storage and single sourcing of documentation for a firm including but not limited to operators' manuals, technical manuals, sales guides, etc. The market for content management systems remains fragmented, with many open-source and proprietary solutions available. A very powerful and attractive tool.

The term was originally used for website publishing and management systems. Early content management systems were developed internally at organizations which were doing a lot of content publishing. In 1995, CNET spun out its internal development offerings into a separate company called Vignette, which opened up the market for commercial systems. As the market evolved, the scope of content management systems broadened, and the term is now used to refer to a range of technologies and techniques, including portal systems, wiki systems, and web-based groupware.

[edit]

Types of Content Management Systems

Several recognised types of content management systems exist:

- Web content management systems assist in automating various aspects of web publishing, such as wikis.
- Transactional content management systems (T-CMS) assist in managing e-commerce transactions.
- Integrated content management systems (I-CMS) assist in managing enterprise documents and content.
- Digital Asset Management systems assist in managing the lifecycle of digital media (video, graphics, marketing materials, photos, multimedia presentations).
- Publications management systems (P-CMS) assist in managing the publications (manuals, books, help, guidelines, references) content life cycle.

Developing a Selection Criteria

- Learning management systems (L-CMS) assist in managing the web-based learning content life cycle. See also managed learning environment.
- Document imaging systems are also generally considered under the family of general content management.
- Enterprise content management systems (E-CMS or ECM) vary in their functionality. Some support both the web and publications content life cycle, while others support the web content life cycle and either transactional content or customer relationship management content. The definition of ECM put forth by AIIM includes methods and tools that "capture, manage, store, preserve and deliver" content across an enterprise. "Manage" contains components like document management, collaboration, business process management, records management, email management, workflow and web content management. The ECM concept is not restricted to web-based technologies but includes client/server and hosted/On-demand solutions.
- Platform Content Management Systems (PCMS) provide the ability to manage all objects (files, folders, programs, etc) on a given set of systems.
- Web Portal Content Management Systems - Browser based software that allows concurrent users secure predetermined access to both common digital assets and individual digital dashboards.

External links

Communities and Associations

- Intranets Journal Bimonthly publication for Enterprise Intranet professionals.
- AIIM, the Enterprise Content Management Association (Association for Information and Image Management).
- CENSA, the Collaborative Electronic Notebook Systems Association), scientific and technical content management industry experts association and community of practice.
- CM Pros, Content Management Community of Practice.
- OSCOM, the central organization for open source content management.
- BrowserMedia, a leader in content management systems.

Directories of available systems

- Open Source Scripts Open Source Content Management Systems.
- OpenSourceCMS Directory of Open Source CMS applications with live demos.
- CMS Matrix Overview of (web) Content Management Systems.
- CMS Watch vendors page List of 40 major Web CMS Vendors at CMS Watch.

Developing a Selection Criteria

- PHPXref CMS page Library of cross referenced Open Source Content Management Systems written in PHP.
- Software-Pointers List of Content Management Tools.
- e107 Free CMS system

Retrieved from "http://en.wikipedia.org/wiki/Content_management_system"

2. LMS – Learning Management Systems

LMS is:

A system that is used to simplify the administration of learning programs within an organization. LMSs manage the log-in of registers users, manage course catalogs, record data from learners, and provide reports to the appropriate faculty. They typically do not have the ability to create content.

A **Learning Management System** (or **LMS**) is a software package, usually on a large scale (that scale is decreasing rapidly), that enables the management and delivery of learning content and resources to students. Most LMS systems are web-based to facilitate "anytime, anywhere" access to learning content and administration.

At a minimum, the LMS usually allows for student registration, the delivery and tracking of e-learning courses and content, and testing, and may also allow for the management of instructor-led training classes. In the most comprehensive of LMSs, one may find tools such as competency management, skills-gap analysis, succession planning, certifications, virtual live classes, and resource allocation (venues, rooms, textbooks, instructors, etc.). Most systems allow for learner self-service, facilitating self-enrollment, and access to courses.

Some LMS vendors do not distinguish between LMS and LCMS, preferring to refer to both under the term "LMS", but there is a difference. The LCMS, which stands for "Learning Content Management System", facilitates organization of content from authoring tools, and presentation of this content to students via the LMS.

LMSs are based on a variety of development platforms, from Java EE based architectures to Microsoft .NET, and usually employ the use of a robust database back-end. While most systems are commercially developed, free and open-source models do exist. Other than the most simplistic, basic functionality, all LMSs cater to, and focus on different educational, administrative, and deployment requirements.

Here are some of the ‘ilities’ of LMS:

- High availability: The LMS must be robust enough to serve the diverse needs of thousands of learners, administrators, content builders and instructors simultaneously.
- Scalability: The infrastructure should be able to expand—or “scale”—to meet future growth, both in terms of the volume of instruction and the size of the student body.
- Usability: To support a host of automated and personalized services, such as self-paced and role-specific learning, the access, delivery and presentation of material must be easy-to-use and highly intuitive—like surfing on the Web or shopping on Amazon.com.
- Interoperability: To support content from different sources and multiple vendors’ hardware/software solutions, the LMS should be based on open industry standards for Web deployments (XML, SOAP or AQ) and support the major learning standards (AICC, SCORM, IMS and IEEE).
- Stability: The LMS infrastructure can reliably and effectively manage a large enterprise implementation running 24x7.
- Security: As with any outward-facing collaborative solution, the LMS can selectively limit and control access to online content, resources and back-end functions, both internally and externally, for its diverse user community.

C. Optional Level Criteria**Collaboration Tools****Collaboration tools: Blogs**

Blogging tool let you create and write content to a blog, or Web log.

Blogging tools**Tools****Vendor****URL**

Blog Studio	Indigo Technology Partners	www.blogstudio.com
Blogger	Pyra Labs	www.blogger.com
DiaryLand	DiaryLand	www.diaryland.com
Free Open Diary	The Open Diary	www.freeopendiary.com
Manila	UserLand Software	manila.userland.com
MoveableType	Six Apart	www.moveabletype.org
Multicity	Multicity	www.multicity.com
Pitas.com	Pitas.com	www.pitas.com
Radio UserLand	UserLand Software	radio.userland.com
TongueWag	Port41 Ltd	www.tonguewag.com
TypePad	Six Apart	www.sixapart.com/typepad/

Collaboration tools: Application sharing

An application sharing program or utility lets the presenter share programs, windows, or the entire screen with participants.

Collaboration tools: Application sharing

Tools	Vendor	URL
Breeze	Adobe Systems	www.adobe.com
Illuminate	Illuminate	www.illuminate.xom
Exchange Conferencing Server	Microsoft	www.microsoft.com/exchange
GoToMeeting	Citrix Online	www.gotomeeting.com
WebEx Meeting Center	WebEx Communications	www.webex.com

Collaboration tools: Audio conferencing

Audio conferencing tools let participants talk with one another.

Collaboration tools: Audio conferencing

Tools	Vendor	URL
Exchange Conferencing Server	Microsoft	www.microsoft.com/exchange
Robust Audio Tool mice.cs.ucl.ac.uk/multimedia/software/rat/	University College London	www-
Skype	eBay	www.skype.com
Skypecasts www.skype.com/help/guides/skypecasts.html	eBay	
vat Lawrence	Berkeley National Laboratory	www-nrg.ee.lbl.gov/vat/

Collaboration tools: Chat and instant messaging

Chat and instant messaging allow participants to carry on a text-based conversation in real time.

Collaboration tools: Chat and instant messaging

Tools	Vendor	URL
Chat Blazer	Pendulab Pte Ltd	www.chatblazer.com
ChatSpace Community Server	Akiva	www.akiva.com
Dbabble	NetWin, LTD	www.netwinsite.com
DigiChat	Digi-Net Technologies	www.digi-net.com
Exchange Server	Microsoft	www.microsoft.com/exchange
Lucid Chat	Lucid Chat	www.lucidchat.com
Multicity	Multicity	www.multicity.com
Skype	eBay	www.skype.com
VolanoChat	Vollano	www.volano.com

Developing a Selection Criteria

Collaboration tools: E-mail

E-mail readers, or clients, enable you to exchange messages with other e-mail clients using the Internet.

Collaboration tools: E-mail**Tools**

Agent
Eudora Email
Eudora WorldMail Server
Exchange Server
MailSite
MSN Hotmail
Outlook
Outlook Express
Outlook Express
SquirrelMail
Thunderbird

Vendor

Forté Internet Software
Qualcomm
Qualcomm
Microsoft
Rockliffe
Microsoft
Microsoft
Microsoft
Microsoft
SquirrelMail.Org
Mozilla Organization

URL

www.forteinc.com
www.eudora.com
www.eudora.com
www.microsoft.com/exchange
www.rockliffe.com
www.hotmail.com
www.microsoft.com/office/outlook/
www.microsoft.com/Windows/oe/
www.microsoft.com/
www.squirrelmail.org
www.mozilla.com

Collaboration tools: News reader

A News reader is a client application that can access, read, and contribute to Usenet newsgroups.

Collaboration tools: News reader**Tools**

Agent
CoffeeLink News Server
DNews Server
Netscape Navigator
Outlook Express
Outlook Express

Vendor

Forté Internet Software
Burton Computer Corporation
NetWin, LTD
Netscape
Microsoft
Microsoft

URL

www.forteinc.com
www.burton-computer.com
www.netwinsite.com
www.netscape.com/navigator
www.microsoft.com/Windows/oe/
www.microsoft.com/

Collaboration tools: Online discussion

Online discussion allow participants to post messages to a known location where other participants can read and respond to them.

Collaboration tools: Online discussion

Tools	Vendor	URL
CoffeeLink News Server	Burton Computer Corporation	www.burton-computer.com
Dbabble	NetWin, LTD	www.netwinsite.com
DiscussionApp	Server Corporation	www.server.com
DNews Server	NetWin, LTD	www.netwinsite.com
Enterprise Forum	Sitescape, Inc.	www.sitescape.com
Eve	Groupee, Inc	eve.groupee.com
Exchange Server	Microsoft	www.microsoft.com/exchange
LISTSERV	L-Soft international	www.lsoft.com
Majordomo	Great Circle Associates	www.greatcircle.com
Multicity	Multicity	www.multicity.com
Phorum	Phorum.org	www.phorum.org
Snitz Forums	Snitz Communications	forum.snitz.com/
Web Crossing	Web Crossing	www.webcrossing.com
WebBoard	Akiva	www.akiva.com

Collaboration tools: Video conferencing

Video conferencing tools let participants see and hear one another.

Collaboration tools: Video conferencing

Tools	Vendor	URL
Breeze	Adobe Systems	www.adobe.com
Illuminate	Illuminate	www.illuminate.xom
Exchange Conferencing Server	Microsoft	www.microsoft.com/exchange
vic	Lawrence Berkeley National Laboratory	www-nrg.ee.lbl.gov/vic/

Collaboration tools: Voting

Voting tools provide a way for participants in an online activity to express their opinions about various issues.

Collaboration tools: Voting

Tools

Multicity
 Poll Pro
 PollMonkey
 The Survey System
 Zoomerang

Vendor

Multicity
 AdComplete.com
 PollMonkey.com LLC
 Creative Research Systems
 MarketTools, Inc.

URL

www.multicity.com
www.pollpro.com
www.pollmonkey.com
www.surveysystem.com
www.zoomerang.com

Collaboration tools: Web tour

Web touring tools allow participants in a collaborative activity to browse Web Web pages together.

Collaboration tools: Web tour

Tools

Multicity

Vendor

Multicity

URL

www.multicity.com

Collaboration tools: Whiteboard

A whiteboard simulates the communication that occurs when the instructor draws on a wall-mounted whiteboard and then invites a student to contribute to the drawing.

Collaboration tools: Whiteboard

Tools

GE Sketch Board
 Groupboard
 wb

Vendor

General Electric
 User Data Connections Limited
 Lawrence Berkeley National Laboratory

URL

www.geimaginationcubed.com/LaunchPage
www.groupboard.com
www-nrg.ee.lbl.gov/wb/

1. LCMS (Learning Management Content Systems)

Learning Content Management System (LCMS)

Learning Content Management System (LCMS) simplify the task of creating, managing, and reusing learning content, that is, the media, pages, tests, lessons, and other component of courses.

An LCMS is a multi-user environment where learning developers may create, store, reuse, manage, and deliver digital learning content from a central object repository. LCMS products allow users to create and reuse small units of digital learning content/assets. An LCMS manages the process of creating, storing and delivering learning content. The components of an LCMS are: an authoring application (editors), a learning object repository, a dynamic delivery interface, and administration tools.

TOOL: Centra Knowledge Center

VENDOR: Saba Software

URL: www.saba.com/centra-saba

The Centra® Knowledge Center allows you to store, search, manage and deliver information and resources from one centralized location. The Knowledge Center provides universal, on-demand access to a standards-based library that can be populated with custom and third-party training content, activities and reference materials, including presentations, simulations, recordings, live online events and assessments.

Using sophisticated capabilities for categorizing and assigning content within the Knowledge Center, organizations can more flexibly and accurately target the selection and delivery of information to individual learners according to their job profile, skills, and knowledge gaps, **delivering personalized blended learning** programs to your enterprise.

The Knowledge Center also allows administrators to track and facilitate learning activities, generate management reports that summarize both individual and group activities, and provide a method to **assess the growth of organizational competencies**.

Features

Developing a Selection Criteria

Personalized Blended Learning

Prescribed Learning Tracks: Design training programs to meet learners' individual needs.

Searchable Content Library: Get on-demand access to a searchable catalog of online information and assigned learning activities indexed by job role, title, type, category and course code. screenshot >

Management and Administration

Centralized Administration: Log-ins, user management and flexible, custom reporting are all handled in one location. screenshot >

Proprietary and Third-Party Content Support: Manage both your own custom-created content and third-party content sources in the Knowledge Center library.

Learning Program Administration: Easily create multiple settings such as roles, permissions, workflows and more. Assign content and settings based on user requirements and organizational structure.

Content Management: Index, search and retrieve catalog content by name, category and type.

Competency and Skills Tracking

Tracking and Assessment: Track individuals' current and previous skill levels and learning; track completion status and effectiveness of assigned activities and assessments.

Custom Reporting: Access and download detailed individual progress and performance assessments and create customized, flexible reports. screenshot >

Collaborative Content Authoring: Enable content to be shared and reused across the organization.

Standards Compliance

SCORM: Ensure content portability through support for SCORM specifications.

IMS: Rapid search and retrieval is facilitated through IMS standard meta-data tagging.

Scaleable for the Enterprise

Rapid Deployment: Web-based architecture facilitates rapid global deployment.

Centralized Administration: Log-ins, user management, and reporting are all handled in a centralized location.

Enterprise Application Integration: For scale, Centra integrates with standard relational databases, such as Microsoft SQL and Oracle, and also easily integrates with today's leading Learning Management and Human Resource Management Systems.

Developing a Selection Criteria

Login Security: Through support of Netegrity SiteMinder™, Centra Knowledge Center provides single sign-on for end user convenience while maintaining optimal security.

- Unique Domains: Individual Knowledge Centers can be configured to unique Centra Collaboration Center domains, enabling departments to deliver their own learning programs.

TOOL: Evolution

VENDOR: Outstart

URL: www.outstart.com

OutStart Evolution LCMS is the only solution on the market today to offer a complete Learning Content Management System. Recognized as the LCMS industry leader, Evolution LCMS delivers a flexible and adaptive solution for creating, managing, assembling and delivering content. Evolution LCMS provides multiple native and 3rd party authoring options and robust content management that maintains the value of existing and future learning assets. Because the solution manages content from any source and provides content reusability that protects your investment down to the paragraph level, you can be sure Evolution LCMS will adapt to future forms of learning information and emerging standards. And to ensure fast time-to-value, Evolution LCMS installs in one day and requires only a few days of training, so that users are typically delivering personalized learning in less than 4 weeks.

With OutStart Evolution LCMS, you can:

Increase author productivity. Streamline development with unparalleled content-creation flexibility. Authors can acquire or import content from any source, assemble new courses from existing materials, use a myriad of authoring tools and publish, deliver and distribute content in multiple formats over multiple channels.

Maximize learning effectiveness. Create "just-for-me" courses with reusable learning objects that can be dynamically and automatically selected and assembled into content based on preferences, role and prior knowledge. Learners can choose the delivery method that best suits their needs, such as on a PDA, in a classroom with printed student guides or via a virtual classroom.

Minimize process re-engineering. Mirror familiar processes while benefiting from automated workflows for content review, assembly and delivery with user-friendly configuration tools.

Meet corporate requirements with support for multiple standards.

Enforce industry and corporate standards with extensive support for standards and platforms including SCORM 1.2, SCORM 2004, seamless conversion from SCORM 1.2 to 2004, ADA Section 508 Compliance level 1, FDA CFR Part 2, AICC, Microsoft Windows, UNIX® and Linux® platform support.

Developing a Selection Criteria

Key Features

Native template-driven authoring, support for multiple 3rd party development tools and media, such as Microsoft® PowerPoint, Word, Adobe® PDF, Macromedia® FLASH® and NETg, allows authors to develop content using familiar tools. Robust configuration tools further streamline development with templates for themes, presentation, navigation, delivery method and language and a highly configurable and flexible metadata engine for all assets and assemblies of assets.

Existing content in any form, including SCORM, XML and Adobe PDF, can be imported into the repository for use as reusable learning objects.

Single source delivery lets authors create content just once and delivery natively in multiple formats including Microsoft Word, Adobe FrameMaker, PowerPoint, SCORM, AICC and HTML.

Content management provides access controls, object locking, configurable partitioning and security, complete versioning and roll-back, workflow and digital rights support for collaborative content creation and editing among distributed authors.

Extensive assessment capabilities let learners' knowledge drive their learning experience. Using performance-based assessments and testing before, during and after training, Evolution LCMS dynamically assembles and delivers exactly what the learner needs.

TOOL: ForceTen LCMS

VENDOR: Eedo

URL: www.eedo.com

Eedo ForceTen™, our award-winning highly scalable Learning Content Management System, enables organizations to drive productivity through learning content management, knowledge sharing, assessment, rapid authoring, and performance support. Entirely browser-based, Eedo ForceTen provides the ability to streamline the capture of information and development of learning materials, improve the management and sharing of information across an organization as well as consistently manage all learning programs for both online and instructor-led formats. Flexible delivery options allow rapid access to important learning and knowledge resources, anytime and anywhere.

Standards Involvement

ForceTen is SCORM 1.2 and SCORM 2004 CERTIFIED, AICC, PENS and Section 508 compliant and supports QTI 1.2 and QTI 2.0.

Eedo ForceTen Simulation gives customers unparalleled flexibility to choose the level of simulation they require

Developing a Selection Criteria

High fidelity, robust replica of learning environment leads to greater knowledge retention

Multiple learning style outputs, including Show me, Teach me, Let me try & Test me – for varied adult learning styles

Practice environment encourages exploration, resulting in greater usability of live application

“Live” interface creates more authentic user experience

Seamless, total immersion in learning experience

Plug-in free, flexible deployment in a Web browser, locally or via the Web

Rapid Content Authoring with Intuitive, Programming-Free Tools

Intuitive user interface has drag-and-drop functionality and fewer pop-ups enabling rapid creation of learning materials and ensuring a smoother and more efficient content creation process

An easy to use wizard allows users to export SCORM 1.2 or SCORM 2004 compliant content for use in a Learning Management System (LMS)

Automated metadata allows users to create objects without having to manually fill in detailed metadata screens

The powerful taxonomy tool allows users to efficiently categorize content for better search and retrieval. Taxonomies of any size are loaded instantly.

Create page layout and design quickly with the easy to use page builder.

Create Engaging, Interactive Content Including Simulation

Tools include a full set of question types, hotspot interactions, drag-and-drop and matching exercises, animations, remediation, review, branching, scenarios and simulation

A project management interface allows project managers to create task-oriented blended content. Users may initiate tasks, manage those tasks, group related content, and distribute content to selected users.

Build Custom Assessments and Surveys

ForceTen provides a variety of highly configurable assessment objects allowing developers to customize the look and feel of assessments

Prescriptive Learning allows learners to review subject areas in which they tested poorly

ForceTen's Survey Facility allows developers to collect user feedback on the structure and content of a course

ForceTen allows users to create custom assessment pools for use in an assessment template. Users can create assessment pools according to taxonomy subject, with an option to create assessment pools that can contain any question pages present in the ForceTen environment.

Developing a Selection Criteria

ForceTen includes a QTI import feature which facilitates the transfer of QTI question types from other systems in ForceTen and allows users to rapidly build assessments by assembling questions into assessment templates.

Customizable User Portal

Organizations can easily customize their user portal to their company's look and feel. ForceTen detects a user's language preference as set in their web browser - users have the ability to logon in any available language without having to change their settings.

Streamlined Content Development and Web-Based Collaboration

Personalize look and feel with the creation of custom templates for content structure, pages and navigation.

Storyboard Facility integrates design and development into a seamless process, reducing time-to-market and content development costs.

Core authoring environment is fully accessible via a Web-browser, with no need for plug-ins.

Workflow management accelerates the development process by managing activities and tasks, ability to attach instructions and notes, and access to built-in workflow tools.

Effectively Manage Content and Reduce Development and Maintenance Costs

Object-based model separates content from structure, storing it in a single repository so that all common content assets shared by different learning materials only need to exist in one instance.

Deliver customized content dynamically across multiple organizations.

Enhanced searching capabilities means large searches will be returned in a matter of seconds. Users can navigate large search results quickly and easily.

Ensure Security with Policy-driven Access

Administrators may define granular security access from groups down to users. Administrators can grant a variety of access options within the following categories: User, Developer, Storyboard, Administrator, and Import/Export.

The System Configuration page will include a Password Policy tab that will allow administrators to force a password change upon first logging into ForceTen, set an expiry on passwords, set a limit to password login attempts, set a limit to password change attempts, expire all users' passwords in the system and enable a password complication algorithm.

Course developers will have the option to set runtime authentication questions at intervals throughout the course providing increased security by verifying a learner's identity.

Access, Ingest and Manage Documents

Ability to import, metatag and reuse legacy learning content developed in various formats including PowerPoint, Dreamweaver and Toolbook.

Developing a Selection Criteria

End users can log into a PDA portal to view existing content. ForceTen dynamically modifies content and layout for better presentation on a PDA

Create Custom Reports

Administrators can generate reports on data collected from assessments, surveys and developer activity using ForceTen's Report Tool

A variety of customizable report types are available and can be exported to Microsoft Excel for further customization

Access Knowledge Anytime, Anywhere with Flexible Delivery Options

Easy distribution of content to a portal, web site or LMS

ForceTen's Knowledge Sync allows learners to take courses offline, and then automatically synchronize results once reconnected to the network

Effectively Manage and Transfer knowledge

Knowledge Portal provides rapid access via search tools to a knowledge base of learning objects, FAQ's, documents and best practices

Knowledge Sharing Facility enables employees to collaborate with one another by submitting personal experiences, issues, best practices, lessons learned, and high-grade information sources for approval and distribution. Users can also assign a custom workflow to a knowledge sharing community.

Ability to push the right content to employees to close performance gaps

Administrators can set up a custom list of knowledge sharing objects which will allow for a more effective transfer of relevant information throughout an organization.

TOOL: iPerformance

VENDOR: Online Courseware Factory

URL: www.courseware-factory.com

The **iPerformance learning content management system** has been designed to automate the provision of appropriate knowledge and learning services to the desktop, mobile devices and other delivery platforms. It provides customers with the power to create customised performance support and learning solutions built from highly granular and customisable learning objects.

The **iPerformance** product is a scalable, open toolset. It combines learning object technology, a template design approach and sophisticated processes that support open interface standard specifications such as AICC, IMS and ADL SCORM. It uses the flexibility and power of XML to interface to multiple content delivery devices.

Any organisation that needs to customise or personalise content, will need to use OCF's **iPerformance** solution.

iPerformance* Modules*Open Content Studio**

Open Content Studio is a set of processes that lets you use your favourite authoring tools and extends them to enable you to deliver learning standards-based content components 'ready wrapped'.

Open Content Builder

Open Content Builder allows you to assemble learning objects, from the ***iPerformance*** content repository, to create your own flexible, tailored courseware, simply, quickly & cost effectively.

Open Content Manager

Open Content Manager allows your online learning and performance content team to leverage their knowledge of their customer to rapidly deploy custom learning and performance solutions directly 'to the line'.

Open Decision Support Manager

Open Decision Support Manager provides a comprehensive system for cataloguing, searching, managing and monitoring the content usage and rights within learning content repositories.

Open Taxonomy Manager

Open Taxonomy Manager allows organisations to apply multiple taxonomies for searching content within the *iPerformance* content repository.

TOOL: KnowledgeBridge LCMS

VENDOR: Websoft Systems

URL: www.websoft.com

KnowledgeBridge is a Fortune 100 enterprise proven web-based learning and improvement solution that provides a rapid return on investment and is affordable for all organizations.

To successfully transfer knowledge throughout your organization, manage learning, performance, and competencies, you need KnowledgeBridge, the Human Enhancement Platform.

KnowledgeBridge enables you to deliver knowledge to your audience and capture a complete understanding of the skills improvement within your organization. KnowledgeBridge makes it easy for you to validate the effectiveness of your learning programs and their impact on performance. Using the KnowledgeBridge robust real-time reporting capability, you will easily be able to measure and evaluate organizational competency, learning completion rates, surveys, assessments, instructor-led classroom registration, and much more.

Developing a Selection Criteria

KnowledgeBridge combines learning management server functionality with advanced content management capabilities, coupled with an easy to use web-based course authoring environment. A robust set of human capital management and collaboration tools, KnowledgeBridge enables you to reduce costly travel budgets while delivering efficient, timely, cost effective knowledge solutions to your organization.

KnowledgeBridge provides users with the ability to learn, collaborate, share, create, deliver, manage, track, and comprehensively report information from web-based and instructor led-learning. Simply put, KnowledgeBridge is the most advanced and comprehensive learning and improvement platform available today.

The AICC/SCORM compliant web based administration and reporting functionality offers flexibility to export and communicate with many major ERP and CRM solutions. KnowledgeBridge offers increased employee productivity and speeds training content development and publication. Unlike many software applications, KnowledgeBridge's ROI can be measured immediately, streamlining your decision process.

The e-Learning Advantage e-Learning delivers online training, education and information to change end-user behavior and improve end-user knowledge. e-Learning requires no instructor or mentor to deliver content or validate assessments, and therefore distinguishes itself from traditional c-Learning (Classroom Learning). While some scenarios require instructor interaction, e-Learning facilitates self-directed, self-paced learning as the student generally interacts only with the teaching system.

Return on Investment

KnowledgeBridge allows your organization to lower excessive training costs without sacrificing the accessibility, quality and integrity of your company's message. By tracking and reinforcing the content with interactive tests, quizzes, and surveys KnowledgeBridge generates more effective learning sessions with a higher retention rate than ever before.

Flexible Solution

KnowledgeBridge consists of several tightly integrated yet independent components. The highly customizable user interface allows your organization retain its distinct corporate image throughout the system. The intuitive back-end administration tool allows non-technical editors to update and maintain content with the click of a mouse in a familiar application setting.

Robust Reporting Tool

KnowledgeBridge's powerful reporting capabilities provide an organization the ability to track data with customizable metrics determined by organizational specific business rules. Created with an open architecture, the system exports data to any enterprise platform in use.

Developing a Selection Criteria

Benefits

KnowledgeBridge easily integrates with other business applications for seamless enterprise-wide interoperability. KnowledgeBridge provides the ability to add, edit, delete and manage a full compliment of text, graphics, flash, video, audio, colors and page template attributes. Non-technical subject matter experts can collaborate, create, and most importantly continually improve engaging learning content through the web browser based administration suite.

The system complies fully with ISO 9001 registration training processes and parallels all business training practices, regardless of complexity. Below are some of the benefits of choosing KnowledgeBridge for your learning and improvement solution:

Quick Implementation

Cost effective solution

Real-time content publishing

AICC/SCORM compliant

Scalable and modular system architecture

Simple view and edit technology

Superior usability

Rapid return on investment

Fortune 100 validated and proven solution

Speeds training content publication

Easy, fast, and efficient way to manage web based training

Simplicity of content-creation and maintenance

Flexibility of deployment methods (ASP Solution, Installed solution)

Breadth of reporting tools

Superior customer care and technical support

Automate user enrollment for all courses

Track training participation and completion to all hierarchical levels

Identify who performed what training management actions

Assign courses by user, department, group, or job title

Monitor and report test scores and course progress

Generate training tracking reports instantly in a web browser

Manage classroom learning online

Archive past user data for future reference

2. LAMS (Learning Activity Management Systems)

LAMS is a revolutionary new tool for designing, managing and delivering online collaborative learning activities. It provides teachers with a highly intuitive visual authoring environment for creating sequences of learning activities. These activities can include a range of individual tasks, small group work and whole class activities based on both content and collaboration.

1. Open Source

- a. **SAKAI** – world’s leading open source collaboration and learning environment
- b. **LAMS** – world’s leading open source Learning Design system
- c. **SAKAI & LAMS** – successful integration. Benefit from highly scalable learning platform combined with the unique ‘digital lesson planning’ of LAMS
- d. **Moodle**
- e. **.LRN Community Platform**

2. Close Source

- a. Integration with LMS
 - i. Blackboard.com
 - ii. WebCT
 - iii. IBM Lotus Space
 - iv. Learn eXact
 - Based on the IEEE LTSA (Learning Technology Systems Architecture)

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Step 1 - Design an activity sequence

* Lesson Proper - interactions, polls, slides, etc.

The first stage of the cycle is to use LAMS's intuitive authoring environment to build a sequence of learning activities.

You can select activities from an extensive Toolkit and drag them into your design.

Sequences can include a range of individual tasks, small group work and whole class activities. You can also include content such as websites, files and 'Learning Objects'.

Once you have finished your design you can save it in your private area or make it public to share it with colleagues or the whole LAMS community.

Step 2 - Set up the class

The next step is to select the learners who will participate in the lesson. They might be a class group scheduled for a lesson that day or a group of independent learners taking evening classes.

LAMS allows an institution's administrative team to set up learner groups using the dedicated Admin area.

Step 3 - Learners join session

Now the session is available for learners to join. They simply log in and click on the session to start.

Depending on the sequence design, the system may wait for all learners to join before proceeding, or allow learners to work at their own pace individually.

LAMS has the flexibility to synchronise learners across tasks, encouraging collaboration and experience of learning.

Learners have a variety of aides always available through the integrated environment such as Notebook and Progress Bar, with more to come in the future.

Step 4 - Live monitoring of students

The ability to actively facilitate groups and individuals from the monitoring console means your time is applied most effectively guiding and mentoring your students as they grapple with the tasks of the curriculum.

See at a glance who is falling behind, check on students as they work, place stop points to allow the whole class to synchronize and contribute to activities using the integrated monitoring panel.

3. Internet Portals

Portals provide a virtual community for people to learn and share experiences. Its main focus is towards communication and socialization. Its architecture is aimed to support knowledge management as oppose to a structure concept of learning as what is usually provided by an e-Learning architecture. The underlying principles of knowledge management are not intentionally developed in portals –the goals of the development of portals simply support the principles of knowledge management.

Internet portals provide an excellent learning environment for independent learning, which the development of critical thinking can be developed. The learners in this case, must be well-adept to the use of computer technology.

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