

**DOKUZ EYLÜL UNIVERSITY
GRADUATE SCHOOL OF NATURAL AND
APPLIED SCIENCES**

**WEB-BASED DISTANCE LEARNING SYSTEM
APPLICATION**

**by
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İZMİR**

WEB-BASED DISTANCE LEARNING SYSTEM APPLICATION

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In Partial Fulfilment of the Requirements for the Degree of Master of Science
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**by
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İZMİR**

M.Sc THESIS EXAMINATION RESULT FORM

We have read the thesis entitled “**WEB-BASED DISTANCE LEARNING SYSTEM APPLICATION**” completed by **MUHAMMET SERKAN ÇINAR** under supervision of **ASIST. PROF. DR. ŞEN ÇAKIR** and we certify that in our opinion it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Science.

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WEB-BASED DISTANCE LEARNING SYSTEM APPLICATION

ABSTRACT

In this study, a Web-Based Distance Learning System Application was developed. While developing this software, requests made by a Turkish public institution were analyzed. Sample lecture materials were prepared and a questionnaire was submitted to staff of organization to assess our efforts. The questionnaire provided data about the website format, presentation of courses, infrastructure, functionality and the performance of the other technical issues. Results showed that the website was accepted by the staff as successful. Besides, individual oriented education in distance education was presented with a different point of view which focuses on the application of IPTV to the system of distance education.

Keywords: Distance education, Web-based distance learning, Internet Protocol Television, Life-long learning.

WEB TABANLI UZAKTAN EĞİTİM SİSTEMİ UYGULAMASI

ÖZ

Bu çalışmada, bir Web Tabanlı Uzaktan Eğitim Sistemi Uygulaması geliştirilmiş ve uygulanmıştır. Yazılım geliştirilmesinde bir kamu kurumunun gereksinimleri göz önünde bulundurulmuş ve analiz edilmiştir. Uygulamamızı değerlendirebilmek için örnek ders ve içerikler hazırlanmış, geliştirilen değerlendirme anketi kurum çalışanlarına uygulanmıştır. Bu yapılan anket ile sitenin formatı, derslerin sunumu, teknik altyapı ve performans ile ilgili veriler toplanmıştır. Elde edilen veriler uygulamanın çalışanlar tarafından başarılı olarak bulunduğunu göstermektedir. Ayrıca, uzaktan eğitimde birey merkezli eğitimin, etkileşimli IPTV(Internet Protocol Television) teknolojisi ile gerçekleştirilmesine yönelik farklı bir bakış açısı sunulmaktadır.

Anahtar sözcükler: Uzaktan eğitim, Web tabanlı uzaktan eğitim, Internet Protokolü Televizyonu, Yaşam boyu öğrenme.

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CHAPTER ONE

INTRODUCTION

Distance learning is a way of education that focuses on teaching methods and technology with the aim of delivering to students who are not physically present in a traditional educational setting. Distance learning is essentially the computer and network-enabled transfer of skills and knowledge. Applications and processes include Web-based learning, computer-based learning, virtual classroom opportunities and digital collaboration. Content is delivered via Internet, intranet/extranet, audio or video tape, satellite TV, and CD-ROM. It can be self-paced or instructor-led and includes media in the form of text, image, animation, streaming video and audio. Distance learning is described as "a process to create and provide access to learning when the source of information and the learners are separated by time and distance, or both". Distance education courses that require a physical on-site presence for any reason have been referred to as hybrid or blended courses of study. It comprises all forms of electronically supported learning and teaching. The information and communication systems, whether networked or not, serve as specific media to implement the learning process.

Much of the literature on Web-based learning shows that one of the main barriers to the effective use of teaching materials is the technology rather than the design of the learning materials themselves. Through programming, designers can produce interactive course materials containing online activities, animations, and simulations. These can improve learning and are often more enjoyable and meaningful for learners. Honeyman & Miller (1993) mentioned that the rapid developments in telecommunication technologies, tightening budgets, and changes in student demographics stimulate an increasing interest in distance education in all educational settings. Increasing requests of individuals for the knowledge, storage, sharing, updating and reaching (Kaya, 2005) have emerged the Internet technology that offers easy, cheap, fast and reliable access to information.

During the last decade, the rapid growth of the Internet, communication and multimedia technologies encouraged Distance Educational Technology towards the Web. Most of the universities in the developed countries have started using distance learning Technologies. Kumaravel & Manoharan (2010) mentioned that learning outside the four walls of the class rooms is the trend of the day and e-learning results in superior retention compared to traditional learning. Studies confirm that online learning processes lead to 60% faster learning curve. Moreover, the delivery of content in smaller units further contributes to a more lasting learning effect. In our country many studies are also accomplished. Particularly, courses on Web-based distance education introduced by the state universities and institutions are some of the examples of this area.

In this thesis, we implemented a new Web-based distance learning (WBDL) application. This new approach was applied to an organization's life long learning process. The structure of our study composes of the following chapters. In the first chapter the problem definition, contributions to science, the aim of the thesis and the method we followed are given. The aim of the second chapter is to review and define distance education, distance education types, cost effectiveness of distance education, new trends on distance education and delivery technologies, advantages and disadvantages of WBDL. In the third chapter, the general framework of the application is provided. In the fourth chapter, a new technology for distance education called IPTV and software modules running on IPTV platform that can be used for distance education are discussed. Questionnaire developed to assess the website format, presentation and technical infrastructure for some modules of WBDL application, such as screen design, accesssibility, usability, durability is presented in chapter five. The conclusion and the future work are mentioned in the following chapters.

1.1 Problem Definition

With the developments in technology, there is an inreasing demand for qualified staff in Turkish Organizations. In the face of increasing neccesity of education, it was a problem that all the duties could not be accomplished by the personnel. Thanks to

the developments in web technologies, information can be easily shared without time or place limitations. Government agencies and companies have encountered loss of time and money in-service training of the staff in Turkey.

In recent years, many distance learning systems have been developed by universities. The efforts to integrate these distance education systems with the courses designed by the organizations have failed. Among the crucial reasons for this failure are institutional structures, differences of organizations' instruments used by the staff in-service training, definitions and classifications of staff.

1.2 Contributions to Science

This study is very important on account of;

1. Explaining new trends of distance education delivery technologies in the world,
2. Offering a new Web-based distance education system design and application using new technologies for course based distance education systems of Turkish Organizations,
3. Supporting concepts of "Life-Long Learning" and "Individual-Driven Education" with new technological tools complying with distance education,
4. Offering new suggestions to cause education become more enjoyable, effective and fertile concerned with training nonliterate and literate adults,
5. Offering IPTV based distance education in Turkey and encouraging new researchers in this field.

1.3 The Aim of The Thesis

Distance learning systems can be very effective and useful to provide a learning environment in which teachers and students can participate in the same lecture and exchange their ideas and opinions remotely. The general aim of thesis is to develop a WBDL application for the delivery of course materials regardless of time and place in Turkish Organizations, and offer a new distance education technology for accessing all of the citizens.

Some parts of application of WBDL system were studied on its format, presentation and technical infrastructure by a public survey to see whether they were usable for distance education or not.

1.4 Material and Method

The application was developed by .NET 2008 environment by using C# and ASPX programming languages. The database was designed by using MSSQL Server and MS Access. The software is running on Internet Information Server (IIS) web server and Microsoft Windows Server 2003 operating system due to large number of users. A group of staff participated in our online assessment questionnaire. And the results of this questionnaire were examined statistically.

CHAPTER TWO

LITERATURE OVERVIEW OF DISTANCE EDUCATION

The major aim of this chapter is to review and define distance education, its types, cost effectiveness, new trends and delivery technologies, advantages and disadvantages of WBDL.

2.1 Distance Education

Thach & Murphy (2006) emphasized that advances in communication technology, emphasis on cost-savings, and changing demographics are just a few of the reasons for new emphasis on distance education. With this growth come challenges in human resource development in terms of new skill acquisition for faculty and other distance education professionals.

There are many definitions of Distance Education in the literature. Despite the fact that the fundamental thoughts of each are mainly similar, developments in technology forced the writers to make wider definition in the course of time. The subsequent definitions are particularly chosen because each of them has the common point like nonadjacent communication between student and teacher.

As defined by Honeyman & Miller (1993) :

Distance education, or distance learning, is a field of education that focuses on the pedagogy, technology, and instructional system designs that aim to deliver education to students who are not physically "on site" in a traditional classroom or campus. It has been described as "a process to create and provide access to learning when the source of information and the learners are separated by time and distance, or both."

The ITC (Instructional Telecommunications Council) definition is:

The process of extending learning, or delivering instructional resource-sharing opportunities, to locations away from a classroom, building or site, to another classroom, building or site by using video, audio, computer, multimedia

communications, or some combination of these with other traditional delivery methods.

Another definition is given by Swan and Jackman (2000):

Distance education, according to the U.S. Department of Agriculture, is a process to create and provide access to learning when the source of information and the learners are separated by time and distance, or both. In other words, it is the process of designing educational experiences that best suit the learner who may not be in a classroom with an instructor at a specific time.

Murphy (1997) defined distance education as a premeditated and persistent attempt to promote learning in an environment that includes geographic, temporal, or pedagogical distance.

A brief definition is given by Citrus College in England as:

Distance Education is a method of instruction that involves learning information by using your computer. Instead of attending traditional classes on campus, the course material is accessed primarily through the Internet.

As a summary:

Distance education is a system and process that binds students and teachers with educational sources from a variety of geographically separate locations using a variety of different media. Students and teachers are separated from each other by distance or time. The wide array of technologies are currently used to link the teacher and student.

In the interest of conceptual clarity several attempts have been made to describe the character of distance education. Among these descriptions Keegan 1990 stand out. Keegan specifies five decisive characteristics of distance education.

These are ;

- the quasi-permanent separation of teacher and learner throughout the length of the learning process (this distinguishes it from conventional face-to-face education),
- the influence of an educational organization both in the planning and preparation of learning materials and in the provision of student-support services (this distinguishes it from private study and teach-yourself programmes),
- the use of technical media - print, audio, video or computer -to unite teacher and learner and carry the content of the course,
- the provision of two-way communication so that the student may benefit from or even initiate dialogue (this distinguishes it from other uses of technology in education),
- the quasi-permanent absence of the learning group throughout the length of the learning process so that people are usually taught as individuals and not in groups, with the possibility of occasional meetings for both didactic and socialization purposes.

This clear definition undoubtedly covers what is meant by distance education in Europe and most of the Commonwealth. However, in North America even the dissemination of lectures from one university to another is now frequently called distance education, which to me is a misnomer (Holmberg, 1999).

A lot of researchers and writers have alternately given and received the means of distance education and distance learning until now. Generally both of them have the same meaning and aims. Turanlı (2005) mentioned that a continuing discussion on which term should be used with the pedagogical arguments centering in on the words "learning" and "education" and education incorporates a systematic approach to learning, including the institution and the creation of a collaborative learning environment. Institutions and instructors control educational delivery while the student is responsible for learning. In other words, Distance Learning is the result of Distance Education. These terms were used same meaning in this study due to avoid any confusion.

Pan & Yang (2010) mentioned that modern distance learning and education is highly effective with optimal combination of teaching and learning. They specified that the modern distance learning and education comparing with traditional education are as following ;

- Different students at different places can take the same class. Real time and non real time communication is realized between teacher-student or student-student.
- According to students learning object, time, place and course content, they can arrange by themselves. Additionally students' questions are resolved anytime by modern distance learning and education system.
- Modern distance education can inspire the initiative, activity and creation of students. Students are the core and base in the distance learning and education.
- The optimum and comprehensive services of teaching and learning are provided to student by modern distance learning and education. It is the objective of modern distance learning and education that students may learn conveniently at anytime and anyplace.
- Modern distance learning and education system can take advantage of the best education resources in one country or region. Thus, the education is enlarged. This will benefit anyone who wants to learn.

Although the main aim of this thesis is to concentrate on the WBDL, the general information and the common concepts of the other delivery methods are also discussed in this chapter.

2.2 The History of Distance Education

In this section, we will be addressing distance education applications in the world. The historical development of distance learning applications can be handled in five stages :

1. Instruction before the correspondence education,
2. Correspondence course,

3. One way radio and television broadcasts,
4. Two way radio and television broadcasts,
5. Computer systems and the new communication technologies.

There is no distinction between the phases of distance education. These phases are intertwined with each other. The first phase of distance education is procured through printed and written correspondence by mail. Afterwards, the printed materials are endorsed by audio tapes, video tapes, or both. Later, the printed materials used in correspondence study are supported by radio or television broadcast signals, but with no direct real time communication between the teacher and learner.

The evolution of distance education has not been easy. By taking Cobb's study in 2004 to examine this evolution period, timeline for distance education technology is given in Table 2.1.

Table 2.1 Timeline for Distance Education Technology

Period	Distance Education Technology
1800s-1900s	Correspondence courses / postal system
1920s	One-way audio – Radio broadcasts
1950s-1960s	Video Conferencing
1950s-1980s	Teleconferencing
1980s	Personel Computers / Internet
1990s	Web-based Education
2000s-2005s	Course Management Systems
2005s-	Integrated Distance Learning

1800s - 1900s Correspondence courses and the postal system.

The first known correspondence course was initiated in England by Isaac Pitman, the English inventor of shorthand. In 1840, he began teaching shorthand by correspondence in Bath, England. In the United States Anna Eliot Ticknot and William Rainey Harper began teaching courses in History, Science, Art, Literature, French, and German via correspondence in 1873. Assignments were exchanged

between student and teacher via the postal system. The International Correspondence Schools (ICS) evolved from the Colliery Engineer School of Mines based in Wilkes-Barre. It was also a member of the first generation of distance education. Their home study course on mine safety quickly became very popular after their formation in 1890. With the growing importance of railroads, ICS became a very large institution. At one point, they offered courses to employees from as many as 150 railroad companies. Today, ICS is the largest commercial provider of home study programs in the US. It also has a very large international presence. (Moore & Kearsley, 1996) Today – ICS is part of Thomson Learning, and is known as Education Direct. Student can now access course materials via the Internet, rather than waiting on the US mail.

1920s One-way audio - Radio

The first educational radio license was issued in 1921.

1950s - 1960s Video Conferencing

In July 1962, the first American communications satellite (Telstar 1) was launched into space. Shortly thereafter, educators recognized this method of communication as a viable means of distance education. One-way video/two-way audio was and still is the most common format.

1950s - 1980s Teleconferencing

The first educational television license was issued in 1945. In 1952, the Joint Council on Educational Television, a group of professional educators and interested parties, pressured the U. S. Federal Communications Commission to reserve a segment of the open TV channel spectrum for educational purposes. "Educational" stations began to spring up. During the 60's and 70's, classrooms were privy to instruction via classrooms an avenue to receive instructional programming. During the 70's and 80's, broadcast video and home video playback equipment provided another means of constructing a distance learning course and allowed the learning goals that could be addressed through independent learning to be expanded. At the college level, telecourses became a common distance learning format. Several major telecourse

development projects were funded by the Annenberg Foundation, the Corporation for Public Broadcasting, and some community colleges and universities. During the last decade, cable television and satellite transmission has offered an alternative method for delivering instructional television. Many cable companies will pick up satellite transmissions of educational programs and broadcast them on public access channels.

1980s Personal Computers

Personal computers became common by the late 1980s. At first, they were used mostly by distance learners as tools to type up papers to be submitted to correspondence teachers via the postal system, but very soon the Internet became popular and online Internet classes began to replace the postal system method of exchanging assignments.

1990s – 2000s Web-based Instruction

Virtual learning environments are popular today via Internet. Basically, students in the class, along with the instructor, use a local computer to access the course. Students then are able to do a myriad of things register online, download course materials, gain access to video and audio materials, and communicate with instructors and fellow students. Learning Management Systems and applications that can be used to encapsulate learning materials for Internet delivery have been steadily expanding since the 1990s.

2000s -2005s Course Management Systems

Today, some of the most popular Course Management Systems are Blackboard, WebCT and Web Crossing. Some popular software applications for creating learning objects include Macromedia Flash, PowerPoint, Impatica, Hot Potatoes, SoftChalk LessonBuilder, Camtasia, Robo Demo, Macromedia Director, QuickTime and many more. Audio and video are common components within Web courses, as well as interactive quizzes, discussion boards and live chat applications. Many homes have high speed Internet access via cable or DSL, and email is fast becoming the premier

method of communication. Online learners will typically either email assignments to instructors or upload them into some type of online digital drop box.

2005s Integrated Distance Learning

Teaching on the Internet could be integrated with other forms and methods of distance learning, for example, with broadcasting courses, mobile learning, computer assisted instruction, teleconferences, videoconferences, Internet Protocol Television and e-mail.

2.3 Types of Distance Education Courses

There are a variety of types depending on the usage of information technologies in distance education. Moisseeva (2005) classified that the main forms of distance learning considering the type of technology that was chosen to form the basis of this or that course:

- Correspondence conducted through regular and electronic mail

Traditional correspondence education assumes that learners should work with various educational materials received by mail. In this type, previously prepared teaching materials are sent to students by teachers. Students study the course materials submitted by the teacher. The students can ask the teacher about the materials by mail. The students also should send back written assignments and results of their individual research activities. Today the students use different kinds of educational materials: video- an audiotapes, CD-ROMs with educational courseware, etc. Traditional mail in this structure is substituted by e-mail and fax.

- Web-based Distance Learning

This form of distance education could be developed in the Internet environment with the help of the interactive Web-based textbooks, e-mail,

mailing lists, chats, asynchronous forums, computer modeling and simulation programs, etc. Teaching on the internet could be integrated with other forms and methods of distance learning.

- Telecourses /Broadcast, in which content is delivered via radio or television

The TV and radio broadcasting for educational purposes is widely used for teaching. Very often TV programs are integrated into the curriculum in addition to the existing face to face educational programs (for example, taped demonstration of the lectures of the famous scientists, Nobel prize laureates, etc). The feedback is organized in a form of the email and asynchronous conferences. Students receive the help from the teachers, and send them back the reports about the ongoing projects.

Radio and television have served as an educational medium since their invention. They have the ability to easily reach a large audience. They are a one way teaching mechanism and evaluation of learning will require extra steps to be taken. Up to 90 % of the information disseminated by television in a teaching situation is in the audio portion In situations like this, it is often advisable to consider radio as an option. It can provide a large ability to disseminate information at a fraction of the cost of television broadcast(Aguilar, Eaglin, Batarseh & Bakir, 1997).

- Teleconferences/ VideoConferences

Many colleges, universities, and high schools use teleconferences to unite students who work at the same topic (problem, project) into collaborative teams providing them with the mentor's, or industry experts' support. These two forms of teleconferences are used at the very beginning of the course, presenting the introductory lectures, while the seminars or small group activities are organized in a form of the desktop audio and videoconferences. Students work at their projects, and they use teleconferences to make the

presentation of, to discuss something with other students, and coordinate their own learning and research activities, as well as to consult the instructor, or the tutor directly

- Courses on the Basis of Computer Assisted Instruction (CAI)

Having a personal computer at home, the students could learn the subject by various interactive educational software programs, that are delivered in most cases in a form of an educational toolkit with software and courseware materials (textbooks, guides for self-instruction, learning tools, etc). The student interacts with computer content stored on a CD-ROM. The student could work with these materials at his home computer, or could get the access to the same educational resources.

- Mobile Learning

As a result of the new mobile devices, a new learning idea has come into light during the recent years. The mobile learning where the student accesses course content stored on a mobile device or through a wireless server. It has the ability to provide learning to students through mobile devices and personalized contents everywhere they are and at any moment.

- Integrated Distance Learning

Teaching on the Internet could be integrated with other forms and methods of distance learning, for example, with broadcasting courses, mobile learning, computer asisted instruction, WBDL, teleconferences and videoconferences. Kumaran and Nair (2010) specified that distance education terms frequently interchanged with WBDL include, on-line learning, online education, distance education, distance learning, technology based training, e-learning, computer based training.

2.4 Interaction in Distance Education

Interaction is the most important component in face to face learning and it serves the distance education by making it more effective with using new technology and it increases the motivation of people also by developing positive manners towards distance education.

The effective interaction is required to take advantage of distance education in learning and teaching activities. Distance education also relies on efficient communication, whether synchronous or asynchronous. Interaction is the most important issue since the instruction process and the learning process are all based on efficient communication. Interaction can be divided into the following four types in distance education:

- **Learner-Content Interaction:** Reading Web document has a limited degree of interaction.
- **Learner-Instructor Interaction:** The students can ask questions, either using e-mail, or using Internet phone.
- **Learner-Learner Interaction:** Group communication is possible if proper network infrastructure is installed.
- **Learner-Intelligent Agent Interaction:** Artificial intelligent methods can be applied to distance education. The student will talk to an agent program, which understands and answers to the student's question up to a limited precision (Shih, 2002). Agents have the ability to perform many of the emotional and behavioural nuances provided by instructor in the classroom environment. An intelligent agent can assess a student's performance based on virtually any criteria and provide appropriate feedback. The agent also has the ability to adapt to the learner's current level, modifying material on the basis of progress. Extra time or cogent examples could be provided for important concepts (Butler & Blashki, 2003).

The communication between the learner-content, learner-instructor, learner-learner groups and learner-intelligent agent can be classified as synchronous or

asynchronous communication. Synchronous and asynchronous concepts emerged depending on how and when an activity took place. These concepts also used in distance education. Considering the temporal aspects of interaction distance learning applications can be classified in two main headings:

- Synchronous Interaction
- Asynchronous Interaction

The synchronous interaction in distance education expresses realization of learning-teaching activities at the same time whereas, the asynchronous interaction is the activities carried out at different times. Types of available technologies used in distance education are also divided into the same groups. Synchronous technology is also a way of online delivery where all participants are present at the same time. Web Conferencing is an example of synchronous technology. Asynchronous technology is a mode of online delivery where participants access course materials on their own schedules. Students are not required to be together at the same time. Message board forums, email and recorded video are examples of asynchronous technology.

Grice (2002) mentioned that the communication as a vehicle for education. As education moved out of the traditional classroom and into the arena of distance education, the communication techniques used needed to be modified or replaced to suit the new technological delivery systems and also to reflect the new images and capabilities of communication. Many of the traditional communication techniques used in the classroom can be applied directly to teaching in the distance education classroom; others need to be modified. Others really do not work at all and need to be rethought and redeveloped. The challenges are to determine which techniques fall into which category and to develop effective modifications and replacements for those that need change. Some examples of synchronous and asynchronous technologies are given below:

Synchronous technologies

- Web-based VoIP
- Telephone

- Videoconferencing
- Web conferencing
- Direct-broadcast satellite
- Internet radio
- Live streaming

Asynchronous technologies

- Audiocassette
- E-mail
- Message board forums
- Print materials
- Voice Mail/fax
- Videocassette/DVD
- On Demand Streaming (Delayed)

There are also Learning Management Systems which can be used for both synchronous and asynchronous interaction. Designed WBDL software is an asynchronous application to consider the functionality of modules.

2.5 Evolution of Web and Distance Learning

Distance Education is a developing education system that is parallel with technology and a response to people's lifelong learning requirements. The technological developments provide new delivery methods in distance education. Such as computers, mobile devices, ipads, interactive televisions and other new technological devices and their internet connectivity increase widespread of distance education. Distance education is also parallel with the evolution of Web.

The Web continues to grow unabated at exponential rate. The current Web is described as the second Web generation or Web 2.0 by the experts. The first generation Web starts with static HTML pages and the second generation starts with machine generated and often dynamic HTML pages. These generations of the Web

are meant for direct human processing such as reading, browsing and some activities with interaction. The third generation Web aims at machine processable meaning of information. The third generation Web is called Semantic Web or Web 3.0.

Murugesan and Ginige (2001) mentioned that the scope and complexity of Web applications vary widely: from small scale, short-lived (a few weeks) applications to large-scale enterprise applications distributed across the Internet, as well as via corporate intranets and extranets. Web applications now offer vastly varied functionality and have different characteristics and requirements. Web applications can be categorised in many ways. There is no unique or widely accepted way. Categorisation of Web applications based on complexity (Figure 2.1) is useful in understanding their requirements and for developing and deploying Web-based systems and applications.

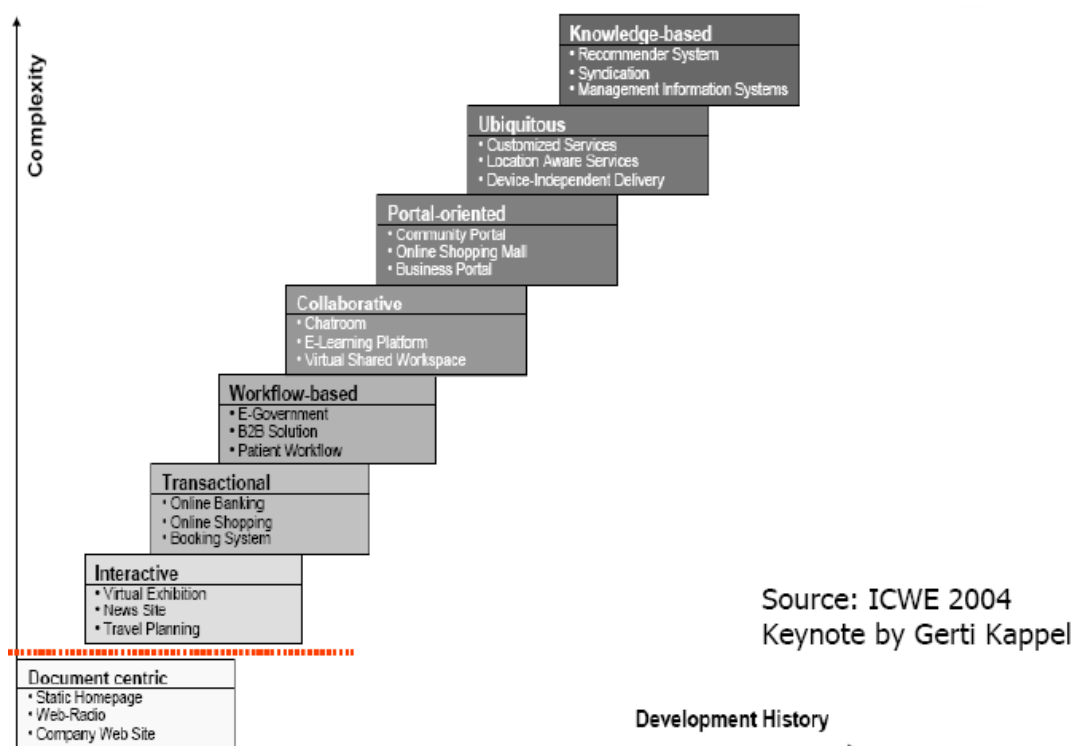


Figure 2.1 Web applications development based on functionality

WBDL is in the level of collaborative application to take account of complexity of web applications. Distance learning related with evolution of web are explained in the following headings.

2.5.1 Web 2.0 and Distance Learning

Recently, current generation Web technologies is commonly increasing in distance learning area. Web 2.0 is all about two way communications and collaborations. Kumaran and Nair (2010) mentioned that all collaborative learning theory contends that human interaction is a vital ingredient to learning. With well delivered synchronous distance education, and technology like message boards, chats, e-mail, and teleconferencing, this potential drawback is reduced.

The interactive applications of Web 2.0 allow users to alter content and share content with the other users. Some examples of Web 2.0 include social networks, video sharing portals, wikis, and blogs. Students and instructors enjoy a more dynamic educational experience. Some examples of Web 2.0 application is given following :

- Email (gmail, yahoo mail)
- Google Docs
- Wikis (pages)
- Blogs (posts)
- Del.icio.us (bookmarks)
- Wikipedia (articles)
- Flickr (photos)
- YouTube (videos)
- MySpace
- Salesforce.com
- Classroom 2.0

Social networks can be used to connect instructors and students, as well as allow students to help each other on a peer to peer basis. User generated content can be created by and used by both online tutors and students. Online tutors may use many applications of Web 2.0 to enhance their online tutoring in more flexible and up to date ways. Podcasts provide the advantage of the human voice, ease of use and mobility (Salmon & Edisingha, 2008)(Online Tutoring,n.d.).

2.5.2 Web 3.0 (Semantic Web) and Distance Learning

The Semantic Web was called by World Wide Web Consortium (W3C) director Tim Berners-Lee. According to Tim Berners Lee, the Semantic Web is a Web that includes documents, or portions of documents, describing explicit relationships between things and containing semantic information intended for automated processing by our machines. The defining feature of the Semantic Web is the ease with which PDAs, laptops, PCs, and cars communicate with each other.

The Semantic Web aims at machine agents that thrive on explicitly specified semantics of content in order to search, filter, condense, or negotiate knowledge for their human users. A core technology for making the Semantic Web happen, but also to leverage application areas like Knowledge Management and E-Business, is the field of Semantic Annotation, which turns human-understandable content into a machine understandable form (Handschuh & Staab, 2003).

Role of Semantic web in E-learning (electronic learning), covers a wide set of applications and processes such as web-based learning, computer-based learning, virtual classrooms, and digital collaboration. The real power of the semantic web is realized when people create many systems that collect web content from diverse sources, process the information and exchange the results with other human or machine agents. The explicit representation of the semantics of data accompanied with relationship between the data (ontologies) will enable a web that provides a qualitative new level of service for the users to access the e-learning materials(SaleenaJ, Salini, & Venkateswaran, 2010).

2.6 Web-Based Distance Learning

Nowadays our century's developments of Internet and communication technology caused radical changes in education. New methods and tools should be used in order to meet the learning requirements of the students who can not be present in a desired

place at a specific time because of their personal choices and their working conditions.

WBDL has skyrocketed into the training and education arenas since the mass usage of Internet technology began in the late 1990's. It is no longer a fad or new trend it is now an established, although rapidly changing, approach for delivering educational materials such as international business courses for both training and educational courses and programs (Hunt, 2005). WBDL is rapidly growing learning system that is in urgent need of systematic study.

Hall (1997) clarified Web-based distance training as instruction that is delivered over the Internet or intranet. Accessibility of this training, related Hall, is through the use of a web-browser such as Netscape Navigator, Firefox or Microsoft Internet Explorer. Hall and Snider (2000) define e-learning as the process of learning via computers over the Internet and intranets.

Deperlioglu and Arslan (2010) define WBDL systems are generally called learning management systems (LMS). Students can access the content in the system whenever they want and benefit from the sources at will. When combined with cost advantages, this flexibility allows the formation as an ideal model.

The public state organization or academic institution almost mixes Web-based learning and traditional training; thus using what has come to be known as "blended learning". Though the main driver of blended learning is the concern about cost, both theory and available evidence suggests that blended learning will be more effective than Web-based learning alone.

In our country many studies are also carried out in this field. Especially, developments of courses or programs on WBDL have started in the public universities. Some of the private universities are also seriously conducting their studies on this topic. During all this studies many printed matters published and many theses are prepared in our universities.

2.6.1 Advantages of WBDL

WBDL represents an alternative in the fulfillment of the common and professional education demands, which are not furnished by the conventional education systems, with the following advantages:

- Provides all students equal opportunities.
- Does not require physical attendance. The students can have access to learning at any time and any place. There are no restrictions imposed on their study time and location.
- 24/7 accessibility makes scheduling easy and allows a greater number of people to attend classes.
- Students have the flexibility to spend the amount of time they choose for each module of course.
- Students can learn their own pace.
- Students should acquire up to date information because instructors update related web pages easily.
- Use the tools best suited to the students.
- Skip over already known materials and focus on new topics. Students may go on to the next topic any time and speed, he or she wants.
- Some people feel shy about joining a class. Distance learning courses do not require them to attend classes.
- Uniformity of Content. Allows to students acquiring the main sources of information.
- Creates interactions that stimulate understanding and exchange of ideas.
- Technology tools make collaboration among students much easier.
- Accommodates multiple learning styles using a variety of delivery methods to learners
- Travel time and associated costs (parking, fuel, and vehicle maintenance) are reduced or eliminated.

Some of advantages of WBDL are taken from the Kumaran and Nair's study about Future Trends in E-Learning in 2010. WBDL has important place in distance learning with the following general advantages, satisfying possibility and opportunity equality, being independent from individual differences, geographical difficulties, removing time and place limitation, lack of establishment and staff, excluding traveling and housing expenses, and being individual oriented.

2.6.2 Disadvantages of WBDL

Rivera and Rice (2002) stated the students enrolled in the Web-based section were not uniformly knowledgeable in the use of the web and its technologies. Lack of knowledge also meant that some students could not adequately configure their computer systems. Ultimately these experiences probably had a negative impact on students' satisfaction with the Web-based course.

Besides the advantages of WBDL, there are some disadvantages as followings;

- Desired success may not be acquired due to insufficient skills and knowledge related to computer.
- Handcraft works are not possible in WBDL system.
- It may not provide effective learning for students who are not study by themselves.
- It may cause social problems because of long-term use the computers.
- Due to network problems, students may not be responded about their adhoc questions by the instructor.
- Teachers are less likely to notice when students daydream or slack off in a virtual classroom. It is probably this fact that leads to allegations that WBDL is less effective than traditional classroom learning.
- WBDL system requires experienced staff and money in order to take full advantage of technological developments.

2.6.3 SCORM(Sharable Content Object Reference Model) Standards

SCORM is a collection of standards and specifications for WBDL. It defines communications between client side content and a host system called the run-time environment, which is commonly supported by a learning management system. SCORM also defines how content may be packaged into a transferable ZIP file called "Package Interchange Format".

The SCORM integrates a set of related technical standards, specifications, and guidelines designed to meet SCORM's high-level requirements-accessible, reusable, interoperable, and durable content and systems. SCORM content can be delivered to learners via any SCORM-compliant Learning Management System (LMS) using the same version of SCORM (Advanced Distributed Learning [ADL], 2008).

SCORM 1.1 is the first production version. SCORM 1.2 is the second version that is widely used. It is still widely used and is supported by most Learning Management Systems today. SCORM 2004 is the current version. It is based on new standards for API and content object-to-runtime environment communication, with many ambiguities of previous versions resolved. It includes ability to specify adaptive sequencing of activities that use the content objects. It includes ability to share and use information about success status for multiple learning objectives or competencies across content objects and across courses for the same learner within the same learning management system. A more robust test suite helps ensure good interoperability (SCORM, 2010).

In this study, Reload SCORM player was used for providing compatibility with SCORM. The Reload SCORM player project focuses on the development of tools that are based on emerging learning technology interoperability specifications. It is managed by the University of Bolton with staff located at the University of Bolton and the University of Strathclyde. The SCORM Player is a cross platform desktop application that lets users play SCORM 1.2 packages.

2.6.4 Core Modules of WBDL System Applications

Learning management systems are very important part of distance learning that enable the management and facilitation of a range of learning and teaching activities. There are many commercial LMS products available today as well as several open-source options from which educators and institutions may choose. A few of the widely known LMSs are: Blackboard, WebCT, FirstClass, Moodle, and Lotus Learning Space. The specific features and functions of these systems vary considerably, but certain core modules can be found across all of them. These modules include:

- **Registration**

The registration module is an important activity for registration of users to access the other modules. When the users fill in the form, they get registered. Each registration can have state such as accepted or canceled. Administrators can update fields and change the state of that registration.

- **User and Role Management**

By creating roles, the users are divided into different kinds of roles who hold different rights in the application such as student, teacher and administrator.

- **Enrollment**

Adding students to a course may be done by the instructors or by the administrators. Administrators add instructors to lessons. Instructors create the materials and upload them to their lessons.

- Students to Course
- Teachers to Lessons
- Material to Lessons

- Course Module

The administrator may create courses to help teachers and students find their courses easily. Course start date and finish date are defined while courses are being created by administrators.

- Lesson Module

The lesson module presents a series of HTML pages to the students. Lesson module includes a lot of material about lesson subjects. Lessons are created by administrators or teachers who are owners of lessons.

- Material Module

This module supports display and upload of any electronic content, Word, Powerpoint, Flash, Video, Sounds or SCORM contents that are stored locally, or remotely. Internal web pages can be created with WYSIWYG editor and linked to.

- Message Module

This module allows users to communicate with each other and provides feedback between students and teachers. Students can send new messages to the teachers, and the teachers can view and reply the message through the message module.

- Announcement Module

The Announcements module produces a list of simple text announcements consisting of a title and brief description with the options of active and passive ones according to date.

- Test Module

Teacher can create tests for the enrolled students. The teacher can also add unlimited number of questions to the tests.

- Questionnaire Module

This module allows users to complete online feedback about general subjects.

- Reports Module

It provides to see what pages the student accessed, the time and date they accessed it, the IP address they came from. All sessions are logged for later viewing, and these can be made available to teachers and administrators.

- Feedback and Suggestion Module

The module is designed to capture feedback and suggestions from students.

- Forum Module

The users can create forum subjects about their courses or lessons. It is possible to allow student to ask a question which will be queued for users to answer.

- Educational Video Viewing Module

This module provides viewing educational video like a video-sharing website on which users can upload, share, and view videos such as youtube and vimeo. This module is important to provide new avenue of information transfer for educational institutions. Turoff & Hiltz (1995) expected video on demand technology to greatly enhance availability of multimedia information to teachers and to add substantial value to the educational process.

One of the optimal modes for a web-based distance lecture is to use streaming video clips for the audio/video lecturing, and dynamically loaded HTML pages to present the lecture notes (Thomas, Carswell & others, 1998).

Integrated voice, video and data systems in association with interactive multimedia have been made successful, distance education media to provide educational opportunities for learners of all ages, at all levels and in diversified geographical locations. To make the learning processes' independent of time and places in combination of technology based resources, steps need to be taken towards interactive multimedia methods for disseminating education to remote rural-based learners (Rahman, 2005).

CHAPTER THREE

WBDL SYSTEM APPLICATION

We started with a simple set of requirements to design and implement a distance education system. In this chapter, we present the general framework of our approach and modules and screenshots of the application.

3.1 Web Development Process

Murugesan & Ginige (2001) emphasized that characteristics of Web applications that make their development difficult and uniquely challenging include their real-time interaction, complexity, changeability and the desire to provide personalised information. In addition, the effort and time required to design and develop a Web application is difficult to estimate with a reasonable accuracy. A Web development process outlines the various steps and activities of Web-based systems development. It should clearly define a set of steps that developers can follow and must be measurable and trackable. Essential steps in development (Figure 3.1) ;

- Understand the overall function & environment in which system will be used
- Identifying & specifying technical & nontechnical requirements
- Developing architecture
- Addressing non-technical issues
- Identifying sub project or sub processes
- Developing and implementing sub projects
- Incorporating mechanisms for evolution and maintenance

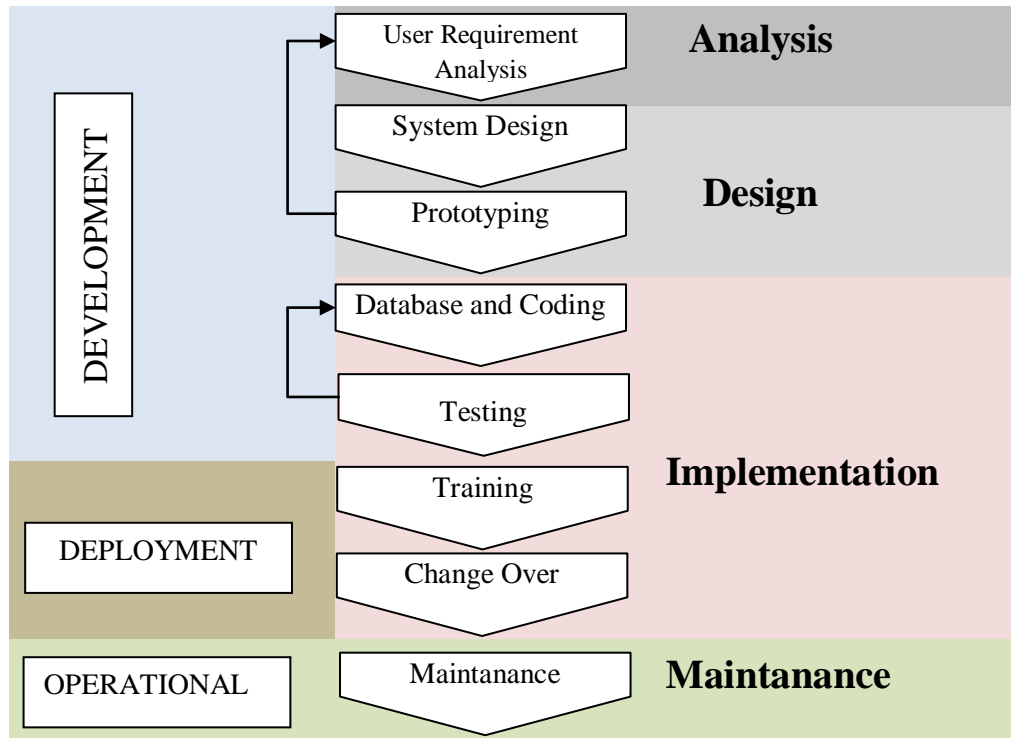


Figure 3.1 Web development process typical life cycle

The mentioned Web development process is used to develop WBDL system application.

3.2 Requirements

Requirements have been gathered based on the needs of an existing online learning website and by investigating the distance education needs of several other organizations and websites. One of the primary goals of the requirement phase is to identify the audiences for the course. The first target audience of this guiding and project are the people graduated from the Universities and second ones are the non-university graduate people who only know how to write and read. The target audiences should use the computer and a web browser. Our initial requirements are as follows:

User should be able to

- register the system,
- see the information on any course selected,
- login to enter a selected course,

3.3 System Design

System design is the process of defining the architecture, modules, interfaces, and data for a system to satisfy specified requirements. The system components are composed of user interface, web browser, web server and material repository. The architecture is illustrated in Figure 3.2.

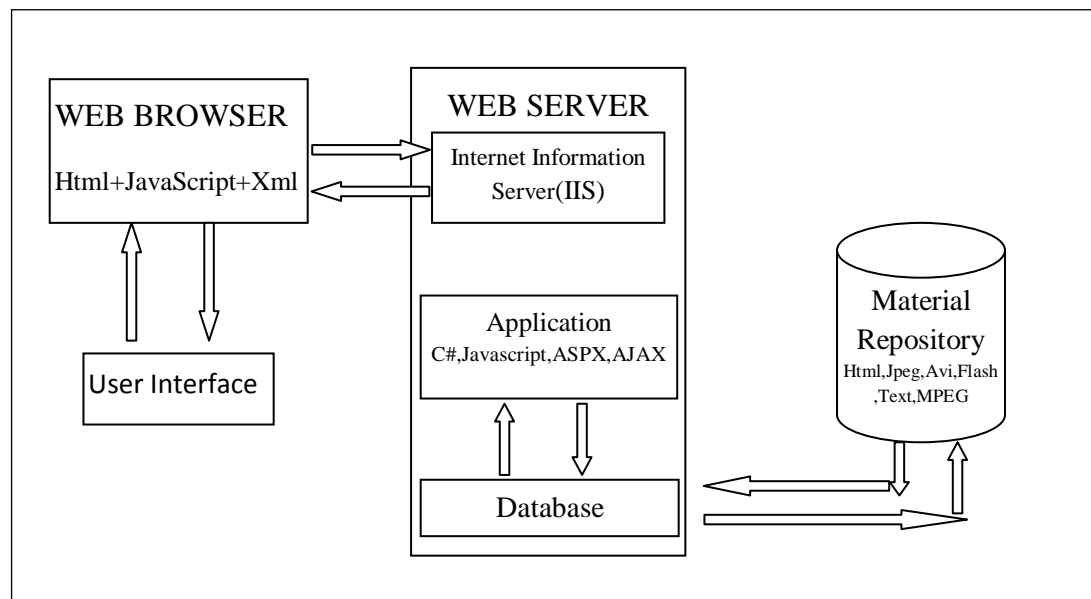


Figure 3.2 The components of WBDL system

These components constantly interact with each other during learning activities. The following web site design considerations help us to make user interfaces more accessible.

- Provide consistent and predictable screen layouts and navigation schemes. The graphics and text should include a single style that flows throughout, to show consistency.
- Provide information on navigation. The site should be user-friendly, with the interface and navigation simple and reliable.
- Allow users to skip navigation elements.
- Make content easy to read on screen: Use lists, headings, and so forth to organise information.

The system includes core modules of LMS discussed in previous section. There are Registration, Courses, Lessons, Materials, Announcements, Questionnaire, Tests, Messages, Forum, Feedback and Suggestion, User management, Assigning students to courses, Assigning materials to lessons, Following student state and tests and Educational video viewing. They are explained in section 3.5.

According to access modules, the system has three separate panels for administrators, teachers and students. System administrators are responsible for creating and maintaining the users which include teachers and students. Administrators are also responsible for creating courses and assigning them to the teachers. Teachers may have access to create and modify course contents, supervise students or both of these functions. Upon creation of a student user, the administrator can register the student to any of the available courses. Students fill in the registration form about personal information and after the confirmation, they attend to the learning activities. Their workflows are given under the following heading.

3.3.1 Use Case Diagram

Use case diagram of student, teacher and administrator is shown in Figure 3.3.

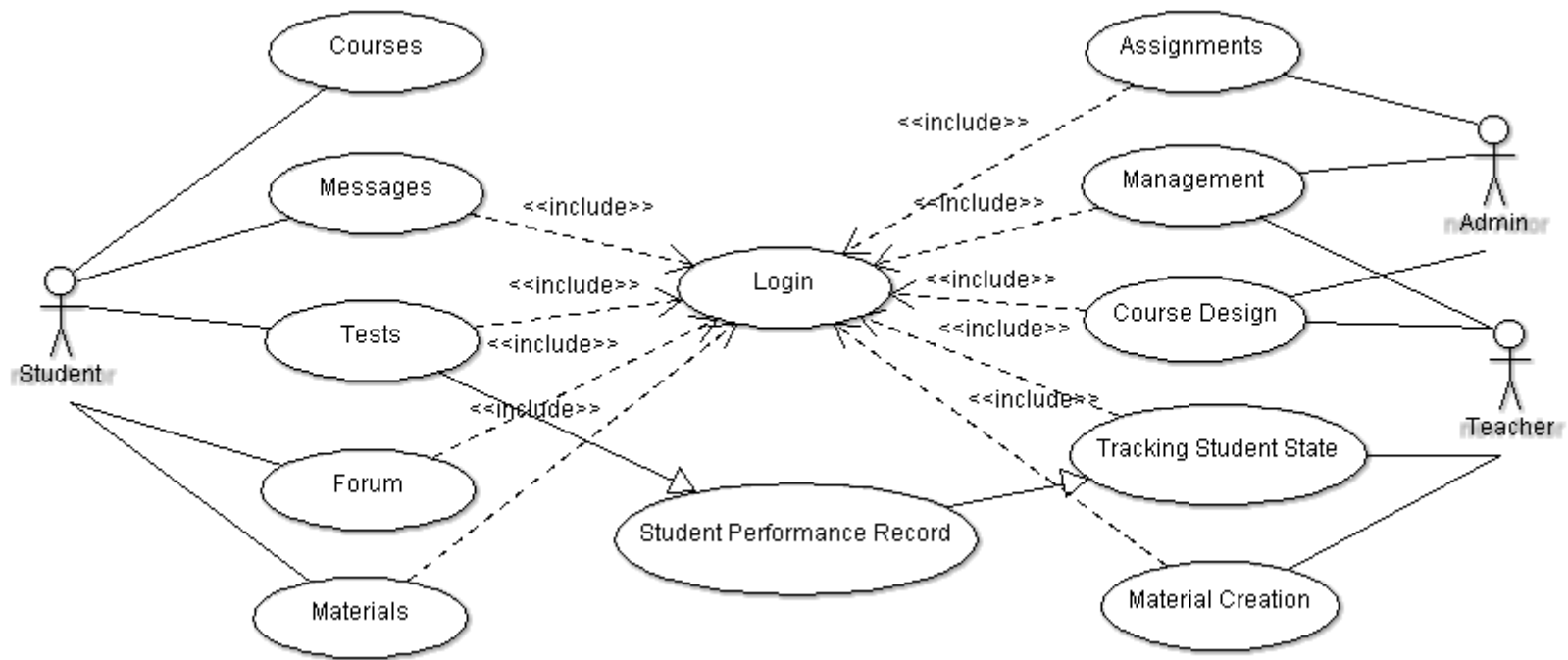


Figure 3.3 Use-case diagram

3.3.2 Workflows

Students, teachers and administrators workflows are shown in Figure 3.4, 3.5 and 3.6.

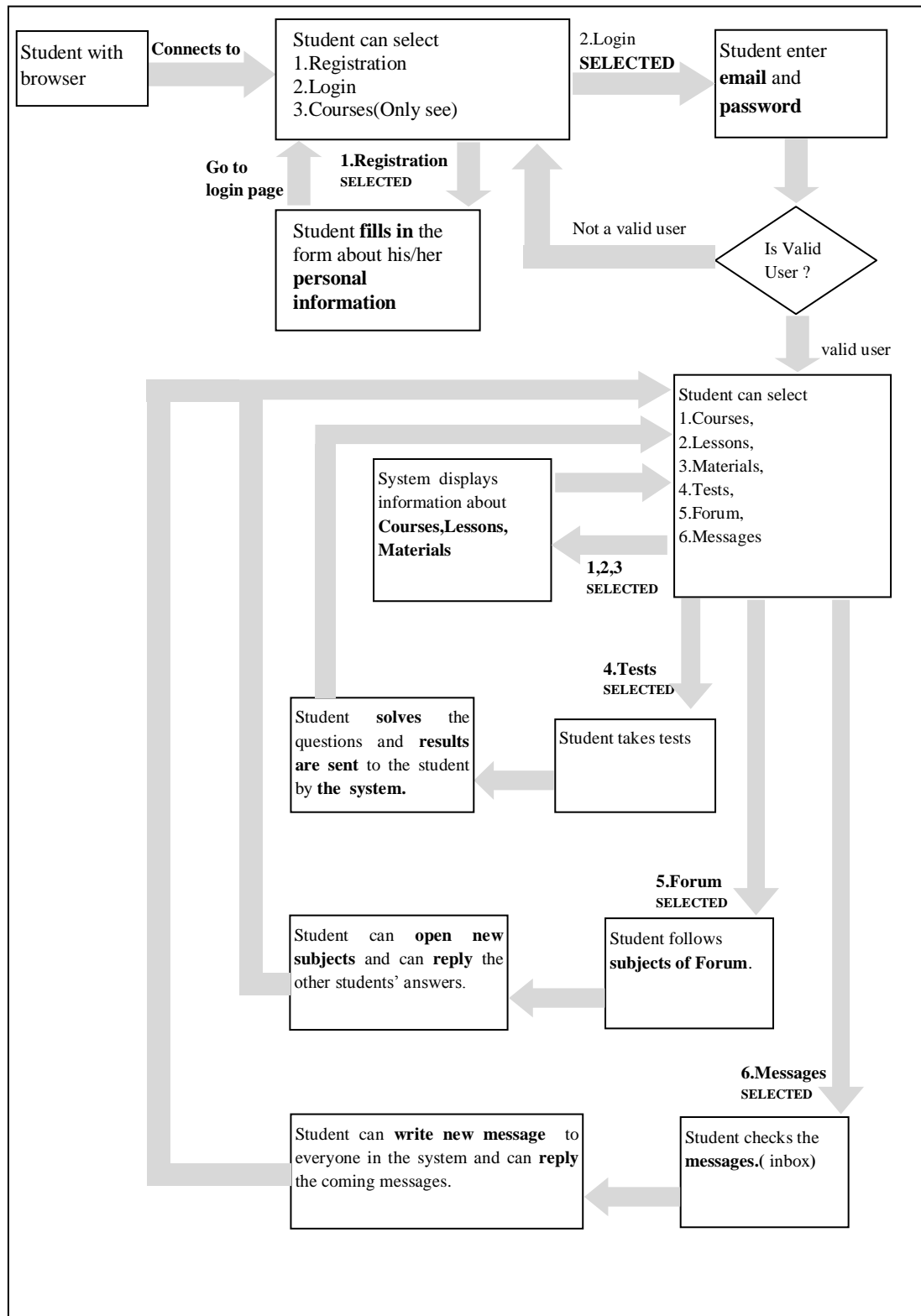


Figure 3.4 Student workflow

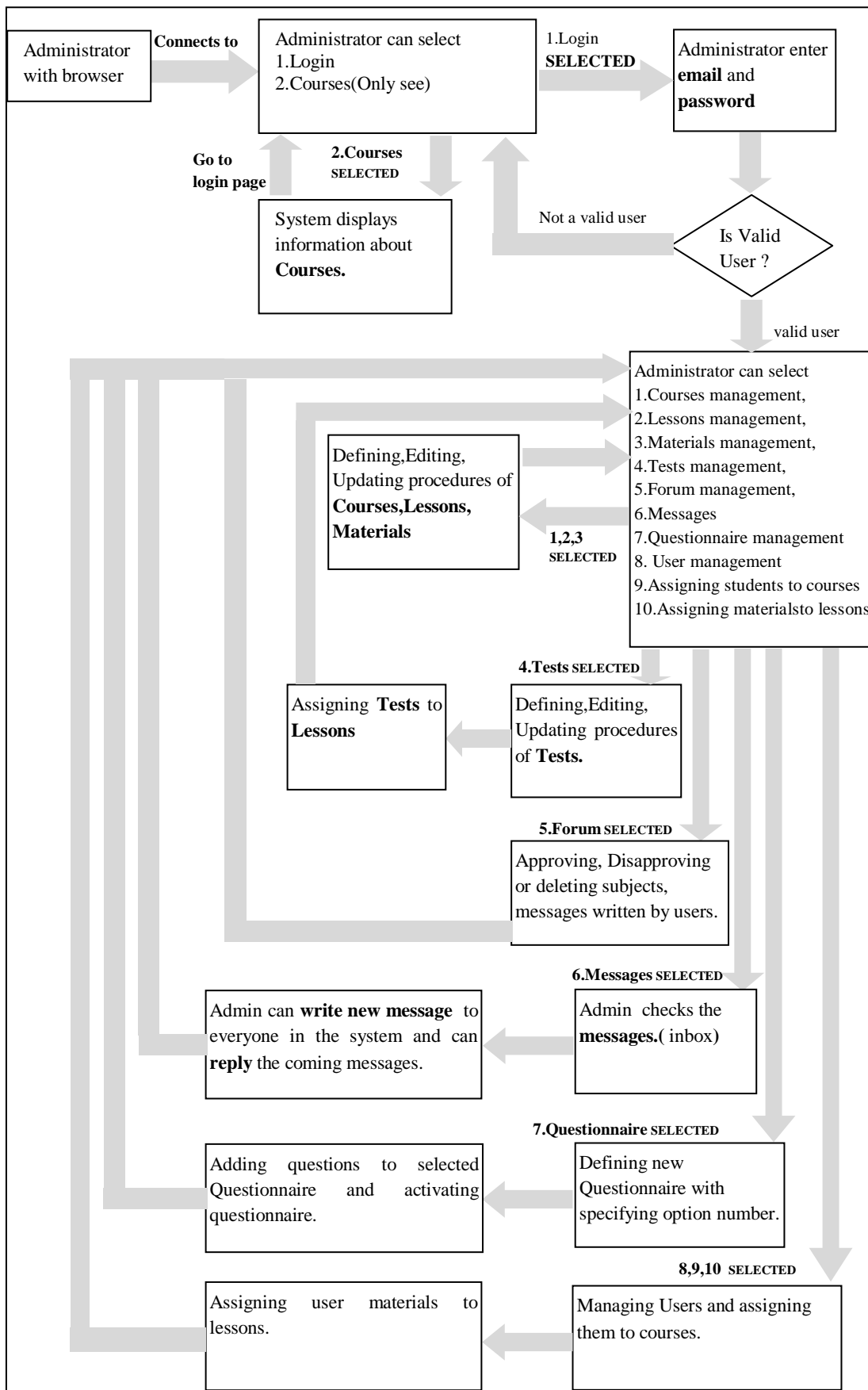


Figure 3.5 Administrator workflow

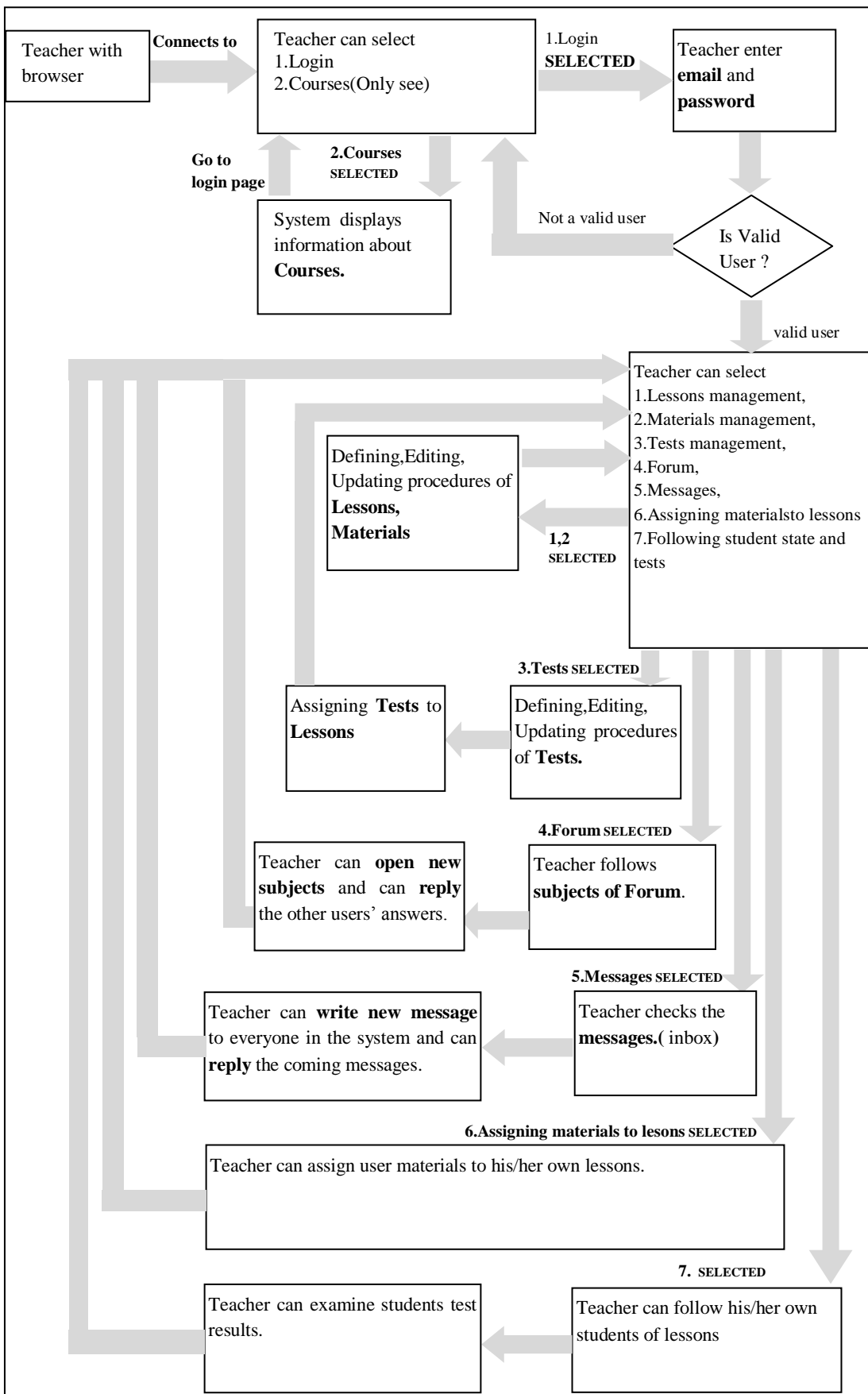


Figure 3.6 Teacher workflow

3.3.3 Entity-Relationship Diagram

An entity-relationship (ER) diagram is a specialized graphic that illustrates the interrelationships between entities in a database. Figure 3.7 illustrates E-R diagram of WBDL system application. Explanation of tables is given below.

USERS: This table contains all users of the WBDL system: administrators, teachers and students. It stores information about users with name, surname, image, email, password, usertype and registration date.

COURSES: This table contains information about courses of WBDL system. It stores course name, course starting date, course finishing date, detailed information and owners of the course.

STUDENTS OF COURSES: This table contains enrollment information about courses. It stores student identity, course identity and registration date.

LESSONS: This table contains information about lessons of courses. It stores lesson name, owner of lesson (teacher), course identity, detailed information about lesson and lesson registration date.

MATERIALS : This table contains educational contents of lessons. These materials can be used in different lessons because they have no relation with any lesson in this table. It stores material name, material document type, file (can be SCORM content), detailed information or contents, owner of material and registration date.

MATERIALS OF LESSONS : This table contains information about materials of lessons. It stores lesson identity, material identity, order of material in lesson, explanations about material and lesson (week, objective, audience vs.) and registration date.

MATERIALACCESS: This table stores access information about materials such as user identity, material identity and access date. This table helps the teachers for following their states of students.

TESTS : This table contains tests related to lessons. It stores test name, lesson identity and registration date.

TESTDETAILS : This table contains test questions related to material. Each question may belong to any material. It also stores choices of question and correct answer.

TESTRESULTS : This table contains user answers to the questions of test. It stores user identity, test identity, question identity and user answers.

QUESTIONNAIRE : This table contains questionnaire about courses or system. It stores question name, state of questionnaire (active, passive) and questionnaire registration date.

QNDETAILS: This table contains question items such as good, very good, bad or anything about question. It also stores votes of items.

FORUM : This table contains forum discussion topics related to the course topics or any other subjects. Forum discussions are moderated by the administrator. It holds topic name, message, owner of message, and state of confirmation and registration date.

FORUM DETAILS: This table contains sub topics of main topics in FORUM table. It stores information about subtopics like FORUM table.

MESSAGES: This table contains user messages. It stores sender, receiver, header and details of message, state of message (read, unread) and message registration date.

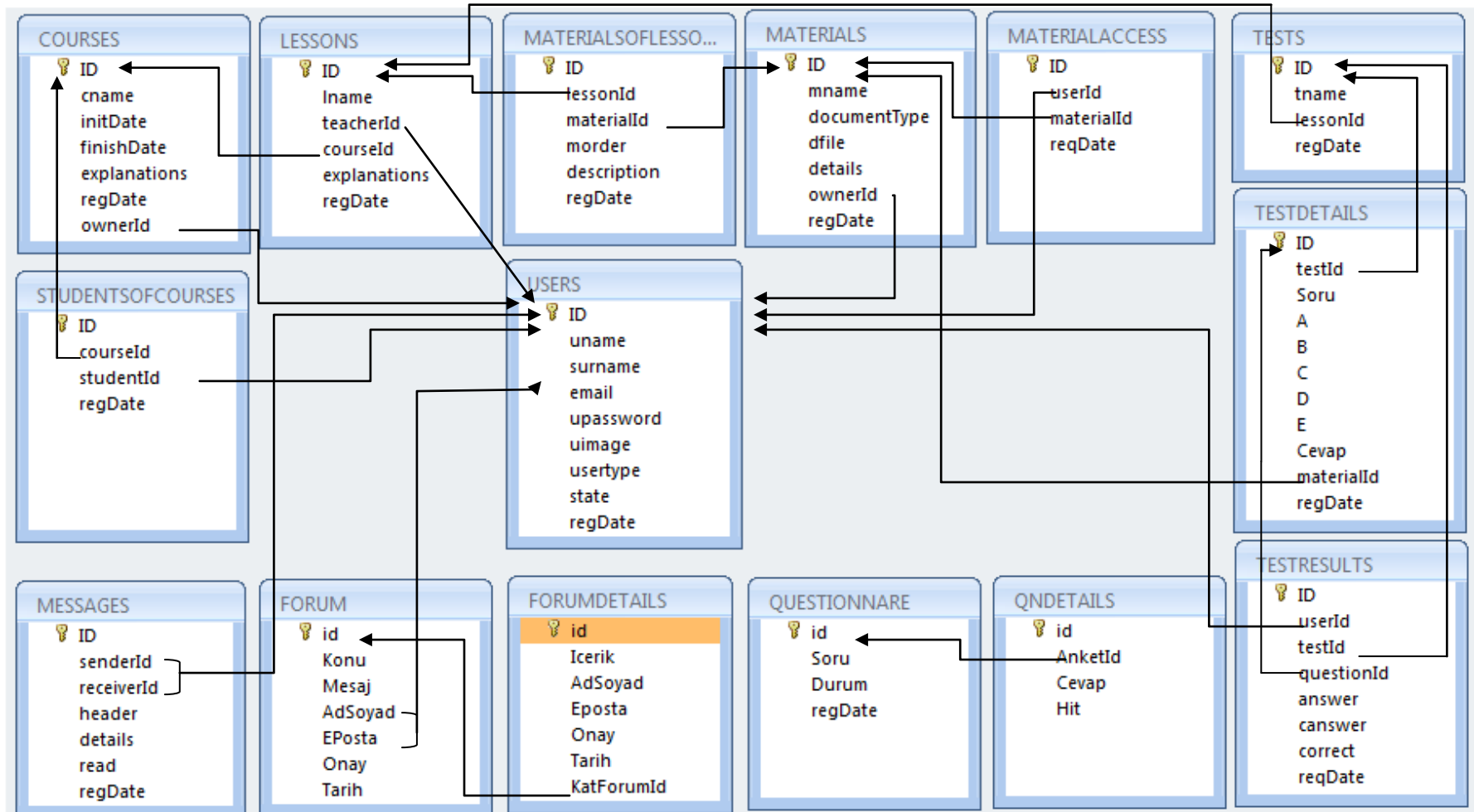


Figure 3.7 E-R Diagram

3.4 Project Implementation

The WBDL system application has been developed in the Microsoft .NET 2008 platform by using C# and ASP.NET programming languages. This application has been organized into three major disjunctive tiers on layers. The application can be divided into three-tier: Presentation layer, Business layer and Data layer. A layer is a reusable portion of code that performs a specific function. In the .NET environment, a layer is usually setup as a project that represents this specific function. This specific layer is in charge of working with other layers to perform some specific goal. This make the platform flexible, easily to distributed management, maintain and extend.

Presentation layer is the form which provides the user interface to either programmer of end user. Programmer uses this layer for designing purpose and to get or set the data back and forth. Presentation layer contains pages like .aspx where data is presented to the user or input is taken from the user. The welcome page represented in Figure 3.8 is an example of presentation layer in WBDL system application.

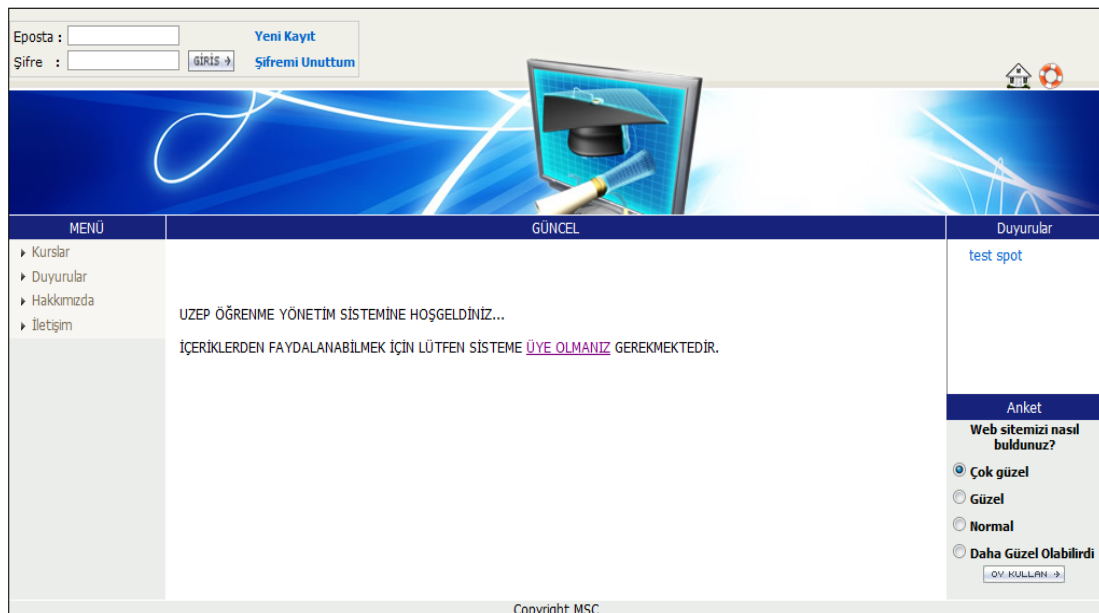


Figure 3.8 An example of presentation layer in WBDL system

Business layer is a class which the programmers use to write the function which works as a mediator to transfer the data from presentation layer to data layer. “Kullanici class” represented in Figure 3.9 is a business layer class in WBDL system application. This class defines user functions such as user access control, update information, add new user, remind password and get user role.

Data layer is also the class which gets the data from the business layer and sends it to the database or gets the data from the database and sends it to the business layer. “Vt class” represented in Figure 3.9 is a data layer class in WBDL system application. This class defines database access and SQL query functions.

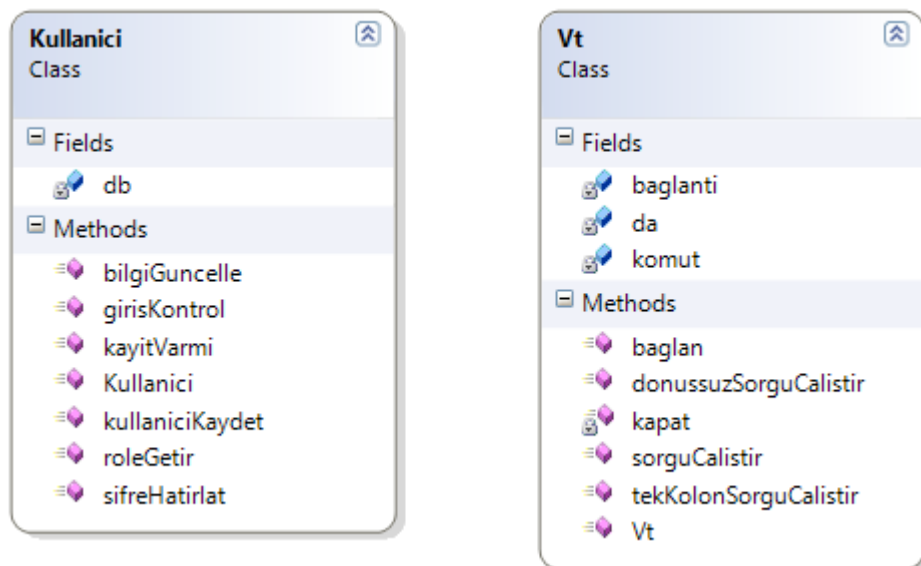


Figure 3.9 Business layer and data layer classes

3.4.1 Main Technologies

The following headings describe some of the main technologies we use to develop WBDL system application.

ASP.NET and .NET Framework : ASP.NET is a new generation of software development tools of Microsoft. It is not only the next version of Active Server Page (ASP), but also provides with a model of unified Web development, including of developers generate various services required for enterprise-levels Web applications.

Framework is a programming model which based on .NET platform. The key components of .NET Framework are common language runtime and .NET Framework class library (including ADO.NET, ASP.NET and Windows Form). .NET Framework provides with environment of trusteeship execution, simplified development and deployment and integration of a variety of programming language. (Wang, Cheng, Wang & Zheng, 2009).

AJAX: *AJAX (Asynchronous JavaScript and XML)* is not a new programming language, but a technique for creating better, faster, and more interactive web applications. With AJAX, your JavaScript can communicate directly with the server, using the JavaScript XMLHttpRequest object. With this object, your JavaScript can trade data with a web server, without reloading the page. AJAX uses synchronous data transfer (HTTP requests) between the browser and the web server, allowing web pages to request small bits of information from the server instead of whole pages. The AJAX technique makes Internet applications smaller, faster and more user-friendly. AJAX is based on the following web standards: JavaScript, XML, HTML and CSS. The web standards used in AJAX are well defined, and supported by all major browsers. AJAX applications are browser and platform independent. However, Internet applications are not always as "rich" and user-friendly as traditional desktop applications. With AJAX, Internet applications can be made richer and more user-friendly (Covic & Radulovic, 2008).

MSSQL SERVER 2005: Microsoft SQL Server 2005 is a relational model database server produced by Microsoft. SQL Server 2005 released in October 2005, is the successor to SQL Server 2000. **SQL Server Management Studio** is a graphical user interface tool included with SQL Server 2005 and later for configuring, managing, and administering all components within Microsoft SQL Server. The tool includes both script editors and graphical tools that work with objects and features of the server. SQL Server Management Studio replaces Enterprise Manager as the primary management interface for Microsoft SQL Server since SQL Server 2005. A central feature of SQL Server Management Studio is the Object Explorer, which allows the user to browse, select, and act upon any of the objects within the server. It can be

used to visually observe and analyze query plans and optimize the database performance, among others. SQL Server Management Studio can also be used to create a new database, alter any existing database schema by adding or modifying tables and indexes, or analyze performance. It includes the query windows which provide a GUI based interface to write and execute queries (Microsoft SQL Server, 2010).

MS ACCESS 2007: Microsoft Access is a database software package used to create and manage computer-based databases on desktop computers and/or on connected computers (a network). The Microsoft Access 2007 is used to create database for WBDL system application. Three tier architecture helps us easily move our database from Access 2007 to SQL Server 2005.

Internet Information Services (IIS): Microsoft IIS (formerly called Internet Information Server) is a set of Internet-based services for servers created by Microsoft to be used with Microsoft Windows. It is the second most used web server behind Apache HTTP Server. The servers provide services for File Transfer Protocol, SMTP for e-mail and HTTP/HTTPS for web server. The current shipping version of IIS is 7.5 for Windows 7 and Windows Server 2008 R2 (IIS, 2010).

3.5 Modules of System

3.5.1 Registration

The registration module is responsible for adding new users to the WBDL system. The registration module validates the field data and checks for an existing entry before adding the student. The screenshot of registration module is shown in Figure 3.10.

Figure 3.10 Screenshot of registration module

3.5.2 Login

This is the process of logging into the system by using user names and passwords. If user name and password are correct, the user is accepted by the system. The login module is shown in Figure 3.11. When a user logs into the system, the way that user will proceed is determined after getting authority information from related fields in the database. The authenticated user menu is shown in Figure 3.12.

Figure 3.11 User login module

The password recovery function called as "Şifremi Unuttum" allows user passwords to be retrieved based on the e-mail address that was used when the account was created. The password recovery function sends an e-mail message containing a password to the user.

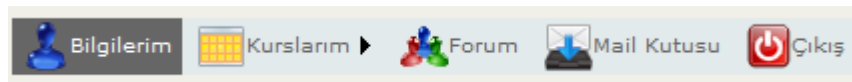


Figure 3.12 Authenticated user menu

Authentication and Authorization are two interrelated security concepts. In short, authentication is a process of identifying a user, while authorization is the process of determining if an authenticated user has access to the resource(s) they requested. ASP.NET provides three ways to authenticate a user:

- Windows authentication,
- Forms authentication,
- Passport authentication

It is the job of the authentication provider to verify the credentials of the user and decide whether a particular request should be considered authenticated or not. The authentication scheme an ASP.NET Web application uses can be configured in its Web.config file (Venugopalan, 2004).

User authentication that is used in WBDL system application must be prepared as “forms authentication”.

ASP.NET provides two fundamental ways to authorize access to a given resource:

- File authorization
- URL authorization

File authorization is active when windows authentication mode is used. URL authorization maps users and roles to pieces of the URL namespace. URL authorization module is used to provide authorization. The following example code block in web.config file provides authorization in our WBDL system :

```

<location path="~/Kurs.aspx">
  <system.web>
    <authorization>
      <allow roles="ADMIN,TEACHER,STUDENT" />
      <deny users="?" />
    </authorization>
  </system.web>
</location>

```

3.5.3 Courses

All types of users may access course information page. There is no restriction for course information page. Figure 3.13 shows snapshots of "course information page".



Figure 3.13 Course information page

3.5.4 Lessons

At the time of registration, a student has access to limited number of lessons in each course. Each course includes a number of lessons. Each lesson can contain any number of tests. The evaluation of the student work is performed by these means. Figure 3.14 shows lessons screen.



Figure 3.14 Lessons screen

3.5.5 Materials

Lesson materials include rich text and attached files (PDF, SCORM and etc.). It is possible to attach more content in the form of SCORM content, PDF e-books and text to each of the lessons. Tests are the elements of lessons being used to evaluate learning results. After studying the lesson materials, student shall complete tests of the lesson.

The screenshot shows a web application titled "İÇERİKLERİM" (My Contents). The main content area is titled "ASP.NET Web uygulamaları" (ASP.NET Web Applications) and displays the following information:

İçerik Adı:	ASP.NET Web uygulamaları
İçerik Sorumlusu :	Serkan Çınar
Dosya :	0 [dosya]
İçerik :	<p>ASP.NET, Microsoft tarafından pazarlanan bir web uygulama nesnesi teknolojisidir. Özdevimli (dinamik) web sayfaları, web uygulamaları ve XML tabanlı web hizmetleri yaratılmasına olanak sağlar. Aynı işletme tarafından geliştirilen .NET çatısı nın (framework) parçası, ve artık işletmece desteklenmeyen ASP teknolojisinin devamını teşkil eder.</p> <p>Her ne kadar isim benzerliği olsa da ASP.NET, ASP ye oranla çok ciddi bir değişim geçirmiştir. ASP.NET kodu ortak dil çalışma zamanı (ingilizce - common language runtime) altyapısına dayalı çalışır, diğer bir deyişle, yazılımcılar .NET çatısı tarafından desteklenen tüm dilleri ASP.NET uygulamaları geliştirmek için kullanabilirler. Yani, Java teknolojisinde olduğu gibi, yazılımcı tarafından yazılan kod, çalıştırılmadan önce sanal bir yazılım katmanını tarafından ortak bir dile çevrilimtedir.</p>

Konu başlıkları

[gizle]

- 1 ASPX belge yapısı
- 2 Örnek bir ASP.NET sayfası
- 3 Geliştirme araçları
- 4 Dış bağlantılar
- 5 Ayrıca bakınız

ASPX belge yapısı

ASP.NET belgeleri **ASPX** yapısını kullanır. ASPX belgesi, özdevimsiz (statik) **HTML** veya **XHTML** tabanlı, **web sayfasında** belirecek olan içeriğin yanı sıra, sunucu tarafından çalıştırılacak olan özdevimli kodu da ki ayrıç, arasında tutar : < -- özdevimimli kod -- >. Bu her ne kadar sıkça kullanılan bir yaklaşım olsa da, genelde uzmanlarca tavsiye edilmez.

Onun yerine, içerik ve kodun ayrılması önerilir. Kullanılan dile göre, sunucu tarafından çalıştırılacak kodu içeren belge **Sayfam.aspx.cs (C#)** veya **Sayfam.aspx.vb (VB.NET)** olarak adlandırılabilir. Bu yaklaşıma ile, yazılımcı kodunu **yordamsal programlama** ikelerinden çok, oluşturabilecek olaylara gereken tepkiyi verebilecek biçimde geliştirir; örneğin, bir sayfa yüklenince, bir düğmeye basılınca, vb.

Figure 3.15 Lesson materials screen

3.5.6 Announcements

Announcements module is a basic module used for displaying news on WBDL system. The announcements module produces a list of simple text announcements consisting of a title and brief description. It is very handy for making website visitors aware of items of interest which may have links to additional information. AJAX technology was used in announcements module. The announcements module is shown in Figure 3.16.

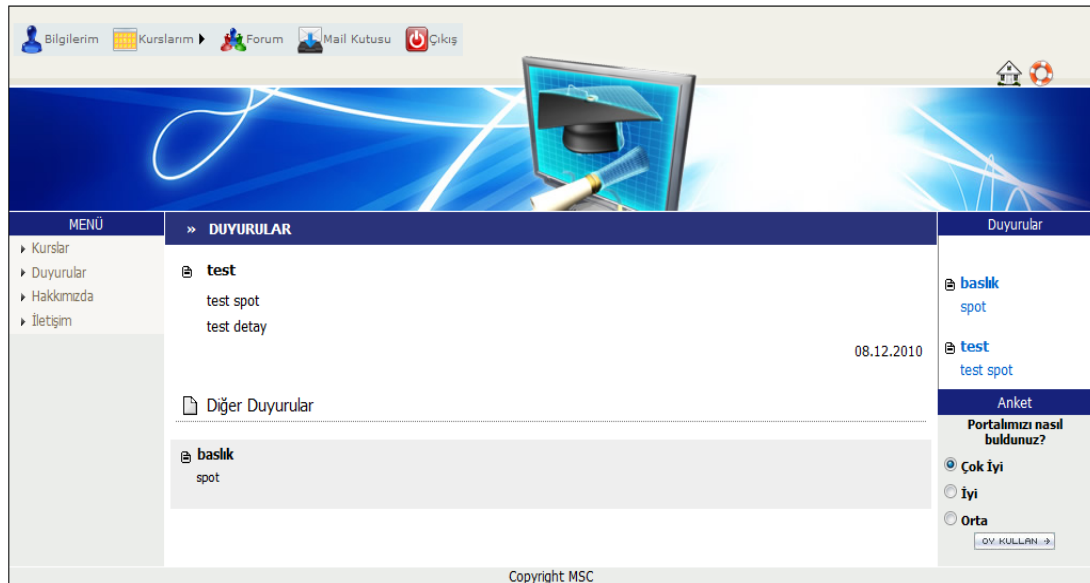


Figure 3.16 Announcements screen

3.5.7 Questionnaire

This module allows users to complete online feedback about general subjects. The users can view results of questionnaire. Figure 3.17 shows a sample questionnaire and results of questionnaire.

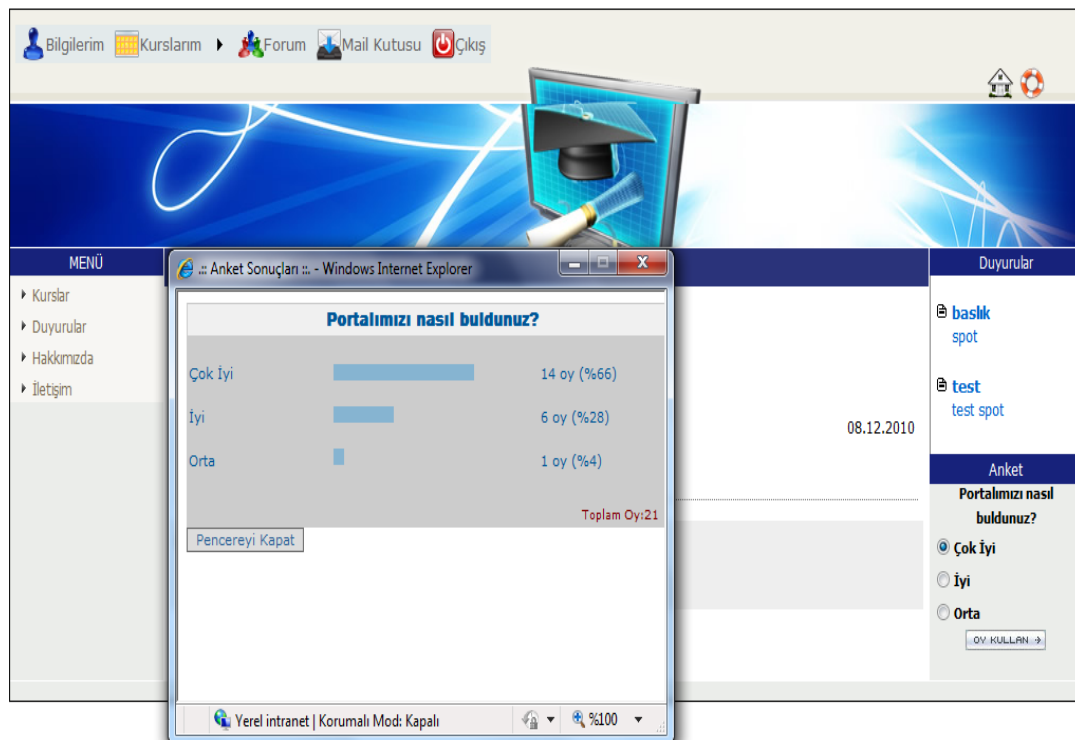


Figure 3.17 Questionnaire and results of questionnaire screen

3.5.8 Tests

Student learns the course content and possibly performs lesson tests. The answers of student automatically responded by system. The tests screen is shown in Figure 3.18.

The screenshot displays the "ASP.NET TESTİ" interface. At the top, it shows the test results: "TESTİ BİTİR DOGRU : 2 ---YANLIŞ : 3 ---BOS :0". Below this, a red box highlights "Tekrar Gözden Geçirmeniz Gereken Konular" (Topics you need to review) with the sub-heading "Internet ve Web" and "ASP.NET Web uygulamaları". The main content area is titled "SORULAR" (Questions) and contains three questions:

1. What is the lifespan for items stored in viewstate?
 A) Exists for the Life of the current page
 B) 20 min
 C) 2 min
 D) 2 sec
 E) 1 sec
2. Select the validation control used for "PatternMatching"
 A) FieldValidator
 B) RegularExpressionValidator
 C) RangeValidator
 D) PatternValidator
 E) Validator
3. How do you post the current page to a different aspx page ?
 A) FORM ACTION="actiopage.aspx" RUNAT="server" method="post"
 B) FORM ACTION="actiopage.aspx" method="post"
 C) FORM id="Form1" method="post" runat="server"
 D) FORM ACTION="actiopage.aspx" RUNAT="server" method="get"
 E) FORM ACTION="actiopage.aspx" method="get"

Figure 3.18 Tests screen

3.5.9 Messages

The WBDL system application provides an internal mail function. This function includes most of the required features like writing new message, opening messages and replying the messages for contact the users of the system. Inbox and creating new message screen are shown in Figure 3.19 and 3.20.

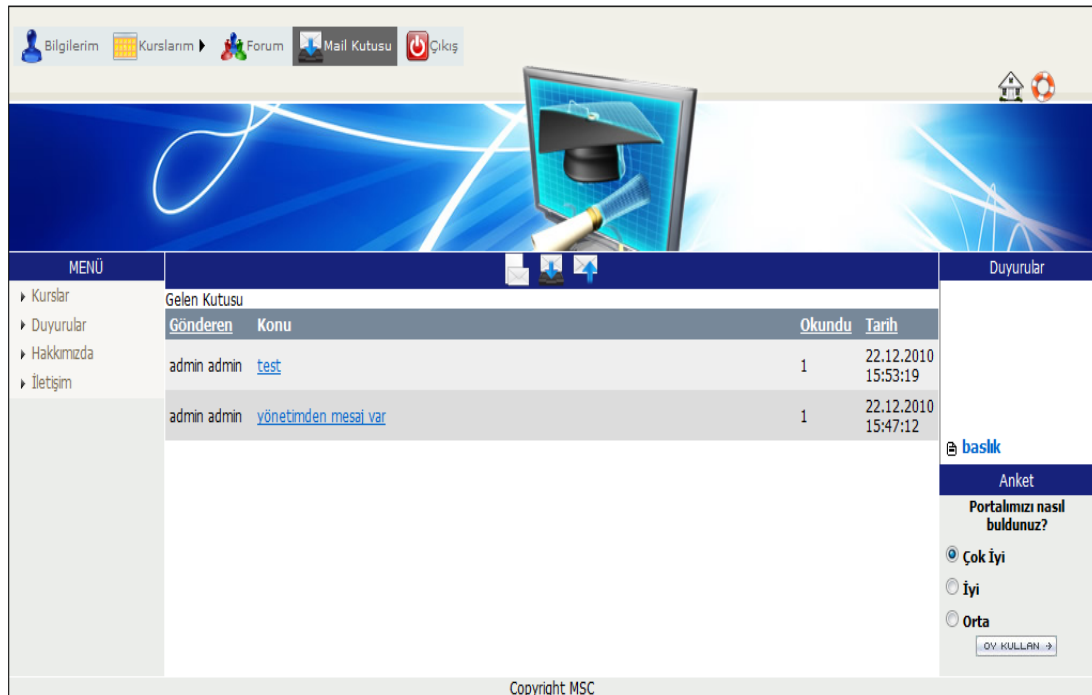


Figure 3.19 Inbox screen of messages module.

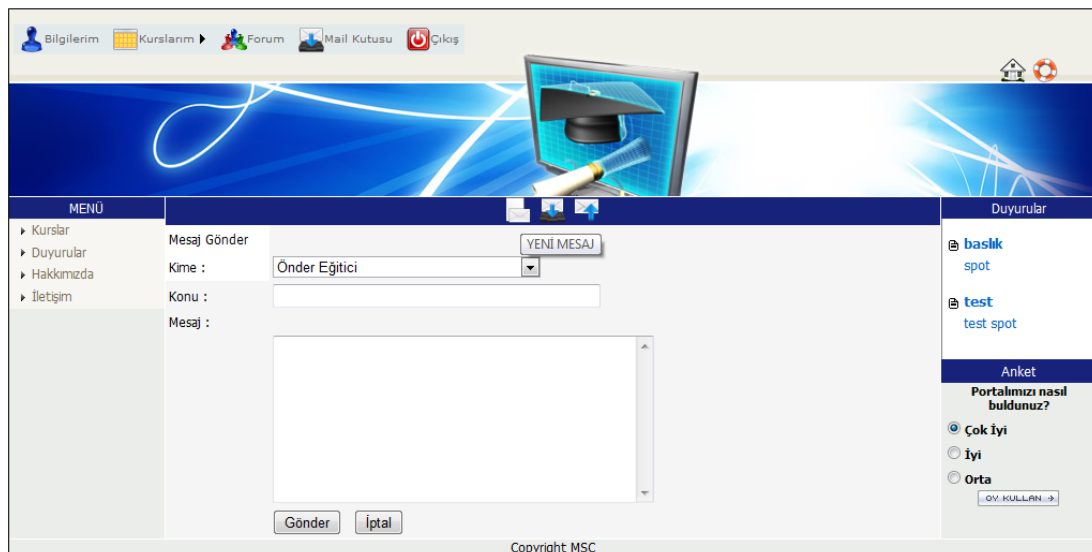


Figure 3.20 Creating new message

3.5.10 Forum

A forum can contribute significantly to successful communication and community building in an online environment. The forum is used by students to post new messages or comments on posted ones, to other students and the teachers. Forum

discussion topics are related to the course topics given. Forum topics and creating new topic modules are shown in Figure 3.21 and Figure 3.22.

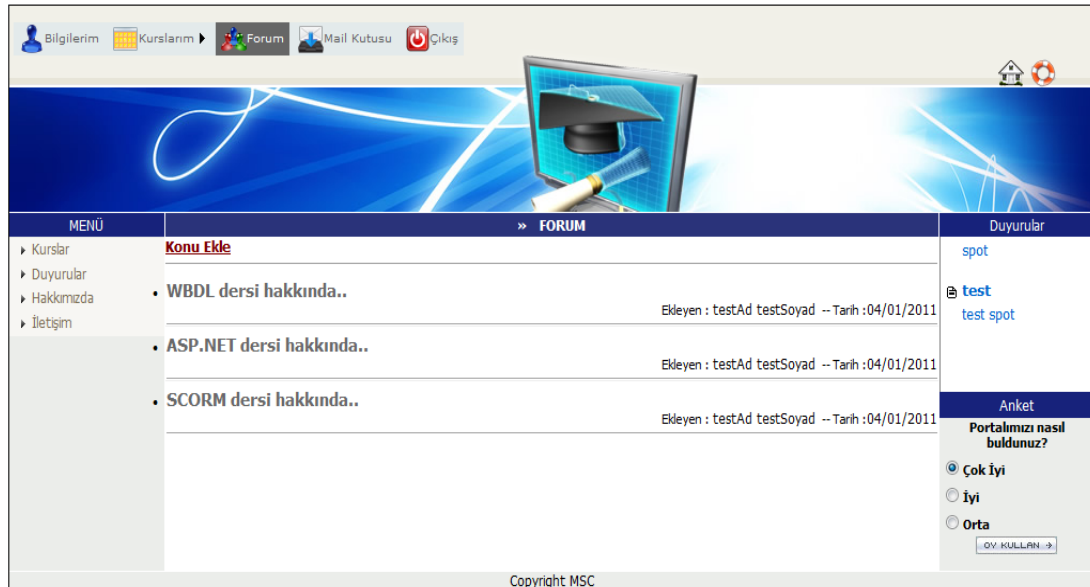


Figure 3.21 Forum module

Figure 3.22 Creating new topic in forum module of WBDL system application

3.5.11 User management

User management enables the administrators to manage the users in WBDL system. First, the users need to be logged into system as a administrator to use the features of user management. For example, administrators may:

- Create new users such as students and teachers.
- Edit students and teachers

YÖNETİM MENÜSÜ		YENİ KULLANICI EKLE						
ID	uname	surname	email	uimage	usertype	state		
1	Önder	Eğitici	onder@onder.com		TEACHER	1	Düzenle	
4	Serkan	Çınar	mserkancinar@yahoo.com	~/images/users/ben.jpg	TEACHER	1	Düzenle	
5	a	a	a@a.aaaaa		STUDENT	0	Düzenle	
6	STUDENTNAME	STUDENTSURNAME	student@student.com		STUDENT	1	Düzenle	
7	Ahmet	Varlık	ahmetvarlik@yahoo.com	~/images/users/03_12_20101Penguins.jpg	TEACHER	1	Düzenle	
8	TeacherName	TeacherSurname	teacher@teacher.com	~/images/users/11_12_201054Tulps.jpg	TEACHER	1	Düzenle	
9	Mehmet	Çimen	mserk@hotmail.com	~/images/users/varsayilan.jpg	STUDENT	1	Düzenle	
10	Ahmet	Atasoy	aatasoy@hotmail.com	~/images/users/varsayilan.jpg	STUDENT	1	Düzenle	
11	Şafak	Engin	sengin@hotmail.com	~/images/users/varsayilan.jpg	STUDENT	1	Düzenle	
12	testAd	testSoyad	test@test.test	~/images/users/varsayilan.jpg	STUDENT	1	Düzenle	
13	admin	admin	admin@admin.com	~/images/users/varsayilan.jpg	ADMIN	1	Düzenle	

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Figure 3.23 User management screen

3.5.12 Management of courses

This page includes some of the features and settings in a course, the primary tool of teachers and administrators. First, the users need to be logged into a course as a teacher/administrator editing rights to use most of the features. Administrators or teachers may create a new course as Figure 3.25. Some information(Course name, course starting date, course finishing date, course explanations and course owner) about a course must be filled for creating a new course.

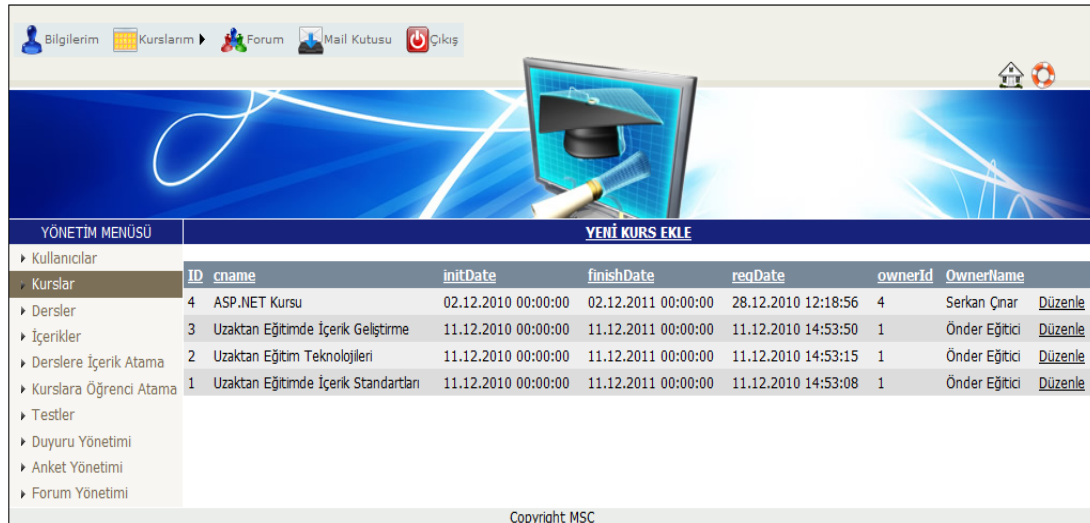


Figure 3.24 Course management screen

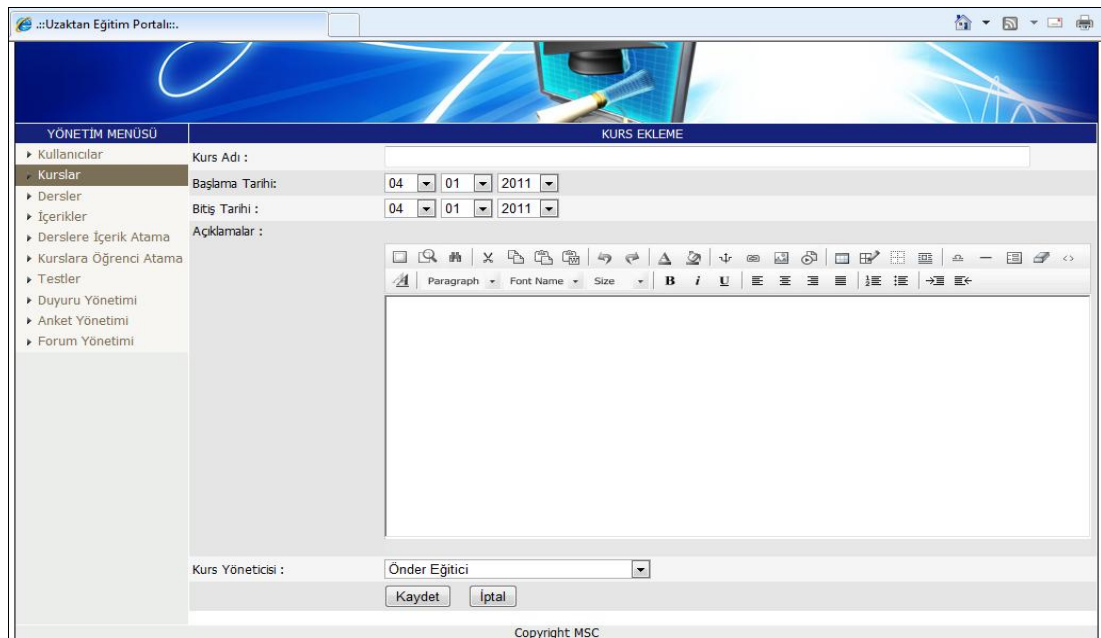


Figure 3.25 Creating a new course

3.5.13 Management of lessons

The lessons of the course are created in the WBDL system by the teachers and the lesson properties are populated with the values defined in the database. Lesson properties include information such as the lesson name, course name, explanations and lesson owner. Lessons and creating a new lesson page are shown in Figure 3.26 and 3.27. Lessons are shown to the student in the home page for the course within weeks or topics.



ID	İname	teacher	course name	reqDate	
9	ASP.Net Kursu - XML Web Servis çağırıp kullanmak	Serkan Çınar	ASP.NET Kursu	28.12.2010 12:22:38	Düzenle
8	ASP.Net Kursu - ADO.NET ile data ya erişim	Serkan Çınar	ASP.NET Kursu	28.12.2010 12:21:53	Düzenle
7	ASP.Net Kursu - ASP.NET Tanıtım	Serkan Çınar	ASP.NET Kursu	28.12.2010 12:21:09	Düzenle
6	ASP.Net Kursu - Visual Studio .NET IDE ile çalışmak	Serkan Çınar	ASP.NET Kursu	28.12.2010 12:20:34	Düzenle
5	ASP.Net Kursu - Uygulama Geliştirmenin evrimi	Serkan Çınar	ASP.NET Kursu	28.12.2010 12:19:56	Düzenle
4	Web Tabanlı Uzakdan Eğitim	Serkan Çınar	Uzakdan Eğitim Teknolojileri	21.12.2010 15:21:58	Düzenle
3	Standartlar	Serkan Çınar	Uzakdan Eğitimde İçerik Standartları	21.12.2010 15:17:05	Düzenle
2	Adobe Presenter Kullanımı	Önder Eğitici	Uzakdan Eğitimde İçerik Geliştirme	11.12.2010 16:00:07	Düzenle
1	Captive Kullanımı	Önder Eğitici	Uzakdan Eğitimde İçerik Geliştirme	13.12.2010 00:00:00	Düzenle

Figure 3.26 Lessons page

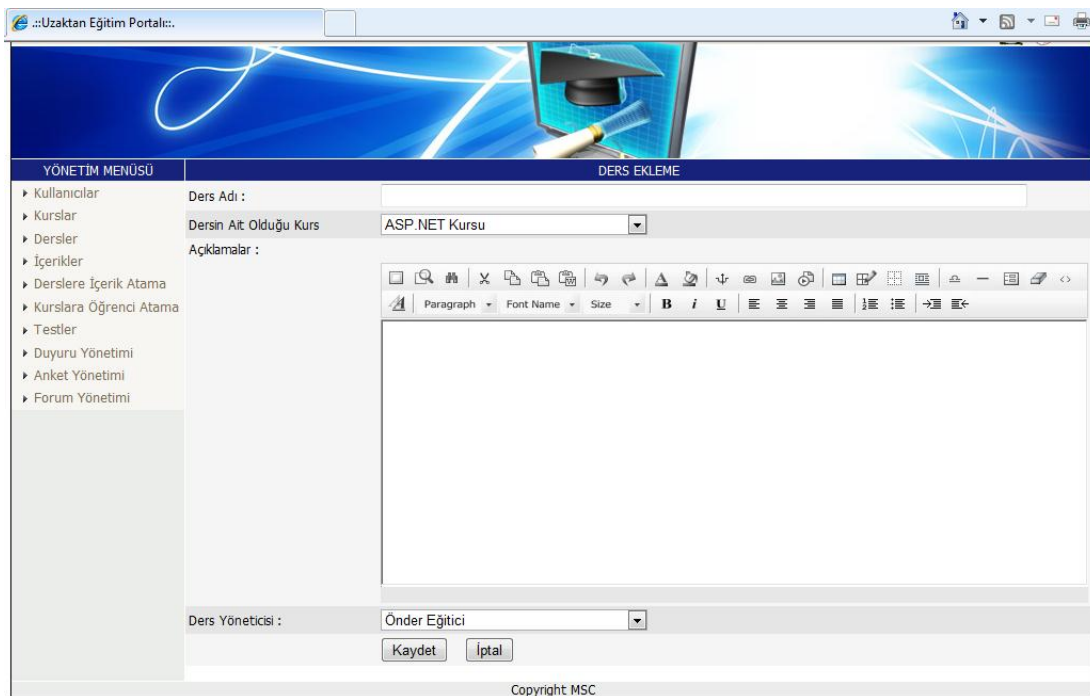


Figure 3.27 Creating a new lesson

3.5.14 Management of materials

This module provides display and upload of any electronic content, Word, Powerpoint, Flash, Video, Sounds or SCORM contents that are stored locally, or remotely. The users need to be logged into the WBDL system as a teacher in order to

use this module. Teachers may create unlimited number of materials using WYSIWYG (What You See Is What You Get) editor shown in Figure 3.29. Internal web pages can be created with WYSIWYG editor and linked to. Figure 3.28 is a snapshot of the materials page. Each material belongs to a teacher.

YÖNETİM MENÜSÜ		YENİ İÇERİK EKLE						
► Kullanıcılar		ID	mname	documentType	dfile	Owner	reqDate	
► Kurslar		1	SCORM player	.zip	20_12_201025scorm_1_2_test.zip	Serkan Çınar	01.12.2010	Düzenle
► Dersler		2	SCORM paketi	0	0	Serkan Çınar	02.12.2010	Düzenle
► İçerikler		3	LMS Türleri	.zip	20_12_201059customQuiz.zip	Serkan Çınar	03.12.2010	Düzenle
► Derslere İçerik Atama		4	Web Based Distance Learning	0	0	Serkan Çınar	05.12.2010	Düzenle
► Kurslara Öğrenci Atama		5	IPTV	0	0	Serkan Çınar	20.12.2010	Düzenle
► Testler		6	IPTV Based Distance Education	0	0	Serkan Çınar	20.12.2010	Düzenle
► Duyuru Yönetimi		7	SCO Nesneleri	0	0	Onder Eğitici	27.12.2010	Düzenle
► Anket Yönetimi		8	Web development tanıtımı	0	0	Serkan Çınar	28.12.2010	Düzenle
► Forum Yönetimi		9	İnternet ve Web	0	0	Serkan Çınar	28.12.2010	Düzenle
		10	Visual Studio .NET	0	0	Serkan Çınar	28.12.2010	Düzenle
		11	ASP.NET Web uygulamaları	0	0	Serkan Çınar	28.12.2010	Düzenle
		12	ADO.NET	0	0	Serkan Çınar	28.12.2010	Düzenle
		13	ADO.NET Provider	0	0	Serkan Çınar	28.12.2010	Düzenle
		14	Web Servisi Yaratmak	0	0	Serkan Çınar	28.12.2010	Düzenle
		15	J2EE ve .NET Web Servis Karşılaştırması	0	0	Serkan Çınar	28.12.2010	Düzenle

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Figure 3.28 Materials screen

Uzaktan Eğitim Portalı

YÖNETİM MENÜSÜ

İÇERİK EKLEME

İçerik Adı :

İçerik Dosyası (SCORM paketi): Gözet...

İçerik :

İçerik Sahibi :

Kaydet İptal

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Figure 3.29 Creating a new material

3.5.15 Management of announcements

The users need to be logged into the WBDL system as an administrator in order to add new announcements to WBDL system. The administrators may edit or delete any announcements in WBDL database through this module.



Figure 3.30 Management of announcements screen

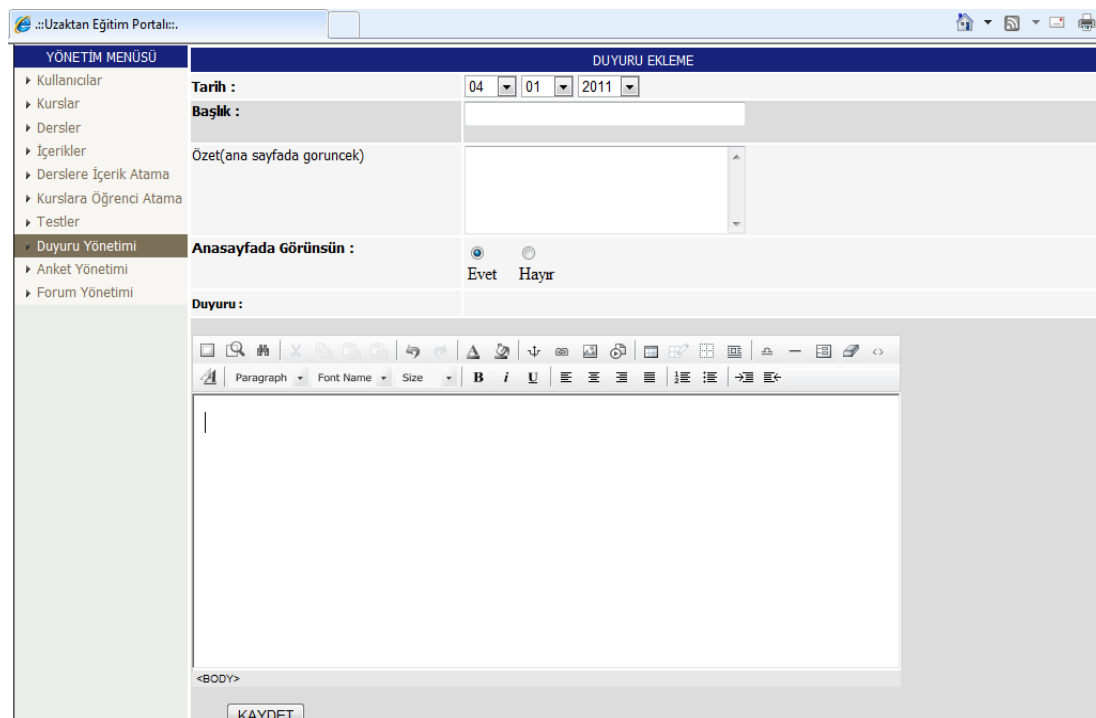


Figure 3.31 Creating a new announcement

3.5.16 Management of questionnaire

This module lets administrators design feedback forms and online questionnaires and publish them to WBDL system easily. Figure 3.33 and Figure 3.34 shows steps of creating a questionnaire. The question and number of options are defined in first step. The substances of question are filled in second step.

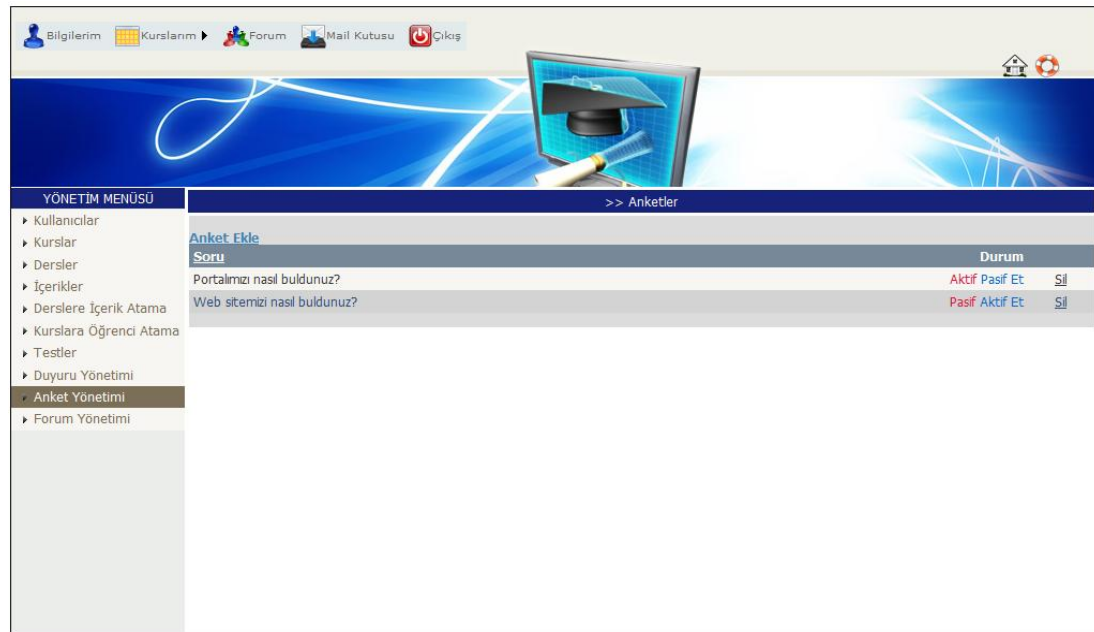


Figure 3.32 Management of questionnaires

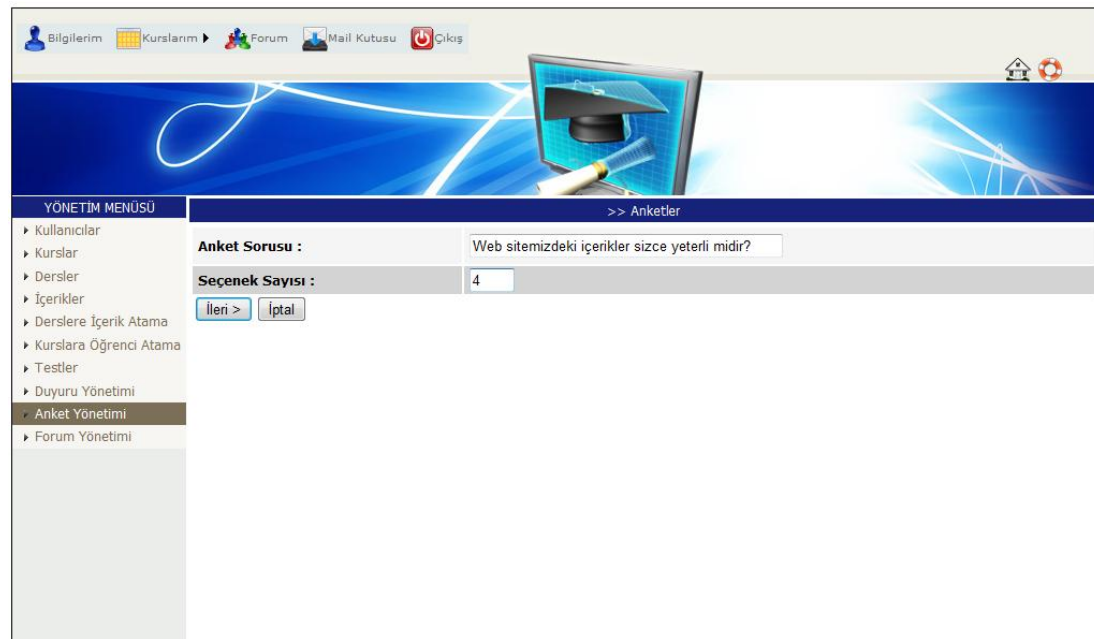


Figure 3.33 The first step to create a questionnaire

YONETIM MENUSU	>> Anketler	
<ul style="list-style-type: none"> ► Kullanıcılar ► Kurslar ► Dersler ► İçerikler ► Derslere İçerik Atama ► Kurslara Öğrenci Atama ► Testler ► Duyuru Yönetimi ► Anket Yönetimi ► Forum Yönetimi 	> Secim 1: Çok Fazla > Secim 2: Yeterli > Secim 3: İdare Eder > Secim 4: Yetersiz	Hit : 0 Hit : 0 Hit : 0 Hit : 0
	<input type="button" value="İleri >"/> <input type="button" value="< Geri"/>	

Figure 3.34 The second step to create a questionnaire

The administrators may fill hit field according to their previously obtained data as shown in Figure 3.34.

3.5.17 Management of tests

The users need to be logged into the WBDL system as a teacher in order to manage a test module in WBDL system. Tests are online evaluations that can be used to measure a student's understanding of the lessons. Each question in a test belongs to a material of the lesson as shown in Figure 3.36. Each test belongs to the lesson. Figure 3.35 is a snapshot of the test management page.

YONETIM MENUSU	YENİ TEST EKLE				
<ul style="list-style-type: none"> ► Kullanıcılar ► Kurslar ► Dersler ► İçerikler ► Derslere İçerik Atama ► Kurslara Öğrenci Atama ► Testler ► Duyuru Yönetimi ► Anket Yönetimi ► Forum Yönetimi 	ID	TEST ADI	reqDate	SORU EKLE	SORULAR
	2	Adobe Presenter Testi	23.12.2010 10:17:44	<input type="button" value="+"/> <input type="button" value="x"/>	Düzenle
	3	ASP.NET	28.12.2010 12:56:33	<input type="button" value="+"/> <input type="button" value="x"/>	Düzenle
	1	Captivate Testi	22.12.2010 23:09:40	<input type="button" value="+"/> <input type="button" value="x"/>	Düzenle

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Figure 3.35 A snapshot of test management

Figure 3.36 Creating a new question for tests

3.5.18 Management of forum

The users need to be logged into the WBDL system as a teacher or as an administrator in order to manage a forum module in WBDL system. As long as the administrators or teachers may not confirm posted message, the message is not shown in the forum page. Figure 3.37 is a snapshot of the management of forum page.

Forum Yönetimi		FORUM KONULARI	Onay
Konu :	SCORM dersi hakkında..		
Mesaj :	SCORM ile ilgili bilgi paylaşımını buradan yapalım arkadaşlar.		
Ekleyen:	testAd testSoyad	Onaylı Mesajlar	✓ ✗
E-Posta:	test@test.test		
Tarih :	04.01.2011 00:00:00		
Konu :	ASP.NET dersi hakkında..		
Mesaj :	ASP.NET ile ilgili bilgi paylaşımını buradan yapalım arkadaşlar.		
Ekleyen:	testAd testSoyad	Onaylı Mesajlar	✓ ✗
E-Posta:	test@test.test		
Tarih :	04.01.2011 00:00:00		
Konu :	WBDL dersi hakkında..		
Mesaj :	WBDL ile ilgili bilgi paylaşımını buradan yapalım arkadaşlar.		
Ekleyen:	testAd testSoyad	Onaylı Mesajlar	✓ ✗
E-Posta:	test@test.test		
Tarih :	04.01.2011 00:00:00		

Figure 3.37 A snapshot of forum management

3.5.19 Assigning students to courses

Teachers and administrators may enroll an existing student into the course using this module.

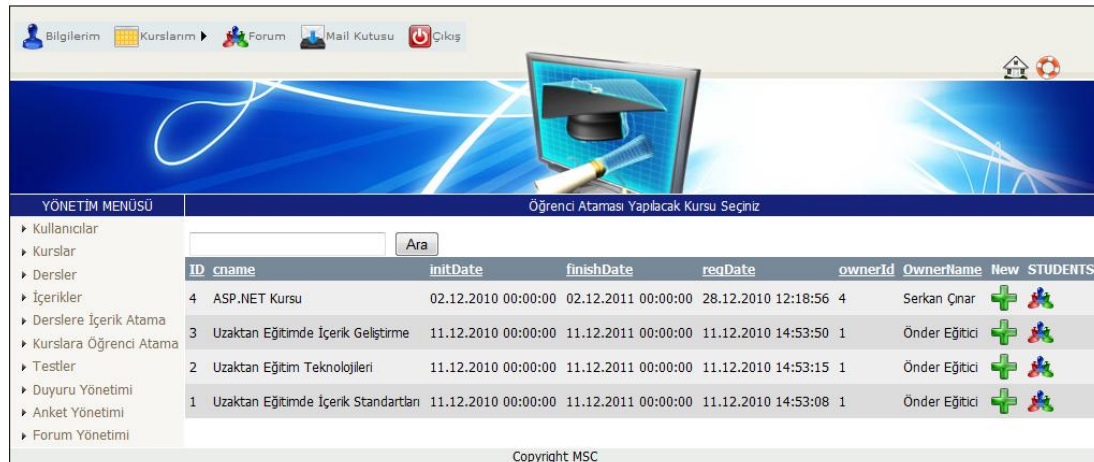


Figure 3.38 List of courses for student enrollment

Figure 3.39 is an example of the assignment page that displays the search results. If more than one page of users is returned, links to additional pages will appear on the bottom of the page.

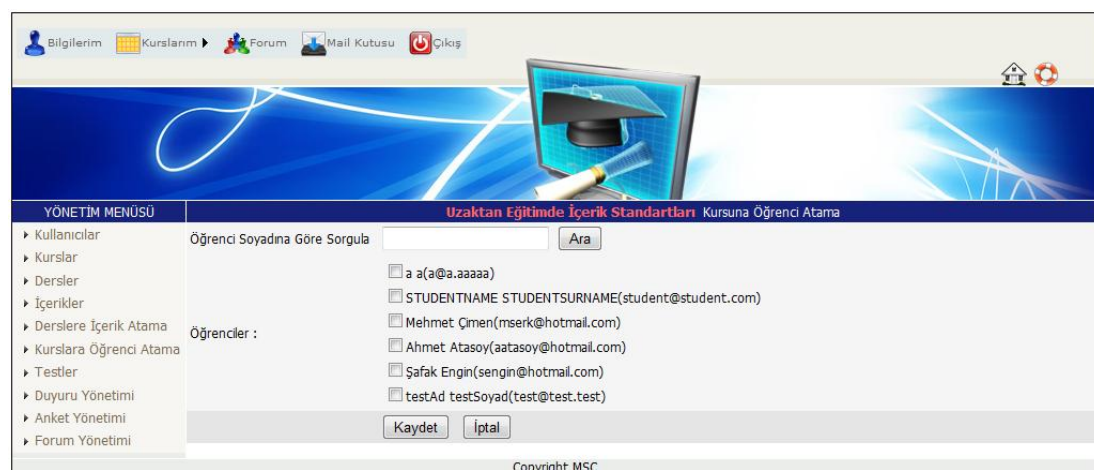
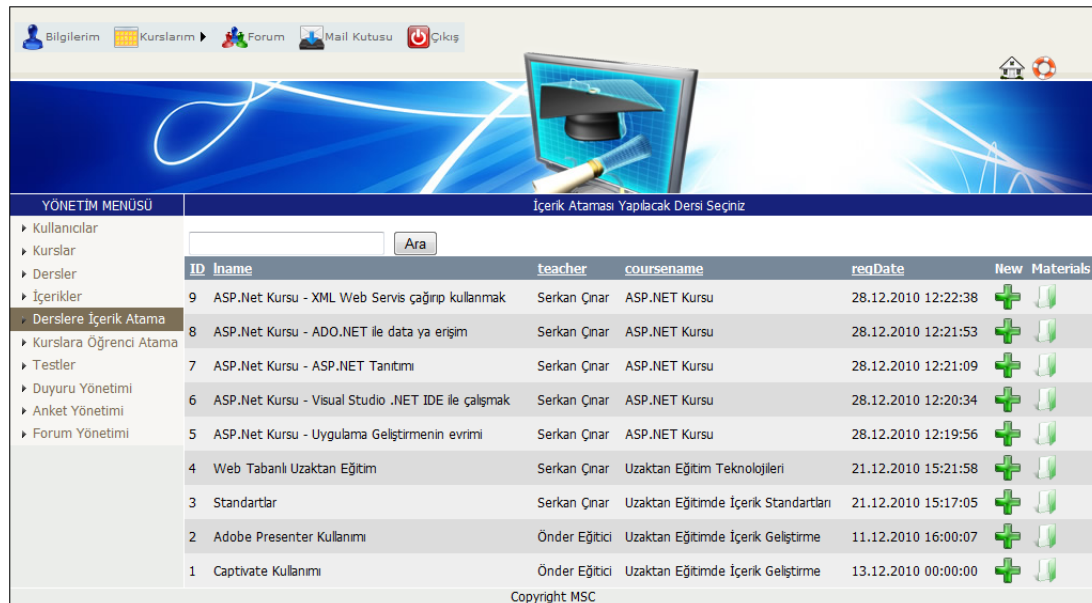


Figure 3.39 Assigning students to a course

As soon as a student is assigned to a course, a course owner (teacher) is assigned to the student.

3.5.20 Assigning materials to lessons

The users need to be logged into the WBDL system as a teacher in order to assign materials to lessons in WBDL system. Figure 3.40 and Figure 3.41 shows assigning materials to lessons.

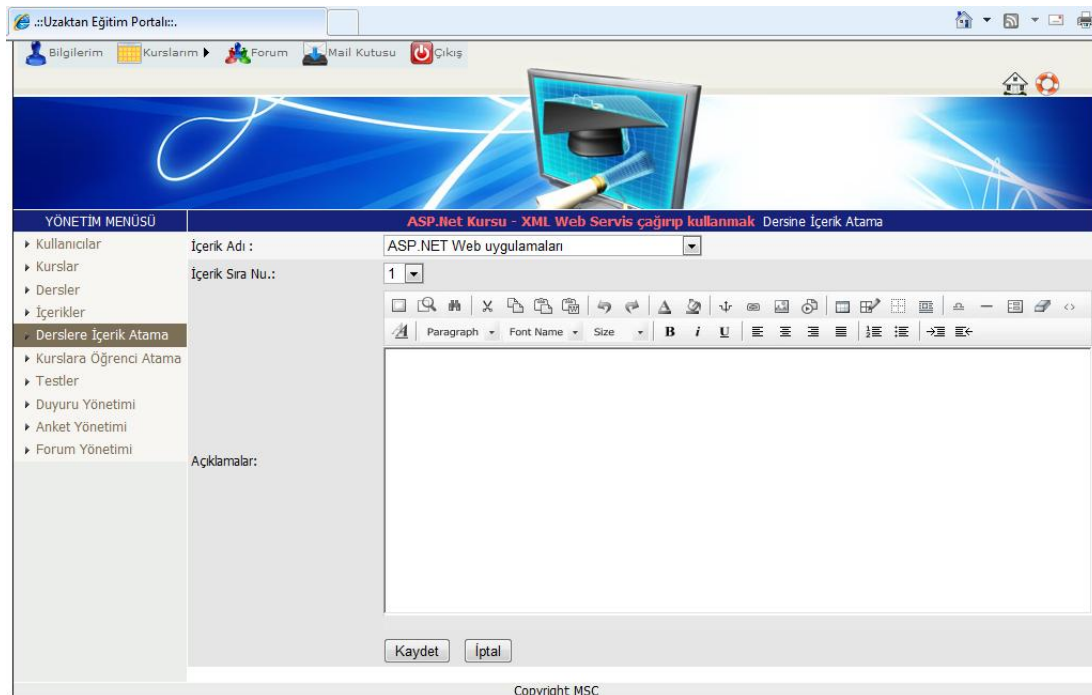


The screenshot shows the WBDL system interface. The top navigation bar includes links for 'Bilgilerim', 'Kurslarım', 'Forum', 'Mail Kutusu', and 'Çıkış'. The main content area is titled 'İçerik Ataması Yapılacak Dersi Seçiniz'. On the left, there is a 'YÖNETİM MENÜSÜ' (Management Menu) with options like 'Kullanıcılar', 'Kurslar', 'Dersler', 'İçerikler', 'Derslere İçerik Atama', 'Kurslara Öğrenci Atama', 'Testler', 'Duyuru Yönetimi', 'Anket Yönetimi', and 'Forum Yönetimi'. The 'Derslere İçerik Atama' option is selected. The main area displays a table of lessons with the following data:

ID	İname	teacher	coursename	reqDate	New	Materials
9	ASP.Net Kursu - XML Web Servis çağırıp kullanmak	Serkan Çınar	ASP.NET Kursu	28.12.2010 12:22:38	+	
8	ASP.Net Kursu - ADO.NET ile data ya erişim	Serkan Çınar	ASP.NET Kursu	28.12.2010 12:21:53	+	
7	ASP.Net Kursu - ASP.NET Tanıtımı	Serkan Çınar	ASP.NET Kursu	28.12.2010 12:21:09	+	
6	ASP.Net Kursu - Visual Studio .NET IDE ile çalışmak	Serkan Çınar	ASP.NET Kursu	28.12.2010 12:20:34	+	
5	ASP.Net Kursu - Uygulama Geliştirme evrimi	Serkan Çınar	ASP.NET Kursu	28.12.2010 12:19:56	+	
4	Web Tabanlı Uzaktan Eğitim	Serkan Çınar	Uzaktan Eğitim Teknolojileri	21.12.2010 15:21:58	+	
3	Standartlar	Serkan Çınar	Uzaktan Eğitimde İçerik Standartları	21.12.2010 15:17:05	+	
2	Adobe Presenter Kullanımı	Önder Eğitici	Uzaktan Eğitimde İçerik Geliştirme	11.12.2010 16:00:07	+	
1	Captivate Kullanımı	Önder Eğitici	Uzaktan Eğitimde İçerik Geliştirme	13.12.2010 00:00:00	+	

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Figure 3.40 List of lessons for assigning materials



The screenshot shows the WBDL system interface for assigning materials to a lesson. The top navigation bar is the same as in Figure 3.40. The main content area is titled 'ASP.Net Kursu - XML Web Servis çağırıp kullanmak Dersine İçerik Atama'. The 'Derslere İçerik Atama' option is selected in the left menu. The form includes the following fields and controls:

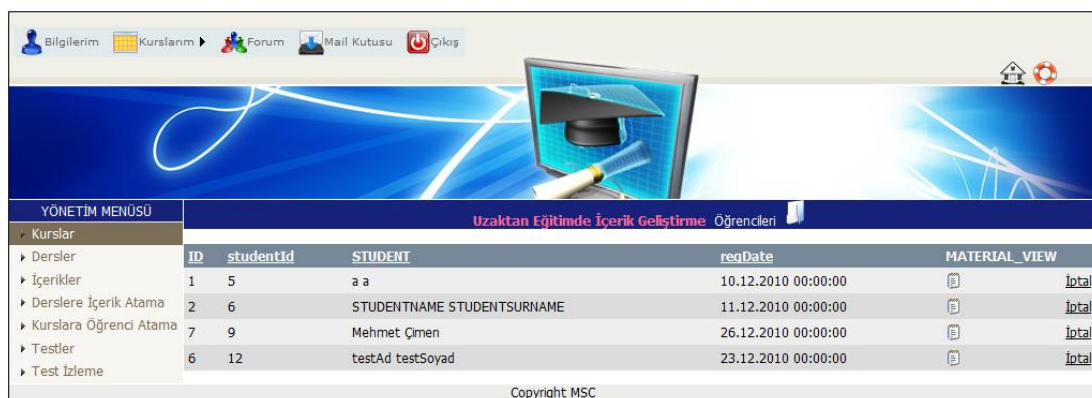
- İçerik Adı :** A dropdown menu with the selected value 'ASP.NET Web uygulamaları'.
- İçerik Sıra Nu.:** A dropdown menu with the selected value '1'.
- Açıklamalar:** A rich text editor with a toolbar containing various formatting options like bold, italic, underline, and text color.
- Kaydet** and **İptal** buttons at the bottom of the form.

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Figure 3.41 A snapshot of assigning materials to a lesson

3.5.21 Following student state and tests

Administrators and teachers have access to different reporting tools which help them in their duties. Teachers who query the status and progress of individual students (including number of visits and which course material viewed), have a list of active students in each course and several other useful information as shown in Figure 3.42 and 3.43. They can also see a list of newly submitted tests as shown in Figure 3.44 and 3.45. Administrators can see general information about users (number of visits and last visit).



YÖNETİM MENÜSÜ		Uzaktan Eğitimde İçerik Geliştirme Öğrencileri				
Kurslar		ID	studentId	STUDENT	reqDate	MATERIAL_VIEW
► Dersler		1	5	a a	10.12.2010 00:00:00	İptal
► İçerikler		2	6	STUDENTNAME STUDENTSURNAME	11.12.2010 00:00:00	İptal
► Derslere İçerik Atama		7	9	Mehmet Çimen	26.12.2010 00:00:00	İptal
► Kurslara Öğrenci Atama		6	12	testAd testSoyad	23.12.2010 00:00:00	İptal
► Testler						
► Test İzleme						

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Figure 3.42 List of students



YÖNETİM MENÜSÜ		ÖĞRENCİ EĞİTİM İÇERİKLERİ İZLEME DURUMU					
Kurslar		ID	materialId	MATERIAL	uname	surname	reqDate
► Dersler		75	11	ASP.NET Web uygulamaları	testAd	testSoyad	04.01.2011 20:33:07
► İçerikler		74	14	Web Servisi Yaratmak	testAd	testSoyad	04.01.2011 20:32:44
► Derslere İçerik Atama		73	12	ADO.NET	testAd	testSoyad	04.01.2011 20:32:35
► Kurslara Öğrenci Atama		72	13	ADO.NET Provider	testAd	testSoyad	04.01.2011 20:32:32
► Testler		71	9	İnternet ve Web	testAd	testSoyad	04.01.2011 20:32:26
► Test İzleme		70	10	Visual Studio .NET	testAd	testSoyad	04.01.2011 20:32:15
		69	8	Web development tanıtımı	testAd	testSoyad	04.01.2011 20:32:10
		68	8	Web development tanıtımı	testAd	testSoyad	04.01.2011 20:31:53
		66	8	Web development tanıtımı	testAd	testSoyad	29.12.2010 13:46:59
		65	9	İnternet ve Web	testAd	testSoyad	29.12.2010 13:46:49
		64	10	Visual Studio .NET	testAd	testSoyad	29.12.2010 13:46:44
		63	8	Web development tanıtımı	testAd	testSoyad	29.12.2010 13:46:20
		62	10	Visual Studio .NET	testAd	testSoyad	28.12.2010 13:19:24
		61	14	Web Servisi Yaratmak	testAd	testSoyad	28.12.2010 13:19:03
		60	14	Web Servisi Yaratmak	testAd	testSoyad	28.12.2010 13:18:53

Figure 3.43 Tracking material view of students

YÖNETİM MENÜSÜ		Adobe Presenter Testi TESTİ ÇÖZEN ÖĞRENCİLER			
		ID	uname	surname	SONUÇLAR
▶ Kurslar		6	STUDENTNAME	STUDENTSURNAME	Sonuçlar
▶ Dersler		12	testAd	testSoyad	Sonuçlar
▶ İçerikler					
▶ Derslere İçerik Atama					
▶ Kurslara Öğrenci Atama					
▶ Testler					
▶ Test İzleme					

Copyright MSC

Figure 3.44 Tracking test results of students

YÖNETİM MENÜSÜ		testAd testSoyad AİT Adobe Presenter Testi TESTİ SONUÇLARI		
		DOGRU : 2 ---YANLIŞ : 1 ---BOS :0		
		Öğrencinin Tekrar Gözden Geçirmesi Gereken Konular		
		SCORM paketi		
		SORULAR		
		1 . Adobe Presenter kaç tür SCORM paketi oluşturabilmektedir?		
		A) <input type="radio"/> 1		
		B) <input type="radio"/> 2		
		C) <input checked="" type="radio"/> 3		
		D) <input checked="" type="radio"/> 4		
		E) <input type="radio"/> 5		
		2 . Adobe Presenter SCORM hangi veriyonu ile uyumludur?		
		A) <input type="radio"/> SCORM 1		
		B) <input type="radio"/> SCORM 2		
		C) <input type="radio"/> SCORM 3		
		D) <input checked="" type="radio"/> SCORM 2004		
		E) <input type="radio"/> SCORM 2005		
		3 . Presenter da export seçeneği hangi menüdedir?		
		A) <input checked="" type="radio"/> File		
		B) <input type="radio"/> Tools		
		C) <input type="radio"/> Options		
		D) <input type="radio"/> View		
		E) <input type="radio"/> Help		

Copyright MSC

Figure 3.45 Tracking answers of a student

3.5.22 Educational video viewing

Educational video viewing module in WBDL system helps to increase student's satisfaction. Educational videos are used frequently in Web-based learning materials. The JW Player is used to play educational videos that is the most popular open source video and audio player for the Web. Informing the user about transfer time is important since the file transfer speed changes according to computer network bandwidth. JW player gives to the users some information about size of the video and transfer speed. The users can make their own decisions about viewing the video according to the status of the educational video transfer rate. Figure 3.46 is a snapshot of sample educational video.



Figure 3.46 A snapshot of an educational video page

3.6 Comparison of Our WBDL with Other Learning Management Systems

Comparison of our application with other learning management systems is shown in Table 3.1. Our application includes new developments in Web technologies such as AJAX. And our HTML editor was configured according to our system requirements. Teachers can link to materials with using our HTML editor.

The most important difference between learning management systems is whether they are platform independent. OLAT uses hibernate technology that provides database independence. However this technology takes more time for programming and works slower than the other programming techniques if programmer does not write codes properly.

Table 3.1 Comparison of our application with other learning management systems

	Our App.	Moodle	WebCT	Atutor	OLAT
Open Source	-	+	-	+	+
Programming Language	C# ASPX	PHP	JAVA	PHP	JAVA
Database	ACCESS-MSSQL	MySQL-PostgreSQL	MSSQL-ORACLE	MySQL	Independent (Hibernate)
Operating System	Windows	Unix/Linux Windows	Unix/Linux Windows	Unix/Linux	Independent
Users	Admin, Teacher, Student	Admin, Course Creator	Admin, Teacher, Student	Admin Teacher Student	Admin, Teacher, Student
WYSIWYG /HTML Input	+	+	+	+	+
AJAX	+	-	-	-	-
Email / Internal Messaging	Internal	Both	Internal	Internal	Email
Forum	+	+	+	+	+
Testing /Questionnaire	+	+	+	+	+
Tracking Students	+	+	+	+	+

CHAPTER FOUR

EXPERIMENTS AND COMMENTS

In this section, a questionnaire was developed to assess the website format, presentation and technical infrastructure for some modules of WBDL application, such as screen design, accessibility, usability, durability. The questionnaire form is available in Appendix A. A variety of questionnaires were examined in the literature for assessing the usability and technical infrastructure of websites (Gliem J. & Gliem R., 2003; Benedict, 2006; McLachlan, 2002; Tullis & Stetson, 2004). The questionnaire form is composed of two parts: part one consists of ten questions about evaluation of website format and presentation, part two is about adequacy of technical infrastructure including ten questions. Rate aspects of the questions on a one to five scale (Likert Scale), one equals "strongly disagree" and five equals "strongly agree." One represents the lowest and most negative impression on the scale, three represents an adequate impression, and five represents the highest and most positive impression.

4.1 Research Model

In this research, it was taken advantage of individual survey model from the general survey model and this study was applied in the following two main stages:

- The some modules of WBDL application was published on Intranet.
- The questionnaire form was developed to assess the website format, presentation and technical infrastructure for some modules of WBDL application and the results were evaluated.

4.2 Samples and Analysis

The sample group has consisted of public organization employees that actively uses the web applications. They filled the questionnaire on intranet attending from different cities. Table 4.1 shows distribution of samples according to their professions.

Table 4.1 Distribution of samples according to professions

Profession	Frequency	Percent (%)
Computer Engineer	8	23,53
Industrial Engineer	7	20,59
Electric and Electronic Engineer	4	11,76
Mechanical Engineer	3	8,83
Systems engineer	2	5,88
Guidance Counselor	2	5,88
Computer Technician	4	11,76
Operator	4	11,76
Total	34	100

Distribution of samples according to different cities is given in Table 4.2.

Table 4.2 Distribution of samples according to cities

City	Frequency	Percent(%)
Ankara	19	55,88
Elazığ	2	5,88
İstanbul	2	5,88
İzmir	1	2,94
Kayseri	4	11,77
Erzincan	2	5,88
Eskişehir	3	8,83
Diyarbakır	1	2,94
Total	34	100

The survey was tested by Cronbach's α (alpha) reliability method. Cronbach's alpha is commonly used as a measure of the internal consistency or reliability of a psychometric test score for a sample of examinees. Cronbach's alpha is a measure of internal consistency, that is, how closely related a set of items are as a group. A "high" value of alpha is often used along with substantive arguments and possibly other statistical measures as evidence that the items measure an underlying construct. Cronbach's alpha is not a statistical test - it is a coefficient of reliability (or consistency). It was first named alpha by Lee Cronbach in 1951, as he had intended to continue with further coefficients. The measure can be viewed as an extension of the Kuder-Richardson Formula 20 (KR-20), which is an equivalent measure for dichotomous items. Alpha is not robust against missing data.

Cronbach's α is defined as

$$\alpha = \frac{K}{K - 1} \left(1 - \frac{\sum_{i=1}^K \sigma_{Y_i}^2}{\sigma_X^2} \right)$$

where K is the number of components (K -items or *testlets*), σ_X^2 the variance of the observed total test scores, and $\sigma_{Y_i}^2$ the variance of component i for the current sample of persons. (Wikipedia; SPSS; Cronbach, 1951).

Microsoft Excel commercial spreadsheet application was used to calculate Cronbach's alpha. A column was created for variances. VARP function calculates variance based on the entire population. The following formule was typed in the formula dialogue box “=VARP(first user score of question one : last user score of question one)” and then was pressed Enter. The variance for question one was calculated. The AutoFill was used to calculate the variances of other questions. STDEVP function calculates standard deviation based on the entire population given as arguments. The following formule was typed in the formula dialogue :

“=(questionnumber/ questionnumber-1)*(1- SUM(variances of all questions) / STDEVP(SUM(first question score) to SUM(last question score))^2)”.

Then Cronbach's alpha coefficient was calculated. George and Mallery (2003) provide the following rules for evaluation of internal consistency:

- If the Cronbach's alpha is greater than 0.9, internal consistency is excellent,
- If the Cronbach's alpha is greater than 0.8, internal consistency is good,
- If the Cronbach's alpha is greater than 0.7, internal consistency is acceptable,
- If the Cronbach's alpha is greater than 0.6, internal consistency is questionable,
- If the Cronbach's alpha is greater than 0.5, internal consistency is poor,
- If the Cronbach's alpha is less than 0.5, internal consistency is unacceptable.

The Cronbach's alpha coefficient for the twenty items was found 0.93, suggesting that the items have relatively excellent internal consistency. The results are given in

Table 4.3. Questions classified into two parts, reliability coefficients for each part and for all the questions are given in Table 4.3.

Table 4.3 Internal consistency values for scale

	Question Count	Frequency	Cronbach Alfa	Average
Website Format and Presentation	10	34	0.836	4.502
Technical Infrastructure	10	34	0.894	4.341
Total Questions	20	34	0.93	4.422

The Cronbach's alpha coefficient for the first part of questionnaire was found 0.836, suggesting that the items have relatively good internal consistency. The Cronbach's alpha coefficient for the second part of questionnaire was 0.894, suggesting that the items have relatively good internal consistency. Considering the characteristics of the questionnaire, the data obtained from the sample group is analyzed with other statistical methods and inferences are discussed in next section.

4.3 Findings and Comments

The questionnaire is composed of two parts : part one is about evaluation of website format and presentation, part two is about adequacy of technical infrastructure. Frequency and percent values are used for the evaluation of the data. Investigations are performed on the data with frequency distribution and percentage.

Each member of the samples (the staff) are asked 10 questions to measure the format and presentation properties of viewing educational video module that is part of WBDL. The frequency distribution of answers to the questions are given in Table 4.4.

Table 4.4 Distribution of answers to the website format and presentation questions

Questions	Strongly Agree		Agree		Uncertain		Disagree		Strongly Disagree		User Score
	f	%	f	%	f	%	f	%	f	%	
1	20	58.8	13	38.2	1	2.9	0	0	0	0	34
2	19	55.9	10	29.4	5	14.7	0	0	0	0	34
3	26	76.5	7	20.6	1	2.9	0	0	0	0	34
4	24	70.6	8	23.5	2	5.9	0	0	0	0	34
5	22	64.7	8	23.5	3	8.8	1	2.9	0	0	34
6	15	44.1	16	47.1	3	8.8	0	0	0	0	34
7	12	35.3	20	58.8	2	5.9	0	0	0	0	34
8	20	58.8	12	35.3	2	5.9	0	0	0	0	34
9	20	58.8	13	38.2	1	2.9	0	0	0	0	34
10	16	47.1	18	52.9	0	0	0	0	0	0	34
Total	194	57.1	125	36.8	20	5.9	1	0.2	0	0	340

According to responses given by the participants, the rate of agree is 36.8% and the rate of strongly agree is 57.1%. These percentage can be seen in Figure 4.1. The strongly agree and agree responses to the survey is 93.9% percent of the total, the value in terms of format and presentation by participants in the website should be interpreted as containing a very large extent successful.

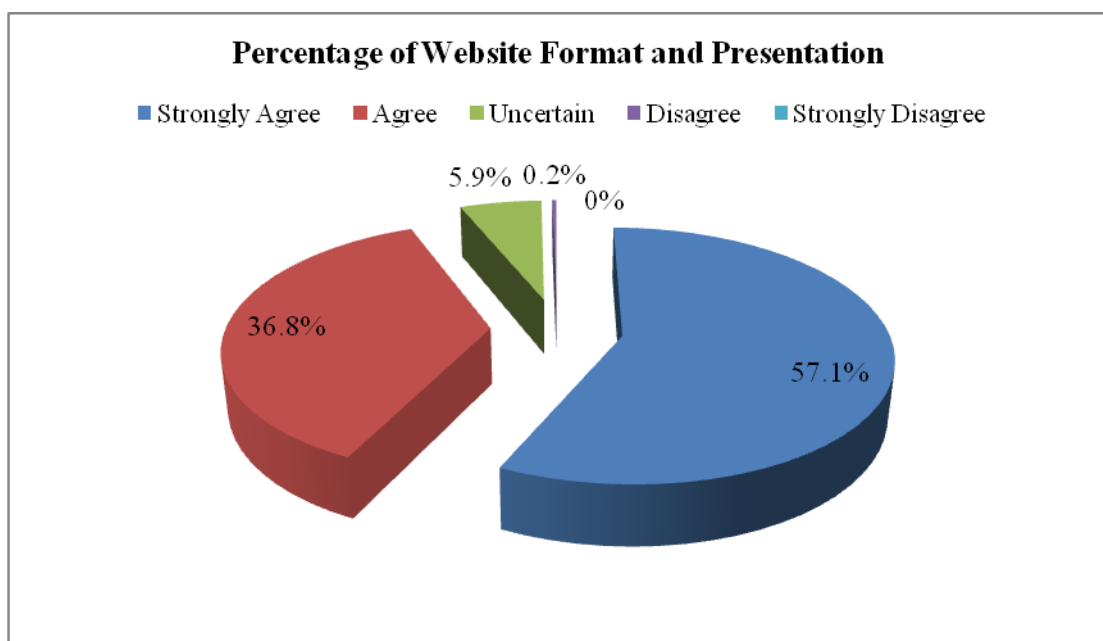


Figure 4.1 Percentage of website format and presentation

However, the responses to 5th clause of the participants were the rate of 2.9% (1 person) "disagree", and the rate of 8.8% (3 persons) "uncertain". This situation is noteworthy. The rates show us that the whole participants do not agree with the 5th clause, "The information is timely and up-to-date."

Also, "The site is suitable to provide the educational materials easy to understand." testimony questioned the 10th question, the sum of 52.9% (18 people) agree and 47.1% (16 people) strongly agree responses are 100.0%. This figure shows that the website is successful with respect to this criterion.

The distribution of responses is also given in Figure 4.2 for each question about measuring format and presentation features of website. According to evaluation of the figure, participants' responses of format and presentation clauses are seen to become dense in the fields of agree and strongly agree.

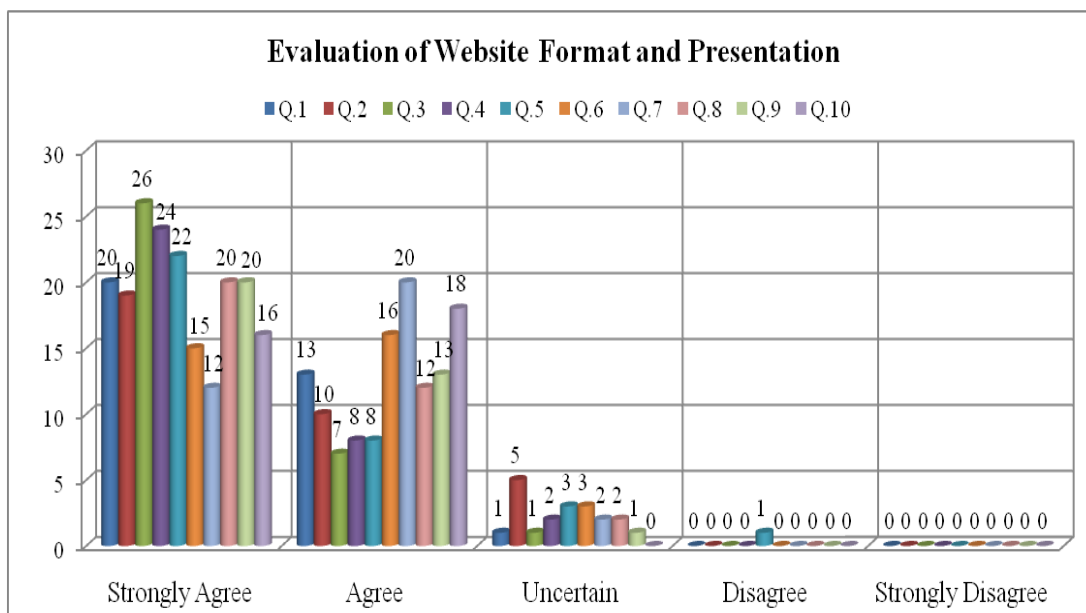


Figure 4.2 Evaluation of website format and presentation

The staff are asked 10 questions to measure the technical infrastructure properties of educational video viewing module part in WBDL. The frequency distribution of answers to the questions are given in Table 4.5.

Table 4.5 Distribution of answers to the technical infrastructure questions

Questions	Strongly Agree		Agree		Uncertain		Disagree		Strongly Disagree		User Score
	f	%	f	%	f	%	f	%	f	%	
11	27	79.4	6	17.7	1	2.9	0	0	0	0	34
12	28	82.4	5	14.7	1	2.9	0	0	0	0	34
13	23	67.6	11	32.4	0	0	0	0	0	0	34
14	16	47.1	11	32.4	6	17.6	1	2.9	0	0	34
15	17	50	14	41.2	3	8.8	0	0	0	0	34
16	15	44.1	14	41.2	4	11.8	1	2.9	0	0	34
17	13	38.2	14	41.2	4	11.8	3	8.8	0	0	34
18	10	29.4	13	38.2	7	20.6	3	8.8	1	2.9	34
19	10	29.4	15	44.1	6	17.6	2	5.9	1	2.9	34
20	21	61.8	9	26.5	3	8.8	1	2.9	0	0	34
Total	180	53	112	32.9	35	10.3	11	3.2	2	0.6	340

According to responses given by the participants, the rate of agree is 32.9% and the rate of strongly agree is 53%. These percentages can be seen in Figure 4.3. The strongly agree and agree responses to the survey is 85.9% percent of the total, the value in terms of technical infrastructure by participants in the website should be interpreted as containing a very large extent successful.

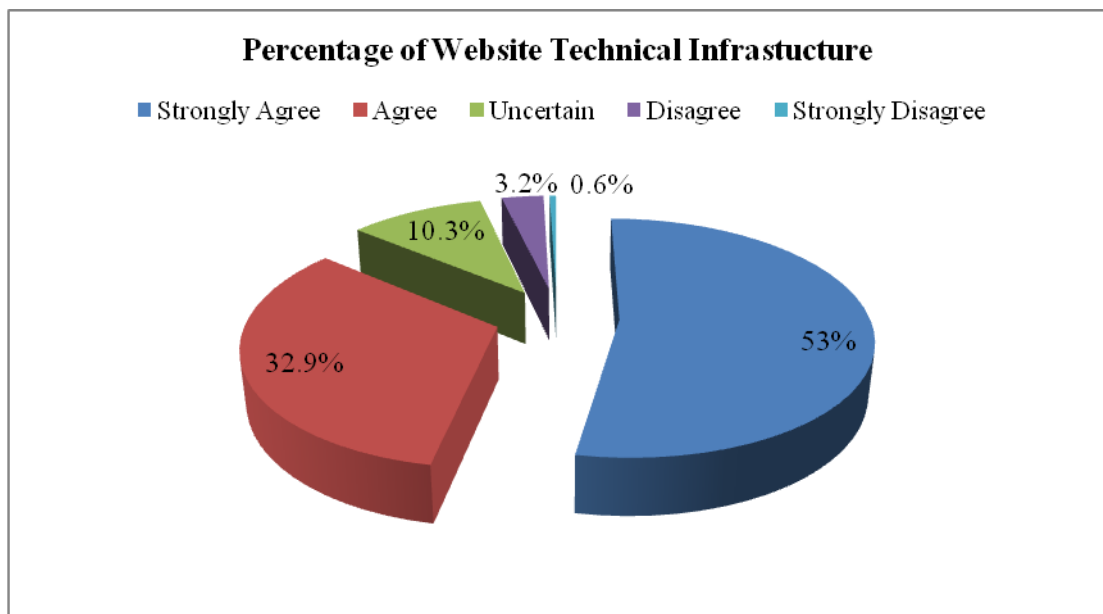


Figure 4.3. Percentage of website technical infrastructure

However, the responses to 18th clause of the participants were the rate of 2.9% (1 person) "strongly disagree", and the rate of 8.8% (3 persons) "disagree". This situation is noteworthy. The rates show us the whole participants are not agree with the 18th clause, "The transfer speed of video content is fast". In this clause, strongly disagree and disagree responses given by participants in the provinces of Erzincan and Elazığ, observed in these regions are needed to increase network bandwidth.

As shown in Table 4.4, the responses to 19th question were 2.9% (1 person) strongly disagree, and 5.9% (2 people) disagree. These rates are noteworthy. The rates show us the whole participants do not agree with the 19th clause, "I have not any problem using video player". Participants' with older versions of Adobe Flash Player can be shown as the reason for these responses. The newer versions of the Adobe Flash Player are required for running JW video player. Participants were informed about installing newer versions of Adobe Flash Player.

On the other hand, "More educational video contents must be added to this site" testimony questioned the 13th question, the sum of 67.6% (23 people) strongly agree and 32.4% (11 people) agree responses are 100.0%. The operation of adding more educational video content is evaluated to be very useful by all participants.

The distribution of responses is also given in Figure 4.4 for each question measuring technical infrastructure features of website. According to evaluation of the figure, participants' responses of format and presentation clauses is seen to become dense in the fields of agree and strongly agree.

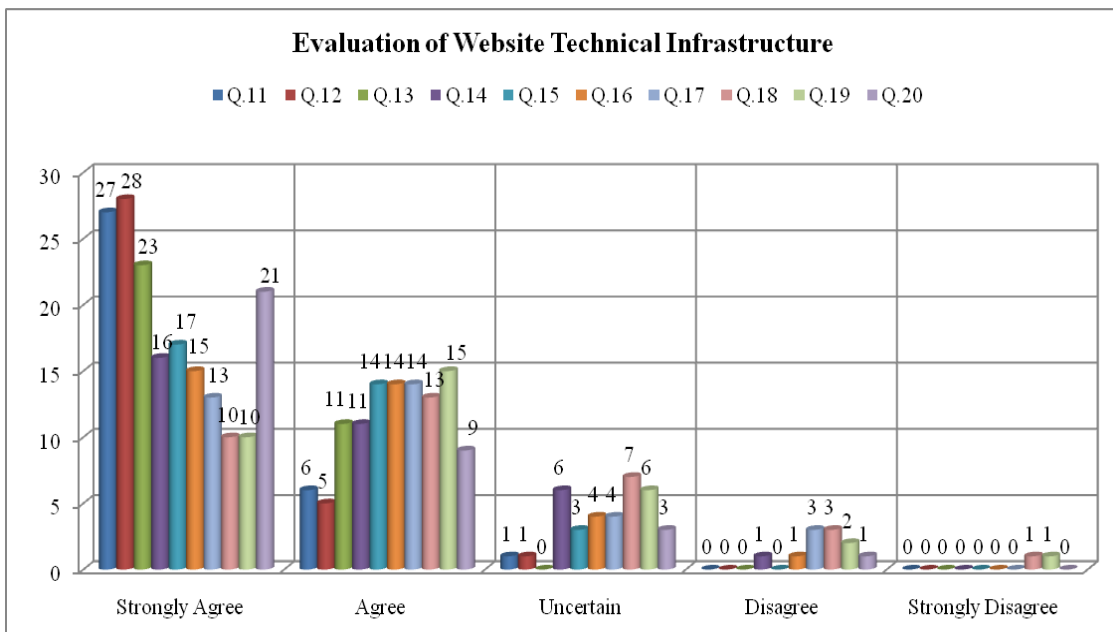


Figure 4.4 Evaluation of website technical infrastructure

CHAPTER FIVE

IPTV BASED DISTANCE EDUCATION

In this chapter, we discuss using a new technology for distance education that is called IPTV and software modules running on IPTV platform which can be used for distance education. The first target audience of this thesis is the people graduated from the Universities and secondary are the non-university graduate people who only know how to write and read. Since it is thought that the major mean of communication is IPTV (Internet Protocol Television) technology for the second target audience, the modules that have various designs are required in WBDL application.

5.1 IPTV Technology

IPTV is an acronym for Internet Protocol Television. It is a new technology that delivers video or TV broadcasts based on Internet Protocol. In this system, TV channels (password protected or not) and video contents are transformed into IP packages and sent over broadband networks. Although IPTV technology emerges digital television and video on demand broadcasting to end users, it provides personal service because of its IP-based technology. Its technology is easy to use, interactive and presents user interfaces including visual components.

Television is most suitable system for distance education because of its easiness to use and suitability for educational videos to all people. The Open Education Faculty is established by Anadolu University and it began to use television in order to deliver their instruction to students in 1982. However they could not reach to desired success because television lessons do not have any interaction with students. Kaya (2002) mentioned that TV is a one-way communication technology and broadcasting schedule of TV lessons may not be suitable for all the students. IPTV technology removes this drawback with its interactive applications.

Education level of people is one of the most important issues for using this technology in distance learning. People at initial level of education can also easily follow their educational contents prepared for them via IPTV technology. Considering that TV remote control device can be easily used by the people, education level of them is not an important factor.

IP technology provides full duplex data transfer. Integration of TV with IP should allow students to interact more efficiently. IPTV will allow people not only see if they are online, but also chat or share information about the lessons that they are watching on TV.

How to acquire fair educational opportunities in rural areas as in city is now a social hotspot in China. To solve the problem, E-learning should play an important role. However, some new challenges should be addressed in rural areas than in city. Based on IPTV, the user can access and learn a rich set of multimedia content by distance learning via dynamic and heterogeneous networks and devices (Liang, Quan, Jie, Juan, 2008).

5.2 Evolution of IPTV

The efficiency of IPTV applications increases parallel with the increase of network bandwidth provided by ISP (Internet Service Providers). IPTV is one of the most popular service among the IP-based network services (Ünaldı, 2009).

Multimedia Research Group(2009) published semiannual IPTV global forecast report. The forecast indicates that the number of global IPTV subscribers will grow from 28 million in 2009 to 83 million in 2013, a compound annual growth rate of 31% as shown in Figure 5.1.

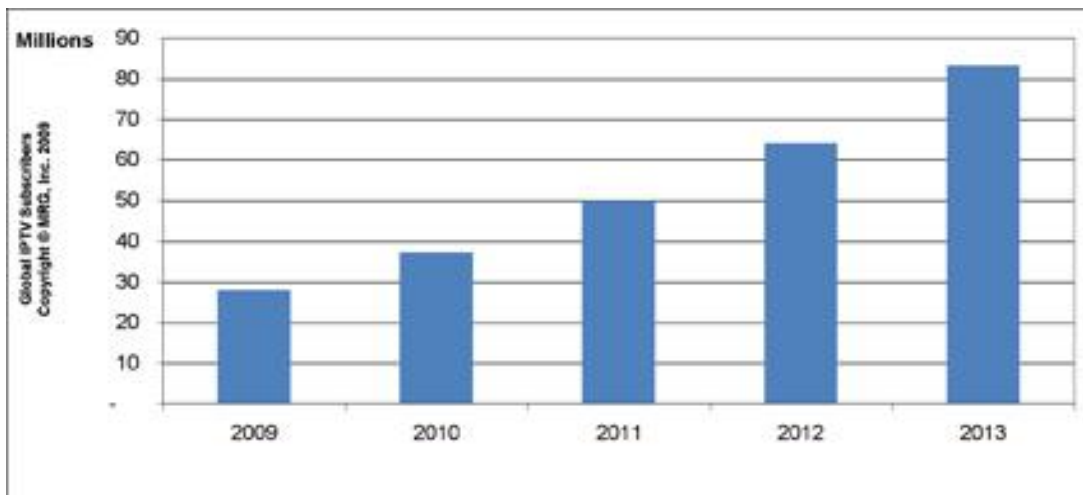


Figure 5.1 Global IPTV Subscriber

Many analysts have stated that IPTV is definitely the trend for the future of television broadcasts. Many broadband operators, telephone companies and cable companies that already pipe in broadband Internet to homes can easily add this service. Nowadays, Internet service providers such as Turk Telekom, Turksat, SuperOnline study to give IPTV service in Turkey.

5.3 IPTV Architecture and Components

Main components in IPTV service can be examined in four categories such as content resources (educational, entertainment contents, etc.), broadcast center (IPTV service points), network and clients as shown in Figure 5.2.

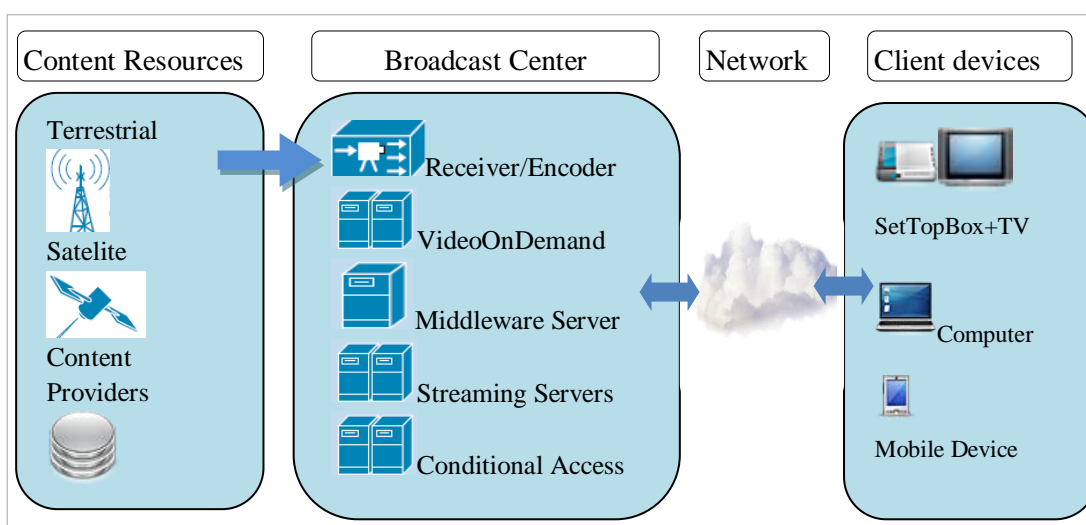


Figure 5.2 IPTV service main components

Content resources are composed of previously produced videos by Content Service Providers, and live TV broadcasts. Broadcast center is the main component of IPTV system that includes Receiver/Encoder (device/software), Video on Demand Server, Middleware Management Server, Streaming Server and Conditional Access Server.

All functions of these servers can be combined on a server. If the number of system users is less than nearly 5000, one server solution is the best cost-effective solution to provide IP services. This solution may not respond user requests as the user count exceeds over 5000. Service quality provided for each user reduces. IPTV technology works as client-server architecture. Videos encoding with MPEG-2 or MPEG-4 (encoding standarts) are transferred to client device (STB) by Streaming Server and the videos are decoded by client device. Client requests are sent to the Middleware Management Server by STB and the Conditional Access Server allows to view contents if the user is authenticated.

IPTV softwares may be divided into two categories such as server side (Middleware) and client side (STB software).

IPTV middleware is a set of software that controls the interaction between the components of an IPTV system (Receiver/Encoder, Video on Demand Server, Conditional Access Server, and STB). IP middleware controls all processes in IPTV system. (Taşkın, 2008). It also provides managing STB software and updating STB configurations. Different IPTV middleware compatible softwares are produced by companies as third party products. IPTV middleware communicates with all servers in IPTV system and third party software by using application programming interfaces(API). So the development of different applications is possible for IPTV. Moreover IPTV middleware includes Program Guide, Customer Management, Reports, Billing, and Controlling modules.

There are a lot of IPTV middleware producers such as Microsoft, Orca, Netris, Cubiware, Netup, NSN/Myrio and Minerva. IPTV middlewares can be modified

according to requests of the organizations. In addition to its flexibility, it also provides a user friendly platform for distance education. IPTV middlewares are developed by using JAVA, C# or C++ programming languages. Also various script codes and animations (applet, flash, javascript,etc.) are used to develop user interfaces for STB.

As shown in Figure 5.3, software architecture of set top box includes web browser, media player, operation system and drivers. Among them, drivers locate between hardware platform and operation system, which make operation system work well on hardware platform. Web browser and media player are application programs.

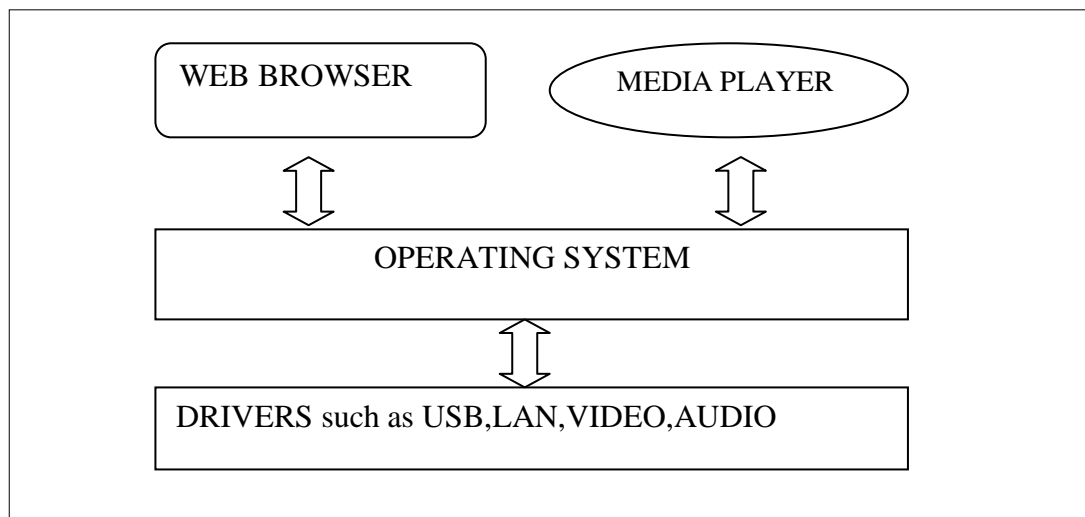


Figure 5.3 Software architecture of Set Top Box

5.4 Advantages of IPTV

From (Liang, Quan, Jie, Juan, 2008), we can summarize and list the main advantages of IPTV as:

- IPTV uses an improved standard of compression than the current digital television standard. This means that not only are file sizes being sent to your TV set smaller in size, the quality of the TV image is higher.

- Video on Demand is an interactive feature that allows you to request programs such as movies, TV shows, etc at users' convenience. IPTV makes this interactivity extremely efficient and convenient.
- IPTV requires less specialized equipment. Easy to use with a TV with use of a Set Top Box (STB).
- IPTV can make use of multicast to minimize bandwidth usage.
- IPTV can convey content from anywhere to anywhere on the network.
- IPTV can deliver triple-play services -IPTV, data, and voice-all with quality.
- IPTV can realize rich interactive operations.

5.5 IPTV and Distance Education

Distance education reaches to a larger area with the use of Internet Protocol Television(IPTV) than Internet can do. Because TV may present a lower cost and be more user-friendly than computers. Although some new challenges must be faced, using IPTV for distance education in education system provides more broad way than those taken by traditional distance learning techniques.

Although TV is suitable for distance education, because of the absence of interaction in the usage television, desired yield is not obtained. Internet Protocol Television (IPTV) covers both live TV (multicasting) as well as stored video on demand (unicasting) with user interaction. Video content is typically an MPEG-2 or MPEG-4 transport stream delivered via IP Multicast in case of live TV or via IP Unicast in case of video on demand.

Interaction is the most important feature of IPTV application. Instead of only watching recorded videos in traditional computer-based education, users can individually interact with the back-end learning system to be involved in the learning process with appropriate learning resources. Comparison of IPTV- based distance learning with Web-based distance learning is given in Table 5.1.

Table 5.1 Comparison of IPTV- based distance education with Web-based distace learning

	IPTV-Based	Web-Based
Target Audience	Reaches to a larger area	Only computer users
Cost effective	TV may present a lower cost	Requires a computer
User-friendly	TV is more user-friendly than computers	-
Login procedure	Easier than web site login	Requires user name and password
Interaction	Synchronous and Asynchronous	Asynchronous
Individual and group work	Allows individual and group work	Group work is not effective
Monitoring student activity	Facilitated by the instructor	Requires management module
Stream quality	Quality of Service(QoS) is guaranteed by provider	QoS is not guaranteed
Platform	TV, computer, pocket PC and mobile phone.	Computer, pocket pc,mobile phone.

CHAPTER SIX

CONCLUSION

In the future, IPTV system will be used more often in the distance learning programs. Students located in the different schools in the other countries or states will be taking courses from the same teacher. The teacher will be able to watch student groups on the TV or computer screen.

The development of subcomponents running on IPTV middleware and converting these subcomponents to be suitable for distance education will provide individual oriented education in distance education. Besides, improving third party software running on learning management systems compatible with SCORM will provide using educational contents which is produced compatible with SCORM so far, in IPTV platform. However distance education institutions can be easily transfer their learning materials to IPTV based distance education.

The contents and content management softwares must be compatible with standarts for acquiring equal quality in distance education through different technologic devices like PC, TV, Pocket PC, Mobile Phone etc. As IPTV technology become widespread in the world, TVs will have more important and more effective role for individual education.

Some problems occurred when we implemented to the WBDL system application. Most of the problems are about previously prepared educational video files. Bandwidth of the network infrastructure is not to be suitable for large video files published on the web and the low image quality of video requires reduction of the size without any loss. Besides, educational videos must not be presented in a standard form. We reduced size of educational videos and converted them to Adobe flash format for provide a standard form.

The following results are emphasized by giving a brief characteristics of the WBDL system application.

- Distance education became more attractive with audio-visual educational materials published on the Web.
- Staff in organizations take education at any place and time without any interruption of their jobs via WBDL system.
- It is possible for teachers to upload SCORM contents into WBDL system.
- WBDL system application was prepared considering the most learning management systems. The system was designed neither the managers nor the students will not need to know too much technical detail.
- Students are able to repeat the educational contents and have the right to download them to their computers.
- WBDL system application is consistent with knowledge management steps in terms of knowledge creation, storage, transfer and easy accessibility to information.
- Any file can be uploaded by users. This also facilitates the uploading of video files such as educational video materials.

CHAPTER SEVEN

FUTURE WORK

We will improve third party software compatible with our WBDL for IPTV based distance education. Additionally, we will implement a new digital library (including educational videos, and documents) for distance learning by using semantic web technologies. The digital library will include semantically related learning objects. A user interactive environment will be created for the learners to interact with the digital library to efficiently access and utilize lecture materials.

Other study is using data mining techniques on collected data by WBDL system applications. It is difficult to collect enough data to implement a data mining algorithm to reach reliable knowledge but once the data is collected, students' interest and behaviour in distance education can be evaluated. So a student-driven distance learning system will be developed according to requests of students.

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APPENDIX

A. QUESTIONNAIRE

Each question is a statement and a rating on a five-point scale of “Strongly Disagree” to “Strongly Agree”.

	Web site format and presentation	1	2	3	4	5
1	The site is well designed.					
2	The illustrations are appropriate for the content.					
3	The user interface is logical and clear at all pages of site.					
4	The screen displays are easy to understand					
5	The information is timely and up-to-date.					
6	The information on this site is accurate.					
7	The user can easily move through the site to a desired location.					
8	The contents on our website is appropriate for the intended audience.					
9	The presentation of content is consistent throughout the site.					
10	The site is suitable to provide the educational materials easy to understand.					
	Technical Infrastructure					
11	The training facility at this site is comfortable.					
12	Interactive educational video on intranet was a good way for me to learn educational contents.					
13	More educational video contents must be added to this site.					
14	A communication form is beneficial for the user questions or verify information.					
15	This site is helpful for reducing the costs of education. (CD, DVD Distribution and CD, DVD player requirement etc.)					
16	This web site is more usable than CD,DVD player for accessing and playing video content.					

17	The security procedures are enough for accessing video content .					
18	The transfer speed of video content is fast.					
19	I have not any problem using video player.					
20	Educational video contents are placed on intranet is more secure than CD / DVD media.(administration, tracking, logging)					