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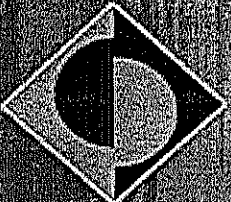
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ITHET 2004 PROCEEDINGS



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What Makes a Good LMS: An Analytical Approach to Assessment of LMSs

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Abstract: This study aims to describe the key issues in assessment of a learning management system for higher education institutions and eventually to construct a criteria list.

I. INTRODUCTION

Today's society has undergone several massive changes from the agrarian age to the industrial age, and now it is entering into what some call the information age [1]. In this age, it is obvious that the importance of knowledge has been increasing day-by-day, and the people awareness in organizations to integrate valuable knowledge within their projects tends to rise as well. In this context, the Internet has a critical role as it enhances dissemination of information. According to McPhaill [2]; "The Internet is to the information age what the automobile was to the industrial age".

The rapid technological developments in this era include a wide range of interactive computers, web technologies, and new approaches other than the traditional lecture-style have been revealed largely because of the growth of the Internet [3]. In this sense, a new term has been recognized as "e-learning".

II. THEORETICAL BACKGROUND

E-learning technologies are increasingly being integrated into organizations' work flows [4]. The functionality of e-learning is created by a learning management system (LMS) as it simplifies the process of administrative education and training [4; 5; 6]. An LMS is a software system integrating web based training, classroom delivered courses, online courses, and human resources systems, and because of this reason, it is referred as the backbone of e-learning [7].

An LMS provides managers, administrators, instructors, and learners with a complete e-learning infrastructure in order to facilitate the creation, storage and delivery of unique learning activities, as well as the management of student rosters, and assessments [5]. Rosenberg explains that LMS uses "internet technologies to manage the interaction between users and learning resources" [6]. Those technologies include discussion boards, chat environments, self-diagnostic quizzes, multimedia, audio, or video facilities, etc. By using those technologies, an LMS

primarily aims at managing and monitoring the progress of the learners and observing their performances.

LMSs should include some essential features. First of all, an LMS should be dynamic; that is, it should be active, flexible, adaptive and customizable [8]. As Graziadei [9] mentions, accessing people and learning resources, interaction and collaboration 24/7 are other key factors for success in an LMS. Graziadei also puts the emphasis on 4Cs of e-Learning as; (1) Curriculum Development, (2) Class, Course & Content Management & Delivery, (3) Competency Assessment, and (4) Collaboration. These issues should be conducted efficiently in an LMS by designing effective and easy to use tools for learners, administrators, and instructors. Finally, the technical features of an LMS should supply the requirements of the necessary equipment, security, and budget concerns.

All the aforementioned features represent the general characteristics of an LMS. Those characteristics can be assessed by defining certain criteria. In the literature, however, a commonly defined criteria list either exists or application changing needs of organization exist. The existing ones are built by organizations or universities for their own assessment needs. The purpose of this study, in this sense, is to describe the key issues in assessment of an LMS, being used in higher education institutions, and eventually to constitute a criteria list. This list attempts to provide a ground for assessing an LMS.

III. PROCESS

We made use of the general searches to locate case studies, product comparisons, and discussion threads together with our current and past experiences to establish a context for developing general criteria as well as a detailed feature list. In particular, we categorized the necessary features and constructed our criteria list within four major sections. These are: (1) General Features, (2) ID and Content, (3) Technical Features, and (4) Support Service. The criteria list has a scale of 0 to 4 where; 0 = not achieved (not existent or poor), 1= partially achieved (low standart), 2= moderately achieved (an average basic standart), 3= mostly achieved (good), and 4= fully achieved (exceeds standart expectation).

Furthermore, the currency of this study is limited to available products since LMSs are advancing rapidly.

IV. PROPOSED CRITERIA

Evaluation is necessary in selecting the right LMS or assessing the existing ones since "Learning Management Systems need high investments with long-term impacts on organizations"[4]. Dobbs [10] states that if how to make a smart choice is known, then a lot of money can be saved. Regarding those concerns, the key issues that should be present in an LMS are provided as in the Figure 1.

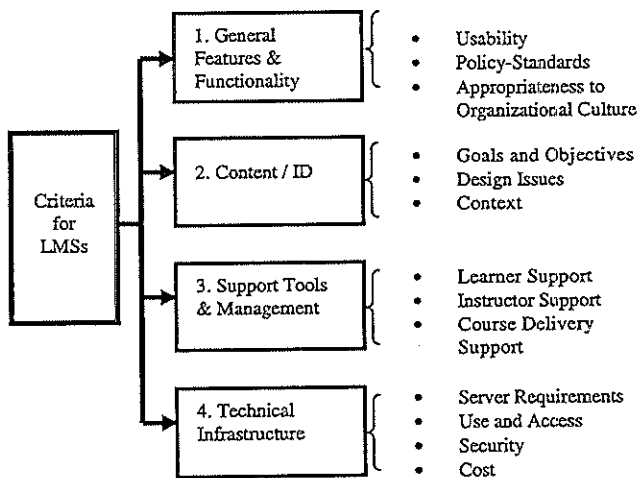


Figure 1. A General Overview of the Criteria List for LMSs

A. General Features and Functionality

a. Usability

Usability concerns include the accessibility, organization, navigation and aesthetics issues. An LMS should provide a user-friendly interface supporting those issues. It is also important that the users should be able to get familiar with the use of the system. As a whole, the system should be easy to use for all of its users.

b. Policy-Standards

An LMS should use some standards especially in content. These standards facilitate the migration of content from one system to another, use of electronic content supplied by publishers, and use and sharing of learning objects. The license options are handled by vendors, but should be focusing on institutions. The users of the system should be aware of those options.

c. Appropriateness to Organizational Culture

Every higher education institution has its own organizational culture. An LMS should support and meet the needs of institutional culture.

B. Content / ID

a. Goals and Objectives

The goals and objectives of the content in an LMS should be relevant, consistent, clear, coherent, up-to-date, and at an appropriate ease level. They should also be relevant to organizational culture.

b. Design Issues

Design issues include navigation, interface and legibility concerns. Roxin [11] declares that navigation interface should answer the following questions: "Where am I? Where did I already go? Where can I go from here?" Therefore, a flexible design is necessary within the system. Interface should be developed in an LMS so that it reduces the cognitive charge of information as much as possible (p.1374). The use of text, animation, sound, color, and graphics should be appropriate to the visual design principles and should be convenient. The clarity of texts, different scripting supports, the orthography, and the display of elements on the page are important in the considerations in legibility concern. Designing courses with reusable objects would increase the flexibility of the system, and enhance more functionality.

c. Context

The content should be accurate, practical and immediate [12]. Just the central points of the content should be on focus, and the integrated features should be concise and appropriate to the context.

C. Support Tools / Management

a. Learner Support

The system should provide two-way communication between learners and content, and among learners, instructors and content [13;14]. Effective study practices ranging from simple review tools to mini courses should be provided to the learners. The system should conduct effective self-assessment tools for the learners. Direct encouragement to overcome difficulties that impede or impair student performance is another important issue in learner support. That is, the system should create and maintain motivation. It should also support the learners to check grades on assignments and tests. As one of the core features of e-learning support tools is to support customization, the system should provide learners with the chance of reconfiguring menus, features of the system for creating profiles.

b. Instructor Support

The system should enable instructors to monitor and manage learners and the course. The instructors should be able to coordinate knowledge sharing within the system so that they can manage which knowledge should be accessible to learners and which are viewable to themselves. The instructor should be enabled to supply instant feedback wherever and whenever necessary. Another important issue is that the instructors are able to back up course content easily.

c. Course Delivery Support

The tools, including multimedia sources, e-mail services, newsgroups, chat environments, whiteboards, discussion boards, videoconferencing, and teleconferencing, should be supporting the course. Help-desk facilities and instructional support should be available in the system. The system should integrate sharing of information or application. In this way, the learners can form a sense of group/team identity.

D. Technical Infrastructure

a. Server Requirements

The server should meet the needs required for the delivery of the courses. It should also provide multiple software and hardware capabilities.

b. Use and Access

The system should be configured so that every learner can access to the system with ease. The system should work without technical use problems.

c. Security

Security concern is a critical issue, therefore username-individual/group- and password to access the courses or log out from the system should be specific to each user, and correct privilege should be supported to users. The system should integrate encryption with privacy. The records and data should be accessible to user but it should be safe from tampering. Required measures should be taken in order to protect of viruses. Security of the files should be supported by locking after editing.

d. Cost

E-learning is not cheap, and cost-effectiveness becomes more important as the institutions become large-scale providers of online education [15]. The cost of LMS should be reasonable in a higher education institution.

V. CONCLUSION

By identifying the key issues, this study reveals a criteria list in assessing LMSs for higher education institutions. In addition to providing a ground for assessing LMSs, this criteria list can be used as a supporting base in the design and development processes of an LMS. After indicating the strong and weak features of the systems using the criteria list, we believe that the weak points should be

strengthened and updated accordingly. We also believed that the criteria list provided in this study can form a base in selecting appropriate LMSs for higher education institutions.

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APPENDIX

Detailed Criteria for Evaluating Learning Management Systems

DETAILED CRITERIA FOR EVALUATING LMS		Not Achieved	Partially Achieved	Moderately	Mostly Achieved	Fully Achieved	NOTES
1. General Features and Functionality							
1.1	Usability						
	Is the LMS easy to use?						
	Is the process of getting familiar with the system easy?						
	Can the data be imported and exported easily into/from the program?						
1.2	Policy-Standarts						
	Does the LMS adhere to standards?						
	Do license options focus on the institution?						
	Are the users of the system provided with the awareness of license options?						
1.3	Appropriateness to Organizational Culture						
	Does the system function appropriate to the needs of the organization?						
2. Content / ID							
2.1	Goals and Objectives						
	Are the goals and objectives of the learning content consistent?						
	Is the content relevant to the goals and objectives?						
	Is the content accurate?						
	Is the content up-to-date?						
	Does the content have appropriate ease level?						
	Is the content relevant to organizational culture?						

2.2	Design Issues							
	Is the system easy to navigate?							
	Does the interface provide ease to use?							
	Is the use of text appropriate to the visual design principles?							
	Is the use of animation appropriate to the visual design principles?							
	Is the use of sound appropriate to the visual design principles?							
	Is the use of color appropriate to the visual design principles?							
	Is the use of graphics appropriate to the visual design principles?							
	Is the format of the text legible?							
	Is the design of course flexible?							
2.3	Context							
	Is the content accurate?							
	Is the content practical and immediate?							
	Are the features concise and appropriate to the context?							
3. Support Tools / Management								
3.1	Learner Support							
	Is a two-way communication provided?							
	Does the system provide effective study practices for learners?							
	Does the system provide effective self-assessment tools for learners?							
	Are the learners encouraged to overcome difficulties?							
	Does system create and maintain motivation?							
	Does the system support the learners' abilities to check grades on assignments and tests?							
	Does the system provide learners profile creation?							
3.2	Instructor Support							
	Does the system enable instructors to monitor and manage learners and course?							
	Does the system enable instructors to coordinate knowledge sharing within the course?							
	Does the system enable instructors to supply instant feedback?							
	Does the system enable instructors back up course content easily?							
3.3	Course Delivery Support							
	Do the multimedia sources support the course?							
	Do the e-mail services support the course?							
	Do the newsgroups and chat environments support the course?							

	Do the whiteboards and discussion boards support the course?						
	Do the videoconferencing/ teleconferencing support the course?						
	Does the system provide help-desk facilities?						
	Does the system provide instructional support?						
	Does the system integrate sharing of information or application?						
	Does the system support collaborative assignments/projects?						
4. Technical Infrastructure							
4.1	Server Requirements						
	Does the system server meet the needs required for the delivery of the courses?						
	Does the system provide multiple software and hardware capabilities?						
4.2	Use and Access						
	Does the system configuration provide ease of access and use?						
4.3	Security						
	Does the system support creating profiles with user-names and passwords?						
	Does the system support time-management on login of session?						
	Does the system integrate encryption with privacy?						
	Are the records safe from tampering?						
	Can the files be locked after editing?						
	Is virus protection provided?						
	Does the system provide access to the course tools specific to each user?						
	Does the system should support correct privilege to the users?						
4.4	Cost						
	Is the system cost-effective?						