

A Concept of Virtual University Implementation

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Abstract. This paper presents the conceptual structure of the virtual university information system. Information technologies are needed that provides the ability not only to present educational material, but also to effectively manage the learning process, resources and the educational institution itself in a centralized manner. A system of distance learning must be an integral part of the organizational information system.

Keywords: virtual university information system, learning management system

1 Introduction

The Lithuanian distance learning network LieDM links many educational establishments in different parts of the country. Currently there are 3 full distance learning programs – master studies “Information technologies” for first and second year students at KTU, interuniversity master program “Open and Distance Learning” and distant master studies “International Communication” at University of Vilnius. In the year 2001-2003, 392 distance education courses were designed, 18000 registered users used e-learning courses of LieDM network [1]. This is a step towards creating virtual universities.

Various WWW virtual learning environments are used for learning in LieDM network. Currently WebCT is the most popular distance learning environment in Lithuania. About 87% of all distance education courses of LieDM network are designed in this environment. LearningSpace and FirstClass environments are also used for distance learning through not so widely spread. About 13% of distance education courses are designed in these environments. [1] The wider variety of media in use, the more important becomes the task to create the system capable of managing all kind of distance courses regardless of the media they have been created with.

In a real university thousands of students study, tens of courses are offered, hundreds of lecturers and instructors teach, and the university administration is also present. Therefore, the need arises to manage not only separate courses. Information technologies are needed that provides the ability not only to present educational material, but also to effectively manage the learning process, resources and the educational

institution itself in a centralized manner. A system of distance learning must be an integral part of the organizational information system.

We think that it is a time of interesting in a virtual university development. The Virtual University is: an open, evolving, learning technology environment based on a ubiquitous, distributed computing infrastructure effectively encompassing all operational, educational, learner, organizational, and technological characteristics, with interoperability of components, operations, learning, learners and organizations across all of these dimensions [2].

E-learning is technology-enabled learning. Therefore, the virtual university information system should be constructed around an evolving set of open standards and specifications for the Internet, e-learning, and learning management. This approach insures widespread interoperability of data between the various elements of the VUIS.

How does a virtual university operate? It is comprised of three parts: human resources (students, professors, tutors, administrators etc.), learning resources (e-books, courses etc.) and technological infrastructure (hardware, software, networks). A virtual university information system (VUIS) provides a single access point for a collection of services, rather than making the user accesses each of the different services directly and individually. The core features of any VUIS include a set of services for learning content delivery and a set of services for learning management, including some integration with existing back office systems for tracking and management. [9]

2 VUIS functionality and conceptual structure

A VUIS often delivers the following functionality that are presented [4,5,6]:

- Supports an enterprise level virtual university.
 - Provides learner- or user-centric services.
 - Provides a single access point for all services (a single portal).
 - Provides a single access point for all users (users differentiated by role, not access).
 - Provides an individualized, customized and personalizable learning and learning management environment.
 - Supports the entire lifecycle of educational and training activities.
 - Is based on a collection of open consensus specifications and formal standards.
- Integrates with back-office systems via open standards-based linkages.
 - Has an open architecture.
 - Operates on a distributed computing and service infrastructure.
 - Utilizes an Internet infrastructure.
 - Is fully web-based with web interfaces for all functionality.
 - Is applicable across the spectrum of organizational types and learning activities.

A usable VUIS architecture must be modular, extendable, customizable, scalable, and provide consistency. The architecture must describe how the components fit together, and specify the protocols and interfaces are used to integrate these components [11].

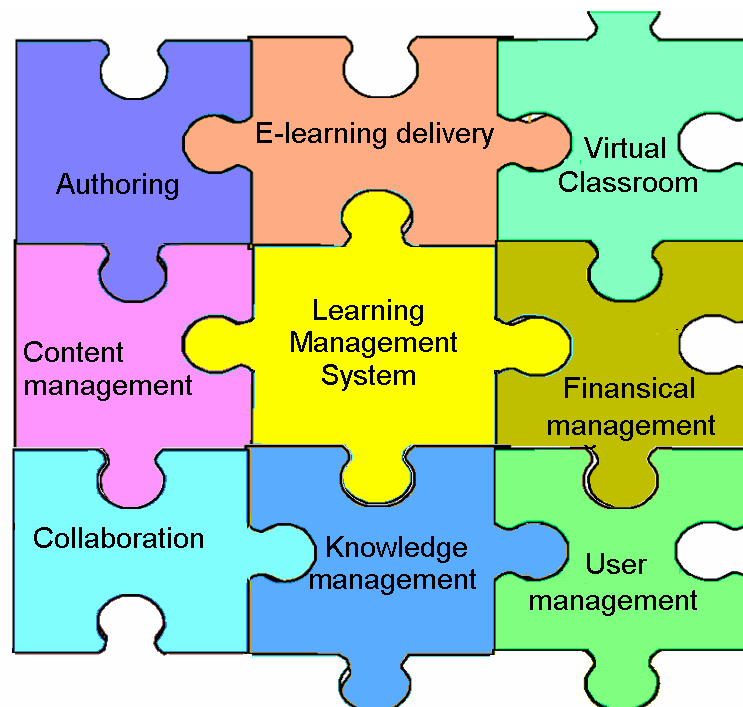


Fig.1. Concept of VUIS

A major component of the VUIS is the Learning Management System (LMS). LMS services differ by tool vendor, but most typically include: course scheduling, course registration, one or more Learning Delivery Systems (LDS) managing, student tracking and completion reporting. To enable an organization to manage the delivery of a variety of courses, LMS provide mechanisms to integrate content from different authoring and delivery environments into the LMS course management structure. An LDS is responsible for delivering courses to a student and handling all related interactions.

Collaboration services enable individuals and groups to communicate and work together in asynchronous (e-mail, Bulletin Boards, etc.), and synchronous (Chat, Instant Messaging, etc.) settings. Using a “lego block” approach, the administrators has the ability to configure Collaborative Workplaces where the “lego blocks” can be “pre” joined to create a planned or intended Collaborative Workplace [11]. Collaboration Services should be well integrated with other services.

Exact implementations of a Virtual University vary.

3 Distance learning system at VGTU IT department

VGTU Information Technologies department is “IBM Certified for e-business University Initiative” [12] and has an opportunity to use IBM providing software for creating an interactive learning environment.

We had analyzed virtual university structures and using technologies as well. This analyze let us project the conceptual structure of the virtual university information system (Fig. 2). The scheme is being used and tested.

Lotus Learning Management System (LMS) plays a key role in the e-Learning environment. Its primary function is to manage learner information, administration, and access to courses. It is used to manage the course catalog and to link different types of e-Learning activities together in order to deliver a blended solution. The LMS relies upon a standard HTTP server for delivery and uses a relational database system for

its data storage. The Delivery Server (DS) is an 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 an 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 [13]. 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.

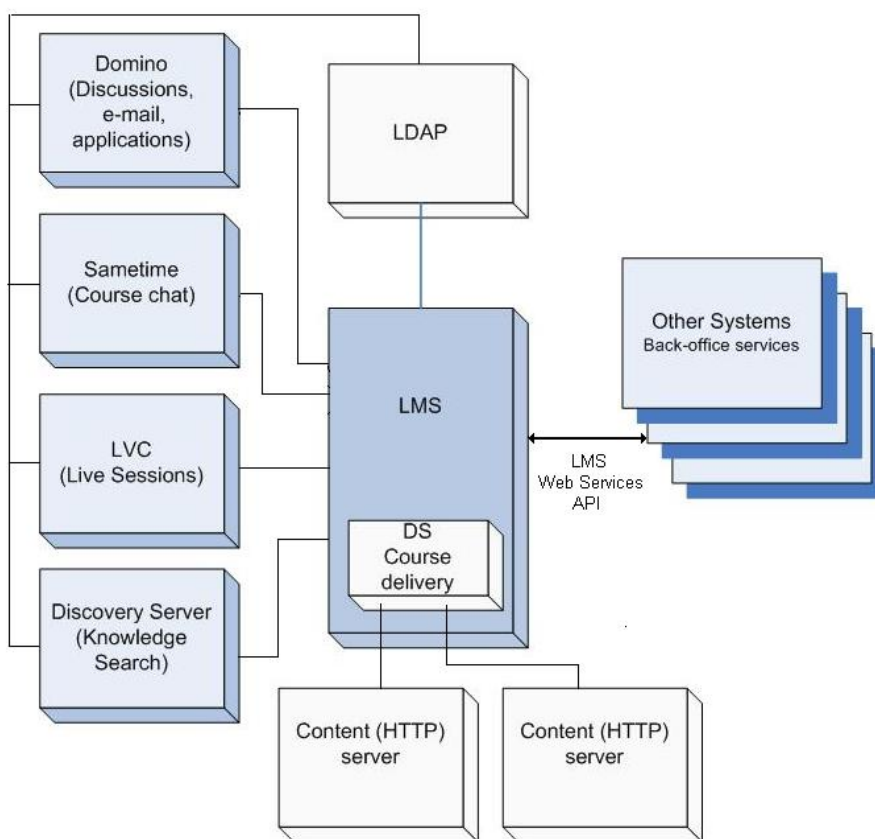


Fig.2. VUIS Conceptual Structure at VGTU IT Department.

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. The LMS support SCORM 1.2 standard. Content supporting

earlier versions of AICC and SCORM can be imported into the AT and converted so that the LMS can track it. When course developers create course content in the AT, they can add materials for a 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 [14]. Content servers store course content files for use with the LMS. The files are accessed from course outlines using URLs.

Knowledge management (KM) systems can be a part of a learning solution. In our scheme it is presented as Lotus Knowledge Discovery Server. The KM system can, for instance, allow curriculum planners, instructors, or learners to search for subject matter experts in the corporation, or find existing relevant materials within a company’s intranet.

The VUIS Conceptual Structure (Fig.2) can realize all main VUIS functions discussed in Section 2. Also, the additional knowledge management and searching component, Lotus Knowledge Discovery Server, is added that permits system users to faster and more accurately find the information needed.

4 Conclusions

VUIS is projected on the basis of the analysis of LTSA and learning standards, VU conceptions and functionality requirements.

The implementation of this system can be considered as an attempt to create a virtual university. The LMS, a core component of the VUIS presented, supports the extension and optimization of the different learning offerings within an organization and combines different learning components in blended learning solutions. Developing a common framework and structure that can be shared across different organizations or suborganizations increases the ease of use for the learner and learning process effectiveness.

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