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Development of LCMS for Collaborative E-learning

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Abstract*:* The trend towards more innovation in technology of eLearning and the increased usage of new media makes the design and development of courses increasingly complex. Most of the parts of the eLearning development process are supported by IT. As an effect, this may lead to a create eLearning material and courses, which is reusable .In aiming to achieve the reusability and adaptability. Learning objects are break-down of digital content into smaller "chunks" of information that can be shared and reused in various instructional context.. This paper aims to present a systematic approach to create a Leaning object and store them in Central content repository, an indexing and searching suggestion is also provide with the content repository based on metadata. All the modules are integrated with LMS to provide a complete LCMS used for deployment of eLearning scenarios.
Keywords*:* Content Management system, E-learning , LCMS, Meta Data standards

I. INTRODUCTION

Nowadays, e-learning is one of the most promising and growing applications that are essential to an information techonology. The growth of the Internet is approaching online education to people in corporations, institutes of higher education, the government, and other sectors. E-learning in institute or universities, where students can learn course related, share idea through forums or access other types of materials via online computer systems, has proved to be an effective way of delivering materials to previous unreachable students.

E-learning is meant to encompass all approaches of delivering instruction to a learner using electronic means. E-Learning's ultimate vision is to allow the learner to learn using electronic means only and removing the traditional classroom face-to-face, one-content-fits-all approach of teaching and learning. However, due to the lack of widely applicable e-learning technologies and skills combined with some social cultural (adjustment) issues, the most prevalent application of e-learning in practice has been blended learning. Blended learning makes use of a combination of E-learning and the traditional face-to-face classroom activities.

There are various challenges in supporting students' learning activities in e-learning systems. As mentioned by Ming Mao[1] First, the database of an e-learning system constantly changes with course materials being added, edited, or removed by teachers. Since collaborative activities are encouraged in learning process, the collections in e-learning systems often contain materials authored, commented, and submitted by students too. Second, how to access and interact with teaching materials have traditionally been dictated by teachers. Third, along with the advantage of allowing students to access the learning system at any time, any place, the presence of lecturers during the learning process, which is an important component in face-to-face education, could be missing. Therefore, how to retain the knowledge provided by lecturers in an e-learning environment and present them in straightforward and intuitive way is another challenge that e-learning systems need support.

The learning process becomes a complex path including the handling of educational resources, formative and evaluation activities, interaction with other students and the teacher, so the concept of content management needs to be redefined. From the secondary place of contents in activity-based learning, the need for breaking down contents in smaller, more reusable pieces follows.

Actual learning systems focus on supporting features like chat, email, virtual whiteboards etc. Content mostly consists of static HTML-Pages following a single didactic concept. Dynamic output depending on the needs and preferences of students are not available to the market.

The social process of acquiring knowledge is rarely taken into consideration. But this is a point, in which similarities between CM-systems and eLearning systems should get attention. While CMS are able to support processes and control their single steps, ELS are not able to check the learning effort of students while they use the system. To be more general: CMS offer a feature that is urgently needed, but not yet available in eLearning systems: They can react on change and usage of content present in their system.

Further some more to be considered in Elearning system are:

- integration with existing systems (e.g., registration and examination systems)
- Integration from previous LMS/LCMS (…hence SCORM)
- Analytics and granularity of reporting
- Integration with external authoring systems (e.g., reporting)
- Pedagogical framework (explicit or covert)
- Granularity of content creation
- Metadata/tagging
- Content reuse, content repository

One of the major concerns for teachers using e-learning environments is the availability of the appropriate structures and tools for organizing such learning resources and making them accessible to learners.

II. LEARNING CONTENT MANAGEMENT SYSTEM

To realize web based learning, organizations need to own and/or have access to some e-learning tools: these are elearning content development platform(s), web based assessment tools, content management systems and learning management systems. The tools in the first three categories are now compiled in a Learning Content Management System (LCMS) which is the corporate version of traditional course management systems that were initially developed for higher education.

The core of an e-Learning system typically consists of a learning content management system (LCMS). An LCMS is aimed at managing learning content which is typically stored in a database. An LCMS can also ease content reusability, support content development, manage learners, track their progress and ease collaboration. International Data Corporation (IDC) defines a LCMS as a system that is used to create, store, assemble, and deliver personalized e-Learning content in the form of learning objects. Different LCMSs share the following elements:

•A learning object repository.

•An authoring tool for creating learning objects.

• A dynamic publishing tool for delivering personalized learning content.

A LCMS must include these six features: learning content creation, publishing, content management function, presentation, communication & collaboration function and standard compliant.

- Learning content creation: Providing templates and storyboarding capabilities that incorporate instructional design principle. Allowing an organization to leverage the knowledge assets it has already invested in developing. Putting these authoring tools directly into the hands of the Subject Matter Experts (SMEs), without requiring them to learn proprietary new tools, they can leverage their expertise .
- Publishing: Providing just in time, just-enough delivery over the Web, in both an online and offline format, supporting user tracking and multiple assessment types with user feedback. Content delivering is based on learners' individual knowledge level.
- Content management function: Providing tools to support all management aspects of student records, elearning course, and students' progress and learning objects across dispersed, multilingual environments.
- Presentation: Providing personalized pages to the users in multiple formats such as HTML (web), printed PDF, hand-held (WAP) and more.
- Communication & collaboration function: Learners can email a question to trainers or other learners through the internal email systems and it automatically indicates where the learner is in the course. Learners and trainers can also use external email. Trainers can post bulletin board announcements to the class and learners can email and attach files in response. Some LCMS products, such as TopClass, can integrate with Virtual Classroom Systems.
- Standard Compliant: A LCMS must conform to the leading industry standards, including AICC, SCORM, IMS, HTML and XML, in order to operate in different platforms.

III. PROPOSED TOOLS WITH LCMS

A. Authoring Learning Content Repository Module:

With the help of this module, we can create the content Repository for our LCMS which we used for ELearning. In this , we will create the course content using LOM Specification. As creating content repository for ELearning is an iterative process and course content and structure of courses keeps on changing. So we realized that there is requirement to separate content from structure of a given course.

Why we use MetaData?

The content must be designed in such a way that it could be used many times and must be so packed that its localization and automatic systematization in the incoming catalogue publication could be made. so this can be achieved by using metadata.

Matadata themselves are often called the data about data or the information about information. Actually metadata are the structure information which describe, explain and locates data or facilitates recovery, use or management of information source.

IEEE Learning Object Metadata (LOM) model has 69 metadata elements in 9 categories. These categories and short definitions are:

• General: General information about a LO like identifier, title, description…

• Lifecycle: Past and present situation of the resource and people affect the resource. Which edition, status, publisher, editor, creator etc.

• Meta-metadata: Information about the metadata.

• Technical: Technical requirements like format, size, URL, browser, OS

• Educational: Pedagogical and educational characteristics of the LO like type, audience, time…

• Rights: Usage rights of the resource like required payment, copyright…

• Relation: The relations between the resource and the other related resources.

• Annotation: Comments on the resource's educational use, information about creation time and creators (optional).

• Classification: Describes the reason for this classification (optional for assets).

<general>
<identifier>
<catalog>URI</catalog>

<entry>http://www.elearning.com/watch?v=WsofH466lqk</entry>
</identifier>
<title> <string language="en">software engineering transaction</string> </title>
<language> en </language>
</general>
<classification>
<purpose>
<source>LOMv1.0</source>
<value>educational objective</value>
</purpose>
<description>
<string language="en">Introduces the software engineering concept.</string>
</description>
</classification>
</lom>

3 Tier Architecture for Authoring Content Repository:

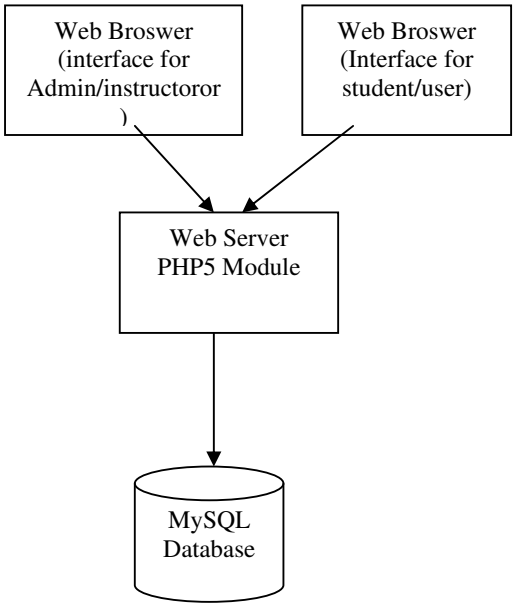

Figure.1 Tier Architecture for Content authoring tool

The module is based on a 3-tier architecture. As front end any state-of-the-art web browser may be used (IE5, NS4). The middle tier is a combination of Apache Web server and PHP5 module. The backend holds a MySQL database and can physically be the same machine as the one running the Web server. Whenever the user selects a link or button Apache delegates the client request to the PHP module executing the appropriate PHP script. In most cases this script will need to interact with the database since it stores all RDF metadata. For communication with MySQL
PHP uses its built-in phpMyAdmin interface. The PHP script evaluates the data returned by MySQL and dynamically creates a HTML page which in turn is sent back to the client browser initially requesting the page.

B. Learning Object Indexing Module:

The increasing number of available learning resources leads to problems of management and sharing. A way to solve some of these problems is to index learning objects with a set of shared metadata. To enable retrieval and indexing of LO, metadata are often used.
It is often difficult to assign values to each LOM element and users must be guided when they have to describe learning objects. So we develop a separate tool for indexing of LO having two objectives: indexing a distributed set of resources referenced by their URL and helping to search for resources. In addition to these objectives, the tool provides a support for a good understanding of the different items.
Our module can be a component that can be added to our authoring LOR Module. Once the user select the LOM category all the relevant information about the LO is displayed.

C. Searching for learning objects

The searching interface allows to fill in the fields that serve to build queries sent to the knowledge base.

Users can mix elements coming from the different LOM categories.They can enter one or more search criteria. When requests are processed, the URLs of learning objects that check the search criteria are displayed. Discovery of resources is performed thanks to SPARQL5 queries against the knowledge base.

In this paper, we described our approach to index LO as a solution for managing sharing, and accessing resources. We showed how we built the ontology and also presented the tool that we developed for LO indexing and retrieval. The tool based on a LOM ontology, mainly describes the type of resources and not directly their content. For example, it is possible to say that a resource is a very difficult exercise, but it is not possible to say that it is a math exercise about the Pythagora's theorem. However, our ontology contains
an open a field allowing to assign keywords to a resource. The idea is to use them in different ways. If application ontologies are available, it is possible to use concept identifiers as keywords and then to add links towards other semantic representations. Otherwise it is possible to insert any keyword.
In this tools, we will use PLQL, a proposal for a simple query language standard for retrieving learning objects from heterogeneous repositories. PLQL is primarily a query interchange format, used by source applications (or PLQL clients) for querying repositories (or PLQL servers). PLQL has been designed with the goal of effectively supporting search over LOM, DC and MPEG-7 metadata.

D. User Management Module

User Registration: Authorized persons may register either a single user manually or more users at once by means of Excel files import. Users dispose of different configuration options, a profile as well as the allocation to system roles. A search form allows looking for users within the system and editing their data afterwards. Users who have not logged in for a predefined period of time can be deleted automatically.
Guests: They are anonymous users with only limited rights. Guests can neither adapt their user interface nor take a test nor contribute a forum entry.
Users: Users can adapt their user interface according to their personal needs as well as create work groups or start a course as participant.
Authors: They can create copy, archive or delete learning resources in addition to the rights ordinary users have.

Group Administrators: In addition to the rights of ordinary users, members of this system role can manage learning or right groups.
User Administrators: They can generate or import new users and allocate roles.
Administrators: They are entitled to implement administrative activities regarding the entire LCMS system in addition to the rights of all other system roles.

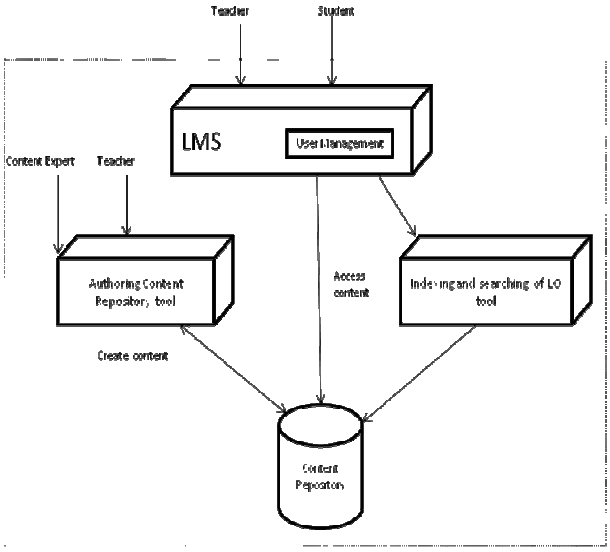

Figure. 2 Component Diagram of LCMS

IV. CONCLUSION

Now day's authors of e-learning courses want to have the flexibility of setting up e-learning courses according to their own ideas. There are various tools for authoring e-learning course, but they are not strictly following the LOM Meta Data standards. LOs are most promising element of e-Learning. As the landscape of e-learning changes, LOs can and should contribute to learning and teaching within a collaborative e learning environment. LOs must be combined and reused for maximum efficiency. It offers many advantages that are beneficial to both teaching and learning. In this we will proposed a LCMS in which authoring Learning Object is a separate module. Our main emphasis's on the creation and indexing of learning objects. We will also provide the search mechanism within the Content repository based on Mata data of LO. In addition separate interface will provide for creation of LO for teacher and instructor.LMS is also implemented as a part of LCMS which includes user management and automates the whole learning process.

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