

Integrating learning management and knowledge management systems

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Abstract: - The paper describes how knowledge management system application can be applied to learning management system to facilitate knowledge sharing, transferring and learning among participants. There is shown an example about contribution and integration these systems at Vilnius Gediminas Technical University.

Key-Words: - E-learning, Learning Management Systems, Knowledge Management, Knowledge Management Systems.

1 Introduction

Universities and other higher education institutions are recognized to be in the knowledge business [4],[9] as they are involved into knowledge creation, diffusion and learning. University's competitive ability depends on institution opportunity to share, spread and adapt knowledge as well as it is created. Modern students will require regular updating of their knowledge, skills and competences. In this context, universities will be required to expand flexibility and innovative learning and teaching [8]. They must recognize and respond to their changing role in a knowledge-based society and need to be consciously and explicitly managing the processes associated with the creation of their knowledge assets.

In this paper is presented knowledge management (KM) application in learning management system (LMS) to facilitate learning processes. KM and LMS used to be two worlds but they can converge, KM systems can be part of learning solutions [14]. Learning occurs when people share their data, information and knowledge. The gap between the rate of change via technology and the rate of learning in the distance learning environment is growing. One way to reduce the gap is to utilize KM systems to provide learning skill gap analysis, course delivery, online testing and reporting [3]. In order to make more easily apprehend interaction between KM and LMS we will set out both of these systems.

Learning management system's primary function is to manage learner information, administration and access to courses. It also allows creating, managing and delivering trainings. It is most often referred to as the "learning portal" (Fig. 1) that links users with the various learning activities and can be used to manage

the course catalog and to link different types of e-learning activities together in order to deliver a blended solution [6]. Examples of LMS systems are Saba, Docent LMS, Blackboard, IBM Lotus LMS, MicroLink and TopClass.

There are many different definitions of knowledge and knowledge management in literature. Differentiation of data and information gives a more adequate definition of knowledge. Data is raw or discerned elements. When these elements are patterned in a certain way, data is transformed to information. Once certain rules or heuristics are applied to this information, knowledge is then created as actionable information for producing some value-added benefit. KM is a discipline to systematically leverage information and expertise to improve organizational responsiveness, innovation, competency, and efficiency [5], [7], [13]. Knowledge in this context includes both the experience and understanding of the people and the information artifacts, such as documents and reports, available within the organization and in the world outside [10]. When knowledge is created and collected they can be indexed, and stored in an archive. At a later time, it is retrieved from the archive and reused. Finally, as knowledge is reused, it is refined and becomes more valuable [11], [12]. Knowledge can be classified into two types: explicit knowledge, the knowledge included in documents or books and tacit knowledge, the knowledge that can be acquired by experience, communication. Tacit and explicit forms of knowledge can converse. Both forms of knowledge are important for organization effectiveness [12].

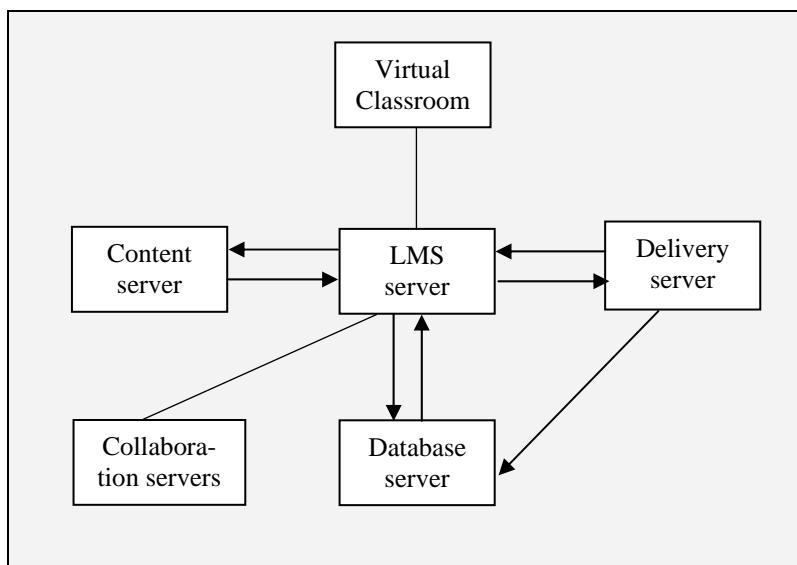


Fig. 1 Typical scheme of LMS

2 Learning Management System

Learning management systems are becoming an integral part of small and large-scale learning environments and can provide a range of capabilities and features. They also include tools for tracking and reporting user training performance. More specifically, a LMS provides the following capabilities: registration for instructor-led training, assignment of instructional responsibilities, setup of courses and curriculum planning, delivery of tests and assessments, tracking and reporting of student progress and performance, generation of certifications and regulatory compliance reports [9].

The IBM Lotus Learning Management System provides a framework for delivering many types of training. It delivers learning management solutions to corporations, governments and educational institutions integrating its extensive learning capabilities in consulting, content design and development, infrastructure technologies, outsourcing and research. It is made up of several software components, dividing functionality among multiple applications and these varied components work together to provide a comprehensive solution to the problem of learning management. The IBM Lotus Learning management system can be used for managing both classroom-based and e-learning activities, resources, curriculums and learning solutions. It organizes and delivers courses, tracks and reports on student activities and reserves instructors and resources enabling customers to manage their training program from a single platform [1]. The LMS includes several required and

optional components: Learning Management server, Authoring tool, Delivery server, Offline Learning Client.

3 Knowledge Management System

One of the knowledge management systems is IBM Lotus Discovery System. It provides search and expertise location solutions designed to ensure that the relevant knowledge and collective experience of an organization is readily available to help individuals and teams solve everyday problems [15].

The Discovery server provides sophisticated tools that categorize documents and user information into a browsable and searchable form. It is a back-end server that spiders documents and your organization's directory to create taxonomy of documents and identifies expertise areas of profiles users and places that the end user can browse and search. The Discovery server provides the following tools: Knowledge Map (K-map) or taxonomy, profiles, spiders and other tools.

K-map is graphical representation of your organization's knowledge. It displays a hierarchical set of categories and documents you can use to find information. Additional information about relationships between people and document activity adds value and context to the user's search and retrieval experience. K-map displays related documents, people and places in categories, so users can browse and search for information in context.

Profiles help identify the right people for the right job. Profiles collect existing user information from the directory and other sources providing a more

completely representation of the users in your organization.

Spiders collect data from different file formats. Each supported date type has its own customized spider [13].

Metrics are computational tasks that collect usage information and calculate the value of a document and

an affinity between a person and categories based on the person's interactions with documents in the categories which in turn help produce category affinities.

The architecture of IBM Lotus Discovery architecture is shown in Fig. 2.

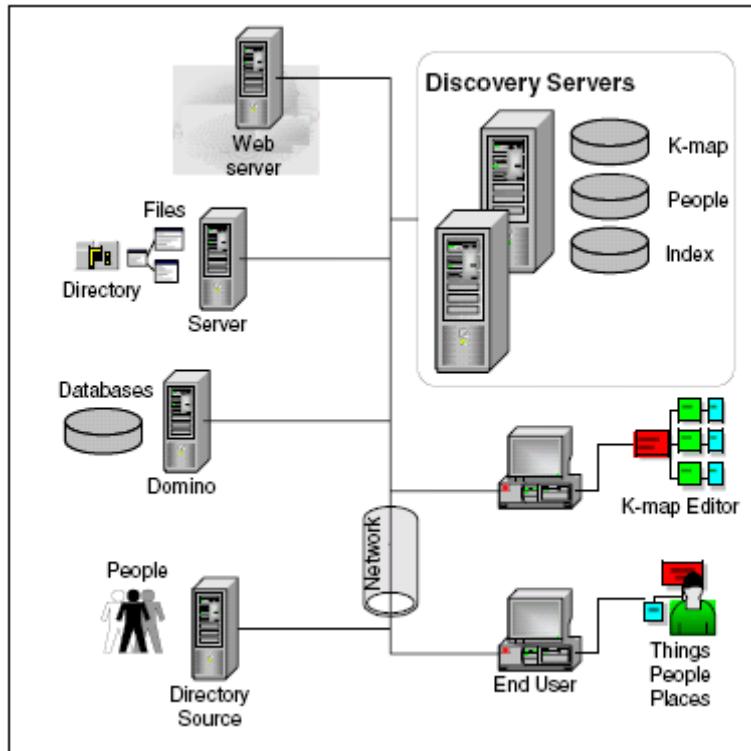


Fig. 2 The Lotus Discovery system architecture

4 Framework of LMS and LDS

IBM learning technologies are used at the department Information Technologies in Vilnius Gediminas Technical University (VGTU) [2], [6] since it became member of the IBM Academic Initiative [16],[17]. The scheme of Virtual University infrastructure is shown in figure 3. This project is being realized and the testing of the different components is being started. The LMS relies upon a standard HTTP server for delivery and uses a relational database system for its data storage. The Delivery Server is a LMS component that connects students to courses, performing tasks that support the sequencing, launching, and tracking of course content.

The LMS requires that user information is stored in a LDAP directory. The directory contains general user information that may be accessed by more than one application. LDAP is the de facto standard regarding directory services and a guarantor for interoperability of heterogeneous platforms, systems and environments.

Many learners have different roles and move within different parts of a large organization, and may often be a part of multiple user groups at the same time. In LMS, permissions can be granted to users by assigning them roles or by adding them to access control lists for specific objects, a user may have more than one role.

LearningSpace - Virtual Classroom (LVC) provides a framework for designing, scheduling, managing, and delivering virtual classroom courses. Course developers can use the Authoring Tool (AT) or LearningSpace, or other tools on their workstations to create courses and export it to the LMS as it supports the SCORM 1.2 standard. When course developers create course content in the AT, they can add materials for live sessions as one of the activities. This means that you can set up blended courses, which include live sessions. Live sessions are hosted on a LearningSpace - Virtual Classroom server, and courses chats are hosted on a Sametime server, online discussions are hosted on a Domino server. Also, Domino server contains

various libraries of data, such as various documents of the department; library of Bachelors' final works, Master theses, and administration documents, library of e-books, news page, schedules, virtual jobcentre, etc [6]. Students can use papers and works of previous students thus reusing and increasing value of knowledge. Also, it could be used as a prevention of unfair behaviour of students thus they can use and reuse previous papers and works of students. Content

servers store course content files for use with the LMS. The files are accessed from course outlines using URLs. Application of the WebSphere Application server on the basis of Java, XML, HTTP and other technologies are used. Thereby two different application servers that perform different functions are used in the distance education information system.

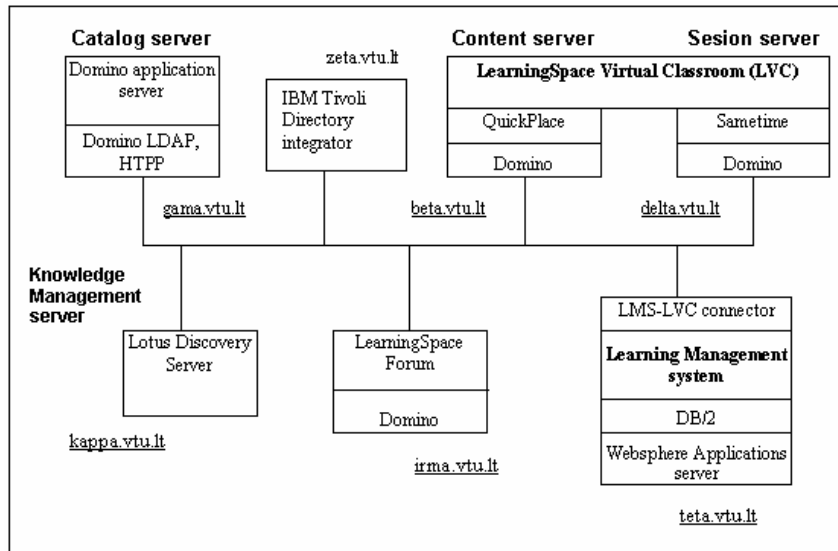


Fig. 3. The virtual university's infrastructure scheme

Specifying Discovery Server in LMS settings enables a Knowledge Search link (figure 4) on the LMS Home Page that takes a user to the company's K-map. If a course developer entered Find an Expert keywords for a given course in the authoring tool, the Knowledge Search link is also displayed in the Course Tools menu for that course.

KM system is being applied for organizing course's material, creating and expertise, learning, sharing and combination knowledge.

Once the user is successfully logged in, the LMS server provides the client browser with an interface allowing access only to set of features associated with each user's defined permissions. Content files are stored on several content servers. The Discovery system can help learners to find and get necessary information from different information resources. It is especially helpful and advantageous for distance learners when a direct contact between the student and

the instructor is absent. The Discovery server also makes it easier for end users to find everything about the resources they need across various systems and information sources. It provides search results from across the data repositories on information relevant to the subject matter of the course. Through the combination of automatic processes and administrative tools the Discovery server creates a unique taxonomy of your content, experts and community workspaces generate affinities representing expertise to topical areas, mine skills to create complete expertise profiles, dynamically calculate and assign document and affinity values, group and organize information to category areas, search for documents, people and topics across disparate sources. Tacit knowledge from chats and discussion forums are collected from Sametime and Domino servers as explicit knowledge from content servers and others as well.

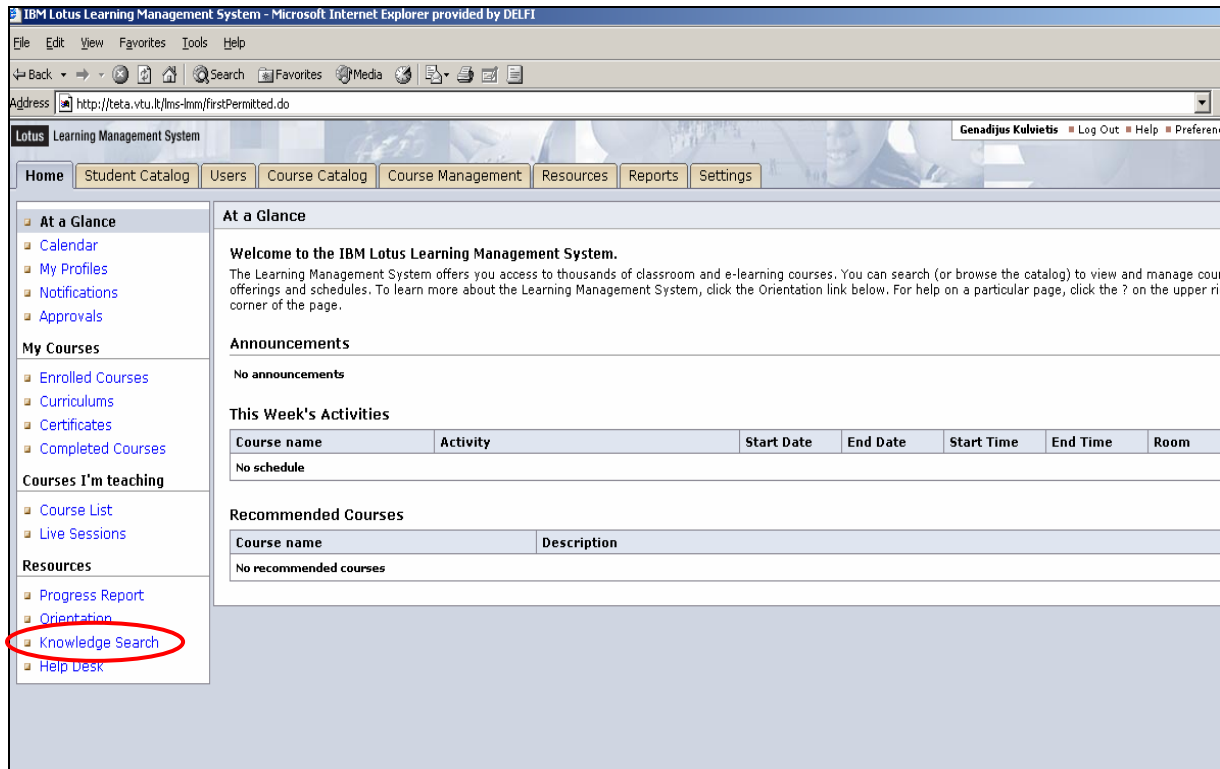


Fig. 4. The LMS home page

5 Conclusions

The primary objective of KM in LMS is to facilitate knowledge sharing, transferring and learning among participants. LMS delivers learning management solutions but for founding Virtual University it is not enough. Added KM technologies help to ensure that the right people get the right information and learners benefit from not to disorient in plenty of information, knowledge which is created during learning and teaching processes would be stored, distributed, used and reused.

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