Learning Management Systems (LMS)  
A Review

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NTG WG IT&ED  
A collaboration between Canada, Sweden, Norway and USA

Preface

Advanced Distributed Learning (ADL) is a concept that makes training and education available anytime and anywhere. Web based Learning Management Systems (LMS) are one of the main fundamentals in ADL and can provide students with a variety of courses, self-paced, in collaboration with teachers and other students or blended with traditional classroom learning. Methods and pedagogy for asynchronous learning are developing constantly, and experiences in this field are spread widely from different organisations. There is a lot of information on this subject on the web, where most of the information in this paper can be found. The sources are presented as footnotes in the text, and in some cases with an URL to the present location on the net.

Firstly this paper will present some important criteria to evaluate and consider when purchasing a LMS. It will also point out some of the purchasing mistakes that are common in that process. Finally this paper is reviewing some of the more “well-known” and commonly implemented LMS:s, but it is far from a full coverage of existing platforms on the market. Nevertheless it will give you some guidelines of the most important features and how well different LMS:s fulfil them in a comparison.

Remember also, that it is very important that you make your own analysis of relevant functions and features for your specific organisation. There is no “one solution” in this respect. What is important for one organisation, may be of less value for another. There are a lot of “low-cost” platforms in the market, so don’t ask for features that you don’t need. Maybe a cheaper platform will fulfil your needs. Brandon Hall\(^1\) has presented a useful paper on low-cost LMS.

\(^1\) [http://www.brandon-hall.com](http://www.brandon-hall.com)
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REQUEST FOR PROPOSAL – SAMPLE REQUIREMENTS

LMS EVALUATION REPORT

BACKGROUND

EASY TO USE PLATFORMS

EXTENSIBLE PLATFORMS
Selecting a LMS

Guide-lines
One of the greatest challenges to selecting a good LMS is that there still are a lot of vendors in the marketplace, and only a handful of them are expected to survive in the future. The best advice to give in such climate is to know what you are looking for. Here are some guide-lines (steps) that can save you a lot of time and money and make sure you ultimately make the best choice for your organisation’s specific needs. These steps are:

- conduct a thorough needs analysis
- write up a requirements document
- calculate return of investment (ROI) upfront
- secure buy-in from management, IT/IS/IM department, and finance
- based on your requirements, select a short list of vendors
- conduct a pilot project(s)
- make your final selection

LMS purchasing mistakes (and how to avoid them)
All LMSs are not created equal. A lot of money has been wasted on LMSs that don't meet an organisation’s needs, or never go live because they don't work within the user’s environment. The task of researching LMS products and companies is daunting, fraught with difficult decisions and plagued with misinformation. Here's a list of some common mistakes to avoid when purchasing a LMS.

Skirting senior management. If you don’t make a persuasive business case to senior management early, you’ll have a hard time getting their signatures on the purchase order. More important, be sure to present your case in terms your leaders can relate to. Learning isn’t about altruism; it’s about creating smarter employees and a measurable competitive advantage for companies.

Failing to spell out your needs. If you don’t enumerate your needs from the first conversations with your LMS vendor--and clarify the technical environment and cultural issues that an LMS must deal with--you're likely to end up with a product that doesn’t do what you need it to.

Comparing apples and oranges. Be aware that several tools that are marketed toward LMS buyers aren't LMSs. For instance, some HR Information Systems have learning modules, but they don’t launch and track e-learning or manage training budgets, classrooms, instructors, grades, skills, certifications, and so on. Knowledge management systems may have features that support learning, but they're a whole other animal as well.

Excluding IT from the process. If an LMS doesn't fit into your technical environment, you’re in trouble. IT generally has the power to quash any new application anyway, so it's imperative to involve them at the outset. In addition, the IT team will ask the right questions to help you make cost-effective decisions. Consequently, don’t let IT run the entire show.

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2 Learning Management Systems by John Nawn, Learning Strategist – Arista Group
3 Dave Egan, American Society for Training and Development (ASTD)
Focusing more on price than value. Insisting on an excellent cost/benefit ratio for your LMS investment is wise; trying to measure your best options merely on purchase price is not. For example, many organisations have bought low-price LMSs for certain units only to face another purchasing decision later on. Your organisation might need an enterprise LMS that will consolidate all of its learning initiatives and scale to meet the needs of large, widely dispersed learner communities.

Overlooking scalability. Scalability results primarily from open multi-tier architecture; Your IT team knows what that is (see Mistake #4). Basically, it’s a system that consists of Web browsers pointing to Web servers that present data that application servers summon from databases. Organisations can scale their LMSs as needed by adding computing power at any tier rather than replacing the entire system. Presuming (and you should!) that your organisation’s learner population will grow in the future, you need to ensure that your LMS can keep up with growth and change.

Ignoring LMS interoperability. Some LMSs only work with their own embedded authoring tools or content that the LMS vendor offers. Are you willing to bet that any single vendor will be able to forecast every type and mode of content, or that every tool you may need to create your own content exists within the LMS? Make sure the LMS you buy supports the latest versions of e-learning standards such as SCORM and AICC.

Overlooking vendor track records. Don’t bet your purchase decision on a battle of press releases. What’s more important than reviewing good PR is finding a vendor with customers that look like your organisation, have actually implemented an LMS, are happy with the results, and are willing to talk to you about it.

Selecting customisation instead of configurability. Custom code is an enemy of flexibility, scalability, and efficiency. Your LMS should be easily configurable to your strategic business processes and be able to change with them. Hard-coded, one-off customisations require extensive programming from ground zero every time your conditions change.

Questions to ask a LMS vendor

- are the vendor’s products and services based on several years of experience delivering solutions to organisations like mine?
- Does the vendor provide references that I can talk to regarding the LMS software and the vendor’s services?
- Do I have evidence that the vendor can implement my project within my timeframe, budget, and expectations?
- Does the LMS support existing and emerging courseware standards? What about my older, or “non-standard,” courseware?
- Can I choose my own tools for courseware authoring, assessments, skills management, etc. or am I restricted to tools approved by the LMS vendor?
- Is the LMS powerful and flexible enough to support my organisation's size, structure, policies, and procedures?
- Is the LMS "future-proof", providing a foundation upon which future e-learning programs can be built?

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4 See also “Request for Proposal – sample requirements” on page 13 ff.
- Does the LMS maximise ROI by efficiently coordinating all of my e-learning and enterprise resources as a single, sensible solution?
- Is the software easy to use and does it protect my data?
- Is the system cost-effective to implement and to maintain?

**Main Functions**

Some of the main functions that a LMS should be able to handle are:

- Possibilities for administrators, teachers and students to register in curriculum’s or separate courses
- Curriculum’s and course administration that links to courses and/or learning objects
- Support for blended learning. Offer a mixed curriculum that combines classroom learning and virtual courses easily
- Skill- and knowledge tools for various analysis and result measurement, and tools for tracking progresses for groups and single students (results/activities)
- An interface to a virtual classroom with access to the range of courses
- Test administration, assessment (certificate) and regular reports
- Interface to other administrative systems (e.g. HRM-systems)
- Skills management. Enables organisations to measure training needs and identify improvement areas based on the individual’s competencies.
- Adherence to standards. Support for standards like SCORM and AICC means that the LMS can import and manage content and courseware that complies with standards regardless of the authoring system that produced it.

**Users and availability**

These are factors that make possible or limit the users to assimilate the course material. Availability is always a key factor in internet based training. The criteria’s are not unambiguous, but it is the user’s possibility, ability and motivation that decide what is acceptable. To make internet based learning more or less impossible for groups of students that do not master the technical environment, is not a desirable situation. In order to lower the threshold and increase the availability you have to plan for training in “platform-management” along with adequate documentation and help-functions.

**Internet connection**

What connection speed is required for the platform to run smoothly? High-resolution video needs higher connection speed than images and text. You must also have this in consideration when you produce the content. Most web based platform does not require high-speed connections to be run. It is more common that the content requires higher connection speed than the platform itself.

**Does the LMS use its own client?**

It means that the supplier has developed the system from their own client and that applications and courses have to be run on it. This means that all users have to install the client on their computers, and for beginners the installation can be problematic.
Does the LMS use a web browser?
The advantage with running a LMS in a browser is that users usually don’t need any extra installations on their computers. Modern browsers have built-in support for viewing multimedia content.

Need for adjustments in the browser?
Some products demand that users make adjustments in their browser. These adjustments can sometimes change the security level and may therefore cause problems.

What plug-ins is needed to use all functions in the LMS?
Plug-ins are additional programs that is needed in order to view certain types of animations, sound and video (e.g. RealPlayer and Flash). The plug-ins must be installed on the user’s computer. Normally plug-ins are free of charge, but the installation can cause problems for users who are not so familiar with computers. Some plug-ins can be downloaded and installed directly from the Internet, and others are built-in in modern browsers. Plug-ins are constantly updated, meaning that the required versions need to be known by everybody.

Requires an e-mail address to start?
If you use “mailto-links” in the platform you need a configured e-mail client. It demands knowledge to configure an e-mail client/server. A mailto-link starts the computer’s standard e-mail client by which the user expects to send messages. In order to make this work the current e-mail client needs to be configured with the users unique e-mail account. In a situation where users not always have their own computer like in a classrooms and computer halls, the user needs to configure the e-mail client on every occasion and to erase the unique settings after the lesson in order to prevent unauthorised use.

Is there documentation and start help for users?
Check out in what different forms there is documentation and possible start-up help - documentation and help to login, start up and use the platform. The documentation is of great importance to all users, and you need to do a separate assessment on its design and quality. It is an advantage if the documentation is available through Internet, but it can also be in form of imbedded learning.

Are there support functions from the supplier directly to the end user?
Describe how the support functions are offered. Except documentation, the support is very important to the user. Can you buy that service directly from the supplier or do you have to build up your own organisation for support?

Is there a guest account or similar function to give potential users a sample of an LMS-system and courses?
Education- and Training Departments can, with a guest account, make it possible for potential users to get familiar with e-Learning and different learning-styles, without immediately increase the number of licences.

Usability

Usability is here defined as the possibility to achieve appointed purposes and to solve different tasks. To create a usable platform means that you need to abort obstacles on the way
between the user and the target/purpose. Fast and easy access to the right information and easy use of the tools in the platform is of great importance.

**User Interface**

Creating usability in a web interface is a complex subject that touches many subject areas. It can be cognitive perspectives, human computer interaction (HCI), pedagogy, graphic design and information architecture - just to mention a few. When evaluating platforms you should take part of real user experiences. An important part of the user interface, and that influences usability, is navigation (how easy you can navigate through different parts of the courses) and search functions. These are decisive for the user’s possibility to assimilate the content.

The navigation should be:

a) Easy to learn  
b) Follow a consistent structure  
c) Offer freedom of choice  
d) Be adjusted to the users most common behaviour

**Is there a table of contents like a “site-map”?**

In web environments you often lack a linear structure of the content. The course structure is therefore complemented by a site-map function. Site map is an outline visualisation of the content structure where the hierarchy and links to all pages in the learning content is illustrated. This gives better possibility to navigate more freely in the sections.

**Is there a search function in the course material?**

To be able to connect search functions to the content makes it easier for the user to explore it and use it in different situations.

**Is there a situation adjusted help function?**

With situation adjusted help means that it is connected to the specific section where the user needs help.

**What language environment is used in the platform?**

With language environment means that all functions in the whole interface is in a certain language – not just the content. A student with insufficient knowledge in English can encounter problems if the function environment in the platform is only in English.

**Learning environment**

Learning environment is the different functions in the platform that users and teachers can use in pedagogical contexts. An important aspect of the learning environments is that they don’t realise any pedagogical models or create learning for the individuals by itself. It demands a context based on a pedagogical idea. The pedagogical idea can be realised and strengthened with appropriate learning environments. It is therefore important to integrate the possibilities with Internet based learning already in the idea- and production phase when developing courses and content. Digitalizing already existing material will seldom give the same result, and sometimes the result is that you only use Internet as a channel for distribution. The user (student, teacher and administrator) must feel that he/she is added something by the platform.
From the users point-of-view the specific learning situation must be improved by using the platform.

The analysis of the learning situation shows that independence of time and place, and the possibility to collaborate, is the most important. To find a good system for asynchronous communication with possibility to send files between the participants will then be a key factor. If you find a platform with a conference system that fulfils these demands, then you have created more value to the users.

Every function in a platform has to be faced the question – what value will this function create for my users in a learning situation? Without these values there is a great risk that the Internet based learning only becomes a burden or an extra tool that only makes the course more extensive and difficult for the student. If these types of values shall be fulfilled in the learning situation, it is needed that the platform functions also work in reality.

The learning environments can be categorised as follows:

a) Communication environment that can be either time independent (asynchronous) or in real time (synchronous)
b) Distribution environments – in which format is the content distributed to the user?
c) Test environment – what different types of tests are there and how can they be used?
d) Interaction environment – the participants possibility to influence the interaction between themselves and the environment

**Learning environment – time independent communication (asynchronous)**

Are there discussion groups / discussion forums?
Discussion group/forum is a function for discussion between students and their teacher(s). Students and teachers post contributions that everybody in the group can read and answer.

Can you create your own discussion groups?
A possibility for teachers or administrators to adjust certain specific discussion groups for certain learning occasions.

Can you attach files in the discussion forum?
Is there a possibility for the user to attach files in the discussion forum?

Are there joint file archive for the participants?
Is there a certain function for a common file archive in the course? In some courses the students produces Word-documents that can be shared or developed by other students or teachers. In these cases files have to be transferred which can be done in a common file archive in the platform.

Is there a “Latest News-function”?
Through “latest news” you can inform the users about news. All participants will directly receive a message from the teacher when you log in to the course.
Are there possibilities to work in a project organisation?
A project work place is an isolated room where only members in a certain project have access. It can consist of “to-do-lists”, a discussion forum and possibilities to store files and information. Also group-work can take place by distance in project work places.

**Learning environment – real time communication (synchronous)**

**Chat-functions**
Chat means that you in real time can have a written dialogue with other students. There is also chat with sound- and video conversation.

**Are there functions for “who is online”?**
“Who is online” is a function to see who are logged-in to the platform at the same time. This makes it easier for participants to contact each other, especially with real time communication tools. It gives a feeling of being together even in the individual studies.

**Support for sound and video communication**
Is there sound and/or video communication in real time between two or more participants? The Internet connection speed and the computers capacity and the hardware such as speakers, camera and microphone are important in order to make it work smoothly. Often this type of communication uses third party software such as Microsoft Net Meeting, Interwise and Centra.

**Support for shared working spaces (whiteboards)**
With shared working rooms, participants can work together with a document from their computers.

**Support for shared applications?**
With shared applications you can work together in other’s files (e.g. Word- and Excel documents). These types of applications often require that you change your security settings!

**Learning environment – Distribution environment**
Is there support for multimedia in the platform in form of built-in streaming?
Streamed multimedia is a so-called direct broadcast over Internet (web casting), meaning that the sound and moving pictures are played-up gradually. Streaming media means that a special compression technique is used in the production and the distribution of the media. Usually this means that the demands for broadband connection decreases compared to when you first have to download the whole file before watching it. The most common formats are played in Windows Media Player and RealPlayer, and the user has to install the plug-ins (players) and need to have a rather fast Internet connection.

**Content creation/integration (authoring tool/system)**
Bundled with the LMS or integrate with an existing (external) one. A LMS should provide support for a wide range of third-party courseware.

**Support for hybrid solutions with parts of the course content on CD-ROM and other parts on Internet?**
Some content require sound and video with a quality that is higher than available connection speed admits. In these cases hybrid solutions can be an alternative. It means that you deliver part of the content on a CD-ROM and other parts through the platform. It requires that the platform can synchronise with the CD-ROM content so that the user don’t need to think about...
where the material is stored.

**Are there off-line functions for studying without being connected to the Internet?**
The cost for the participant to be connected to the Internet can be high, especially if they only have disposal of a modem connection. Off-line function means that parts of the course can be downloaded and run locally on the computer or be delivered on a CD-ROM.

**Learning Environment – Tests**

**Are there test functions?**
Are there possibilities to create different forms of tests. There are several variations of tests (see below).

**Multiple-choice?**
The student answers by choosing from different alternatives. The tests are often self-corrected.

**Short answer tests?**
The student answers by filling in missing words. The tests are often self-corrected.

**Free text answers?**
The answers are written freely. The answer is sent to the teacher for assessment or is compared with the “right” answer shown to the student after the test is taken.

**Answer in attached files?**
Extensive free text answers can be prepared in Word and then be uploaded to the LMS platform whereupon the teacher can correct the answers.

**Multimedia based tests?**
Are there possibilities to complement questions with sound, video and other multimedia presentations.

**Support for statistic follow-up of the test results?**
The results can be stored for statistic work-up, follow-up and as a basis for continuous guidance.

**Is there a test generator with randomly chosen questions to each test?**
A test generator is a function that creates randomly chosen test forms from a database with questions that are ruled from the teacher or administrator. This gives opportunity to automatically vary the content of the tests.

**Learning environment – relationship participant-system-the world around**

**Can the user publish content?**
To be a part in the learning process, and publish material that can be a part of the continuous course.

**Is there a list of participants in the LMS system?**
It assumes that all participants that are listed have given their approval and can choose by themselves which data to be published.
# Request for Proposal – sample requirements

## 1. Company Information (client)

### 1.1 Company Background

### 1.2 Link to Corporate Strategy

### 1.3 Purpose of RFP

### 1.4 Project Background

### 1.5 Business Objectives/Key Metrics

### 1.6 Assumptions

### 1.7 Project Constraints

### 1.8 Relevant Facts and Data

### 1.9 Proposal Conditions

- **1.9.1** Timetable
- **1.9.2** Confidentiality
- **1.9.3** Selection Process
- **1.9.4** Return Address

## 2. Company Information/Background (vendor)

### 2.1 Describe briefly your company history.

### 2.2 Describe key elements of your business strategy and vision.

### 2.3 Describe the primary distinguishing characteristics of your solution.

### 2.4 List locations of offices and function of each site.

### 2.5 List strategic business partnerships.

### 2.6 Describe any awards or industry recognition you have received.

## 3. Technology

### 3.1 Architecture and System

- **3.1.1** Describe your technology architecture and key advantages or limitations to your approach.

- **3.1.2** Specifically, what software technologies is your product based on and please comment on your design choices.

- **3.1.3** Describe briefly the architectural history of your product (e.g., are roots client server, web, etc.)?

- **3.1.4** List technology standards your solution supports.

- **3.1.5** Characterise the ability of your system to scale to very large user populations.

- **3.1.6** Characterise the ability of your system to meet demanding performance/response-time requirements in very large user populations.

- **3.1.7** Describe the status of your support for the following learning industry standards: AICC, SCORM, IMS, and IEEE.
| 3.1.8 | Describe any Intranet/Internet deployment issues or limitations (e.g., firewalls, use of plug-ins). If client-side software is required please list applications/plug-ins by user type. |
| 3.1.9 | Describe how user authentication, authorization/access control, communications security, and secure transactions are handled. |
| 3.1.10 | Describe operating system, database, web server, and client/browser requirements. |
| 3.1.11 | What globalization capabilities does your solution support (localization, multiple currencies, and time zones)? |
| 3.1.12 | Describe the ease in which your solution can be customised and how this flexibility is achieved. |
| 3.1.13 | Describe how interoperability is achieved between the learning management system and content delivery system(s). What data is interchanged? |
| 3.1.14 | Describe strategies and facilities for integrating into existing corporate systems such as HR, ERP, and SFA/CRM systems. |
| 3.1.15 | Describe general usability/user interface of your product. |
| 3.1.16 | Does your solution interface to the standard SMTP-based messaging protocol? |

### 3.2 Learning Management Requirements

<p>| 3.2.1 | Registration: What registration methods are supported (self-service, manager/administrator initiated, etc.). |
| 3.2.2 | Registration: Does system support both individual and batch registration of users to individual courses, certificate programs, or any combination of courses? |
| 3.2.3 | Registration: Does the system support the ability to browse the catalogue as an anonymous user before identifying oneself to the system? |
| 3.2.4 | Registration: Describe ability to set or configure other course registration restriction and approval mechanisms including Manager approval. |
| 3.2.5 | Catalogue, Learning Activity &amp; Class Management: Describe general curricula development capabilities. |
| 3.2.6 | Catalogue, Learning Activity &amp; Class Management: Can the learning activity catalogue be organised in a hierarchy with unlimited levels? |
| 3.2.7 | Catalogue, Learning Activity &amp; Class Management: Describe search capabilities for courses, students, enrollments, and accounts. |
| 3.2.8 | Catalogue, Learning Activity &amp; Class Management: Describe how pre-requisites are defined and enforced as well as ability of learners to test out of all or parts of courses. |
| 3.2.9 | Catalogue, Learning Activity &amp; Class Management: Describe how the system handles student cancellations. |
| 3.2.10 | Catalogue, Learning Activity &amp; Class Management: Does system allow for time-based eligibility for training (e.g., enforce completion time periods). |
| 3.2.11 | Catalogue, Learning Activity &amp; Class Management: Describe ability to group learning activities into certificate programs and track student progress towards completion. |
| 3.2.12 | Catalogue, Learning Activity &amp; Class Management: How are inactive or cancelled courses handled? |
| 3.2.13 | Catalogue, Learning Activity &amp; Class Management: Does system support student and instructor evaluations of learning activities? |
| 3.2.14 | Catalogue, Learning Activity &amp; Class Management: Describe student profiles, transcripts and activity/transaction history tracking capabilities. |
| 3.2.15 | Catalogue, Learning Activity &amp; Class Management: Can customised course catalogues be defined and displayed to different sets of users? |
| 3.2.16 | Resource Management: Describe extent to which system tracks learning activity resources. |
| 3.2.17 | Resource Management: Describe capabilities for managing course capacity and waitlists issues. |
| 3.2.18 | Resource Management: Does solution detect resource conflicts and report resource availability? |
| 3.2.19 | Resource Management: Can resources be tracked by usage, cost, and location? |
| 3.2.20 | Resource Management: Can system allocate individual and pooled resources with limited and infinite quantities. |</p>
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<thead>
<tr>
<th>3.2.21</th>
<th>Resource Management: Does system maintain a list of qualified instructors including skill, availability, location, ranking?</th>
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<td>3.2.22</td>
<td>Resource Management: Does system enable international scheduling of rooms/instructors across time zones?</td>
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<td>Resource Management: Can learning activities be scheduled to span discontinuous days and times.</td>
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<td>3.2.24</td>
<td>Competency &amp; Skills Management: Does system provide a flexible tool for defining a skills/competency hierarchy, specific job or role profiles, and ability to import job and competency profile libraries?</td>
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<td>3.2.25</td>
<td>Competency &amp; Skills Management: Does solution support self-assessment and 360 degree assessment or skill gap analysis?</td>
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<td>3.2.26</td>
<td>Competency &amp; Skills Management: Does the competency management system drive personalised learning plans (including both required and recommended learning activities)?</td>
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<td>3.2.27</td>
<td>Competency &amp; Skills Management: Does system support skills inventory development and enable mapping individuals to available jobs?</td>
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<td>3.2.28</td>
<td>Content &amp; Collaborative Learning Activity Integration: Describe capabilities for supporting off-the-shelf content libraries as well as custom developed learning activities.</td>
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<td>3.2.29</td>
<td>Content &amp; Collaborative Learning Activity Integration: Describe integration with live interactive (virtual classroom) technologies.</td>
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<td>3.2.30</td>
<td>Content and Collaborative Learning Activity Integration: Describe the ability to integrate other collaboration technologies such as chat, threaded discussion, shared whiteboard, and instant messaging.</td>
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<td>3.2.31</td>
<td>Administration &amp; Reporting: Describe administrative interface and usability. Is it browser-based?</td>
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<td>3.2.32</td>
<td>Administration &amp; Reporting: What standard reporting capabilities are delivered with your solution?</td>
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<tr>
<td>3.2.33</td>
<td>Administration &amp; Reporting: What flexibility is provided to develop custom reports? Are 3rd party report writers supported?</td>
</tr>
<tr>
<td>3.2.34</td>
<td>Administration &amp; Reporting: Are default roles/permissions provided by the system and is there facilities for defining additional roles?</td>
</tr>
<tr>
<td>3.2.35</td>
<td>Administration &amp; Reporting: Describe systems flexibility in handling a variety of payment/account management mechanisms including E-commerce engines (e.g., credit card, purchase order, checks, etc.).</td>
</tr>
<tr>
<td>3.2.36</td>
<td>Administration &amp; Reporting: Describe any event management facilities for automatically generating e-mail messages to students and administrators based on pre-defined events.</td>
</tr>
<tr>
<td>3.2.37</td>
<td>LMS Partitioning (Domains) Support: Describe the ability to partition LMS user interface and resources (functionality, course content) according to unique organisational structures, geography, or other criteria? Can individuals be assigned to multiple domains?</td>
</tr>
<tr>
<td>3.2.38</td>
<td>Mobile/Wireless User Support: Can users access the learning management system via wireless devices? Explain.</td>
</tr>
</tbody>
</table>

### 3.3 Content/Assessment Development and Content Delivery Requirements

<p>| 3.3.1 | Content Development: Describe the content development process or approach supported in your system |
| 3.3.2 | Content Development: Do you provide an authoring tool or integrate with off-the-shelf tools? |
| 3.3.3 | Content Development: What facilities are provided for rapid course development including “drag and drop” interface for course structuring tools and inclusion of templates, themes, re-usable components, etc.? |
| 3.3.4 | Content Development: Does your content development approach maintain separation of content presentation and content development tasks in order to facilitate developer productivity? |
| 3.3.5 | Content Development: Elaborate on the ability to re-purpose (store and retrieve) a wide variety of existing content (particularly multimedia content) including specifically audio, video, animation, dynamic HTML, XML, JavaScript and Java. |
| 3.3.6 | Content Development: Does your system support the concept of “learning objects”? |</p>
<table>
<thead>
<tr>
<th>3.3.7</th>
<th>Content Development: What capabilities are provided to facilitate the development of adaptive/personalised learning experiences that adjust content delivery dynamically based on learners needs?</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.3.8</td>
<td>Content Development: What facilities are provided for collaborative authoring (i.e., multiple authors contributing to the same learning activity)?</td>
</tr>
<tr>
<td>3.3.9</td>
<td>Content Development: Does your content development environment provide support for the IMS metatags specification?</td>
</tr>
<tr>
<td>3.3.10</td>
<td>Assessment: Describe ability to create/modify online tests and evaluations for new and pre-existing content. Is programming and scripting required to do so?</td>
</tr>
<tr>
<td>3.3.11</td>
<td>Assessment: Describe systems ability to address the “Kirpatrick Model” 4-levels of evaluation.</td>
</tr>
<tr>
<td>3.3.12</td>
<td>Assessment: List supported question types and functionality.</td>
</tr>
<tr>
<td>3.3.13</td>
<td>Assessment: Describe assessment settings and options (e.g., question randomisation and pools, timed response, multiple question retry, optional display of hints and/or explanations, automatic quiz advancement, and question skipping).</td>
</tr>
<tr>
<td>3.3.14</td>
<td>Assessment: Describe strategy for securing assessment information and protecting against cheating on assessments.</td>
</tr>
<tr>
<td>3.3.15</td>
<td>Content Publishing: Describe learning activity publishing capabilities within and outside security firewalls.</td>
</tr>
<tr>
<td>3.3.16</td>
<td>Content Delivery: Describe key capabilities of your content delivery approach and technology.</td>
</tr>
<tr>
<td>3.3.17</td>
<td>Content Delivery: Describe strategies and issues relative to course delivery server performance</td>
</tr>
<tr>
<td>3.3.18</td>
<td>Content Delivery: Can content be deployed in a true-thing client architecture (i.e., are plug-ins NOT required)?</td>
</tr>
<tr>
<td>3.3.19</td>
<td>Content Delivery: Characterise availability of off-the-shelf content immediately available on your platform.</td>
</tr>
<tr>
<td>3.3.20</td>
<td>Content Delivery: Does system support CD-ROM –based courseware and/or hybrid (CD/Web-base) delivery of courseware.</td>
</tr>
</tbody>
</table>
3.3.21 Content Delivery Reporting: Describe ability to track and report on student interactivity with courseware. Is any special coding required to ensure summary or detailed levels of data are tracked and returned to the LMS?

3.3.22 Mobile Content Publishing & Delivery: Can users download and take courses disconnected from the network? Explain.

3.3.23 Mobile Content Publishing & Delivery: Can assessment results and other data be upload to the LMS?

3.3.24 Mobile Content Publishing & Delivery: Can learning modules be packaged for mobile download with no extra packaging? Explain.

4. Support and Training
4.1 Describe technical support options.
4.2 Describe the standard response times, along with the formal escalation and resolution procedures.
4.3 Describe your product major release and revision schedule including how releases and revisions are distributed.
4.4 What is your maintenance policy with regard to software modifications and upgrades?
4.5 What provisions for “bug fixes” and enhancement requests are included in a typical contract?
4.6 Please describe your company procedure for handling products at the “End of Life”; Include information re. Notification and timing.
4.7 Provide an overview of available training.
4.8 Do you use your product internally for employee, partner and customer training?
4.9 What training is recommended for this project and when will it begin? Are there training requirements for customer prior to implementation? If so, explain.
4.10 What service level arrangements are provided in Intranet or hosted/ASP deployments?

5. Implementation
5.1 Processes
5.1.1 Do you have a documented implementation process or methodology? If so, briefly describe.
5.1.2 How are change requests handled?
5.1.3 How are issues and schedule changes tracked, communicated, and resolved?
5.1.4 What are the critical success factors for enterprise-wide learning management projects?

5.2 Resources
| 5.2.1 | What implementation resources do your company and integration partner(s) provide? Describe roles and responsibilities? |
| 5.2.2 | What resources are expected from our company? Describe roles and responsibilities |
| 5.2.3 | Describe availability of supporting services for courseware development. |
| 5.2.4 | Describe specific service offerings. Specifically, do you have any services focused on rapid deployment? |
| 5.2.5 | Describe the offerings on a competency basis - specifying what we would need to know in order to assume responsibility of implementing further customisations. |
| 5.2.6 | Describe the extent to which you can successfully support global implementations with resources provided by your company and integration partners. |

### 5.3 Timeframes

| 5.3.1 | What are typical project implementation timeframes? |
| 5.3.2 | Timeframe: What factors impact project implementation timeframes? |
| 5.3.3 | How long does it take to install the system? |
| 5.3.4 | Can you characterise time-to-value (e.g., break-even, ROI)? |

### 5.4 Deployment Options

| 5.4.1 | Intranet: Describe any intranet deployment considerations. |
| 5.4.2 | Hosting: Describe any hosted solution offering. |
| 5.4.3 | ASP: Describe any ASP solution options. |
| 5.4.4 | Security of Hosted/ASP solutions: Describe strategy for securing access to hosted/ASP solution. |

### 5.5 Pricing/Costs

| 5.5.1 | What pricing options are available? |
| 5.5.2 | Hidden Costs: Are there any ancillary product costs that need to be considered? |
LMS Evaluation Report

Background

It is quite hard to find sufficient and updated evaluations of LMS:s. The following evaluation is not by far an overall coverage of existing platforms in the market. Brandon Hall (http://www.brandon-hall.com) provides evaluations that can be purchased and downloaded from the web. These reports may be of great value for you in your purchase process. Canada’s armed forces have, for example, based their Statement of Requirements on criteria from Brandon Hall (LMS 2003 Comparison of Enterprise Learning Management Systems).

The contents in this evaluation report are gathered from Edutech, Switzerland (March 2003). Some of the information is not updated, because the market progresses rather quickly and new LMS versions from various vendors hits the market in high speed. It is therefore important that this section of the paper is updated regularly and quite often.

Example of LMS:s that can be evaluated in coming versions of this paper:

- Acumen Enterprice Learning Arena
- Adventus LMS
- Blackboard
- Digital Think
- EASE (Educational Access and Support Environment)
- Global Learning Systems
- IBM LMS
- IlearnWare
- Intralearn
- Oracle ilearning
- PeopleSoft
- Plateau
- SABA
- Seminar Learning Systems
- SUMATRA
- SumTotal (Docent/Click2Learn)
- Syberworks Learning Center
- Theorix
- THINQ
- TopClass
- WebCT
### Easy to Use Platforms

<table>
<thead>
<tr>
<th>Platform</th>
<th>strengths</th>
<th>weaknesses</th>
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</thead>
<tbody>
<tr>
<td><strong>Blackboard ML</strong>&lt;br&gt;Blackboard Inc, USA</td>
<td>- Clean, easy-to-use interface&lt;br&gt;- Powerful “virtual classroom” tool&lt;br&gt;- Good possibilities for interoperating with other systems (e.g. students and administrative information systems)&lt;br&gt;- Building blocks programme for extending the system&lt;br&gt;- Good documentation</td>
<td>- Limited customisability of look and feel&lt;br&gt;- No internal resource or file manager&lt;br&gt;- Frame based display: no bookmarks of individual course pages.</td>
</tr>
<tr>
<td><strong>Clix 5.0</strong>&lt;br&gt;imc AG, Germany</td>
<td>- large palette of tools&lt;br&gt;- good support for external content&lt;br&gt;- syllabus/learning plan with branching options&lt;br&gt;- powerful (but complex!) rights management system&lt;br&gt;- “Mandanten” concept (one installation for several units with their own courses).</td>
<td>- usability problems: no font scaling, no bookmarks,&lt;br&gt;- creating a course is a complex process&lt;br&gt;- only “flat” internal content (no folders or hierarchical structure)&lt;br&gt;- no ftp or WebDAV support.&lt;br&gt;- no search function in contents (only in descriptions of elements)&lt;br&gt;- limited support for eLearning specifications</td>
</tr>
<tr>
<td><strong>WebCT Vista</strong>&lt;br&gt;WebCT Inc, USA</td>
<td>- appealing look-and-feel&lt;br&gt;- easy to use for admins, designers, tutors and students&lt;br&gt;- powerful communication tools&lt;br&gt;- numerous powerful student tools: i.e. search tool, context sensitive help&lt;br&gt;- efficient file handling due to integrated file manager with WebDAV support&lt;br&gt;- numerous flexible authentication models supported&lt;br&gt;- large institutions and consortia can hierarchically organise groups, courses, sections etc.&lt;br&gt;- good documentation</td>
<td>- usability issues: can't copy and paste URLs, no browser bookmarks, browser's 'back' and 'reload' button don't work&lt;br&gt;- less severe usability issues: incomplete font scaling, difficult printing&lt;br&gt;- limited SDK – limited extensibility. End users can't program custom 'components' or custom quiz types.&lt;br&gt;- limited layout control&lt;br&gt;- incomplete or missing support for IMS-QTI, IMS-CP and SCORM&lt;br&gt;- not backwards compatible with WebCT 3.x (missing tools: no compile, english interface language only)</td>
</tr>
<tr>
<td><strong>QualiLearning / Luvit 3.5</strong>&lt;br&gt;QualiLearning, Switzerland / Luvit AB, Sweden</td>
<td>- Nice menu based interface (but non-standard!)&lt;br&gt;- Some interesting didactical functions: feedback on each document, completed status for documents&lt;br&gt;- Powerful rights systems (students can for instance be allowed to place documents in the course navigation tree)&lt;br&gt;- Good statistics on course usage&lt;br&gt;- Support for some e-learning specifications (IMS CP and QTI, AICC).</td>
<td>- No font scaling&lt;br&gt;- Frame based display and lack of browser toolbars give rise to usability problems, e.g. no bookmarks is possible.&lt;br&gt;- No WebDAV or ftp support for file upload&lt;br&gt;- No search function&lt;br&gt;- Problems with zip archives: paths, style sheets&lt;br&gt;- Limited online support (no knowledge base or newsgroups)</td>
</tr>
</tbody>
</table>

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5 Edutech, Switzerland, March 2003. The evaluation results can be viewed in full detail at http://www.edutech.ch/edutech/tools/ev2.php
Extensible Platforms

<table>
<thead>
<tr>
<th>Platform</th>
<th>strengths</th>
<th>weaknesses</th>
</tr>
</thead>
</table>
| Globalteach TWI AG, Biel, Switzerland | - excellent support for SCORM 1.1 and 1.2 including SCORM debugger  
- efficient and flexible customisation possibilities  
- extensible framework with various documented APIs  
- complete technical documentation | - Severe drawback: authoring tool (content upload, quizz management, ...) is a Windows application (no Mac/Unix versions)  
- Administration tool is a Windows application (no Mac/Unix versions)  
- Server runs on MS .net infrastructure only |
| IBT Server 6.1 Time4You AG, Germany | - full XML/XSL support  
- support for SCORM compliant learning modules  
- API to all important server functions (http/JavaScript and/or JSP programming interfaces) -> toolkit approach  
- the entire system (layout, functionalities) can be fully customised  
- server runs on all operating systems with Java Virtual Machine  
- good multi-language support  
- clean and modern technical design  
- modular architecture  
- runs on all modern browsers | - many features are only available through programming  
- difficult to use for course designers - non-intuitive user interface  
- system cannot really be used out-of-the-box  
- running/customising the server requires skilled and experienced staff (XML, XSL, JSP, HTML, JavaScript and IBTarchitecture knowledge)  
- complex system, difficult to get used to it  
- small user base in universities |

6 Edutech, Switzerland, March 2003. The evaluation results can be viewed in full detail at http://www.edutech.ch/edutech/tools/ev2.php