DISTANCE LEARNING INFRASTRUCTURE AT VGTU INFORMATION TECHNOLOGIES DEPARTMENT

Regina Kulvietienė, Irma Šileikienė

Vilnius Gediminas technical university
Sauletekio st. 11-L604, LT-10223 Vilnius, Lithuania

Abstract. The blended learning method unites the traditional and distance learning models. In Vilnius Gediminas Technical University (VGTU) this model is used for part-time, extramural and distance studies. Thus, a need to develop and implement distance learning system has occurred, in order to satisfy all students', teachers' and administration needs. Using IBM technologies there is developed an environment for student centered learning at Information Technologies Department.

Key words: distance learning, blended learning, information system.

1. Indroduction

Today's universities and education institutions temporizing with the modern day circumstances should at most approach to students and assure the potential for them to study, contribute up-to-date knowledge for everyone by all available ways. Thus, part-time and extramural studies are coming apace back to study programs at VGTU, and distant learning is plugging its way.

Already since 2003 VGTU Information Technologies Department jointly with Kaunas University of Technology offer distant learning study program "Distant Learning in Information Technologies" at Master level next to traditional full-time Engineering Informatics study program. Starting with this academic year part-time Engineering Informatics basic studies and extramural studies were offered for college graduates.

As this new approach to studies has occurred, teachers were motivated to develop and offer students distant learning course on their subject. Thus, a need to develop and implement distant learning system has occurred, in order to satisfy all students', teachers' and administration needs.

Such a system is implemented and continually improved, taking into account the changing situation and emerging user needs, and new technologies. The system substantially changes the approach towards teaching and learning, new methodologies and technologies.

This system should unite various e-learning methods, control teaching and learning processes effecttively, ensure the highest possible of studies quality and service. It is the main task of our scientific research.

In distance learning, much emphasis has been given to the pedagogical concepts of student centered learning and student motivation, resulting in the design and delivery of high quality courses in higher education as well as more generally in resource based education. We want to use blended learning method. The term **blended learning** is used to describe a solution that combines several different delivery methods, such as collaboration software, Web-based courses, and knowledge management practices. Blended learning also is used to describe learning that mixes various event-based activities, including face-to-face classrooms, live e-learning, and self-paced learning.

Technology is changing rapidly. Everything is moving to the web, like data and information; people and communication; the applications people need and use.

2. Student centered Learning Approach

Over several generations, distance learning has evolved from correspondence courses to video and satellite broadcast models of remote learning. However, distance learning has never provided the quality of learning available in the face-to-face environment of a traditional classroom. The connectivity of the Internet and a new generation of software applications make possible a new model of online learning, one which provides significantly higher quality and flexibility and which is more appropriately labeled "e-

learning". E-learning uses a variety of technologies, learning methodologies, online collaboration, and instructor facilitation to achieve applied learning results not possible from traditional education in a truly flexible, anytime/anywhere fashion.

Academic institutions are under pressure to create new revenue streams using their assets in course creation and teaching, while corporate training departments need access to a broad market in education materials and services – multimedia content, course development and customization services, instruction and infrastructure hosting. Both groups are already heavily involved in experiments and pilot projects.

E-learning will achieve its potential to radically alter the education delivery process only if technology is enhanced to make it a comprehensive solution. E-learning technology must [1, 3]:

- Become a platform for the three major modes of e-learning: asynchronous collaborative, synchronous collaborative, and self-paced learning – a platform which flexibly supports the integration of all three into a single environment.
- Provide scalable management and administration tools for creating and operating not only single courses, but course catalogs, enrollment and registration, recordkeeping, and scheduling – all the functions required to operate a campus or a training department in the real world.
- Support open standards so that all the activities of course design, instruction, business management and campus administration can be shared among business partners – organizations that provide content, customization, hosting infrastructure, and other services that constitute complete solutions.

The value chain for a higher education institution spans the creation of knowledge from research, the management of knowledge, and the distribution of knowledge through education. A complete end-to-end solution for higher education would integrate these processes and deliver support to campus constituents through web-enabled services. This integrated education access and support environment would provide for the creation, storage and delivery of courses, would administer student and financial transactions, and support faculty, student, and management information requirements. So this is moving to student centered learning (Figure 1).
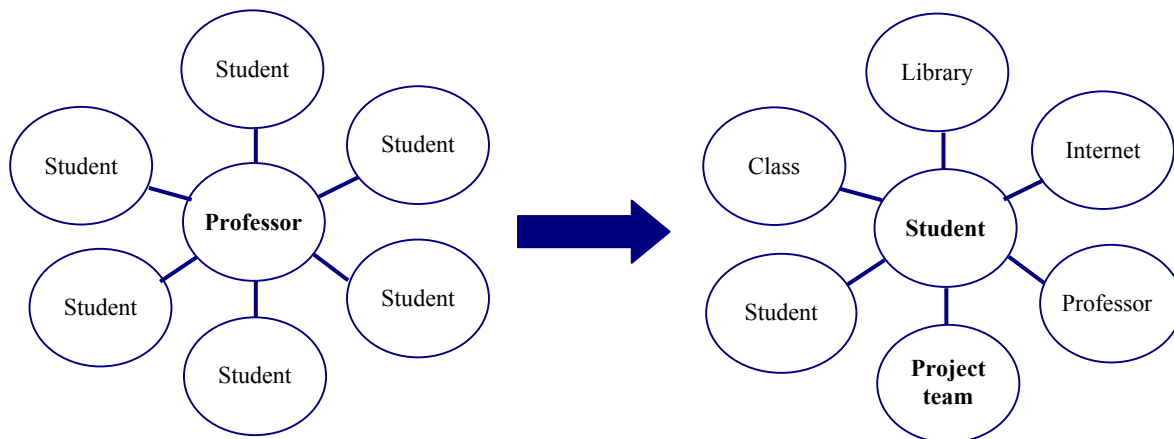

Figure 1. Moving to Student Centered Learning

Moving to student centered learning is:
- Providing access all the time, from anywhere;
- Flexible learning resources;
- Array of support services;
- Meeting student needs and expectations;
- Providing quality in student learning:
  - Collaboration;
  - Active learning;
 - Technology as enabler.

Institutions are transforming administrative processes and teaching through learning management systems.

E-learning is technology-enabled learning. There are many types of e-Learning technology, including the live virtual classroom. Once we have seen the different approaches to e-Learning and the various underlying technologies required to deliver it, let us see what ***blended learning*** is about. Blended learning means different things to different people [2]:
- To combine different modes of Web-based technology in a single learning program (live virtual classroom, and asynchronous collaborative work).
- To combine various pedagogical approaches (for example constructivism, behaviorism, and cognitivism) to produce an optimal learning outcome with or without instructional technology.
- To combine any form of instructional technology (combine videotape, CD-ROM, Web-based training, film) with face-to-face instructor-led training.
- To mix or combine instructional technology with actual job tasks.

The blended e-learning method could be founded and realized using Learning Space Virtual Classroom technology.
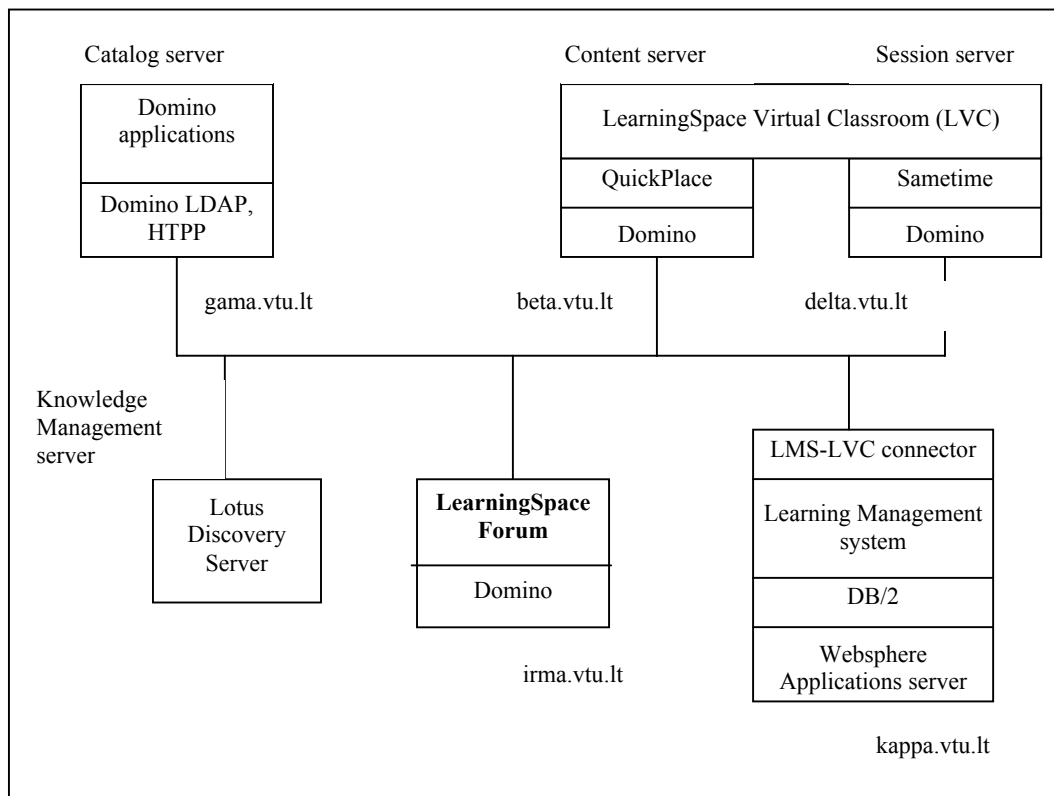
Picture 2. The scheme of the distance learning system

3. IBM Learning framework at VGTU IT department

Since 1994 VGTU Information Technologies department participates in IBM Scholarship program [3] and has an opportunity to use IBM provided software for creating an interactive learning environment.

We have analysed the literature about e-learning methods and about the using technologies as well. This analysis let us project the scheme of the distance learning system (Figure 2). This scheme should help to establish courses putting into practice the blended e-learning method. The scheme is being used and tested.

Lotus Domino is a server that provides an ideal communications infrastructure by tightly integrating the robust functionality of enterprise-ready, client/server messaging and groupware with the open standards and global reach of the World Wide Web. Domino enables individuals and organizations to communicate with colleagues, collaborate in teams, and coordinate business processes within and beyond their organizational boundaries to achieve a competitive edge. Domino supports a variety of clients and devices, including Web browsers, Lotus Notes clients, and various mail and mobile clients.

Lotus Notes is an enterprise or workgroup-computing environment that helps people work together effectively, regardless of platform or technical, organizational, geographical, or time-based boundaries.

Lotus Notes based information can be shared across any distance, at any time.

LearningSpace is the product family and platform that integrates the Lotus vision for solutions for any-time learning. LearningSpace, built on Lotus Domino, provides the market's best framework for asynchronous collaborative learning.

IBM **Web Sphere Application Server** lets you achieve your "write once, use anywhere" goal for servlet development. The product consists of a Java-based servlet engine that is independent of both your Web server and its underlying operating system. Application Server offers a choice of server plug-ins that are compatibles with the most popular server application programming interfaces.

LearningSpace - Virtual Classroom provides a framework for designing, scheduling, managing, and delivering virtual classroom courses, as well as managing participants.

IBM Lotus LearningSpace – Virtual Classroom offers the following functions [2]:

- Course builder – provides the framework for building outlines, selecting virtual classroom tools, authoring assessments.
- Course scheduling – allows you to schedule courses.
- Notifications – handles course invitations and reminders.
- Course catalog – lists all available courses, or the courses in which a learner has enrolled.

- Enrollment manager – administers the enrollment and admission of learners in courses.
- Administrative tools – includes user management, enrollment reports, security settings, and the like.

Not all the functionality of LearningSpace - Virtual Classroom is based on synchronous technology. The synchronous functionality is delivered by Lotus Sametime technology while the asynchronous functionality is based upon Lotus QuickPlace technology.

LearningSpace – Virtual Classroom can be used either as a standalone product or in combination with a Learning Management System [4]

A **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 most often referred to as the "learning portal" that links users with the various learning activities. In some cases, 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.

A Learning Management System often delivers the following functionality [5]:

- Learner enrollment
- Learner administration
- Tracking management and information scoring

- Reporting
- Curriculum management
- Competency management
- Skill gap analysis
- Classroom-based training management
- Live virtual classroom management
- Sessions and learning activities scheduler
- Learning resource management
- Course catalog, including advanced search capabilities
- Common course authoring management

An LMS usually relies upon a standard HTTP server for delivery and uses a relational database system for its data storage. Examples of LMS systems are Saba, Docent LMS, Blackboard, IBM LMS1 and TopClass. We use IBM LMS1.

Knowledge management (KM) systems can be a part of a learning solution. In our scheme it is presented as **Lotus Knowledge Discovery Server**. KM and e-Learning used to be two separate worlds, but they are now starting to converge [6]. A 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.
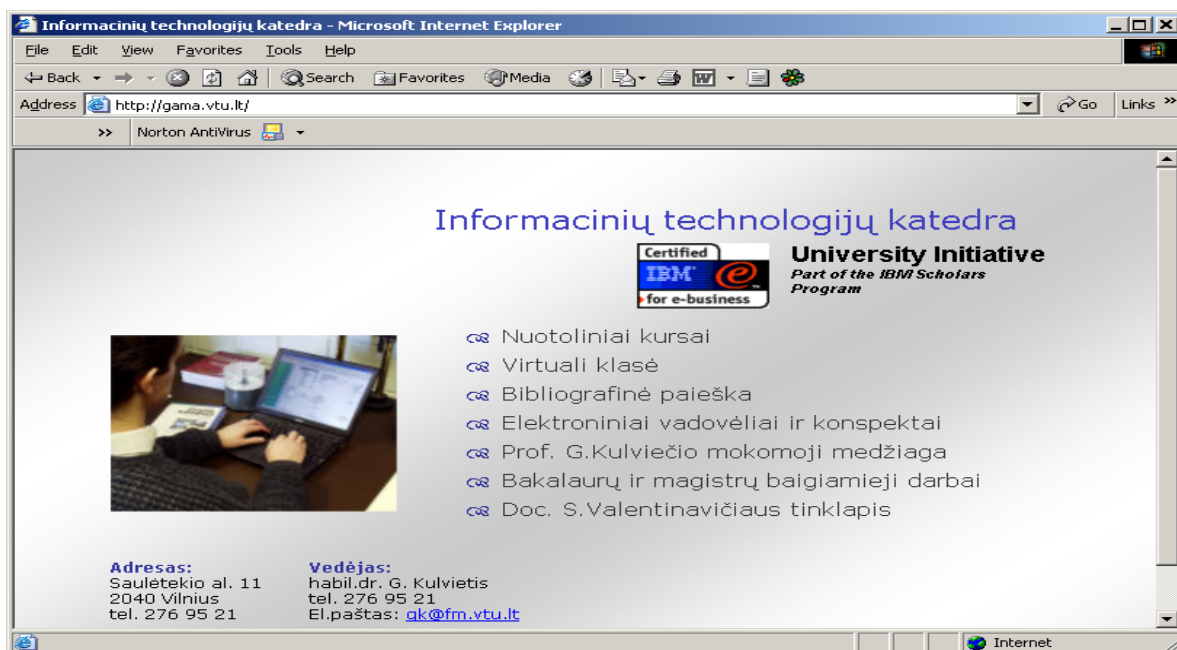

Figure 3. The main page of IT department

4. What can students and teachers find in our system?

In Information Technologies Department there is an implemented information system (Figure 3). It contains distant learning courses in LearningSapce system

(Figure 4), various libraries of data, such as various documents of the department; library of Bachelors' final works, Master theses, and administration documents (Figure 5); library of e-books; news page, users catalogue, schedules, virtual jobcentre, etc.
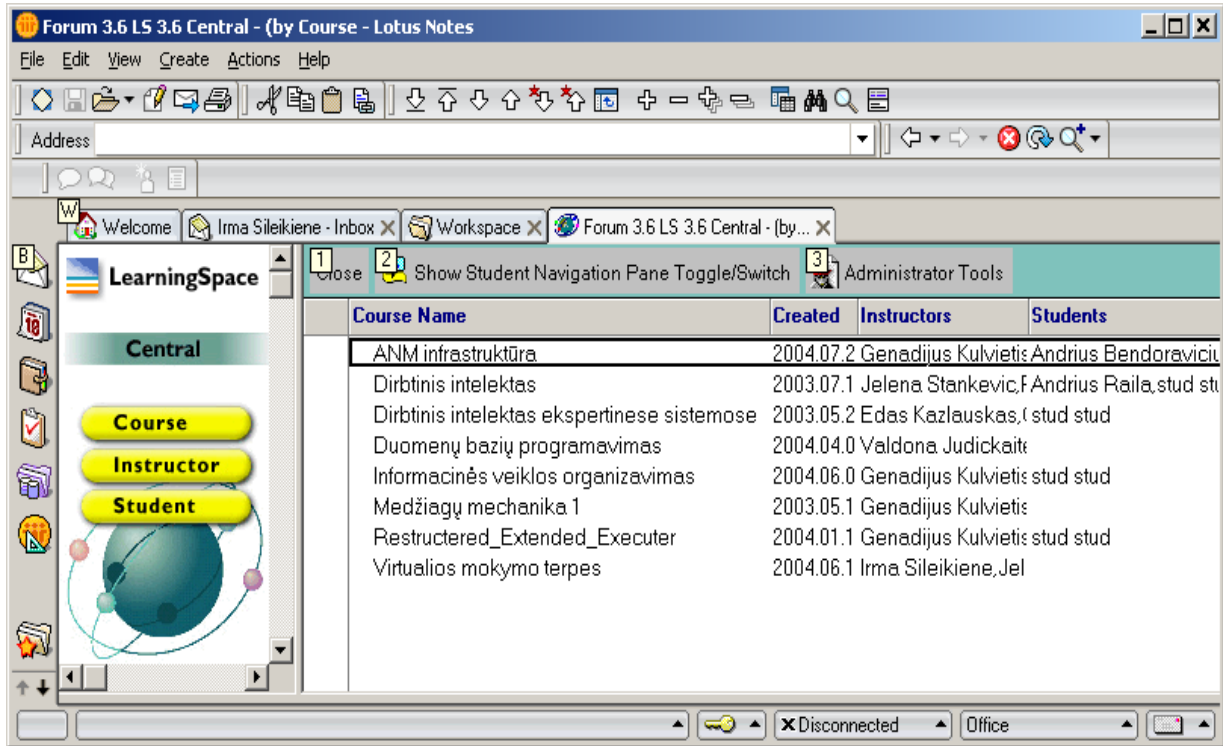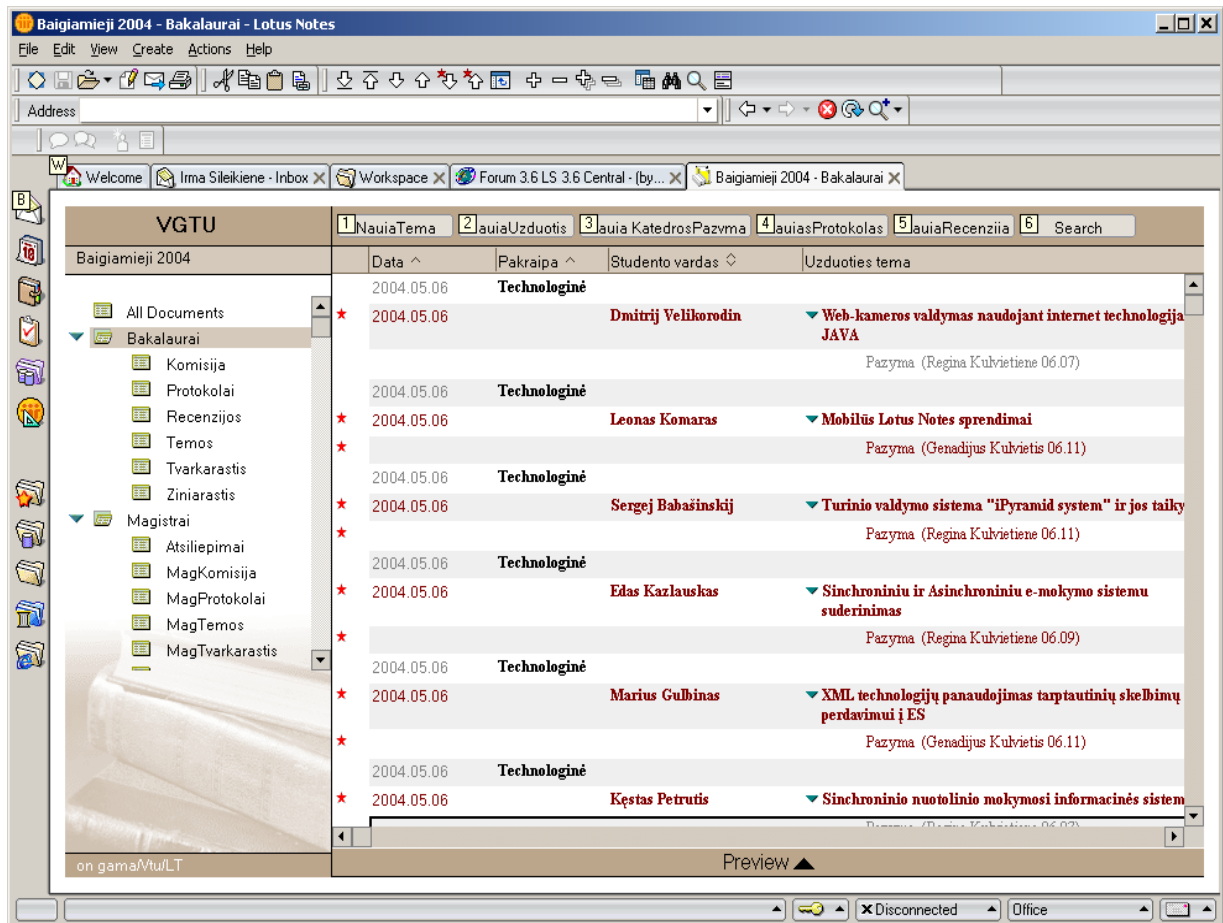
Figure 4. The catalog of distance courses

Figure 5. Library of Bachelors' final works, Master theses, and administration documents

5. Conclusion

VGTU Information Technologies department participates since 1994 in IBM University Scholarship program and has an opportunity to use IBM providing software for creating an interactive learning environment.

Using IBM technologies we have developed an environment for student centered learning at Information Technologies Department. It allows to administer and manage learning processes effectively and apply distance learning technologies for extramural studies to extend their possibilities.

We have chosen blended learning method, as the most suitable, to organize distant learning studies.

The distant learning course in information technologies is included in Engineering Informatics basic study program.

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