TOWARDS AN ONTOLOGY OF LMS
A Conceptual Framework

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Keywords: LMS, Ontology, Elearning , Elearning Standards, LMS evaluation, LMS deployment.

Abstract: Learning Management Systems (LMS) are used widely to support training in an organization. Selecting and implementing an LMS can have an impact in cost, time and customer satisfaction in the organization. Due to the existence of a variety of definitions on the subject of elearning and LMS, it is necessary a conceptual framework using an ontology. This article presents a research in progress whose final objective is to develop a method to select, deploy and integrate an LMS into an organization with a systemic quality approach. As a first step, in this article is presented an ontology to conceptualize the terms associated to LMS, unifying them thr ough their relations.

1 INTRODUCTION

Learning Management Systems (LMS) allow important advantages oriented to keep tracking and automate the administration of training events and support the management of learning in an organization (Hall, 2005a; Dean, 2002; Kaplan, 2005, Martin et al, 2005). An LMS integrates educational resources, the learners and support tools (Edutools, 2003).

In the last few years, there is an increased interest in the process of selecting, implementing and integrating an LMS in an organization (Fernandez, 2003; Piskurich, 2003; Papshew, 2005). Recent studies (Howard, 2003) have shown that these processes have an impact in cost, time and customer satisfaction, and therefore in the organization. From the Bersin&Associates study (Howard, 2003), it is possible to infer that it is very common that companies acquire LMS instead of developing it and that once it is acquired, it turns out expensive to implement it.

In order to get an insight into these processes, an ontology on the LMS domain is proposed. This ontology allows a better understanding of the LMS concept as well as its characteristics and the latest implications in educational, business and engineering environment. This paper is part of a more ambitious project in progress that aims to estimate the systemic quality on the deployment and integration process of an LMS into an organization. For this purpose, descriptions of the concepts related to LMS are presented, a unified concept model is established, and finally, conclusions and future work are presented.

2 LMS ONTOLOGY PROPOSAL

To specify the issues related to LMS in elearning, an Ontology creation methodology was employed: Ontology development 101 (Noy & McGuinness, 2001). Figure 1 shows a set of concept related to LMS.

Elearning concept has evolved from earlier concepts such as TBT (Technology-Based Training), CBT (Computer-based training), and others acronyms that had not agreed upon definition (Piskurich, 2003). It can be found that CD-ROM based learning, CBT, Web-based learning (WBL) and, satellite, mobile and wireless learning can be taken as elearning (Bowles, 2004). Bowles (2004) defines Electronic learning as a learning experience involving the acquisition or transfer of knowledge delivered or transacted through electronic means. As this definition is too broad for the purpose of ongoing research, elearning can be defined as the learning experience involving 'the use of Internet technologies to deliver a broad array of solutions that enhance knowledge and performance'

Díaz-Antón G. and A. Pérez M. (2006).
TOWARDS AN ONTOLOGY OF LMS - A Conceptual Framework.
In *Proceedings of the Eighth International Conference on Enterprise Information Systems - HCI*, pages 161-164
DOI: 10.5220/0002463901610164

(Rosenberg, 2002). This definition includes computer networks or webs as the delivery or mediation mechanism (Piskurich, 2003).

LMS is a software package that automates the administration of training events and supports the management of learning in an organization (Hall, 2005a; Dean, 2002; Kaplan, 2005). All LMSs manage the log-in and registration of users, manage course catalogs, record data from learners, and provide reports to management (Hall, 2005a). According to Brockbank (2003), an LMS ties six elearning components: content, collaboration, testing and assessment, skills and competency, e-commerce and Internet video-based learning in a framework that tracks, supports, manages and measure elearning activities. Kanahele (2003) states that an LMS provides the infrastructure that centralizes several components associated which each phase of the learning cycle. WCET-Edutools (2005) proposes two set of tools that have to be present in a LMS: Learner tools and support tools.

According to Hall (2005a), Content Management Systems (CMSs) are used to store and subsequently find and retrieve large amounts of data. CMSs work by indexing text, audio clips, images, etc., within a database. In addition, CMSs often provide version control and check-in/check out capabilities. For Nichani (2001) the smallest self-contained piece of information in the CMS is the content component. On the other hand, a Learning Content Management System (LCMS), is an environment where developers can create, store, reuse, manage, and deliver learning content from a central object repository, usually a database. LCMSs generally work with content that is based on a learning object model (Hall, 2005a). A LCMS combines the administrative and management dimensions of a traditional LMS with the content creation and personalized assembly dimensions of a CMS. Thus, the objective of a LMS and a LCMS is different: the primary objective of a LMS is to manage learners, keeping track of their progress and performance across all types of training activities (Hall, 2005b). Additionally, the main focus of LCMSs is on achieving personalized learning on demand (LOD) to drive performance in an organization by delivering content to learners to solve business problems (Brockbank, 2003). Understanding the difference can be very confusing because most of the LCMS systems also have built-in LMS functionality (Hall, 2005b).

Elearning standards facilitate the description, packaging, sequencing, accessibility and delivery of educational content, learning activities and learner information (Fallon and Brown, 2002). There are presently several proposed standards but the most prominent are the standards developed by the IMS Global Learning Consortium that define the technical specifications for interoperability of applications. There are three levels of standards support: compliance, conformance and certification (Brockbank, 2003).

Before selecting the right LMS for the organization, Brockbank (2003) proposes to consider to analyze the organization's current training and learning environment, commitment, technology and resources, to determine what needs must be met by an LMS, to find out the existing IT training that will need to be integrated into the LMS and to know the schedule for the deployment of the LMS.

Some organizations and researchers propose a preselecting process before the evaluation and final selection of the LMS that would be used in the organization (Edutech, 2003, Edutech, 2005; COL, 2003; JOIN, 2005, Bershears, 2001, Hollander, 2000).

Most LMS evaluation includes the evaluation of: LMS features or functional requirements, Maintainability, Usability, Reliability and Technical specification. (WCET-Edutools, 2005, COL, 2004; Edutech, 2005; JOIN, 2005; ISO/IEC 9126 Brockbank, 2003).

Papshev (2005) recommends a methodology to implement a LMS in an organization. It uses six phases: project planning, data preparation, data introduction, data migration, impact in the organization, system training and system production.

3 CONCLUSIONS AND FUTURE WORKS

The selection of an LMS is a process that involves a pre-selection process, an evaluation methodology and a deployment process. A correct LMS definition is needed to get a better understanding of what features must conform an LMS to be considered in the pre-selection list.

To make the correct selection, several aspects should be taken into account even before starting the pre-selection process: a study of the organization's current training and learning environment, the existing IT infrastructure and the needs that must be met by the LMS. Elearning standards play an important role in the LMS selection, as well as usability, customer satisfaction and the support that

the LMS suppliers can provide.

Therefore, this ongoing research is oriented towards an establishment of a methodology to select and deploy a LMS into an organization with a systemic approach that includes a rigorous description of the scope and conceptual framework. Additionally, this first ontology would be applied to a study case to validate the concepts. The model would be formulated and validated applying the method DESMET, which allows evaluating methods and tools used in the subject of Software engineering. The applicability and pertinence of the model is expected to be around 75%.

REFERENCES

Beshears, F. 2001. Learning Management System Evaluation Framework. Retrieved online June 15 2005 from http://ist-socrates.berkeley.edu/~fmb/articles/lms_eval/

Bowles, M. 2004. *Relearning To E-learn: Strategies For Electronic Learning And Knowledge.* Carlton. Melbourne University Press. Australia, 198 pp.

Brockbank, B. 2003. Learning Management System for e-learning, in *The AMA handbook of e-learning: Effective design, implementation, and technology solutions*. Piskurich, G.(Ed.).AMACON. NY. USA.

COL, 2003. COL LMS Open Source, Commonwealth of Learning, Retrieved online June 15 2005 from: http://www.col.org/Consultancies/03LMSOpenSource.htm

COL, 2004. LMS Evaluation Tool User Guide, Commonwealth of Learning, 3waynet Inc. Vancouver, Canada. Retrieved online June 15 2005 from:http://www.col.org/Consultancies/04LMSEvaluation.htm

Dean, C., 2002. Technology based training & on-line learning: An overview of authoring systems and learning management systems available in UK. Retrieved online June 15 2005 from: http://www.peak.co.uk/AuthoringSystem.pdf

Edutech, 2003. Evaluation of Learning Management Systems, Retrieved online June 15 2005 from: http://www.edutech.ch/lms/ev2.php

Edutech, 2005. Evaluation of Open Source Learning Management Systems, Retrieved online June 15 2005 from: http://www.edutech.ch/lms/ev3/index.php

Fallon,C. and Brown, S., 2002. *Learning Standards: A Guide to Purchasing, Developing, and Deploying Standards-Conformant E-Learning*. CRC Press.256 pp.

Fernández, E., 2003. *E-learning: Implantación de proyectos de formación online*. RA-MA Editorial, Madrid, España.

Hall, B., 2005a. New Technology definitions. Retrieved online June 15 2005 from: www.brandonhall.com/public/glossary/

Hall, B., 2005b. LMSs and LCMSs Demystified. Whitepaper. Retrieved online June 15 2005 from: http://www.brandonhall.com/public/resources/lms_lcms/lms_lcms.htm

Hollander, N., 2000. *A guide to software package evaluation and selection: The R2ISC Method*. AMACON. American Management Association. New York. USA.

Howard, C., 2003. Selecting a Learning Management System.. Bersin & Associates. Retrieved online June, 15 2005 from: http://www.bersin.com/presentations/Selecting_an_LMS_OLLO_2003.pdf

JOIN, 2005. OS LMS evaluation. Retrieved online June 15 2005 from: http://www.ossite.org/join/es/lms/

Kanahele, C., 2003. Learning Portals, in *The AMA handbook of e-learning: Effective design, implementation, and technology solutions*. Piskurich, G.(Editor). AMACON, New York. USA.

Kaplan, E. E-learning Glossary. Retrieved online June 15 2005 from: http://www.learningcircuits.org/glossary.html

Nichami, M. (2001) "LCMS= LMS+ CMS [RLOs]" ElearningPost. Retrieved online June 15 2005 from: http://www.elearningpost.com/features/archives/001022.asp

Noy, N. and McGuinness, D. (2001). "Ontology Development 101: A Guide to Creating Your First Ontology". Retrieved online June 15 2005 from: http://www.ksl.stanford.edu/people/dlm/papers/ontology-tutorial-noy-mcguinness.pdf

Papshew A.., 2005. Implementing LMS Beyond the Technology. In *The LMS/LCMS Implementation & Management Syposium.* Retrieved online June 15 2005 from: http://www.elearningguild.com/pdf/17/lms05_-_702_-_papshev.pdf

Piskurich, G., G.(Edt), 2003. *The AMA handbook of e-learning: Effective design, implementation, and technology solutions*. AMACON, American Management Association. New York. USA.

Rosenberg, M. (2001) "E-learning: Estrategias para transmitir conocimiento en la era digital". McGrawHill, Bogotá, Colombia.

WCET-EduTools (2005). "Edutools: providing decision making tools for the E-D-U community". Retrieved online June, 15 2005 from http://www.edutools.info/

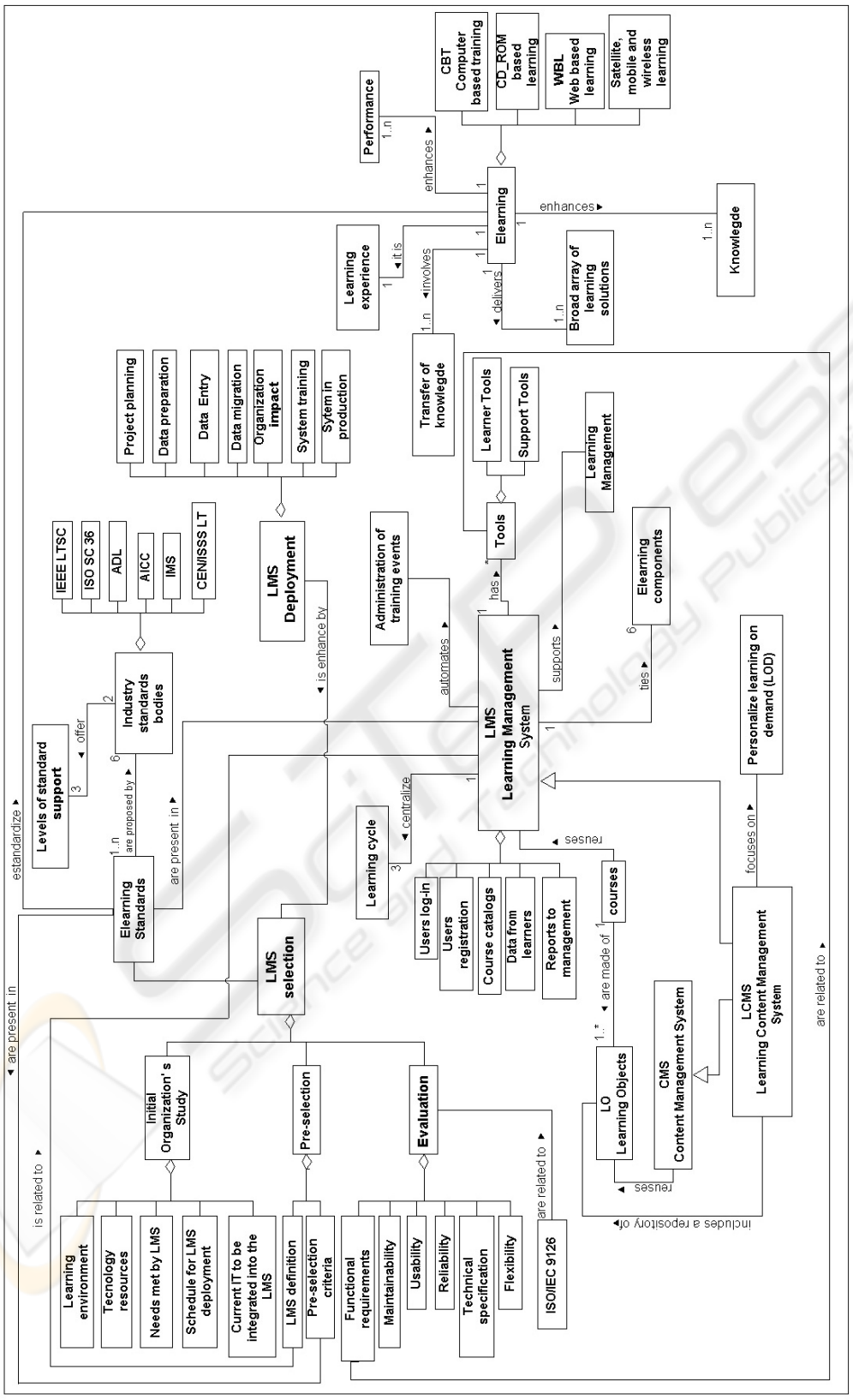

Figure 1: Conceptual model for LMS.