DESIGN AND IMPLEMENTATION OF WEB-BASED SOFTWARE SYSTEM FOR VIRTUAL UNIVERSITIES FOR DEVELOPMENT AND ADMINISTRATION OF ON-LINE COURSES

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Submitted to the Faculty of Computer Science
National University of Sciences and Technology Rawalpindi,
In partial fulfillment for the requirements of an M.S degree
August 2001

DEDICATION

The theoretical name of

“GOD”

is

“GOD”

The practical name of

“GOD”

is

“LOVE”

And I dedicate my MSc thesis to

THE LOVE OF MY PARENTS

Who always pray for my success in every walk of life.

THE LOVE OF MY TEACHERS

Who guided me to the end of my master’s degree with an honorable touch.

THE LOVE OF MY FRIENDS

Who helped me in every difficulty I faced and made me a success.

ACKNOWLEDGEMENTS

I wish to thank Almighty Allah who enabled me to complete this project. I gratefully acknowledge the help and guidance provided by my project advisor Dr. Romana Aziz. Without her personal supervision, advice and valuable guidance, completion of this project would have been doubtful. I am deeply indebted to her for her encouragement and continual help during this work.

My very special thanks are extended to the members of my guidance committee namely Col. Nayyar Hassan, Maj. Farrukh Saeed and Major Muhammad Nadeem and a student of MSCS-7 Mr. Usman Aftab, for their very useful suggestions and critical reviews that assisted me in widening the perspective of this project.

I deeply treasure the unparallel support and forbearance that I received from my family.

ABSTRACT

The research work presented in thesis covers the design and development of a number of web-based software tools, which are integrated to setup a customizable website for Virtual Learning. This software system can be used by institutions like Virtual Universities and Traditional Universities, wishing to expend into the arena of Virtual Learning.

The software system has three sets of utalities. First one for students, second one for faculty and third one for virtual university administration. The proposed software system for virtual university is based on the Asynchronous model of Distance Learning. The courses will be available on-line through internet and students at distance can register and select their desired courses. The software developed for the Virtual University has three main modules;

Students Control Panel

Faculty Control Panel

Administrator Control Panel

Students Control Panel includes student's registration, attend courses, results, notice board, change password, attempt papers and assignments options. In Faculty Control Panel, teaching staff can put their lecture notes and reading lists on the web for students to browse and communicate with students via e-mail and generate their teaching courses web pages. Faculty area also includes a course-authoring tool. The course wizard is a multiple feature package which allows the instructors to design their courses for distribution on internet. This is done via an on-line graphic interface using the web browser. No programming or HTML experience is required to use this tool.

There is also an Administrator Control Panel. The job of the Administrator is to maintain and update the information system of the virtual university. Administrators' work closely with technical and support service personnel, ensuring that technological resources are effectively deployed

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CHAPTER 1

INTRODUCTION

Distance Learning is defined as a formal educational process in which the majority of the instruction occurs when a teacher and student are on remote sides or separated by physical distance. Instruction may be in Synchronous Mode or Asynchronous Mode.
AT&T defines distance learning as :

> 'Distance Learning (DL) is a directed system or a process connecting learners with remote resources. DL can be the primary or supplemental means of learning.' [6]

The California Distance Learning Project (CDLP) uses this definition:

> 'Distance Learning is an instructional delivery system which connects learners with educational resources. Distance Learning provides educational access to learners not enrolled in educational institutions and can augment the learning opportunities of current students. The implementation of Distance Learning is a process which uses available resources and will evolve to incorporate emerging technologies.' [10]

The modified form of Distance Learning is Virtual university. Virtual universities are those universities, which deliver education through electronic medium. For the delivery of education these universities use two types of communication medium Synchronous and Asynchronous. Examples of distance learning delivery systems in the synchronous mode include [11]

1. Audio Conferencing
2. Video Conferencing
3. Chatting Room
4. Electronic White Board
5. Instructional Television (Interactive Mode)

Examples of distance learning delivery systems in the asynchronous mode include [3,11]

1. Audio/Video Tapes
2. Print Material
3. Audio/Video on demand
4. E-mail System
5. Instructional Television (Passive Mode)

1.1 Importance Of Distance Learning

Distance learning courses provide enrollment options for students who may not be able to come to campus regularly and take traditional college courses because of physical limitations, work and family commitments, time and place limitations, or personal preference. Distance Learning allows adult students to take classes whenever and wherever they are. Businesses are able to offer training sessions to employees at several sites.

Distance Learning allows adult students to complete their degrees. Degree programs can be completed at any college or university in the world**.**

1.2 Virtual University

With the help of latest inventions, universities are able to deliver education through Internet. So these types of universities are called “Virtual Universities”. These virtual universities are the advance form of distance learning. Due to these virtual universities

student-teacher interaction is possible (like conventional universities) as compare to old-fashioned distance learning. By definition.

> "Educators and policy leaders are envisioning new approaches to instruction based on communications and computer technology using learning-on-demand and learner-centered instruction. An immense opportunity exists for institutions to establish new forms of electronic-based collaboration - from the student level to the institutional level - that can bring about major improvements in both access and learning while meeting legitimate public and institutional concerns about cost and quality. There is also the opportunity for new levels of multi-institutional, multistate and multinational collaboration to provide postsecondary education and training through existing and emerging global networks. This enriched educational environment envisioned by many academic leaders is captured in the phrase the virtual university." [4]

1.3 Communication Methods

For distance learning programs, Internet can be used to deliver instruction, store information, and to facilitate communication. People equipped with appropriate technology, including individuals with disabilities, can gain access to unlimited opportunities for interaction and learning without leaving their homes or offices. Today, audio, video and computer technologies are more common delivery modes. The new technologies allow for two types of communication to deliver the content of distance learning. They are:

1.3.1 Synchronous Communication Method

This requires that the students and instructors to participate simultaneously. The advantage of synchronous communication is that the exchange of information is done in real-time and the feedback among all participants is spontaneous. [3,11]

1.3.1.1 Advantages

The interaction is done in real time. This method includes interactive TV, teleconferencing, computer conferencing and/or Internet relay chats (IRC). Both teachers and students can have the quick and interactive feedback system

1.3.1.2 Disadvantages

Though the interaction between students and teachers is possible but this type of communication need good and expensive equipment, like well- equipped computer systems, fast Internet connections.

1.3.2 Asynchronous communication Method

This form does not require the simultaneous participation of the students and instructors. The advantage of asynchronous communication is that it allows students to pace their learning process to fit their personal and professional schedules. It also allows them to get a handle on the content because it allows them to repeat the material that they do not understand. [3,11]

1.3.2.1 Advantages

The advantages of asynchronous delivery include student choice of location and time, and, in the case of telecommunications such as e-mail, interaction opportunities for all students.

1.3.2.2 Disadvantages

A disadvantage to consider with e-mail-based interaction is the considerable written exchange. Second the Teacher-Student and Student- Student interaction is not possible.

1.4 Thesis Description

The main objective of this software is to make the university and its education system accessible to the students and educators. It would be a useful software for the students

those can not approach universities due to certain limitations, they can attend the online courses, can give quizes, assignments and papers and participate in other events like conferences, workshops organized by the university. I am using Asynchronous Method to design and implementation of web-based software system for virtual universities for development and orginization of on-line courses. There are three different main modules regarding to the Virtual University. These modules are,

Administrator Control Panel

Faculty Control Panel

Students Control Panel

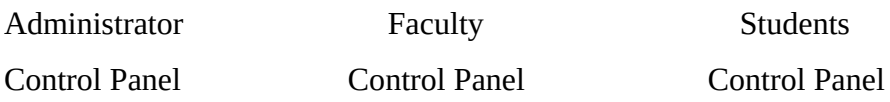


Fig 1.1 Shows the interaction with the university.

1.4.1 Administrator Control Panel

The job of the administrator is to maintain and update the environment of the virtual university. If some sort of problem arises then this is the job of the administrator to remove this problem.

Although administrators are typically influential in planning an institution's distance education program. They are consensus builders, decision makers, and referees. They work closely with technical and support service personnel, ensuring that technological resources are effectively deployed to further the institution's academic mission. Most importantly, they maintain an academic focus, realizing that meeting the instructional needs of distant students is their ultimate responsibility.

In administrator area there is a panel of different options, through which the administrator can maintain the virtual university system easily rather than penetrating into the system. These options are shown in figure 1.2

Figure 1.2 Shows Administrator Control Panel

1.4.2 Faculty Control Panel

The success of any distance education effort rests squarely on the shoulders of the faculty. In a traditional classroom setting, the instructor's responsibility includes assembling course content and developing an understanding of student needs. In distance

education, the attentive teacher consciously and subconsciously receives and analyzes the delivery, to meet the needs of the class during a particular lesson. The learner is usually isolated is distance learning, so it the job of the teacher sort out these problem and then do its best to remove them.

There are different options in faculty control panel, through which the faculty member conduct the classes.

These options are shown in figure 1.3

Figure 1.3 Shows Faculty Control Panel

1.4.3 Student Control Panel

The primary role of the student is to learn. Under the best of circumstances, this challenging task requires motivation, planning, and the ability to analyze and apply the information being taught. In a distance education setting, the process of student learning is more complex. Distant students have a variety of reasons for taking courses. Some students are interested in obtaining a degree to qualify for a better job. Many take courses to broaden their education and are not really interested in completing a degree.

To attend the courses there is a students control panel. Where the students have options to attend the courses.

These options are shown in figure 1.4

Figure 1.4 Shows the Students Control Panel

1.5 Overview Of The Thesis

The thesis contains a total of six chapters. Chapter 1 describes Distance Learning, Virtual Universities and why they are used. Two different methods for the delivery of education in distance learning, their advantages and disadvantages. The description of my purposed thesis work.

Chapter 2 discusses the Open Universities, Distance Learning and Virtual Universities, along with their objectives and limitation in detail. Three different models for Virtual University. Comparison between distance learning and the

traditional learning. In last, challenges which are facing by different universities around the world.

Chapter 3 describes the role of Internet in distance learning. The usages of web technologies like client-server modeling, browsers, servers, protocols, URLs and common gateway interfaces (CGI). Different participants in the distance learning along their capabilities and limitations. Challenges in distance learning (Virtual Universities).

Chapter 4 includes the different modern and old techniques used in virtual universities for the delivery of education. Further this chapter describes the distance learning in Pakistan. Difficulties, which have to face by participants in distance learning. Different methods to improve distance learning quality and management system.

Chapter 5 describes the thesis proposal and the software requirements specification (SRS). SRS describes the product scope, description system model, system functionality user characteristics, interfacing requirements, flow diagrams (DFD) and process specification of the system.

Chapter 6 describes the implementation of the system, like how different users can interact with the system according to their authorizations. Recommendations for the future development of the system are also discussed as the last part.

CHAPTER 2

POPULAR MODELS FOR DISTANCE LEARNING

Distance Education is term that refers to instructional delivery that does not constrain the student to be physically at the same location as the instructor. The term Distance Learning is used interchangeably with Distance Education, but the main difference between the two is that the student is responsible for learning, while the instructors/teachers are responsible to provide the content. Thus, Distance Learning can be seen as the result of Distance Education. Different models of distance learning are as follows.

2.1 Open Universities

The concept of distance learning was developed centuries ago, when the people quires their problem from any established institutions. From here the concept of open universities developed. It is think that the first Open University was established in the late 18th century [5]. Here teachers and students were on remote sides. Distance Education referred to correspondence study between the student and an institution and the medium of the exchange of content was postal mailing system and books.

The Open University is unique in being a distance teaching research university. Because people get admission in these universities to continue their studies. The medium of correspondence between students and teacher in old-fashioned open universities was mailing system and through this students got their book and other course material and this was the only channel to contact to their teachers. The Open University was the most important innovation in higher education of the 20th century. Therefore, since universities rightly change rather slowly, it has considerable relevance for the design of universities in the 21st century, not least on this dimension of learner centeredness.

The concept of virtual universities was developed from these open universities. In the 20th century many new technologies came into use: radio, the telephone, the cinema,

television, programmed learning, computers and the Internet. These new technologies promote the distance learning. It is known that the UK Open University was the first ever-modern Open University. Which was established in 1969, was a particularly significant milestone. In the 1970's, 1980's and 1990's many countries followed the example of the UK and set up open universities of various kinds. [5, 14]

So these Open Universities were the primitive form of Distance Learning. The Open Universities have their objectives and limitations.

2.1.1 Objectives

Open university system has following objectives.

To extend reach so that off-campus students can engage in education.

To attract new audiences around the world.

People can get low cost education.

People cannot only continue their jobs but also their studies.

It provides the student with almost complete flexibility.

It permits the student the opportunity to study anywhere in the world, where the student happens to be located (study need not be done at home).

It affords the student a chance to study at any time of the day or night. [3, 6]

2.1.2 Limitations

Open University has the following limitations

The medium of instruction was postal mailing system only.

The communication with teachers was not possible on the right time

Lack of quality education.

These modern Open Universities are now known as Virtual Universities. In these universities the university administration uses these new modern technologies to spread the education

2.2 Virtual University

The United States Distance Learning Association (USDLA) defines Virtual Universities as :

> "The delivery of education or training through electronically mediated instruction including satellite, video, audio graphic, computer, multimedia technology and other forms of learning at a distance from a university are known as Virtual University." [6]

The term virtual university is used to describe ventures ranging from the development of web-based courses at bricks and mortar universities to the creation of entirely new enterprises dedicated solely to the delivery of online distance education.

The main objective of the Virtual universities is to make the university and its education system accessible to the students and educators through out the world using multimedia sessions. Students and educators from one end of the world can enjoy the education imfarted from the other end of the world. Virtual universities would be a useful for the students who can not approach universities due to certain limitations, they can attend the online courses and participate in other events like conferences, workshops organized by the university. University can organize lectures by the educators who can not come to the university. One can think that a whole university is inside his/her personal computer with the advent of updating itself with the latest curriculum and giving its subscriber latest information. The use of multimedia technology will facilitate the user (student) to get the information with certain ease and concentration.

2.2.1 Working Of Virtual Universities

In Virtual universities we use software systems that synthesize the functionality of computer-mediated communications software and on-line methods of delivering course materials. The popularity of Internet and World Wide Web (WWW) has injected a new lease of life; it is the existing brick and mortar universities. Many universities are putting their existing teaching materials on the Web and delivering learning through Virtual University. The educational material offered on the Web follows a branching structure and uses standard communication technologies of Internet and the Web to deliver the

education. In virtual university system teaching staff put their lecture notes and reading lists on the web for students to browse and are communicating with students via e-mail. Course outlines are commonly published on departmental web sites. Some university libraries have web-interfaces for searching, checking availability and reserving books. Conferencing software is used in some institutions to create on-line discussion groups amongst students.

2.2.2 Objectives

The virtual university system is beneficial due to following reasons.

To extend "reach" so that off-campus students can engage in education.

To attract new audiences, particularly masters-degree and non-degree students, around the world.

To motivate staff, perhaps by using new media to re-invigorate their interest in their subject.

The economical and social contexts have changed.

The number of unemployed workers is increasing and they need to be retrained.

Knowledge has become one of the most important economical forces.

Knowledge is rapidly expanding and its lifetime is becoming increasingly shorter.

To survive in the market, companies need to change, to train and retrain their employees.

A decrease in government grants for universities.

Increased competition - from other universities, from non-university colleges, and in the distance teaching sector, from universities outside the home country

A perceived reduction in the relative value of the qualifications

People want to get cheap education.

A desire to escape from the restrictions of the undergraduate programmed into new markets. [2,3,9]

2.2.3 Limitations

The Virtual Universities have the following limitation

Personal interaction between teacher and student is very difficult.

Interaction between students is also very difficult so the sense of competition between students is much less than conventional universities.

The arrangement of practical labs is not possible through Internet facilities.

It is difficult for the universities to arrange the technical courses by using these technologies.

How many students have good Internet connections.

The cost on those equipments that are required to establish a Virtual University is high.

The student's resources limit research facilities. [2,9]

2.2.4 Quality Assurance

As with the delivery of traditional higher education, a system should be put in place to assure the quality of Internet-based courses. Rigorous and regular testing and evaluation of materials and methodologies is necessary. A system designed to review curriculum, environment and resources, teaching and learning, assessment and standards of achievement, guidance and support is essential to ensure that standards of quality are upheld. It may however be easier to elicit feedback on course quality and learning outcomes from students taking virtual courses than those on campus

2.2.5 Virtual Universities Chart

The following chart shows different modules use by some of the universities. [2,8]

Universities Name **Students Modules** **Staff Modules** **Network** **Buildings** **Legal**
Sheffield Hallam University 22611
Open University (UK) 96452
Dutch OU 79533
Fern University 98443
African Virtual University 55757
Univ. of Highlands & Islands 55757
Virtual Online University 107991
EADTU 56658
Cyber Ed 103994
CU-Online 103994
Global Learning Network 99477
Athabasca University 96992

2.2.6 Models Of Virtual University

Virtual University is divided into three distinct abstract types.

A "Conventional University" can also deliver the education on-line. With proper designing of course material land study support through experienced faculty, a student can register for the study program and get training culminating in certification through normal on-line channels

A number of universities get together in more or less tight organizational framework to put a 'skin' of virtuality around all of them or groups of IT Professionals and academics may form an organization and provide support to students, who wish to take up courses on Internet, offered by other universities.

The pure "Virtual University" compromising of its own independent faculty and academics programs, independent courses and certifications, independent recourse material and delivery mechanism [2,13]

2.3 Distance Learning vs. Traditional Education

Research indicates that the instructional format has little effect on student achievement as long as the delivery of technology is appropriate to the content being offered and all participants have access to the same technology. Conclusions drawn are as follows.

- Achievement on various tests administered by course instructors tends to be higher for traditional students as opposed to distant studests.
- Yet no significant difference in positive attitudes toward course material is apparent between distant and traditional education.
- Conventional instruction is perceived to be better organized and more clearly presented than distance education.
- The organization and reflection needed to effectively teach at a distance often improves an instructor's traditional teaching.
- Teachers and students conceptions are easily accessible to the other as compare to distant students.
- Teacher and students must agree learning goals for the topic and task goals but this is difficult in distance learning.
- The teacher has the responsibility to use the relationship between their own and the student's conception to determine the focus of the continuing dialogue, which is not possible in distance learning.
- The teacher must support the process in which students link the feedback on their actions to the topic goal for every level of description within the topic structure but as compare to distant students.

According to these differences traditional education is much better than distance learning. But as we have mentioned earlier that distance learning is for those people who cannot get education from the conventional universities. [10,14]

2.4 Challenges for Universities

Universities are facing many problems allover the world. Some of them are described below.

- There is a decrease in subsidies from government. This has affected different countries in different ways. And at different times.
- There is increased competition to universities from other universities and from non-university colleges.
- In the distance-teaching sector, there is competition to universities from those outside the home country. For example this is an often thought to have been

started by the UK Open University or perhaps by the Australians, but in fact other European open universities have been quietly signing up foreign students.

- As a consequence of these constraints, there is a great desire to escape from the restrictions of the undergraduate program into new markets.
- Staff morale is low, partly because staff feels underpaid and overworked, also because university staff in many countries is ageing due to lack of recruitment in recent years.

The new markets that universities are looking at fall into four categories:

- Masters degrees are increasingly popular, because fees can be more realistic - not just in the areas of the MBA and in computer science, but also in a wide range of areas including distance education itself.
- Non-degree courses for local firms are of interest, although in some universities there is a degree of snobbery about such courses.
- Distance Learning is spreading fast. For example, the UK Open University faces competition in many areas from other UK universities, many of whom can take a more minimalist and pragmatic approach than the Open University feels able to. In turn the UK Open University has alarmed several European open universities, which feel vulnerable, especially in a world where in many continents the language of much of business and postgraduate instruction moves inexorably towards English. In Europe including the UK there is also much concern over the threat of US universities to "go online" and attract European students.
- Indeed, worldwide education global courses are the dream of several organizations. So far it remains hard to achieve in reality. Cultural and language barriers are strong, so far.

Some universities are going into partnership with non-university organizations. One could argue that this is not new - the Open University itself is a symbiosis of a university and a broadcaster. [8,9,12]

2.5 Conclusion

The concept of “Open Universities” was established centuries ago. The delivery of education in old Open Universities is very simple and easy. They send course material and books to their students, via postal mailing services, and this was the only way of communication between teacher and student.

The concept of Distance Learning was developed through these Open Universities. Distance Learning is term that refers to instructional delivery that does not constrain the student to be physically at the same location as the instructor. The term “Virtual University is the modified form of Distance Learning”. The main objective of the Virtual universities is to make the university and its education system accessible to the students and educators through out the world using multimedia sessions.

CHAPTER 3

ROLE OF INTERNET IN DISTANCE LEARNING AND EDUCATION

Over the past few years, a major explosion in the growth of the Internet has taken place. It is becoming increasingly the place where people go to find information, share information, do their commerce and learn new things. The Internet "information highway" creates a revolutionary forum for the exchange of ideas, fundamentally changing the way we communicate. It is an indispensable tool in the information age. The collection of networks began as a research vehicle, but grew to become much more. The Internet connects thousands of computers and millions of people around the world. The future of software development is taken to new heights with the development of new Intranet/Internet applications on the World Wide Web (WWW).

3.1 Web Technology

The World Wide Web (WWW) shortly written, as the Web is one of the most popular services provided via Internet. There are thousands of web sites available to the browser. The user has wide choice of exploring exotic destinations with the excitement of playing a video game, listening to a music CD, or even doing virtual shopping, banking, and on-line payments. The most appealing aspect of the Web and Internet is that any body can publish his/her pages, and place it as a web site in the Internet. Basically the web is collection of all browsers, servers, files, and browser-accessible services available through the Internet.

Intranets are small Internets designed for an organization which wants to avail the facilities of the web technology but do not want to share its data with other users.

3.1.1 Web Client/Browser

To access information stored in the form of web pages, users must connect to a web server. Once connected an interface that displays the contents of the web page is required.

Computers that offer the facility to read information stored in web pages are called “web clients”. Web clients run special software called “Browser” that allows them to:

1. Connect to an appropriate server.
2. Query the server for the information to be read.
3. Provides an interface to read the information returned by the server.

Some of the most popular browser software that clients run to allow them to query web servers for information are Netscape Communicator and Microsoft Internet Explorer, the latest versions of these browsers support both the Java Script and VB Script. Today’s web browsers extend Mosaic’s GUI features with multimedia capabilities and with browser programming language such as Java, Java Script and VB Script [Bayross 99].

3.1.2 Web Server

Web pages are created using HTML syntax. These pages must be organized and stored at a central computer. The organization of web pages into directories and files stored on the Hard Disk (HDD) of a central computer is called “Web Site” creation. Computers that store web pages into directories and files and provide these files to be read are called “servers”. They act like service providers that service the need for information [Bayross 99]. The server computer runs special software called ‘Web Server’ software that allows:

1. Web site management.
2. Accept client’s request for information.
3. Respond to a client’s request by providing the page with the required information’s.

Some of the most popular software, which servers run to allow them to respond to client request for information, is Internet information server (I.I.S), Apache Web Server, Netscape Server, and Microsoft Personal Web Server.

Web server software stores and manages web pages when required; the web server accepts requests for these web pages, retrieves these web pages from Its HDD and sends the page back to the client who requested for it.

3.1.3 Role Of Internet

The Internet is the largest, most powerful computer network in the world. It encompasses more than 1.5 million computers with Internet addresses that are used by more than 100 million people in most of the countries in the world [12]. As more and more colleges, universities, schools, companies, and private citizens connect to the Internet either through affiliations with regional not-for-profit networks or by subscribing to information services provided by for-profit companies, more possibilities are opened for distance educators to overcome time and distance to reach students.

As technological advances in the computer hardware and software industries continued to grow over the years, a new form of communication emerged, *Computer Communication*. Computer Communication is the exchange of information between persons by the way of computer networks. The information exchanged can be text, images, audio, and video. The information exchanged can be done in real time (synchronously), or the exchange of information can be done in different times (asynchronously).

Examples of using a computer network include.

Modem with an analog or digital telephone line.

Local Area Network (LAN).

Wide Area Network (WAN).

T1/T3 (Time Division Multiplication) transmission network.

One of the applications that benefited from technological enhancements to computer networks is the Internet. The Internet’s original mission, before the recent explosion of commerce on the Internet, was a medium "in support of research and education". As the telecommunications and computer industries continued to grow and expand to change the all of our lives, educators and information providers struggled to find a useful use for this new medium. Initially, university professors and researchers around the world to share information and communicate with each other by using the Internet. Over time educators recognized that the Internet can be useful as a medium to educate and teach people, from young children in lower grades to college students. People can access the Internet

anytime they choose to and from any place in the world. Over time thousands and thousands on-line resources were added to the Internet, and new applications emerged to allow people to communicate and share information over the computer network and the Internet. [7,9,11]

3.1.4 Protocols And URL

The Web uses the Internet as its communication medium; it must follows Internet communication protocols. A protocol is a set of rules governing the procedures for exchanging information. The Internet's Transmission Control Protocol (TCP) and Internet Protocol (IP) enable worldwide connectivity between browsers and servers. In addition to using the TCP/IP protocols for communication across the Internet, the web also uses it own protocol, called the Hyper Text Transfer Protocol (HTTP), for exchange between browsers and servers. HTTP is used by browsers to request documents from servers to return requested document to browsers. Fig 3.1 below shows browsers and servers communication via HTTP over the Internet or Intranet [Wrox 99].

Fig 3.1 Browsers and Web Servers Communication

A client makes an HTTP request by means of a uniform Resource Location (URL). This URL could be typed in to ‘Location’ window of browser, be a hyperlink or be specified in the ‘Action’ attribute of an HTML <form> tag. From URL, the web server determines that it should activate the gateway program listed in the URL and send any parameters passed via the URL to that program. A client’s browser retrieves a web page from the server and displays the web page in the browser. The communication steps between a client and web server can be summarized as follows [Bayross 99]:

3.1.5 Client Server Model

The client server terminology can almost perfectly be applied to the web technology.
The machine that runs the web server software could be remote machine setting at the other side of the network, or even other side of the world, or it could be one’s own home machine. The user’s browser acts as the client. In other words server is one that stores, processes and distributes data and the clients accesses server for information [Wrox 99].
Keeping the client server model in mind designers of web technology has developed two types of scripting languages. The two types are server side and client side scripting described as under:

3.1.5.1 Server Side Scripting

A script is a type of computer code that can be used to make a Web page dynamic. For example, a script could be used to include a "number of visitors" counter that increments each time someone visits a Web page. Or a script could be used to include a countdown to a special event: "only *x* more days", where *x* decreases by 1 every day. Creating scripts is an advanced Office feature that requires programming knowledge.
A script is interpreted by the web server is called a server side script. A server side script is an instruction set that is processed by the server, and which generates HTML. The resulting HTML is sent as part of the HTTP response to the browser.
Presently server side scripting is created in these languages.

1. Active Server Pages (ASP)
2. Cold Fusion
3. Java Server Pages (JSP)
4. Personal Home Page (PHP)

3.1.5.2 Client Side Scripting

A script that is interpreted by the browser is called a client side script. A client side script is also an instruction set but the web server does not process it. Instead, it is sent to the browser (as part of HTTP response) and is processed by the browser. The browser on the monitor then displays the result.

There are four major client side technologies used for creating web pages. These are:

1. Java Script/ Jscript
2. VB Script
3. Java
4. Active X Controls

3.1.6 Common Gateway Interface (CGI)

The Common Gateway Interface (CGI) is a specification defined by the WWW consortium, defining how a program interacts with a HTTP server. The CGI provides a middle ware between WWW servers and external databases and information processing, retrieval, and formatting tasks on behalf of WWW servers.

A CGI program is computer program that is started by the web servers in response to an HTTP request. CGI program are developed in C, C++, Visual Basic Script (VB Script), ASP, Perl, Java, Java Script, TCL, Python, Icon, Apple Script, Unix Shell Script and even Dos Batch Files. [Wrox 99]

The figure 3.2 shows the working of CGI.

Fig 3.2 Explains the working of CGI Programming

As shown in the above figure, a web browser running on a client machine exchanges information with a web server using the HTTP. The web server and the CGI program normally run on the same system, which the web server resides on. Depending on the type of request from the browser, the web server either provides a document from its own document directory or executes a CGI program.

To web server is configure by informing it of the directory where the CGI program reside. The URL specifying a CGI program looks like any other URL, but the web server can examine the directory name and determine whether URL is normal document or a CGI program. [Wrox 99]

3.1.7 Server/Client vs. Master/Slave Relationship

The kind of Student/Teacher relationship in a real classroom is hard to simulate in the current Server/Client architecture that is supported in the current WWW System. The current transfer protocol, the HTTP just provides us with a pair of Client and Server which are suitable for only basic data search and retrieval, but not for our needs.

- Inter Client Communication is supported. Servers and clients can communicate each other and one client can communicate with the other. In which one client is a teacher and the other clients are students, all of which need to know what the other is doing.
- HTTP not has the capability to define a State to client. Which is necessary for any model that is using synchronous method. The teacher needs to be identified as different, than the rest of the clients, and has special privileges and controls.
- The Client/Server connection only remains till the time the Client request has been dealt with, and then it closes. For synchronous DL there needs to be a continuous connection between the Client and the Server.

Thus to enable the system to provide for a State to the Clients and control in the navigation and activity an additional Master/Slave model can be implemented.

This Master/Slave model gives a Role to all the clients in a group, and specifies the privileges and control for each of them. The Master is the teacher in the real classroom world, while the Slaves are all the students in the real classroom model. It is important to emphasize that this distinction is a logical distinction that allows us to enhance the Server/Client model.

The basic Client/Server model also remains in that the server is still a repository of all the information and clients are the one's accessing it, but now one of the clients logs in as a Master, who has special privileges and forms a group of Slaves for a particular group. So after taking permission from the group Master, the slaves log into a session, which connects themselves to the same synchronous activities going on in the session. The master (teacher) has the navigational controls, which he can pass down to the slaves (students), and then take it back from them.

Through the Internet, the Server not only fulfils the need of the people accessing the information and the information providers, but also incorporates the relationship between these two on Real Time. Hence to deal with the Information providers. Information accessing people and the Real Time relationship between these two. All the Virtual Universities models have to provide both the Asynchronous and the Synchronous mode of learning over the Internet. [Ref: 7,12]

3.2 Participants In Virtual University

The following briefly describes the roles of the participants in the distance education enterprise and the challenges they face. These participents in distance learning are students, teachers, administrators, support staff, facilitator. [Ref: 4,10,13]

3.2.1 Students

Meeting the instructional needs of students is the cornerstone of every effective distance education program, and the test by which all efforts in the field are judged. Regardless of the educational context, the primary role of the student is to learn. This is a daunting task

under the best of circumstances, requiring motivation, planning, and an ability to analyze and apply the instructional content being taught. When instruction is delivered at a distance, additional challenges result because students are often separated from others sharing their backgrounds and interests, have few if any opportunities to interact with teachers outside of class, and must rely on technical linkages to bridge the gap separating class participants.

3.2.2 Faculty

The success of any distance education effort rests squarely on the shoulders of the faculty. In a traditional classroom setting, the instructor's responsibility includes assembling course content and developing an understanding of student needs. Special challenges confront those teaching at a distance. For example, the instructor must:

- Develop an understanding of the characteristics and needs of distant students with little first-hand experience and limited, if any, face-to-face contact.
- Adapt teaching styles taking into consideration the needs and expectations of multiple, often diverse, audiences.
- Develop a working understanding of delivery technology, while remaining focused on their teaching role.
- Function effectively as a skilled facilitator as well as content provider.

3.2.3 Facilitators

The instructor often finds it beneficial to rely on a site facilitator to act as a bridge between the students and the instructor. To be effective, a facilitator must understand the students being served and the instructor's expectations. Most importantly, the facilitator must be willing to follow the directive established by the teacher. Where budget and logistics permit, the role of on-site facilitators has increased even in classes in which they have little, if any, content expertise. At a minimum, they set up equipment, collect assignments, proctor tests, and act as the instructor's on-site eyes and ears.

3.2.4 Administrators

Although administrators are typically influential in planning an institution's distance education program, they often lose contact or relinquish control to technical managers once the program is operational. Effective distance education administrators are more than idea people. They are consensus builders, decision makers, and referees. They work closely with technical and support service personnel, ensuring that technological resources are effectively deployed to further the institution's academic mission. Most importantly, they maintain an academic focus, realizing that meeting the instructional needs of distant students is their ultimate responsibility.

3.2.5 Support Staff

These individuals are the silent heroes of the distance education enterprise and ensure that the myriad details required for program success are dealt with effectively. Most successful distance education programs consolidate support service functions to include student registration, materials duplication and distribution, textbook ordering, securing of copyright clearances, facilities scheduling, processing grade reports, managing technical resources, etc. Support personnel are truly the glue that keeps the distance education effort together and on track.

The general modal of virtual university is shown in figure 3.3

Figure 3.3 Network Model

3.3 Importance Of Interaction

Many distant learners require support and guidance to make the most of their distance learning experiences. This support typically takes the form of some combination of student-instructor and student-student interaction.

Research findings on the need for interaction have produced some important guidelines for instructors organizing courses for distant students:

- Learners value timely feedback regarding course assignments, exams, and projects.
- Learners benefit significantly from their involvement in small learning groups. These groups provide support and encouragement along with extra feedback on course assignments. Most importantly, the groups foster the feeling that if help is needed it is readily available.
- Learners are more motivated if they are in frequent contact with the instructor. More structured contact might be utilized as a motivational tool.
- Utilization of on-site facilitators who develop a personal rapport with students and who are familiar with equipment and other course materials increases student satisfaction with courses.
- The use of technologies such as fax machines, computers, and telephones can also provide learner support and interaction opportunities.

3.3.1 Teacher-Student Interaction

Since live interactions between students and instructors are not possible with some delivery systems and instructional formats, off-campus students are urged to contact their instructor or teaching assistant to ask questions of them or make inquiries about homework assignments, tests, etc. The toll-free telephone number plus the appropriate extension number, campus e-mail addresses, and site visits by faculty provide off-campus students with opportunities to interact with their professors, advisor, program administrator, Academic Outreach librarian, and other campus support personnel. [6]

The following diagram shows the big picture of the Teacher-Student Relationship in the virtual university and shows that how both if them can communicate with each other. This Interaction is shown in figure 3.4

Student-Teacher Interaction

Figure 3.4 Shows the Student-Teacher Interaction

3.4 Challenges For Virtual Universities

The greatest challenges in using the Internet to deliver or enhance distance-learning courses are related to difficulties some potential students face in gaining access to the Internet. For example, use of the Internet to deliver distance-learning programs has great potential for reaching those in rural areas and individuals with disabilities. However, people in rural areas and people with disabilities tend to have more difficulty accessing the Internet than others. Equal access to this technology will require the commitment of legislators, educators, information providers and others to overcome financial and technical barriers.

Students must have access to appropriate technology in order to participate in courses that use the Internet. For those who already have computer equipment and can obtain local Internet access, costs can be low. Once on the Internet, there are no line charges. However, for those who must dial long distance to make their connection to a host computer, long distance charges can be significant. Thus, Internet access can be

particularly problematic in rural areas. Access will become less of a problem as more people connect to the Internet. An interim solution for some distance learning providers is to provide both Internet and non-Internet distance learning options. This solution may create more work for instructors now, but help programs move ahead toward more Internet delivery as time goes on. Instructors and administrators who currently have distance learning courses in place, can consider providing an Internet option for one course, evaluate the experience, and add offerings in response to the resulting experience and interests of potential students.

Besides access issues, challenges facing instructors and administrators of distance learning programs who desire to use Internet as all or part of its delivery mechanism include providing Internet training to instructors and students and converting existing materials into formats accessible over the Internet network. [3,12]

3.5 Conclusion

The Internet provides a rich medium for distance learning. Administrators and instructors should consider available technology for delivering distance-learning options that allow all individuals. The Internet is a flexible, powerful, and efficient tool to supplement or replace other distance learning delivery modes. Study programs in Virtual Universities demonstrate the successful use of the Internet for communication, instructional delivery, and information access in support of distance learning. Internet access for each and every

person, is that the rich networking resources will be of personal benefit to them in their own professional growth, research, and collaborative efforts The Internet is a learning environment that promotes the engagement of learners

CHAPTER 4

TECHNOLOGIES FOR DISTANCE LEARNING

The Internet is a flexible, powerful, and efficient tool for the delivery of such programs and facilitates access for people with disabilities. The Internet creates a revolutionary forum for the exchange of ideas, fundamentally changing the way we communicate. For distance learning programs, it can be used to deliver instruction, store information, and facilitate communication. It is an indispensable tool in the information age. People equipped with appropriate technology, including individuals with disabilities, can gain access to unlimited opportunities for interaction and learning without leaving their homes or offices.

An enormous numbers of students study in such institutions. In 1996, there were eleven universities, each with more than 100,000 students. At the largest, China TV University System (China) has over 800,000 students, Indira Gandhi National Open University (India) with nearly 600,000 students. Allama Iqbal Open University, known as AIOU (Pakistan) had over 200,000 students. [Spider, June 01]

In recent years many methods have been developed to deliver the education. All these methods fell into two categories Synchronous Method (Real Time Method) and Asynchronous Method and all these methods are described in this chapter.

4.1 Delivery Of Distance Learning

Based on the analysis of the teaching and learning approaches and the technologies. A specification of the teaching and learning needs was drawn up and this formed the basis for the development of the Virtual University Learning Environment (VULE). The design of the VULE was a joint venture between lecturing and technical support staff. The course would be supported by the adoption of a range of technologies that would provide a richer means of communication than any other technology alone. These technologies would support interaction with:

- Teachers and the students in real-time using video-conferencing and data-conferencing, and asynchronously using email.
- Students and resources, electronically through access to both the Computer Base Learning server and the course web server, and paper-based through the resource center at each site.

The technologies selected were based on what the students would have easy access to, the appropriateness of the technology for the course aims, the potential to provide an interactive virtual class environment. [6,14]

The Synchronous mode of communication is shown in figure 4.1

Figure 4.1 Shows the Synchronous Communication Modes

4.2 Techniques Used To Deliver Distance Learning

Although technology plays a key role in the delivery of distance education, educators must remain focused on instructional outcomes, not the technology of delivery. The key to effective distance education is focusing on the needs of the learners, the requirements of the content, and the constraints faced by the teacher. The educator's task is to carefully select among the technological options. The goal is to build a mix of instructional media,

meeting the needs of the learner in a manner that is instructionally effective and economically prudent.

4.2.1 Audio Conferencing

This is a two-way voice communication between two or more groups done over land telephone network. Generally, good teaching techniques are the same, whether the teacher and learner are in the same room or separated by many miles. Still, some teaching techniques are more effective than others when using audioconferencing as an instructional medium particularly considering the absence of visual communication. Interactive instructional audio tools for the distance educator include the telephone, audioconferencing, and short-wave radio. Audioconferencing can be audio-only or supported by enhanced image or data transmissions (audiographic conferencing).

Audiographic conferencing combines technologies for voice communication with image or data transmissions. While voice remains the principal communication medium, audiographic peripherals provide a visual component. Audiographic peripheral devices include the electronic blackboard, still video technology, and the personal computer. [3,6,10]

4.2.1.1 Advantages

- Audioconferencing is comparatively inexpensive to install, operate, and maintain.
- It uses available telephone technology, therefore reach many students.
- It is a generally familiar technology to teachers and students and is relatively easy to use.
- It is an interactive medium, allowing direct student and instructor participation. Students have many opportunities for give and take with other students, the instructor, and outside experts.
- It can be very effective when used in combination with other media including print, video, and computers

4.2.1.2 Limitations

- May encounter initial resistance until users become familiar with the equipment and how to use it effectively.
- Can be impersonal because it eliminates nonverbal cues and body language such as smiles, frowns, arm and hand movements, etc.
- Places restrictions on the type of content that can be delivered in an oral format.

4.2.2 Video Conferencing

The pedagogic mode for video-conferencing is often said to be "lecturing at a distance". Video-conferencing is actually a symmetric two-way system. This is electronic voice and video communication between two or more groups using digital transmission lines (e.g. ISDN, T1 or T3 lines) or a fiber optic network. The communication between the instructors and the students can be two-way video and audio, or one-way video and two-way audio. This is real time video and audio communication between people in different locations. A video camera, a monitor and some features to control them are needed to send and receive the information.

In US, UK and Australian practice, several "remote" lecture rooms are linked via ISDN or leased digital lines, or in some areas, ATM broadband networks. This provides a distributed lecture room.

The model is much less prevalent in Europe. This seems to be partly due to a less developed infrastructure, partly to a more traditional university system.

The cost-benefits of video-conferencing are very simple to formulate: one replaces teacher traveling by institutional use of telecom. The systems can be very cost-effective, in the situation of use over longer distances and at high utilization factors. But this model is turned out to be most expensive among all the modules. Because video conferencing is a newly developed technique and most of the universities are still trying to rebuild their infrastructure to adopt this technique. Right now the common way of videoconference system is a desktop configuration, which included a very basic camera and microphone and they normally uses Net meeting. [3,6,10]

4.2.2.1 Advantages

Videoconferencing provides a real classroom atmosphere.

Student-Student interaction is possible

Teacher-Student interaction is possible.

Students and Teachers, both can have instant feedback

4.2.2.2 Limitations

Mostly they are connected through ISDN lines which are very costly

Universities have to design new infrastructure for videoconferencing to connect the remote area.

Videoconferencing required suitably good equipment, which can be expensive.

This system can cause problem if the user is not familiar with this system or they have low bandwidth internet connection like in under developing countries

Right now this system is only successful in developed countries.

4.2.3 Print Material

Print Materials are the foundation of distance education and the basis from which all other delivery systems have evolved. The first distance-delivered courses were offered by correspondence study, with print materials sent and returned to students by mail. While technological developments have added to the repertoire of tools available to the distance educator, print continues to be a significant component of all distance education programs.

Various print formats are available, for the students. [3,10]

4.2.3.1 Text Books.

As in traditionally delivered courses, textbooks are the basis and primary source of content for the majority of distance-delivered courses. While textbooks should always be

critically reviewed before adoption, this is especially critical when the learner and the instructor are not in daily contact.

4.2.3.2 Study Guides.

Typically, distance educators use study guides to reinforce points made during class and through the use of other delivery systems. They will often include exercises, related readings and additional resources available to the student.

4.2.3.3 Work Books.

In a distance education context workbooks are often used to provide course content in an interactive manner. A typical format might contain an overview, the content to be covered, one or more exercises or case studies to elaborate the points being made, and a quiz or test (with answer key) for self-assessment. In addition, there is typically some form of feedback, remediation, or "branching" loop to recycle students through the instruction as needed.

4.2.3.4 Course Syllabus.

A comprehensive and well-planned course syllabus is the foundation of many distance-delivered courses. It provides course goals and objectives, performance expectations, descriptions of assignments, related readings (often by session), grading criteria, and a day-by-day overview of the material to be covered. The syllabus must be as complete as possible in order to guide the students through the course in the absence of daily contact with the instructor.

4.2.3.5 Case Studies.

If written imaginatively, case studies are an extremely effective instructional tool. In fact, case studies are often designed around the limitations of print and intended to spark the students' imaginations as they place themselves in the particular case under consideration. Many case studies present a content-based scenario. They raise questions,

pose alternative solutions, and then branch students to different sections of the text. There, the consequences of the selected alternative are described.

4.2.3.6 Advantage

- **Spontaneous print:** Materials can be used in any setting without the need for sophisticated presentation equipment.
- **Instructionally transparent:** The medium of delivery should enhance, not compete with, the content for the learner's attention. If the student reads well, the print medium is the most transparent instructional medium of all.
- **Non-threatening:** Reading is second nature to most students. As a result, they are easily able to focus on the content, without becoming mesmerized or frustrated by the process of reading itself.
- **Easy to use:** Given adequate light, print materials can be used any time and any place without the aid of supplemental resources such as electricity, viewing screen, and specially designed electronic classrooms. The portability of print is especially important for rural learners with limited access to advanced technology.
- **Easily reviewed and referenced:** Print materials are typically learner-controlled. As a result, the student rapidly moves through redundant sections, while focusing on areas demanding additional attention.
- **Cost-effective:** No instructional tool is less expensive to produce than print. In addition, facilities abound for the inexpensive duplication of these materials.
- **Easily edited and revised:** In comparison to technically sophisticated electronic software, print is both easy and inexpensive to edit and revise.
- **Time-effective:** When instructional print materials are created, the developer's primary focus remains on content concerns, not the technical requirements of the delivery system

4.2.3.7 Limitations

- **Limited view of reality.** Print, by its reliance on the written word, offers a vicarious view of reality. Despite the use of excellent sequential illustrations or photos, for example, it is impossible to adequately recreate motion in print.
- **Passive and self-directed.** Numerous studies have shown that higher learner motivation is required to successfully complete print-based courses. To a certain extent, the passive nature of print can be offset by systematic instructional design that seeks to stimulate the passive learner. Still, it takes more motivation to read a book or work through a written exercise than it does to watch a television program or participate in an audioconference with an instructor encouraging student participation and response.
- **Feedback and interaction.** Without feedback and interaction, instruction suffers, regardless of the delivery system in use. By nature, print materials are passive and self-directed. Even with print materials incorporating feedback mechanisms and interactive exercises, it is easy for learners to skip to the answer section.
- **Dependent on reading skills.** Thanks to television, most students have developed fairly good viewing skills by age four. These same children, however, often fail to develop adequate reading skills. Reading skills must often be improved. Lack of ability in this area cripples the effectiveness of even the most instructionally sound print material and must be overcome if print is to be used effectively.

4.2.4 Instructional Television

Instructional Television(ITV), is an effective distance education delivery system that can be integrated into the curriculum at three basic levels:

1. **Single lesson** - Programs address one specific topic or concept, providing a lesson introduction, overview, or summary.
2. **Selected unit** - A series of programs providing the content foundation for a learning unit in the course curriculum.
3. **Full course** - Programs from one or more ITV series may be integrated into a full semester course typically in conjunction with instructional print materials.

Instructional Television may be either passive or interactive.

Passive Instructional Television (ITV). Typically involves pre-produced programs, which are distributed by videocassette or by video-based technologies such as broadcast, cable, or satellite.

Interactive Instructional Television (ITV). Provides opportunities for viewer interaction, either with a live instructor or a participating student site. For example, two-way television with two-way audio allows all students to view and interact at the same time; cameras at remote sites allow the teacher to view all participating students. It is also possible to configure the system so that all student sites may view one another. [3,10]

4.2.4.1 Advantages

- Since most people have watched television, the medium is familiar.
- Motion and visuals can be combined in a single format so that complex or abstract concepts can be illustrated through visual simulation.
- Time and space can be collapsed, so that events can be captured and relayed as they happen.
- It is very effective for introducing, summarizing, and reviewing concepts.
- It can be used effectively as a motivational tool

4.2.4.2 Limitations

- Broadcast quality ITV is expensive to create.
- Video production is time consuming and can be technically demanding, often requiring relatively sophisticated production facilities and equipment.
- Sites choosing to interactively participate in an ITV program may require specialized equipment, facilities, and staffing.
- Most prepackaged ITV courses use a mass media approach to instruction aimed at the average student. As a result, they can be ineffective in serving students with special needs.
- When used passively, without interaction, its instructional effectiveness can be limited.

- Unless professionally produced, completed ITV programs often look amateurish.
- Once completed, ITV programs can be difficult to revise and update.

4.2.5 E-Mail System

User sends and receives mail on a computer. The messages are stored on a server and the user can read the e-mail when they want to. The content of the material is usually text, but you can attach audio or image files to the mail. This is the easiest, cheapest and the simplest method to transfer information because this thing can also operate on low quality equipment.

Through e-mailing teachers can send text, compressed audio and video files and still photographs to their students and students can retrieve these files easily. [3,10]

4.2.5.1 Advantages

1. E-Mail system is inexpensive to install, operate, and maintain.
2. It is a generally familiar technology to teachers and students and is relatively easy to use.
3. Teachers-Students can send any type of matrial like compressed audio, compressed video, images and text in any format.
4. This is the cheapest and simplest way to send information.

4.2.5.2 Limitations

1. Without feedback and interaction, instruction suffers.
2. Teacher-Student and Student- Student interaction is not possible.

4.2.6 Chatting Rooms

The cheapest mode of communication on the Internet in which people are able to communicate synchronously on different ‘channels’ from different locations. The information is usually text based. Distant students often work in isolation without the assistance and support of fellow students. Setting up a class chatting room, can encourage

teachre-to-student and student-to-student interaction. With a class computer conference, individual students can post their comments or questions to the class, and every other individual is free to respond. The conference can also be used to post all modifications to the class schedule or curriculum, assignments/tests, and answers to assignments/tests. [10,11]

4.2.6.1 Advantages

1. Chatting Roon is easy to install, cheep and easy to maintain.
2. Mostaly all the Students and teachers are familiar with chatting
3. This is the cheapest way to provide Synchronous Communication.
4. Do not need any expensive equipment
5. Easily get feedback from students and teachers

4.2.6.2 Limitations

1. The Teacher-Student interaction is not much efficient as in audio/video conferencing.
2. This is only text and image based conversation.

The model is shown in figure 4.2

Figure 4.2 Shows Delivery Of Education Model

4.3 Distance Learning In Pakistan

Now days, locking at the world trends, different Universities are also trying to establish Virtual Universities in Pakistan

4.3.1 WOMES (Web Oriented Multimedia Educational System)

The students of “FAST Lahore” have developed this method of Distance Learning. According to the project specification. They have used both Synchronous and Asynchronous methods.

4.3.1.1 Synchronous Method

In Synchronous method, students can attend the online courses and participate in other events like conferences, workshops organized by the university. University can organize lectures by the educators who can not come to the university. The primary phase of the software is to make a certain system which enables the user to interact with other user through

- Audio/video facility
- White boards (E-Whiteboards)
- Chatting session.

4.3.1.2 Asynchronous Method

In Asynchronous method, they offer these facalities,

- Faculty and students information
- Paper, quiz and assignments
- Notice Board
- Results information

4.3.2 AIOU (Allama Iqbal Open University)

The pioneer of “Distance Learning” in Pakistan is Allama Iqbal Open University. AIOU was established in 1974, had over more than 200,000 students, 105 teaching staff, 2500 part-time tutors per semester in 1999 [Spider, June01] . This university is currently working on “Asynchronous Method”, but they are also developing the “Synchronous Method” to deliver education.

4.3.2.1 Asynchronous Method

This university first started this method to deliver education, for this method of communication they have used these techniques.

Printed Material

Passive Instructional Television

Radio

Audio/Video Tapes

4.3.2.2 Synchronous Method

Allama Iqbal Open University is planning to do so with the setting up different centers around the country.

Where the courses of AIOU and its affiliated virtual universities component should be held. This would take the form of large computer centers with high-speed Internet connectivity, video rooms for viewing satellite beamed programs, and laboratories in science subjects for distance learning students.

Audio/Video Conferencing

Chatting Room

E-Whiteboards

Interactive Instructional Television

4.3.3 PAI (Pakistan Academic Intranet)

This is the biggest project in Pakistan, till date. This program has been launched under the supervision of Ministry of Science and Technology. This program is in development phase. The objective of this program is to connect all the professional and non-professional universities and colleges of Pakistan.

This project will cover all the modules of Synchronous and Asynchronous Methods. Right now they are working on their pilot project. The specifications of the pilot project are as follows,

At first they will connect three (3) nodes. These nodes are

NIIT(Nust Insititute of Information and Technology), Rawalpindi.

Fatima Jinnah Women University, Rawalpindi.

LUMS (Lahore University of Management Sciences), Lahore.

The transmission medium can use IP Network or ATM Network, the thickness of the bandwidth is 2MB. (After spreading counrty wide the bandwidth must be atleast 155MB, which can be increase upto Gigabits.)

These nodes are divided into two types.

Type A: This type can both transmit and receive

Type B: This type can only receive

Where NIIT and LUMS are Type A node and Fatima Jinnah Women University is Type B node. This intranet offers many features some of them are Audio/Video Conferencing, Audio/Video on demand, chatting rooms, File Management area, White Boards. This intranet can handle maximum two (2) simultaneous classes. Right now this is only a pilot project in future this intranet will spread countrywide, with more options and flexibilities.

4.4 Challenges For Participants In Distance Learning

Students and their instructors must face and overcome a number of challenges before learning takes place including, becoming and staying responsible for themselves, "owning" their strengths, desires, skills, and needs, maintaining and increasing self-esteem, relating to others, clarifying what is learned, redefining what legitimate knowledge is, and dealing with content.

These challenges are considered in relation to distance learning: [4,7,10]

- **Becoming and staying responsible for themselves.** High motivation is required to complete distant courses because the day-to-day contact with teachers and other students is typically lacking. Instructors can help motivate distant students by providing consistent and timely feedback, encouraging discussion among students, being well prepared for class, and by encouraging and reinforcing effective student study habits.
- **Owning one's strengths, desires, skills, needs**. Students need to recognize their strengths and limitations. They also need to understand their learning goals and objectives. The instructor can help distant students to explore their strengths/limitations and their learning goals/objectives by assuming a facilitative

role in the learning process. Providing opportunities for students to share their personal learning goals and objectives for a course helps to make learning more meaningful and increases motivation.

- **Maintaining and increasing self-esteem**. Distant students may be afraid of their ability to do well in a course. They are balancing many responsibilities. Student performance is enhanced if learners set aside time for their instructional activities and if they receive family support in their academic endeavors. The instructor can maintain student self-esteem by providing timely feedback. It is critical for teachers to respond to students' questions, assignments, and concerns in a personalized and pleasant manner, using appropriate technology such as fax, phone, or computer. Informative comments that elaborate on the individual student's performance and suggest areas for improvement are especially helpful.
- **Relating to others**. Students often learn most effectively when they have the opportunity to interact with other students. Interaction among students typically leads to group problem solving. When students are unable to meet together, appropriate interactive technology such as E-mail should be provided to encourage small group and individual communication. Assignments in which students work together and then report back or present to the class as a whole, encourage student-to-student interaction. Ensure clear directions and realistic goals for group assignments.
- **Clarifying what is learned**. Distant students need to reflect on what they are learning. They need to examine the existing knowledge frameworks in their heads and how these are being added to or changed by incoming information. Examinations, papers, and class presentations provide opportunities for student and teacher to evaluate learning. However, less formal methods of evaluation will also help the students and teacher to understand learning. For example, periodically during the course the instructor can ask students to write a brief reflection on what they have learned and then provide an opportunity for them to share their insights with other class members.
- **Redefining what legitimate knowledge is**. Adult learners may find it difficult to accept that their own experience and reflections are legitimate knowledge. If the

instructor takes aefacilitative rather than authoritative role, students will see-their own experience as valuable and important to their further learning..

- **Dealing with content**. Student learning is enhanced when content is related to examples. Instructors tend to teach using examples that were used when they received their training. For distance learning to be effective, however, instructors must discover examples that are relevant to their distant students. Encourage students to find or develop examples that are relevant to them or their community.
- **Keep It Flexible**. Design the intervention for flexibility and "nimbleness." This will not only enable you to keep the material timely and accurate, it will also enable you (as the instructor) to tailor the experience to the needs of each class cohort to better ensure successful learning. A little investment in this area up front in the design will pay off many-fold during the life of the course.

4.5 Planning and Organization For Distance Learning

In developing or adapting distance instruction, the core content remains basically unchanged, although its presentation requires new strategies and additional preparation time. Suggestions for planning and organizing a distance delivered course include: [7,8,10]

- Begin the course planning process by studying distance education research findings. There are several research summaries available.
- Before developing something new, check and review existing materials for content and presentation ideas.
- Analyze and understand the strengths and weaknesses of the possible delivery systems available to you (e.g., audio, video, data, and print) not only in terms of how they are delivered (e.g., satellite, microwave, fiber optic cable, etc.), but in terms of learner needs and course requirements before selecting a mix of instructional technology.
- Hands-on training with the technology of delivery is critical for both teacher and students. Consider a pre-class session in which the class meets informally using

the delivery technology and learns about the roles and responsibilities of technical support staff.

- At the start of class initiate a frank discussion to set rules, guidelines, and standards. Once procedures have been established, consistently uphold them.
- Make sure each site is properly equipped with functional and accessible equipment. Provide a toll-free "hotline" for reporting and rectifying problems.
- If course materials are sent by mail, make sure they are received well before class begins. To help students keep materials organized, consider binding the syllabus, handouts, and other readings prior to distribution.
- Start off slowly with a manageable number of sites and students. The logistical difficulties of distant teaching increase with each additional site.
- Design the simplest learning intervention that will meet the goals and expectations of the target population. Do not feel that you need to include the latest gizmos and technologies just because they are there. If they do not serve a specific purpose in the learning process, don’t use them. One of the most prevalent problems in online learning today is when the designer focuses on the technology to the detriment of the instructional design

4.6 Conclusion

Two methods are in commanly used in Distance Learning, Synchronous Method and Asynchronous Method.

The Synchronous Method contains Audio/Video conferencing, Chatting Room and White Boards and Asynchronous Method contains audio/video on demand, audio/video tapes, print material and e-mail system.

Teachers and Students can regularly share and discuss ideas, viewpoints, and beliefs with other learners and with the instructor. They can communicate at their convenience (not necessarily at the same time), contemplate issues before presenting ideas to the group, and develop long-term relationships. Electronic mail facilitates student-teacher interaction, "classroom" discussions, and collaboration on group projects at their convenience.

CHAPTER 5

THESIS PROPOSAL AND SOFTWARE REQUIREMENTS SPECIFICATION (SRS)

This chapter covers the thesis proposal and the requirements specifications of the software system. The software requirements specification portion covers scope of the product, product perspective user characteristics, general constrains, data flow diagrams and the process specification.

5.1 Proposal

The research and development work proposed for my Msc thesis focuses on design and implementation of web-based software system for virtual universities for development and organization of on-line courses. The software system can be used by institutions like Virtual Universities. This software system has three front ends, one for students, one for faculty and the third one for the virtual universities administration.

In this project I hacve used Asynchronous Method of communication. The courses will be available On-Line through internet and a student at distance can register himself and select his desired courses. The Virtual University has its own web site, which includes student's registration, offered courses, courses description, notice board and faculty information system. In faculty management area, teaching staff can put their lecture notes and reading lists on the web for students to browse and communicate with students via e-mail and generate their teaching courses web pages. There is also an Administrator area through which he can keep the university Information system (University Database) up to date.

The tools which I have used are Java Script, HTML, Active Server Pages (ASP) and MS-Access.

5.2 Software Requirements And Specification (SRS)

The software system requirements are as follows.

5.2.1 Scope Of Product

The main scope of this thesis is to design and implementation of web-based software system for virtual universities for development and orginization of on-line courses. This product can be used by the educational institutions. This software system has three front ends, one for students, one for faculty and the third one for the virtual universities administration. The front ends are:

1. Students Control Panel
2. Faculty Control Panel
3. Administrator Control Panel

Each one of these three front ends contains different options.

5.2.1.1 Administrator Control Panel

In administrator area there is a panel of different options, which he/she can perform. These options are:

1. Notice board
2. Registration
3. Queries
4. Change password
5. Deletion options
5. Add and update options

5.2.1.2 Faculty Control Panel

The available options for the faculty members are:

1. Page wizard
2. Upload files
3. Delete uploaded files
4. Result preparation
5. Examination Paper
6. Assignments
7. Notice board
8. Result calculations

9. Queries

10 Change passwords

5.2.1.3 Student Control Panel

The available options for students are,

1. Download lectures
2. Check result
3. Notice board
4. Assignment
5. Paper
6. Change password
7. Queries

5.2.2 Benefits Of The Product

The advantages of this software system are as follows

People can get higher educations at their own timmings.

People can get education from any part of the world (no need to visit the university/college).

People can get the low cost education.

People can keep themselves up to date through short courses.

5.2.3 Product Perspective

The techniques and tools which I have used are Active Server Pages (ASP), HyperTextMarkupLanguage (HTML), Java Script, Ms-Access, Flash 4.0, Dreamwear 3.0, FrontPage2000, Visual InterDev, Internet Information Server (IIS5), Internet Explorer and Microsoft Windows 2000 (Professional) as operating system.

5.2.3.1 HTML

HyperText Markup Language (HTML) is used for creating hypertext on the Web. Conceived as a semantic markup language to mark the logical structure of a document,

HTML gives users a way to identify the structural parts of a document. HTML involves finding out what tags are used to mark the parts of a document and how these tags are used in creating an HTML document. HTML was not originally intended to be a page-layout language; instead, it was to be a language used to mark the structural parts of a document-parts such as paragraphs, lists, headings, block quotations, and others. Based on the identification of these document parts, the programs that render HTML documents (Web browsers) display the HTML in a readable form. This organization allows for a separation of a document's structural specification in the HTML code from its formatted appearance in an HTML browser. In practice, there now are many language constructs that one can use in HTML to control the appearance of a document.

Developments tools like Dreamwear 3.0, FrontPage2000 and Visual InterDev are popular in web development because they generate the HTML automatically when some component is addes in the web page accordingly.

5.2.3.2 ASP

Active server pages (ASP) are a powerful server based technology from Microsoft, designed to create dynamic and interactive HTML pages for World Wide Web. Introduction of ASP was a milestone in the development of dynamic, interactive and scalable web applications and it has matured great deal since its inception.

ASP is now considered an integral part of working with windows on Internet. ASP integrates with the latest version of exciting new technologies such as ADO, COM + and XML. With ASP compelling, practical web applications with intelligent, dynamic pages can be produced. ASP works by allowing us the functionality of programming language; we write programming code that will generate the HTML for the web pages dynamically. So whenever a user browses to our website and requests one of our ASP pages, the ASP code is processed at that time by a special piece of software- the web server. This processing generates the HTML, which is then passed to the browser and used to create the page on the user screen

Most important advantage that ASP brings is its ability to create pages that are sensitive to factor such as time and place, and user’s identity and previous choices and actions. It

means that the text, images, tables, forms and even the layout of the page can be selected automatically at the time the user requests the page.

5.2.3.3 Java Script

This language is known as Client-Side Scripting. This means that this language run on the client browser and has nothing to do with the server side. JavaScript exposes properties related to the document windows, the history list, the loaded documents, frames, forms, and links to the programmer. In addition, JavaScript can be used to trap user events, such as changing form values or pointing at links, so that appropriate programs can be developed for each event.

JavaScript is an interpreted language. Source code is compiled prior to runtime, in an interpreted language source code files are executed directly at runtime in JavaScript. JavaScript are generally simpler than compiled languages and are easy to learn. It is often easier to develop, change, and trouble-shoot programs because the need to recompile with each change is removed.

5.2.4 System Functionality

The main idea of this software is to bring university education, evaluation, and information management system on the Internet making it available to the whole world using all modes of multimedia making it user friendly.

The software system provides the student to register via the Internet and get enrolled without even going to any academic office or something. The software will provide facility like giving the student a examination paper, class test and assignments available for some time in which he/she have to attempt. The students can ask their quires from faculty members, send information to anyone in the university using noticeboard and can aslo down load audio/video files for their class lectures.

On the other hand the software provides, teachers to design their course web pages through course wizard. Faculty can upload lectures files, can prepare the examination papers and assignments and these can also be uploaded. Faculty members can answer the quires of the students and can be sent any other type of information to all the students.

In this software system the job of Administrator is to maintain and update the database of the university. The administrator performs actions on the database (insert, delete, update) under the instruction of faculty and administration.

In short this system, having access to all part of the world, having users of all races, provides a standard way of getting education from your Personal Computer without getting into the university.

5.2.5 User Characteristics

The characteristics of the different users of this software system are as follows:

5.2.5.1 Faculty

Classroom teachers rely on a number of visual and unobtrusive cues from their students to enhance their delivery of instructional content. A quick glance, for example, reveals who is attentively taking notes, pondering a difficult concept, or preparing to make a comment. The student who is frustrated, confused, tired, or bored is equally evident. The attentiveteacher consciously and subconsciously receives and analyzes these visual cues and adjusts the course delivery to meet the needs of the class during a particular lesson.

In contrast, the distant teacher has few, if any, visual cues. Those cues that do exist are filtered through technological devices such as video monitors. It is difficult to carry on a stimulating teacher-class discussion when spontaneity is altered by technical requirements and distance.

Without the use of a real-time visual medium such as television, the teacher receives no visual information from the distant sites. The teacher might never really know, for example, if students are asleep, talking among themselves or even in the room. Separation by distance also affects the general rapport of the class. Living in different

communities, geographic regions, or even states deprives the teacher and students of a common community link.

5.2.5.2 Students

Distant students bring basic characteristics to their learning experience which influence their success in coursework. Distance education students:

- Are voluntarily seeking further education.
- Have post-secondary education goals with expectations for higher grades
- Are highly motivated and self-disciplined.
- Can be older.

Studies also conclude that similar factors determine successful learning whether the students are distant or traditional.

These factors include:

- Willingness to initiate calls to instructors for assistance.
- Possessing a more serious attitude toward the courses.
- Employment in a field where career advances can be readily "achieved through academic upgrading in a distance education environment.
- Previous completion of a college degree.

5.2.5.3 Administrators

Administrators are typically influential in planning an institution's distance education program, they often lose contact or relinquish control to technical managers once the program is operational. Effective distance education administrators are more than idea people. They are consensus builders, decision makers, and referees. They work closely with technical and support service personnel, ensuring that technological resources are effectively deployed to further the institution's academic mission. Most importantly, they maintain an academic focus, realizing that meeting the instructional needs of distant students is their ultimate responsibility.

5.2.6 Functional Requirments

This section will specify the requirements of the system, that is, the services/tasks to be provided. The exact organization and information content of this is dependent on the requirments methodology used.

5.2.6.1 Faculty Control Panel

Faculty control panel contains several options, which enable the instructors to visually authoring the course pages and conduct the course

Course Wizard: This is a multiple feature package, which allows the instructors to design their courses for distribution on Internet. This is done via an on-line graphic interface using the web browser. No programming or HTML experience is required to use this tool

.

Upload Area: This is also an important option for the faculty, because with out this option faculty cannot conduct the classes/lectures. Through this option the instructor can upload files of all formats like doc, pdf, ppt, zip, dat, wav, mp3, jpeg, bmp
etc.

Delete Uploaded Files: Through this option the instructor can delete the uploaded files of their courses. In this option the instructor can delete his/her courses files only and they cannot delete the other courses files.

Result: This option is used to insert or update the marks of students, which they have gained in different tests and assignments. This option is not only used to

insert/update the marks of the students but also to calculate the GPA and final result.

Change Password: Faculty can also change the password. To change the password, faculty member has to provide the User-id, old password, new password and then confirm password. If any of the information is not provided correctly then the system will not change the password and indicate about that wrong entry.

Query Form: If the faculty members have any query then they can ask the administrator. Faculty members have to fill only the text area in the Query Form, rest of the information is provided automatically by the system.

Papers/Assignments: The faculty can present the course testing materials including assignments and papers, using two methods. Upload Method and University Database Method.

Delete Papers/Assignments: Faculty members can also delete the papers and assignments after the due dates. For this they have to provide the course ID and the paper type or assignment number.

Notice Board: The faculty notice board option is divided into three portions. Faculty, students and the administrator. Faculty member can read/write notices with in the whole university

Sign Out and Home Page: Sign out option ends the session on the web. Once the faculty member is signed out then he/she has to log in again. Through Home option the instructors can view the university home page without ending the session and can again enter into the faculty control panel without logging in again.

5.2.6.2 Administration Control Panel

The job of the Administrator is to maintain and update the information system of the virtual university. Administrators' work closely with technical and support service personnel, ensuring that technological resources are effectively deployed.

Notice Board: Through the notice board the administrator can send the important messages, news and any kind of information regarding to the departments, administration, policies and other information to the Faculty and Students Area.

Queries: This option is divided into three parts Faculty, Students, and Visitors. The administrator uses this option to answer various queries.

Change Password: The administrator can also change the password. To change the password, administrator provides the User-id, old password, new password and then confirm password. If any of the information is not provided correctly then the system will not change the password and indicate about that wrong entry.

Insert New Information: This option contains two portions schedule and result area. By using these options the administrator can insert and update the schedule of the courses and in second method the administrator can add the student's ID into the result area for which the student is enrolled.

Registration: This option is divided into two parts. Faculty & Students Registration. When a new person joins the university then the administrator fills all the particulars of that new person along with password and the ID

Record Deletions: This option contains several sub options and divided into three categories namely faculty, students and visitors. By these options the administrator can delete faculty, students & courses records, expired notices and different types of query forms, different users (faculty, students, visitors) etc.

Sign Out & Home Page

: Sign out option ends the session on the web. Once the faculty member is signed out then he/she has to log in again. Through Home option the instructors can view the university home page without ending the session and can again enter into the faculty control panel without logging in again.

5.2.6.3 Students Control Panel

Students have different options to attend the courses in their control panel. To enter into the students control panel they have to fill a login form, which checks the authorization.

Download Lectures: This is one of the most important options in the students control panel because students can only attend their classes through this option. To download lectures students provide the course name and the upload ID for that particular courses in which the students are enrolled.

Result: Through his option the students can view their own result only. On clicking this option a window opens displaying all the marks regarding those subjects, in which the students are registered.

Change Password: To change the password, firstly the student has to provide the User-id, old password, new password and then confirm password. If any of the information is not submitted correctly then the system will not change the password and indicate about the incorrect entry.

Notice Board: Contains two options. Students notice board and the administrator notices. The students can write the notices (messages, news, and information) in the students area only, but can read the notices, which have been send by the instructors and other students.

Papers/Assignments: This option contains two methods for attempting the course testing materials. Download Method and University Database Method. In the 1st option, students download the papers/assignments from downloading area. In the 2nd option, students retrieve the testing material from the database.

Query Form: If the students have any query then they can ask the administrator. Students have to fill the form, which contains these fields: student name, student-id, e-mail address, and department name.

Sign Out & Home Page: Sign out option ends the session on the web, then students cannot enter into control panel and performs any kind of operation. For this students have to log in again. Through Home option students can view the home page and performs any sort of work without ending the session and can again enter into the students control panel without logging in again.

5.2.7 Interface Requirements

To run this software system different users need system with different hardware and software specification according to their authorization level.

5.2.7.1 Administrators' System Requirements

The Following system is required by the administrator to maintain the university information system update.

Operating System: Windows 2000 Server, Windows 2000 professional, Windows NT4.0

Web Server: Internet Information Server (IIS) ver 4.0 or 5.0, Personal Web Server (PWS) 4.0.

System: 1 GB Hard Disk, 600 MHz (Branded), Complete Multimedia

Random Access Memory (RAM): 256 MB RAM

Web Browser: Latest version of Internet Explorer, Latest version of Netscape.

5.2.7.2 Faculty System Requirements

The Following system is required by the Faculty members to conduct the on-line courses.

Operating System: Windows 2000 Server, Windows 2000 professional, Windows NT 4.0, Windows 98.

Web Server: Internet Information Server 5.0 Internet Information Server 4.0, Personal Web Server 4.0 (for win98)

System: 1 GB Hard Disk, 400 MHz, Complete Multimedia

Random Access Memory (RAM): 128 MB RAM

Web Browser: Internet Explorer4.0 or higher, Netscape Communicator 3.0 or higher.

5.2.7.3 Students System Requirements

The Following system is required by the students to attend their on-line courses.

Operating System: Windows 2000 Server, Windows 2000 professional, Windows NT 4.0, Windows 98.

- **Web Server:** Internet Information Server 5.0, Internet Information Server 4.0, Personal Web Server 4.0 (for win98)
- **Processor:** 1 GB Hard Disk, 400 MHz, Complete Multimedia
- **Random Access Memory (RAM):** 128 MB RAM
- **Web Browser:** Internet Explorer4.0 or higher, Netscape Communicator 3.0 or higher.

5.2.7.4 Normal Users System Requirements

The Following system is required by the normal users to get information about the online courses from the virtual university.

Operating System: Windows 2000 Server, Windows 2000 professional, Windows NT 4.0, Windows 98.

Web Server: Internet Information Server 5.0 Internet Information Server 4.0, Personal Web Server 4.0 (for win98)

System: 1 GB Hard Disk, 266 MHz,

Random Access Memory (RAM): 64 MB RAM

Web Browser: Internet Explorer4.0 or higher, Netscape Communicator 3.0 or higher.

The mode of delivery of education is shown in figure 5.1

Figure 5.1 Shows The Mode Of Delivery in this Thesis (Distance Learning)

5.2.8 Data Flow Diagrams (DFD)

DFD is a Graphical Representation Technique. DFD shows the whole system as Graphical method

Context Level (Level 0)

LEVEL 1 DFD

University Information System

5.2.9 Process Specification

The definition of each function is defined into this model, also known as (PSPEC)

5.2.9.1 Level 1 DFD

Authorize Area: Only faculty members, administrator and registered students can only access in this area. This area contains the control panels for the registered persons of the university.

Check Password: To enter into the university authorized area, registered persons provide their identity. Password, user id and department.

Confirms Password: To enter into the university authorized area, authorization is necessary. This authorization is then checked from the university database.

Administrator Area: If the authorization for the administrator is confirmed, then the administrator can enters into the control panel and performs necessary actions.

Faculty Area: If the authorization for the faculty members is confirmed then they can enter into their control panel and can conduct classes.

Students Area: If the authorization of students is confirmed then they can enter into their control panel and can attend their classes.

University Website: When the visitors visit the university website then they can collect information regarding the university.

Faculty Information: Through this option the visitors can collect the information about the faculty members of the university with respect to their departments.

Schedule: This option provides the schedule of all the courses, which are being teaching in the university, according to their departments.

Courses Information: This option provides the list of all the courses. From these options the people can collect all the information regarding to that particular course, which they have selected.

Registration Form: If the persons are interested to get admission into the university then they fill this form. In this they provides their personal and educational information and submit this registration form, from where the administration checks their eligibility for that courses and inform that person about his/her admission.

Queries: If the visitors have some query then they can fill the query form.

Administrator: If the administrator is eligible to answer the query then the administrator replies the concern person.

Other Departments: If the administrator is not eligible to answer the query then he/she forwards this query to the concern department or to the concern persons. The visitors can also send queries to the their concern departments directly. Through the contact us option, in university website.

Reply: After getting these queries, different departments and the administrator reply to these queries, to the concern persons

LEVEL 2 DFD [Exploding Process 5 (Administrator Area)]

University Information System

5.2.9.2 Level 2 DFD (Administrator Area)

Administrator Control Panel. Enter his/her control panel after login. Then first check for quires and the instruction from the administration. The administrator can perform many operations through the control panel.

Queries. These queries can be asked from visitors, faculty members and students. If administrator knows about these quires the reply to the concern person otherwise send to the concern person.

Change Password. Administrator can change the password any time. This step is necessary to from hacking.

Notices Board. Read notices from students and faculty, and can also send notices to them.

Administration Requirements. Check the instruction, which are directed through administration department. These instructions could be to addition, deletion and modification of new information. To register students and the faculty members.

Insert New Entries. Add new information. Create a new schedule of a course. Entries into the result area. Then update this information.

Delete, Update Options. Delete students and faculty records, quires, notice board area. Students and faculty information, any kind of change into notice board and the change of password, of faculty and students.

Registration. The registration of students for a new course. The registration of new faculty member.

Update Information. Collect the information form Insert, Delete and Update, Registration and then send this information into the University Information System to update the university database. **LEVEL 2 DFD** [Exploding Process 4 (Faculty Area)]

University Information System

5.2.9.3 Level 2 DFD (Faculty Area)

Faculty Control Panel. Enter his/her control panel after login. The faculty member can performs operation by using different option in the control panel. The options are wizard, change password, upload files, and delete upload different files, papers, assignments, notice board, quires and results.

Queries. The faculty member can send the queries to the administrator in case of some problem or he/she needs some information.

Change Password. The faculty member can change the password any time. This step is necessary to from hacking or the faculty member has forgot the password. Then faculty member can send e-mail to the administrator in this regard.

Wizard. Wizard is use to create web pages for the courses. When the faculty member wants to create a new course then he/she can use this option. This information is then updated into the university information system.

Upload Files. The faculty member can upload the files (audio, video, text) to deliver the lectures.

Delete Upload Files. The instructor can delete the lectures at the end of semester or if some file is not updated correctly.

Papers/Assignments. The teacher has three options. Create assignments and papers and save them into database. Upload these into upload area. E-mail to the students.

Update University Information System. Collect all these information (new course page, upload files, delete files, papers/assignments) and then update the university information system.

Notice Board. The teacher can read and write notices through this option.

Students Queries. Students can make queries from teacher. The teacher replies their quires through their e-mail address.

Read Notices. Teacher can retrieve the notices from the information system to read the notices.

Write Notices. Teacher can write the notices to give some sort of information, to students and faculty, and can also reply the notices.

Check Papers/Assignments. Teacher can check papers/assignments after retrieving it from the database for checking. Students can also send papers/assignments on the teachers e-mail address.

Prepare Result. Teacher can prepare the result of the students after checking their papers/assignments. Then send this result into the database.

LEVEL 3 [Exploding Process 8 (Notice Board)]

University Information System

5.2.9.4 Level 3 DFD [Notice Board (Faculty Area)]

Control Panel. This control panel belongs to Faculty Area, and faculty member can enter into the control panel after login. Then to view or write notices there is an option, named Notice Board.

Receive Notices. The teacher can view the notices after retrieving from the university information system

Write Notices. The teacher can also write the notices/messages for different categories university.

Notice Board Types. There are two types of notices. Departmental notices and general notices. The teacher can read or write in both these categories.

Departmental Notices. The teacher can send and view any information into his/her own department. There are two categories faculty area and student area. So can send and view messages into both areas.

General Notices. The teacher can send any information into any department. There are two categories faculty area and student area. So can send and read messages into both areas. This option can be viewed through any department

Faculty Area. The teacher can view and write messages. This area is not visible to students. There are two categories general and departmental notices. The

general area is visible to all faculty members and departmental area is visible to faculty of same department.

Students Area. The student can view and write messages. This area is also visible to faculty. There are two categories general and departmental notices. The general notices are visible to all the faculty and students and departmental notices are visible to students and faculty of same department.

LEVEL 2 DFD [Exploding Process 3 (Students Area)]

University Information System

5.2.9.5 Level 2 DFD (Students Area)

Students Control Panel. Student can enter his/her control panel after login. The student can performs operation by using different option in the control panel.

The options are download lectures, change password, papers, assignments, notice board, quires and results

Write Queries. The student can query from faculty, administrator and other members of administration.

Change Password. The students can change the password any time. This step is necessary to from hacking or the student has forgot the password. Then student can send e-mail to the administrator in this regard

Download Lectures. The student can download lectures with the help of a password, which is issued to him by the course teacher.

Result. The student can only check his/her result only. After retrieving it from university information system.

Paper/Assignment. The student can get the paper/assignment from database, download area and through e-mail from course teacher.

Notice Board. The student can read and write notices through this option.

Read Notices. Student can retrieve the notices from the information system to read the notices.

Write Notices. Student can write the notices to give some sort of information, to other students and faculty, and can also reply to these notices.

Submit. The student can submit assignments/papers to course teacher via e-mail system and by submitting it into university information system.

Check University Information System. To get any type of information, the student can check the university information system.

Retrieve Data. Students can retrieve the data from the university information system. The data can be in the forms of lectures, test, assignments and notices.

Retrieve Paper/Assignments. Students can check the paper and assignments from information system. On the availability of the data, students complete this and then submit it into database or to course teacher.

CHAPTER 6

IMPLEMENTATION OF THE SOFTWARE SYSTEM

This chapter gives the information about the implementation and working of the different modules in the Virtual University experimental web site.

There are three different main modules regarding to the Virtual University. These modules are:

- Administrator Control Panel
- Faculty Control Panel
- Students Control Panel

6.1 High Level Architecture Diagram Description

The virtual university server (Internet Information Server) is build over HTTP Server and World Wide Web (WWW) is used to arrange and search the applications. The end users, teachers, students, administration and normal users interact with the university server directly. When the university database is accessed then university server links with HTTP Server.

This is shown in figure 6.1

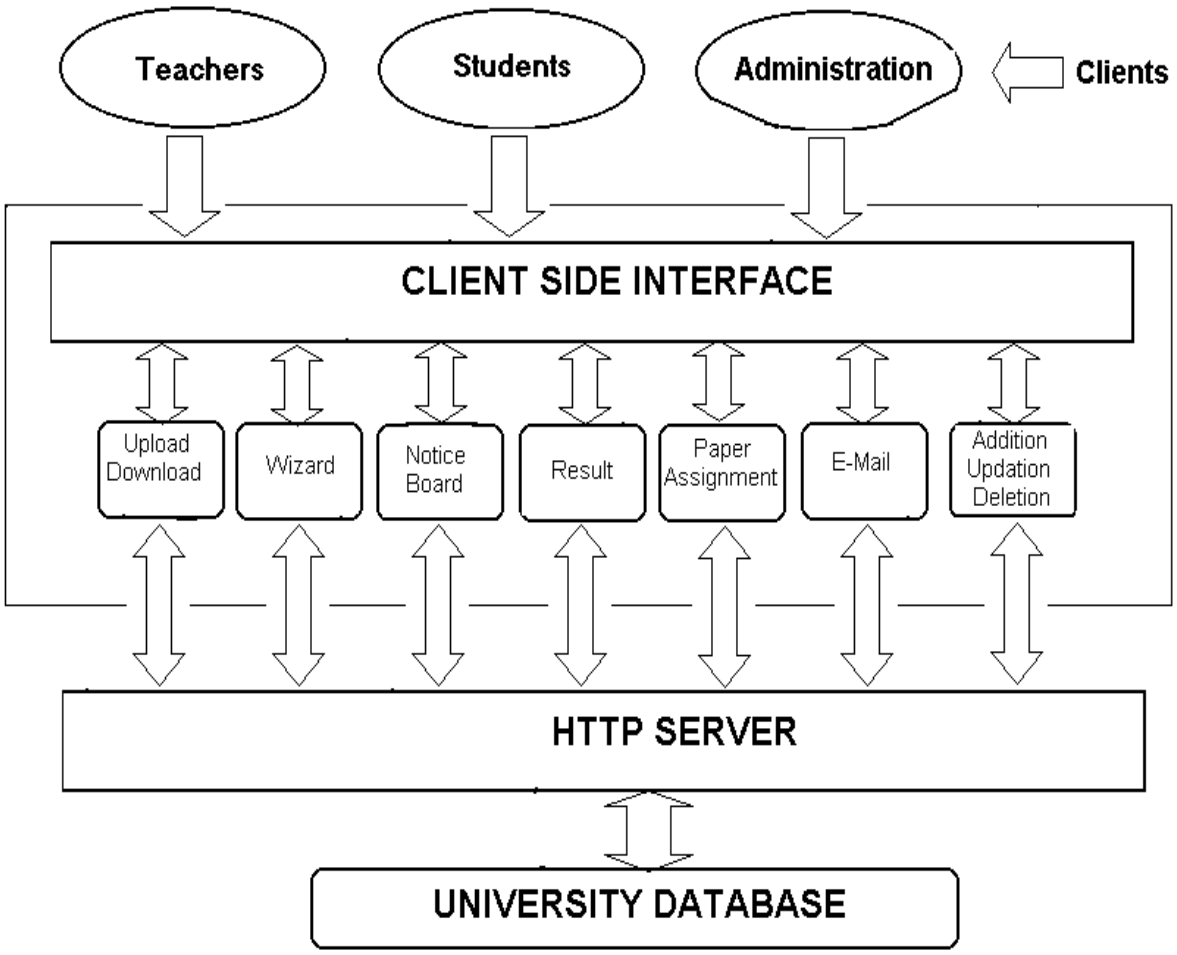
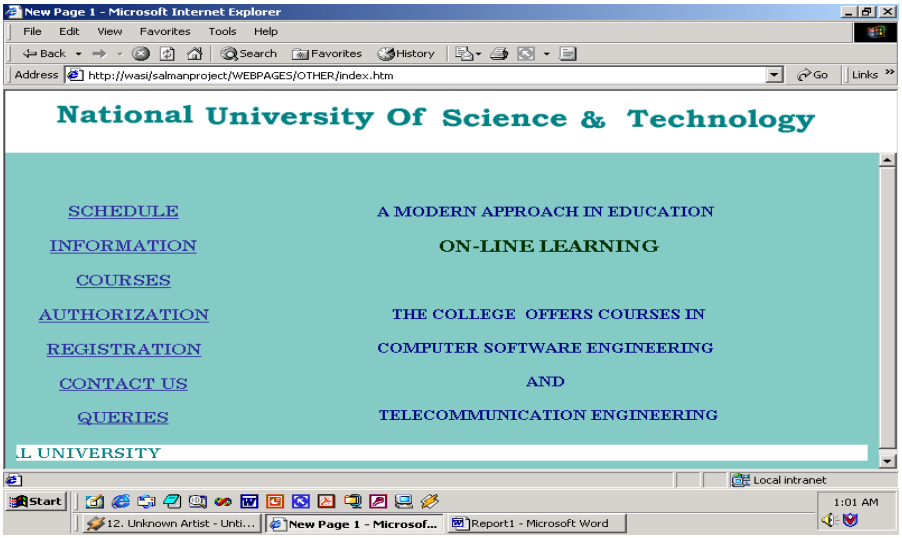


Figure No. 6.1 Shows The High Level Architecture

6.2 Detailed Description

This system is actually divided into four main portions. Three of them are the main modules and the fourth module is for the normal users/visitors. Because when visitors visit the university website then they can collect the information about the university and the courses being offer by this university.

The main web page of the Virtual university is shown below.



6.2.1 General Users/Visitors

The general users/visitors include those Persons who wish to enroll themselves in this university or are interested in general information regarding the virtual University. General users/visitors are authorized into few areas to collect the information regarding the university.

These areas are

1. Courses Schedule
2. Faculty Information
3. Courses Information
4. Registration
5. Contact
6. Queries

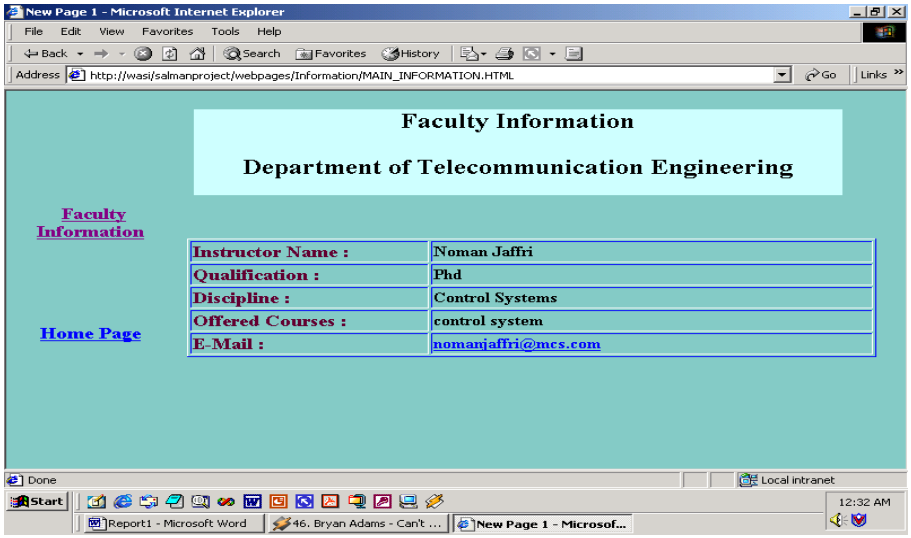
6.2.1.1 Courses Schedule

Courses Schedule is the very first option in the virtual university website.

When visitors click on the Courses Schedule option, then in new screen they find the department names. When they choose their required department then they find a list of the courses being offer by that department. Then clicking one of these courses they find the schedule of the course. (Starting and ending date, types of examination, dates of examinations, pre-requisite and the instructor name). If visitors have any query regarding this subject then they can submit their queries by clicking query option. If they want to get admission in any of the offered courses then they can fill the registration form by clicking the registration form option.

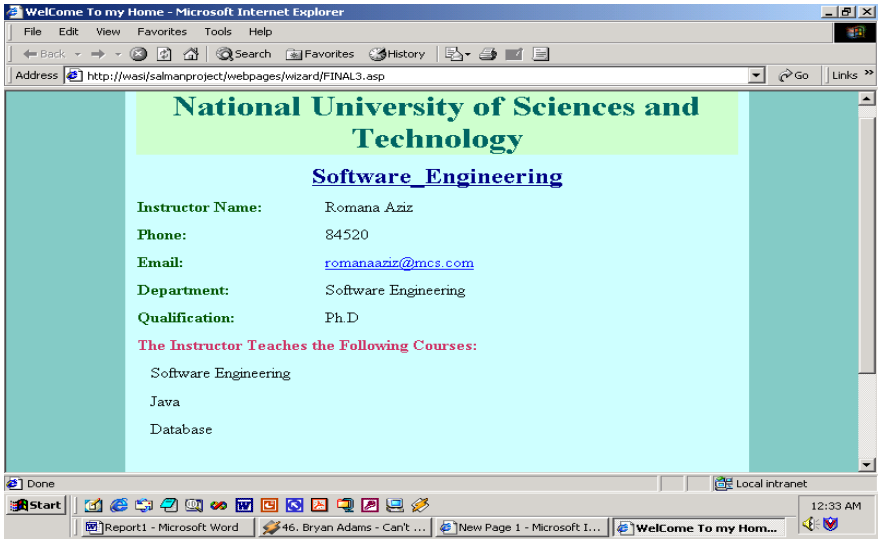
6.2.1.2 Faculty Information

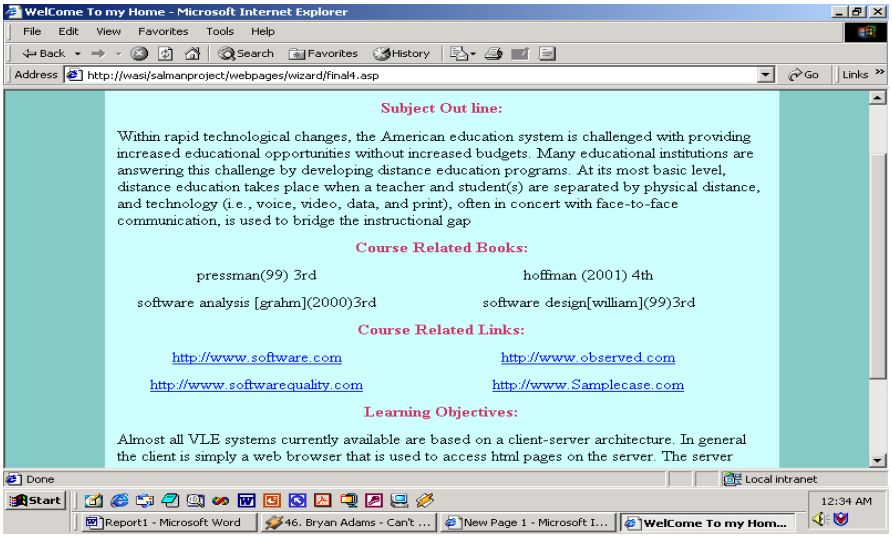
The second option is Faculty Information. When the visitors click this option then they find the name of the department. By clicking the department name they get the complete information of the faculty in that department. The information of faculty members is based on their name, e-mail address, qualification, discipline and teaching courses. Visitors can also contact faculty members regarding the courses being teach by them, through their e-mail address.



6.2.1.3 Courses Information

The third option is Courses Information. When the visitors click this hyper link then they will be asked for the required department. By choosing their required department they find the list of the courses, offered by that department. When visitors choose any subject then they see the complete detail of that course. The instructor name and information, course contents outline, recommended books, web sites related to the subject and the description of the course. By this the visitors can analysis about the course, which make them easy to decide to get admission in that particular course. If the have any query about that course or getting admission in that particular course then they can consult to the course instructor and the administrator abut that particular course.

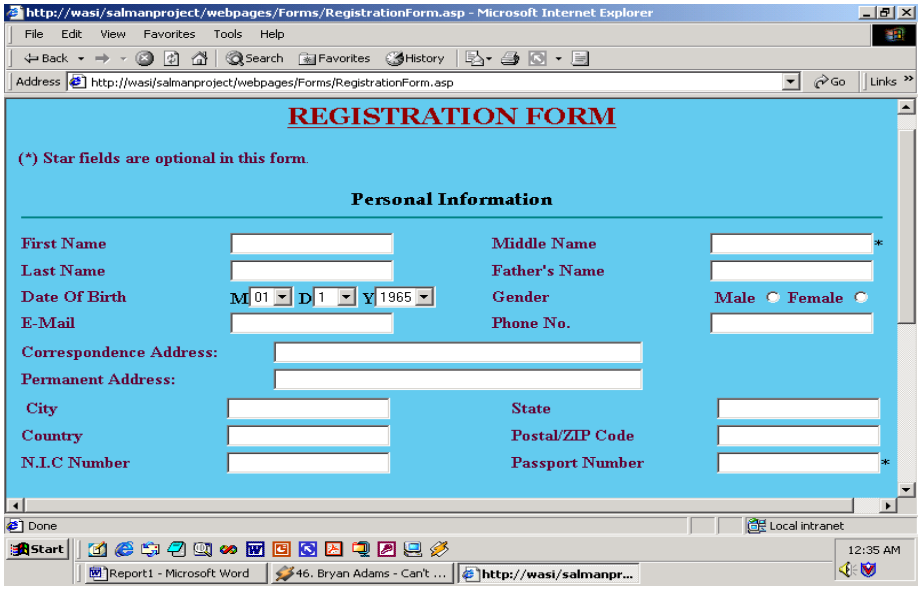




6.2.1.4 Registration Form

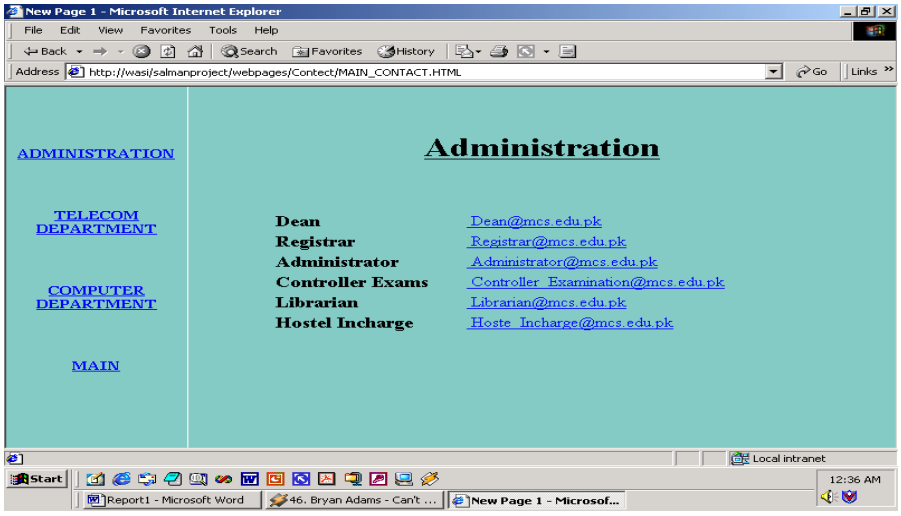
The next option is Registration. The Registration option contains a registration form. When the visitors complete their visit of the university web site and if they are interested in any of the courses offered by the university then they can fill the registration form. If they qualify for that course according to the qualification and merit then they will be informed later on. Visitors have to fill their personal information, educational information and then the course name in which they are interested.

If the interested persons submit the admission form with some empty field, then the form validation activate and indicates that person about that empty field.



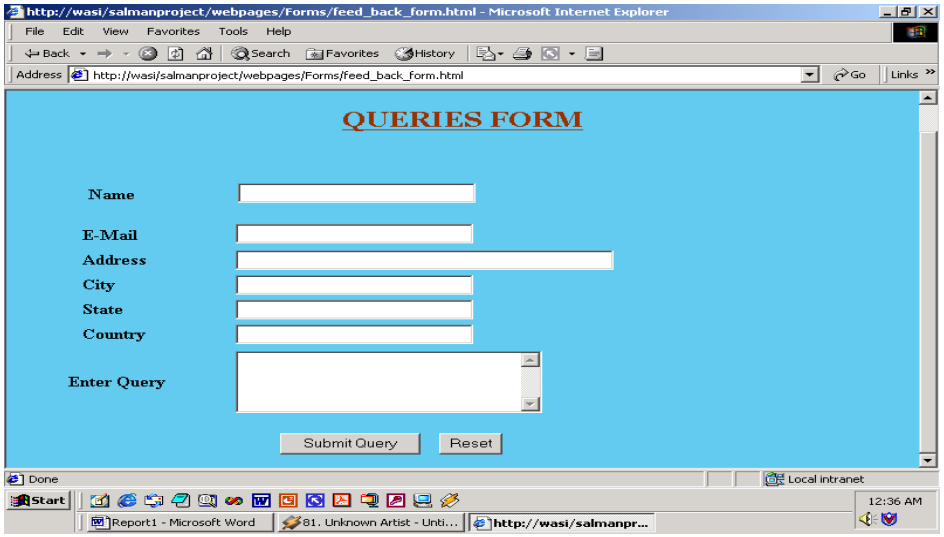
6.2.1.5 Contact and Queries

The next option is Contact Us. This option contains the e-mail addresses of the main authorities of the virtual universities, according to their department and their positions. The university provides the E-mail addresses of these departments (Department of Telecom, Department of Software Engineering and the Administration). If the visitors or registered students want to make any query regarding any information then they can contact to these authorities through their e-mail address.



The last option is Query Form. If the visitors have any doubt regarding to any thing or want to make query regarding any information or they are unable to decide to whom they contact for some particular information. Then they can fill the Query Form. Then the administrator views these queries, if the

administrator has information regarding to their query then the administrator reply to that particular person. If the query is regarding to any department or admission process then, the administrator forewords the query to that particular department and the department reply the visitors according to their quires



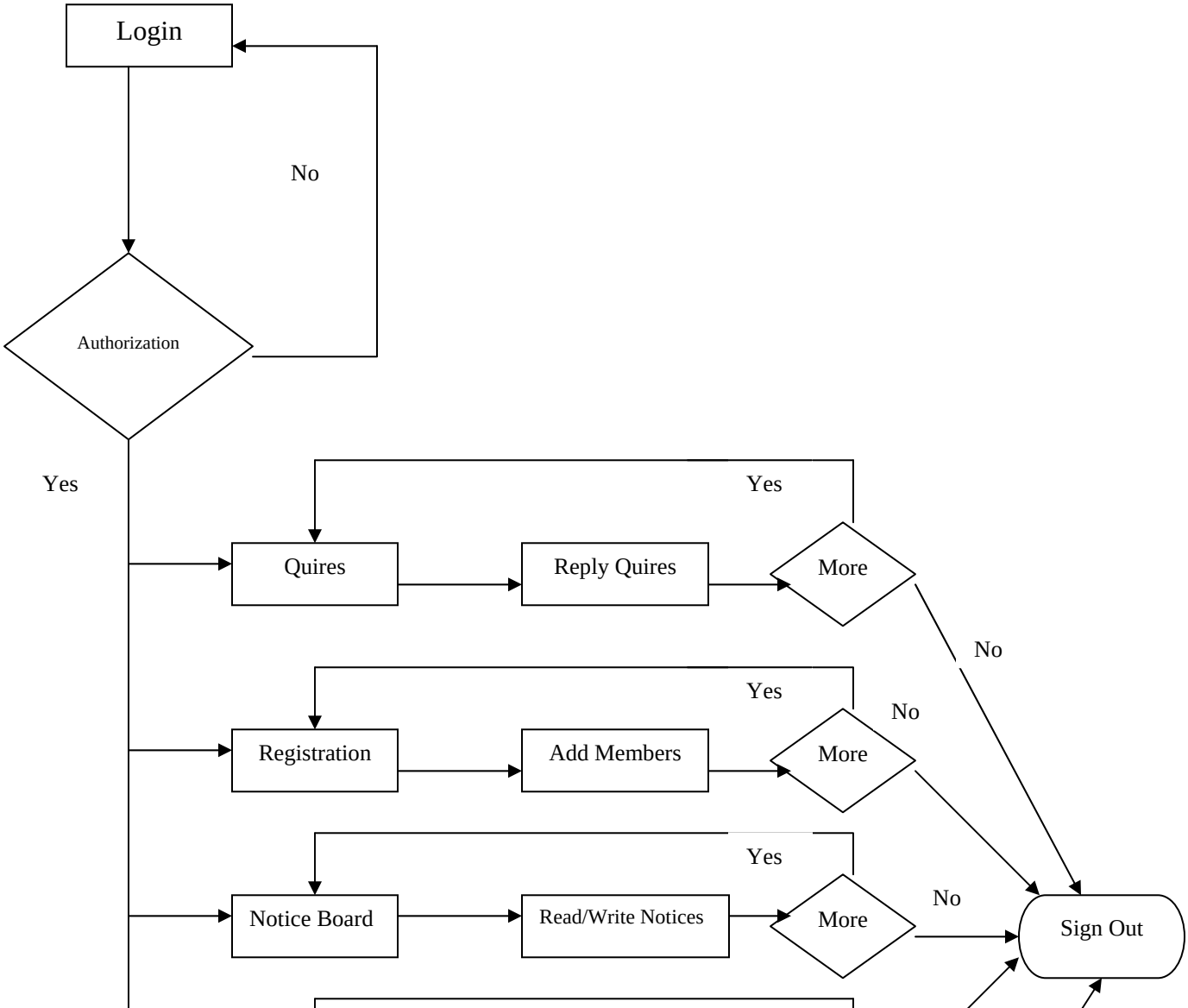
6.2.2 Administrator Control Panel

In this Virtual University the job of the Administrator is to maintain and update the database of the university. The administrator performs actions over the database (insert, delete, update) under the supervision of faculty and administration.

To enter into the administrator authorization area, a login window will appear, which will ask for the user name, user id and password. If any of these options are wrong then the system tells the administrator about it and again asks for the correct entries. When the entries are correct then the system allows administrator to enter into the administrator control panel. The working of Administrator Control Panel is shown in Figure no 6.2.

Control Flow Diagram Of Administration Control Panel

(Figure 6.2)



6.2.2.1 Records Deletion

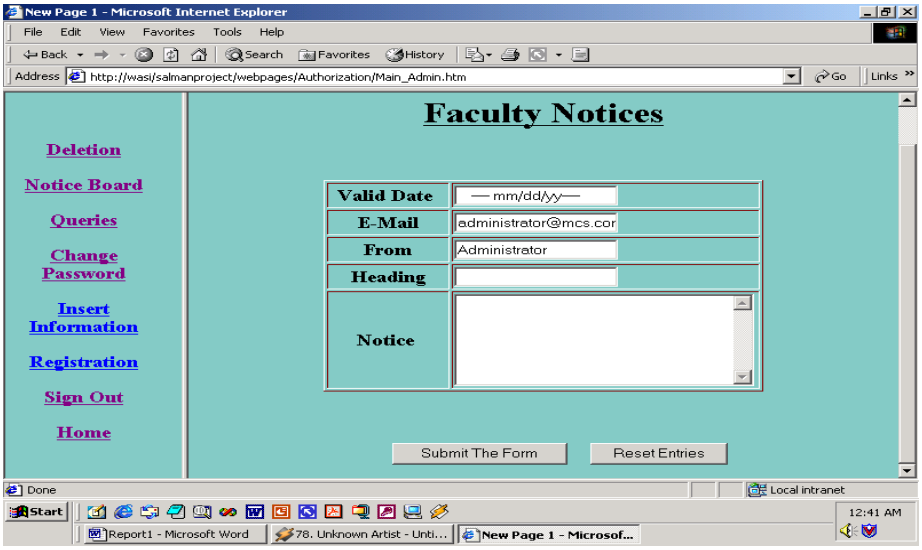
The very first option of the administrator control panel is Records Deletion. By clicking this option link the administrator finds a list of different options for deletions. These options are faculty, students, courses, notice board, faculty query, students query and visitors query. Through these options the administrator can delete the record of faculty members, students, notice board and quires. But the administrator can delete some records under the specific instruction from university administration (faculty, courses and students record). Some fields can be deleted after a specific time like notice board entries and quires option is deleted after answering the quires immediately.

All these above entries can be deleted through the administrator control; panel or from the database directly. For these deletions the administrator is informed by the administration through e-mail system and after deleting the particular records, the administrator inform the administration.

6.2.2.2 Notice Board

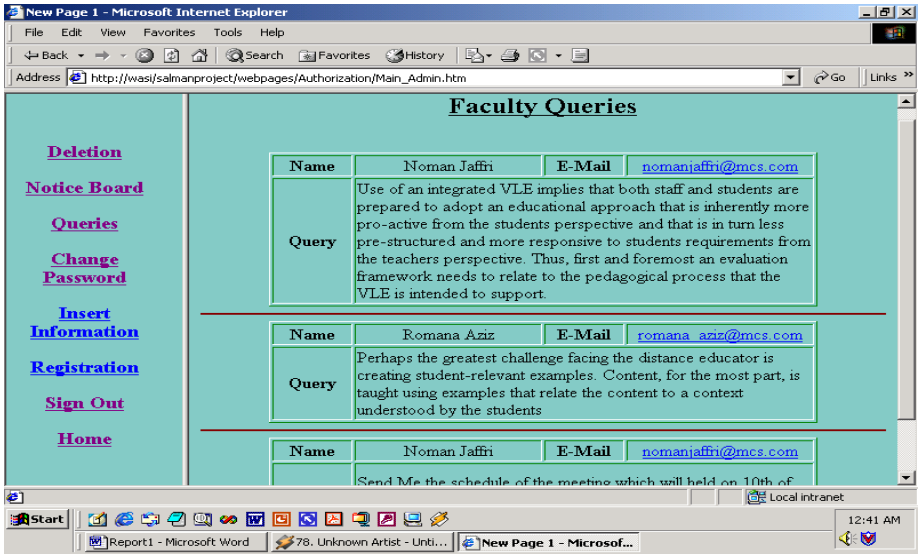
The second option in the control panel is Notice board. Through these options the administrator can send the notices to faculty members and students. This is an asynchronous way to send the notices.

Through the notice board the administrator can send the important messages, news and any kind of information regarding to the department, administration, policies and other information, which are related to the students and the teachers. Though to send information can be done through-mail addresses but it’s very difficult to send the information to each and every person of the university. So through this option the administrator can broadcast any sort of information among the whole faculty and students.



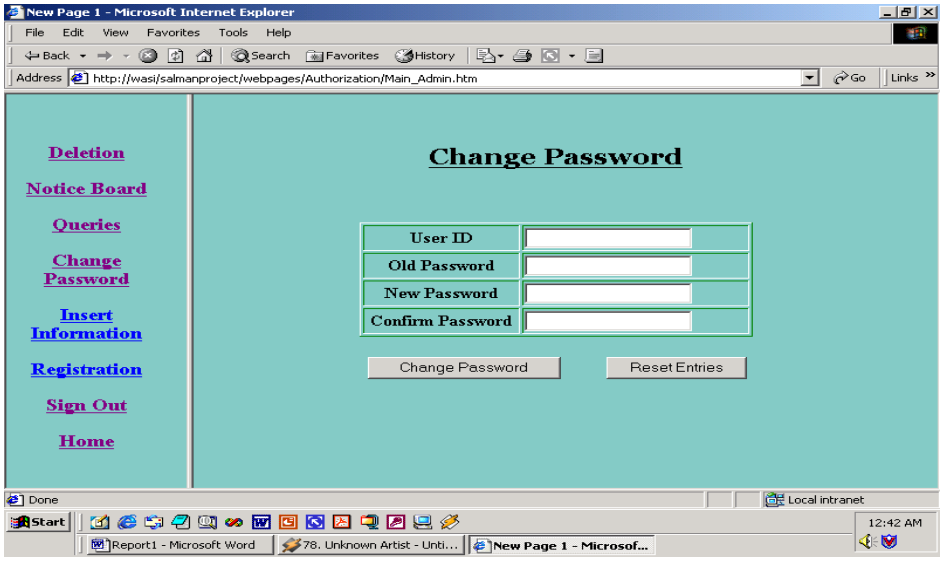
6.2.2.3 Queries

The next option in the control panel is Queries. This option contains three more options. These options are: faculty queries, students' queries and the visitors' queries. On clicking these options the administrator can finds all those queries, which are being made by persons according to their categories. The faculty query option contains the information like faculty member name, e-mail address and the query. Students query option contains student name. E-mail address, student-id, department and the query and the general query option contain the information like visitors name, address, e-mail address and the query. Then the administrator answers to these queries accordingly and if the administrator is not concern with any of these queries then the administrator forward this query to the concern person. Administrator answers the queries through their e-mail addresses. But in the case of visitors queries, if they required some sort of written material from university like university prospectus, then the related material is send to their postal addresses accordingly.



6.2.2.4 Change Password

The next option is Change password. Though, the administrator has the full access to the database but the administrator can also change the password through this web application. If the administrator changes the password regularly then the password can be save from hacking. To change the password, first the administrator has to provide the User-id, old password, new password and then confirm password. If any of the information is not provided correctly then the system will not change the password and indicate about the incorrect entry. When the entries are filled correctly then the system will change the password. Then this will be the new password for the next time, when the administrator logged in.

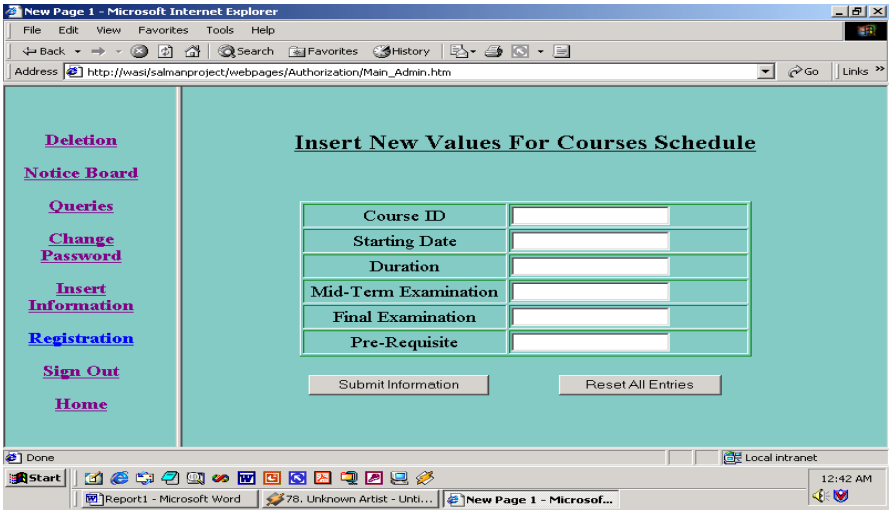


6.2.2.5 Insert New Information

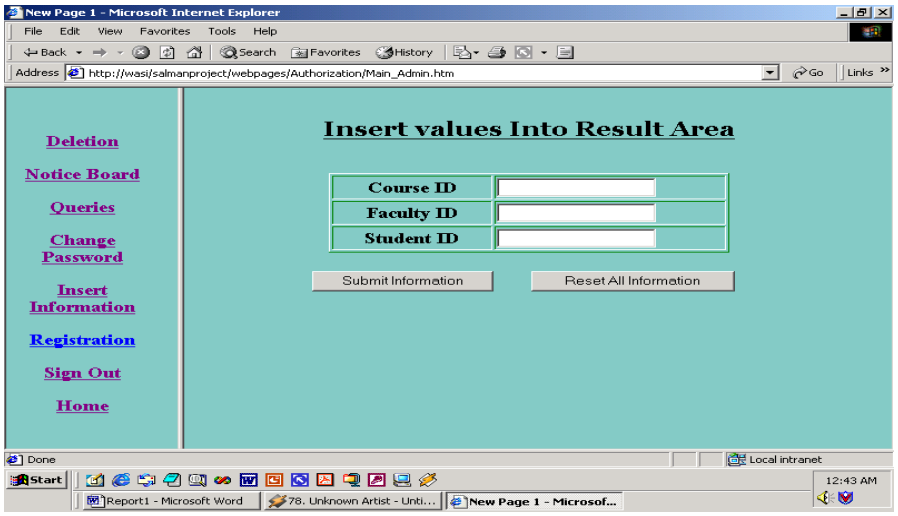
Insert Information link contains two options. First is Insert Schedule and the second is to insert information of faculty members and students of their concern courses.

The first options (Insert Schedule) is also divided into two portions. One is for inserting new schedule and second is used to update an existing schedule. The first option (insert new schedule) is regarding to the schedule of the courses, which are added by the faculty members. This option contains the Course-id, starting date of the course, mid-term examination, final examination, duration of the course, instructor name and the pre-requisites for that course. These information are added when a faculty member design a new course syllabus to teach. Then the administration provides all the information about that course to the administrator. Then the administrator inserts all these values accordingly. But this option is also provided to faculty members, which is used in some conditions by the faculty members.

The second option is Update Schedule. The update schedule form is used when the instructor or administration wants to change the schedule for courses. In this the administrator provides the course name and the course ID and a window opens, containing all the schedule information regarding that particular course. Then the administrator can change the schedule for that course and on submitting, the records get update in the database. Next time if some one view this schedule, then he/she will finds the new entries for that subject.



The second option is to insert information of faculty members and students regarding their concern courses into the result area in university database. When a new course starts then the administrator insert this information. This information includes course-id, faculty-id and students-id for that particular course in which the students are enrolled. Because this area contains the result information of the students those are enrolled in this course. Once the entries are done in this field then the course instructor can add, delete and update the result information of the registered students for the particular course.

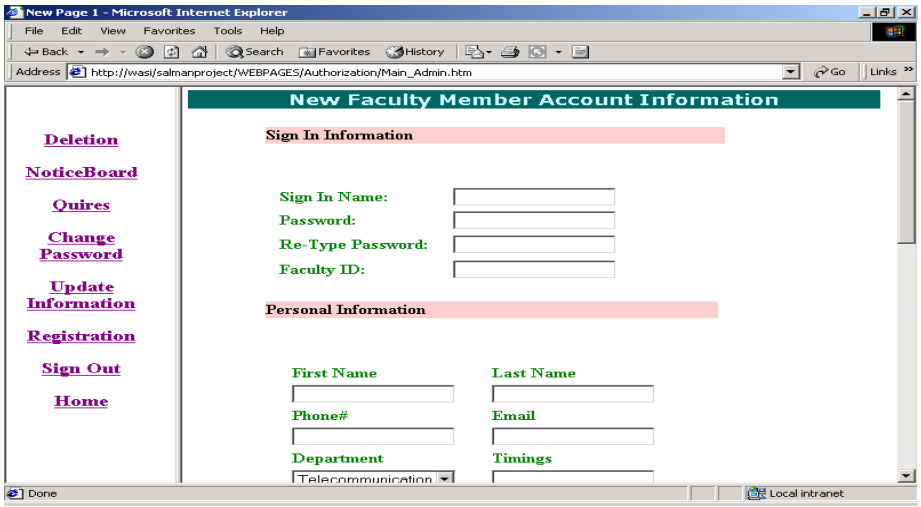


6.2.2.6 Registration

The Registration option contains two options. First is the Registration of the faculty members and second is the registration of the students.

When a new person joins the university as a new faculty member then the administration inform the administrator about that person and provide all the particular of that person to the administrator. Then the administrator fills all the particulars of that new faculty member along with password and the faculty-id, which is given to the administrator by the administration. Then the administrator sends the faculty-id and the password to the new faculty member via e-mail. The faculty member can change the password but not the faculty-id.

Secondly, when a person joins the university as a student then again, the administration sends all the particular of that person to the administrator. The administrator fills that information and sends the password and student-id to the student, who can change the password but not the student-id.



6.2.2.7 Sign Out and Home

The next options are Sign Out and Home. Through clicking on the Sign Out option the administrator can end the session on the web. Once the administrator is singed out, then he/she or any one else cannot enter into control panel and performs any kind of operation. For this administrator has to log in again once he/she has sigh out.

Through Home option the administration can view the home page and performs any sort of work without ending the session and can again enter into the administrator control panel without logging in again.

6.2.3 Faculty Control Panel

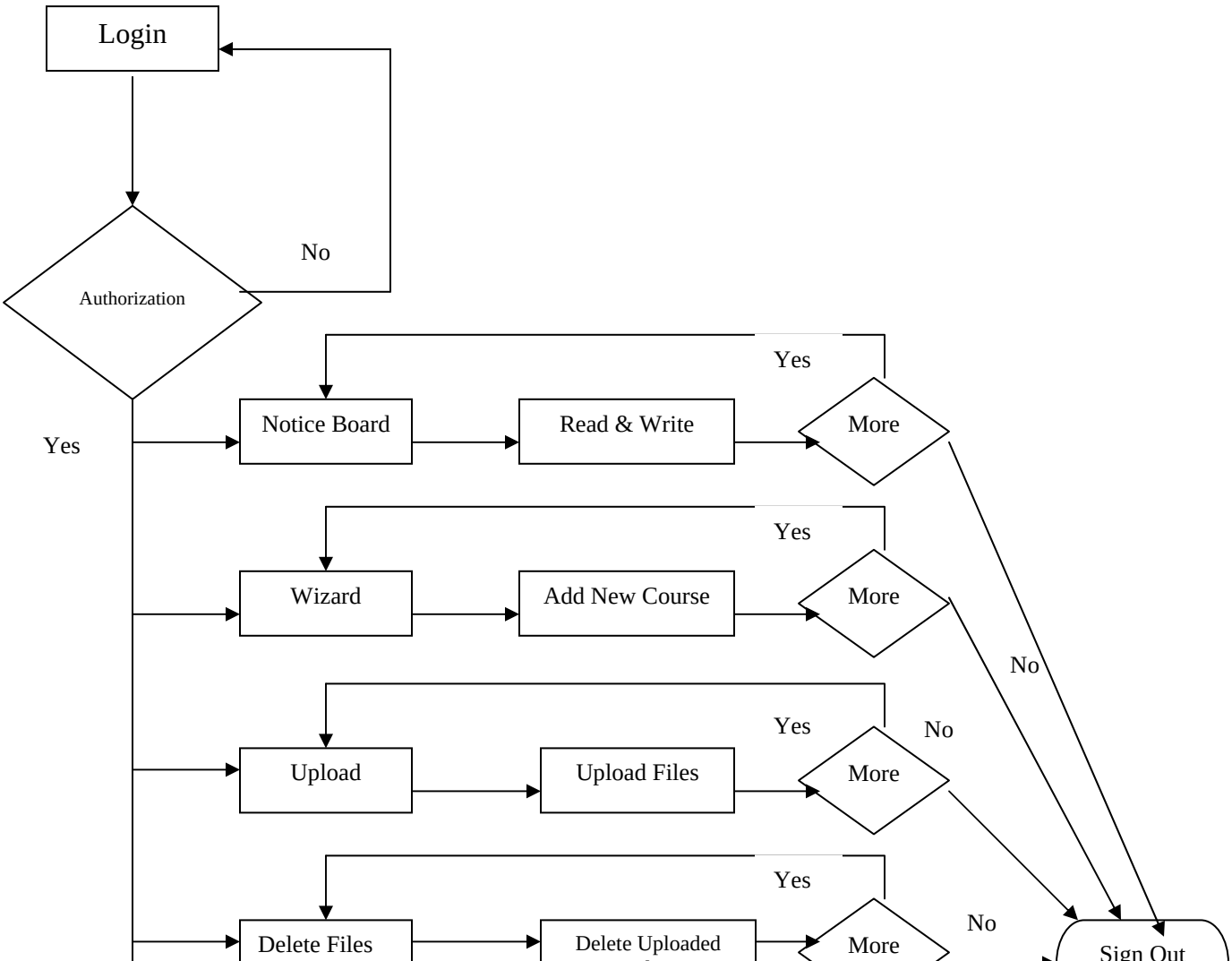
To conduct/teach the courses there is a faculty control panel. Where the instructor has options to conduct the courses. All these options are based on asynchronous communication method.

To enter into the faculty control area, a login window will appear, which will ask for the user name, user-id, department and password. If any of these options are wrong then the system tells you about it and asked for the correct entries. When the entries are correct then the system allows the faculty member to enter into the faculty control panel.

The working of Faculty Control Panel is shown in (Figure no 6.3)

Control Flow Diagram Of Faculty Control Panel

(Figure 6.3)

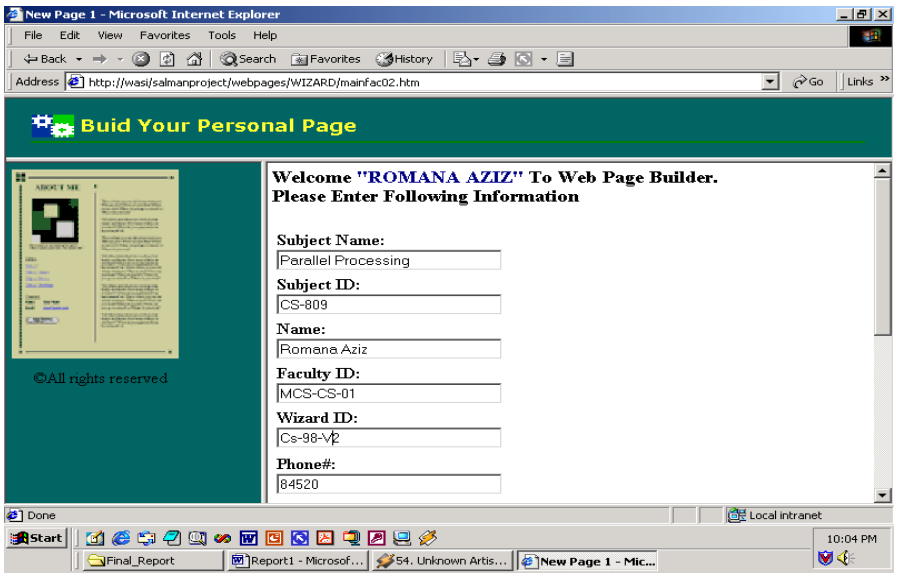


6.2.3.1 Course Wizard

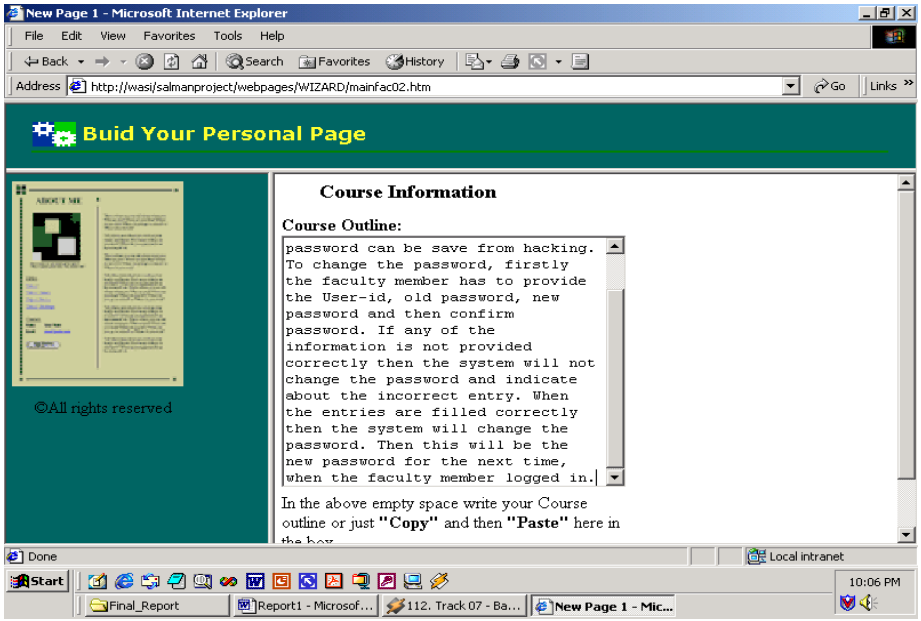
This is the very first and one of the most important options in the faculty control panel. When a faculty member wants to design a new course to teach, then the instructor can publish the information for that course through wizard by designing web pages for that course. Any one can view the information about the course through the Courses link in university home page.

The course wizard is a multiple feature packege which allows the instructors to design their courses for distribution on internet. This is done via an on-line graphic interface using the web browser. No programming or HTML experience is required to use this tool.

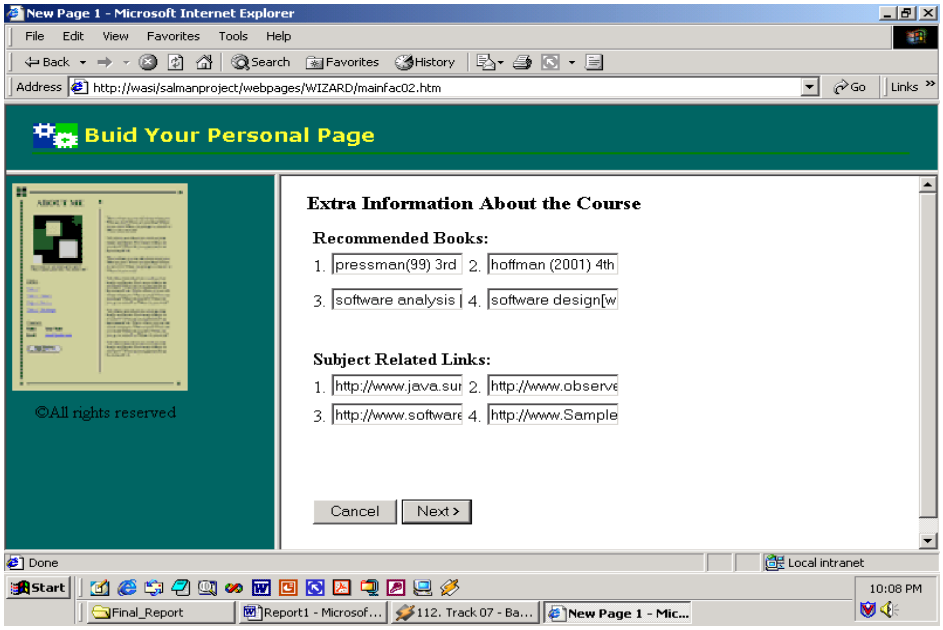
When the instructor clicks, a window opens to collect the information for that course. In the first window instructor insert the course name, course-id, his/her name, wizard-id, e-mail address, department, qualification and discipline, then the instructor clicks the submit button to send this information into the university database.



Then the second window opens. In this window instructor writes the course outline and then sends this information into the university database.



So the third window opens, here instructor insert the names of the recommended books for that subject and related URL addresses. In the next window instructor has to write the course description and when he/she clicks the submit button then a new window opens, which shows all the information which is inserted by the instructor.



When the instructor clicks the submit button, each time a new window open and the information in the previous window stored into the database accordingly. Each time, instructor has to give a new and unique Wizard-ID because on same Wizard-ID the instructor cannot design a new course. The course name and the course-ID have to be unique also. The Course Outline shows the topic names, which will be teach by the instructor. The course outline shows an overview of the course structure. Finally the course description provides a clear picture of the course.

The Wizard is very use full option because through wizard the instructor can design and publish a course with out any difficulty.

6.2.3.2 Files Upload Area

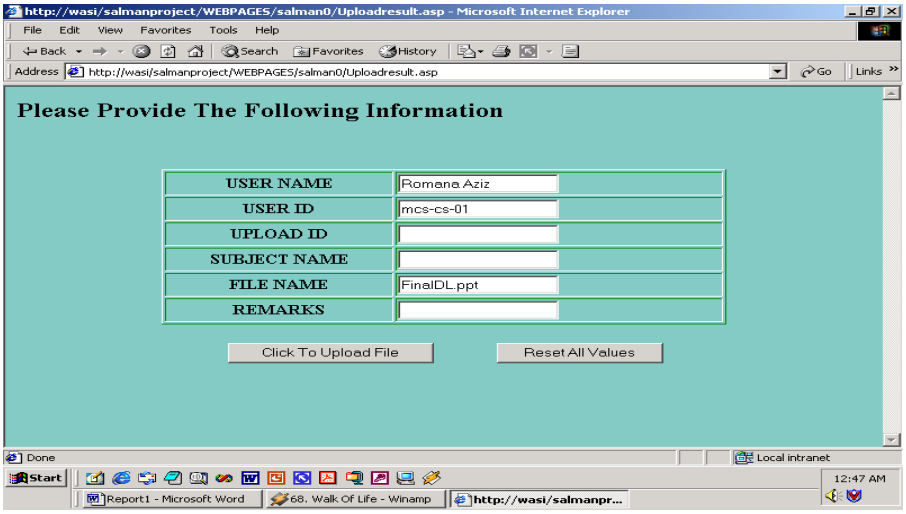
This is also a most important option for the faculty and in asynchronous method because with out this option faculty cannot upload the lectures for the students.

This option firstly asks for the file to be uploading, then the instructor browses the file name and click upload button.

A new window opens which contains the name of the file, which is selected for uploading. This new window contains some text fields. These are user name, user-id, upload-id, subject name, file name and remarks. After filling these text fields the instructor clicks the button. To check that the file is been uploaded or not an option also is present there, through this the instructor can check the file status.

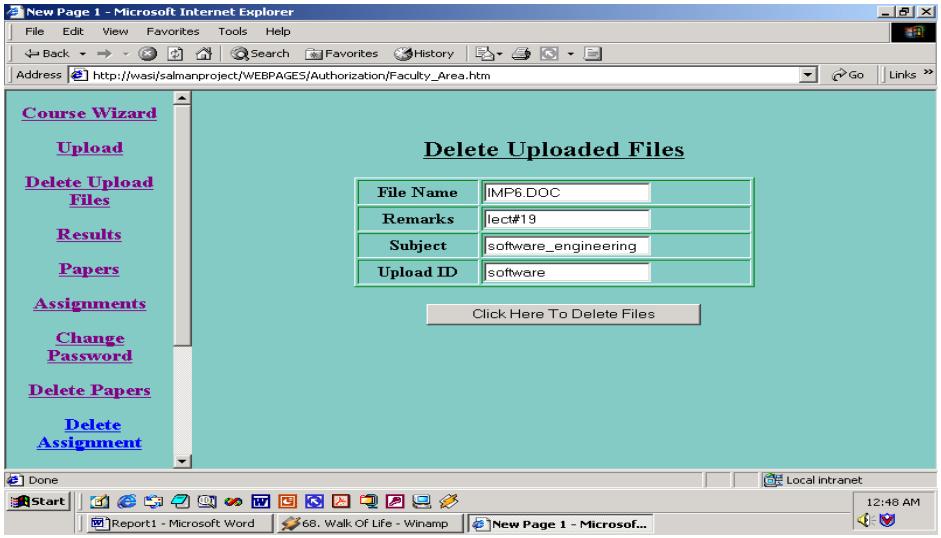
The user name, user ID, upload ID and subject name distinguishes the file name into database and when the instructor wants to check the file from database then these information helps to sort the particular file. Remarks option is used to identify the nature of the file the upload-id is the main key of this uploading

because each subject has its own upload-id. The instructor sends this ID to all the students; those are registered in this course through e-mail. The instructor can upload any type of file format (audio, video, images, text documents).



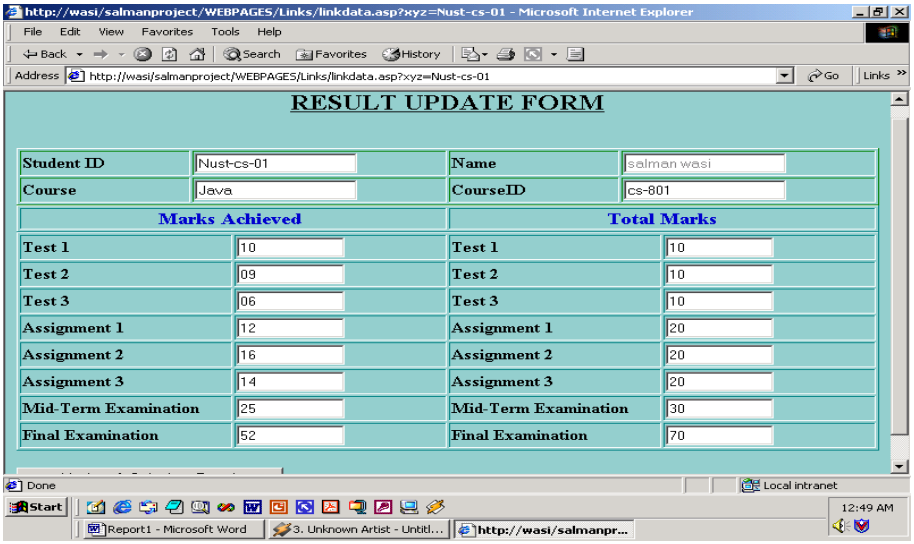
6.2.3.3 Delete Uploaded Files

If the instructor wants to delete any uploaded file then the instructor selects the Upload ID and the subject name. The upload Id and the course name is provided by the system according to the faculty members respectively. This information is provided by the system due to security, so the instructor cannot delete some others uploaded files. The instructor can delete the uploaded files for these reasons (file is corrupted like virus or the garbage data). Secondly at the end of semester or before the commencing of semester, the teacher can deletes all the uploaded files. On clicking the view button the page will show you the names of all the uploaded files regarding the subject. Then instructor clicks any one of the file names, which he/she wants to delete. On clicking the file name the complete information regarding the uploaded files comes in front of instructor and then on clinking the delete button the file will be deleted. If the instructor checks the uploaded files again then the deleted file will not be present with the uploaded files.

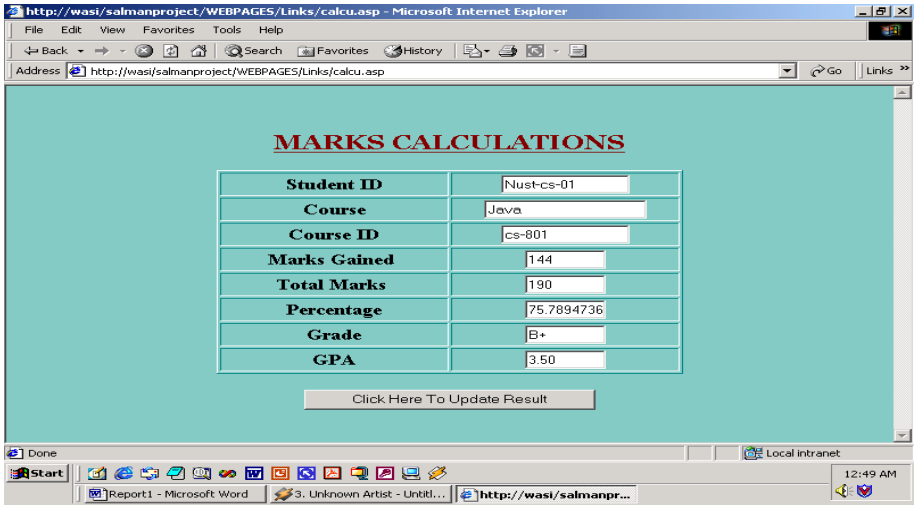


6.2.3.4 Results

This option is used to insert or update the marks and results of the students, which they have gained in different tests and assignments. When the instructor clicks the Result option. Then a new window opens with the course name and course-id of those courses, which are being taught by that instructor. Each course-id contains a link on it. On clicking the courses-id link, a window opens having information regarding students, those are enrolled in that particular course. The student information contains student-id, student name, class roll number, subject name, marks, GPA, grade and e-mail address. E-mail address field is used because instructor can send any type of messages directly to that particular student. Each student-id also contains a link on it. On clicking these links, a window opens containing all the information regarding that student. The student information contains student-id, name, course name, roll number, assignments numbers, class test numbers and examination numbers. Here instructor can insert new marks or update previous marks of students. If the instructor inserts invalid marks, like gained marks are more than total marks, then the system will not update marks into database and indicates the faculty member about that particular field.



On submitting these marks a new window opens which contains the total marks, total percentage, gained marks, GPA and grade of the student. Through this option the instructor can confirm the result. After confirmation instructor submits this information into the university database.



6.2.3.5 Papers and Assignments

This is the asynchronous way to take the assignments and examinations. There are three methods in this virtual university for managing assignments and examination.

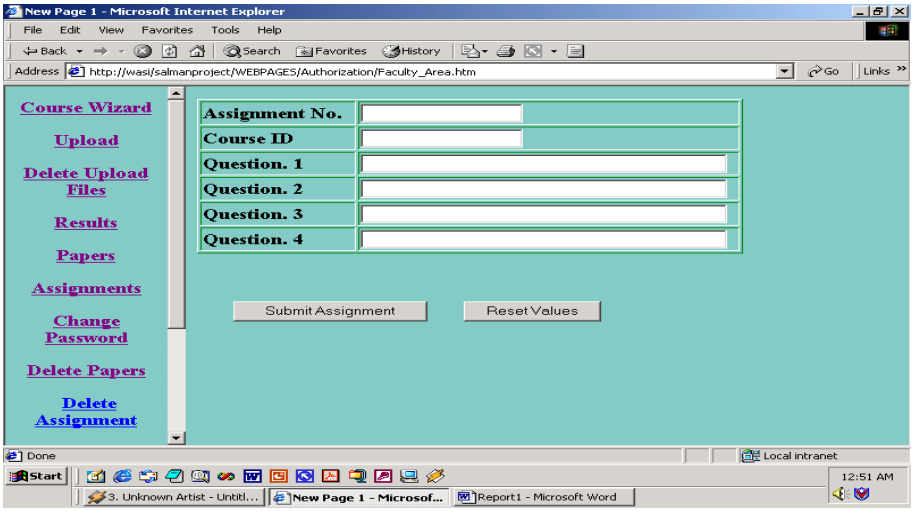
First method is E-mailing. Instructor sends the assignments, paper and tests to students at their e-mail addresses. After completion Students send them back on teacher's e-mail address. But this method is used rarely.

Second is the Uploading method. Instructor uploads the tests and papers through file upload area. From there students can download the paper and tests. After completion students send them back on teacher's e-mail address.

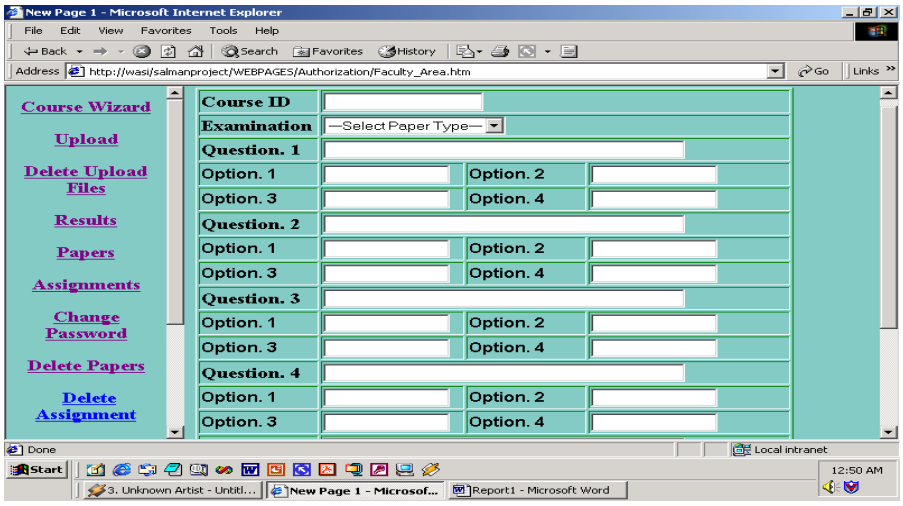
Third is by using Database method. When instructor clicks the Paper and Assignments links, then two options appears. First one is to prepare paper and assignments first and then submit them into database. Students retrieve them from database. After completing these assignments and papers, students submit them back into the database. Second option is Check Paper and Assignments. Instructor can retrieve these papers and assignments from database as an individual student or collectively.

In the third, Database Method. The Paper format contains course-id, type of examination, multiple choice questions (mcqs), and descriptive questions. The Assignment format contains assignment number, course-id and the descriptive questions.

The following form shows the assignment lay out page.



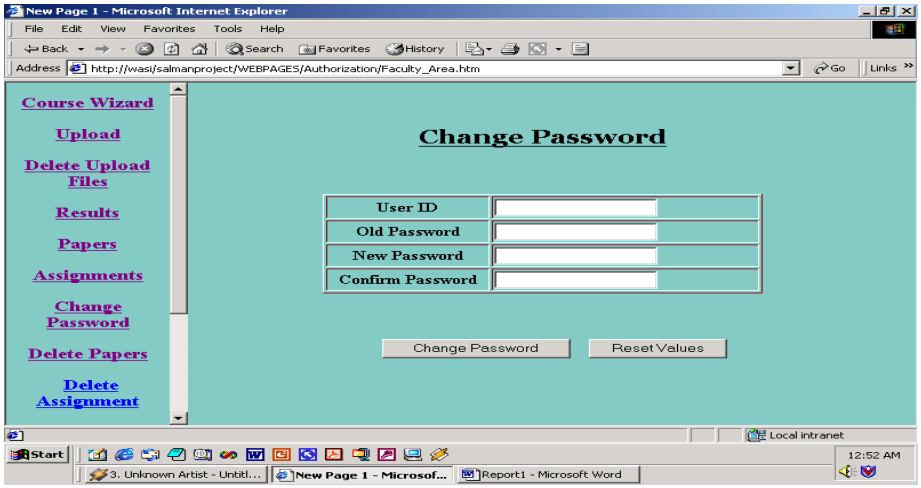
The following form shows the lay out page of the examination paper



6.2.3.6 Change Password

The next option is Change password. If the faculty changes the password regularly then the password can be save from hacking. To change the password, firstly the faculty member has to provide the User-id, old password, new password and then confirm password. If any of the information is not provided correctly then the system will not change the password and indicate about the incorrect entry. When the entries are filled correctly then the system will change the password. Then this will be the new password for the next time, when the faculty member logged in.

If the faculty member forgets the password or the password is been hacked, then he/she has to e-mail to the administrator immediately. Then administrator issues them the new password.



6.2.3.7 Notice Board

The next option in faculty control panel is Notice Board. The faculty notice board option is divided into three portions. Faculty, students and the administrator.

First option is Faculty Notice Board. The faculty member can sends the notices (messages, news, announcements and information) in his/her own department and can also broadcast these notices into whole faculty area. Similarly the instructor can also read the notices from his/her department and from general notice board with in the faculty area, which are send by other faculty members.

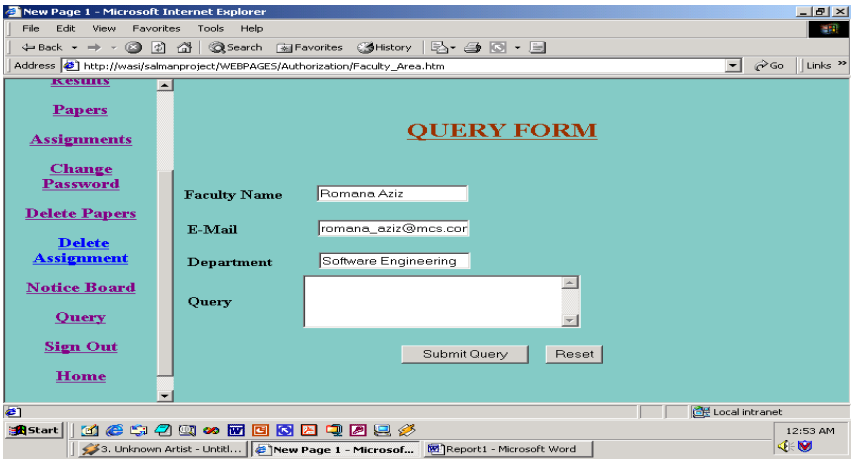
Second option is Students Notice Board. The faculty member can sends the notices to the students of his/her department and can also broadcast these notices into whole students area. Similarly the instructor can also read the notices from his/her department which are send by the students of the same department and can also read notices from general notice board with in the students area, which is send by any other faculty members or by other students.

The third option is Administrator Notice Board. Here the faculty can only read the notices that are send by the administrator. To write the notices, departmental-wise or in general. Faculty has to fill two different types of notices forms. The only difference between these two is that, there is an additional text field of ‘Department Name’ in the departmental notice form as compare to general notice form. While filling the notice board form, the most important field is ‘Date’, because after this due date the will be removed by the administrator. If the faculty member wants to extends the due date then he/she has to inform the administrator for the next due date. The next important field is ‘Heading’ because this field shows the importance of the notice. If there is some sort of mistake in the notice then the faculty member has to inform the administrator for this, for correction or removal of notice.

6.2.3.8 Query

If the faculty members have any query then they can make this from administrator. Faculty members have to fill only the text area of the query field in the Query Form and

all the remaining information about the faculty member, who is willing to fill the query form, is retrieve by the system automatically. The administrator answers the query on his/her e-mail address.



6.2.3.9 Delete Paper/Assignment

Through this option the instructor can delete the papers/assignments. On clicking this option a window appears containing the course name and the course id. The system will show only the names of those courses, which are being teaching by that particular instructor only.

The can instructor deletes the papers and assignments after the due date. Through this option the instructor deletes the papers and assignments of all the related students form the university database.

6.2.3.10 Sign Out and Home

The next options are Sign Out and Home. On clicking the Sign Out option the faculty member can end his/her session on the web. Once the faculty member has singed out, then he/she or any one else cannot enter into faculty control panel and performs any kind of operation. For this faculty member has to logged in again once he/she has sigh out.

Through Home option the faculty member can view the home page and performs any sort of work without ending the session and can again enter into the faculty control panel without logging in again.

This way of teaching is through Asynchronous Method. So the conduction of classes is possible through text, audio and video on demand and images. The E-Mail System is also a very important feature because this is the most efficient way to contact with teachers and students.

6.2.4 Students Control Panel

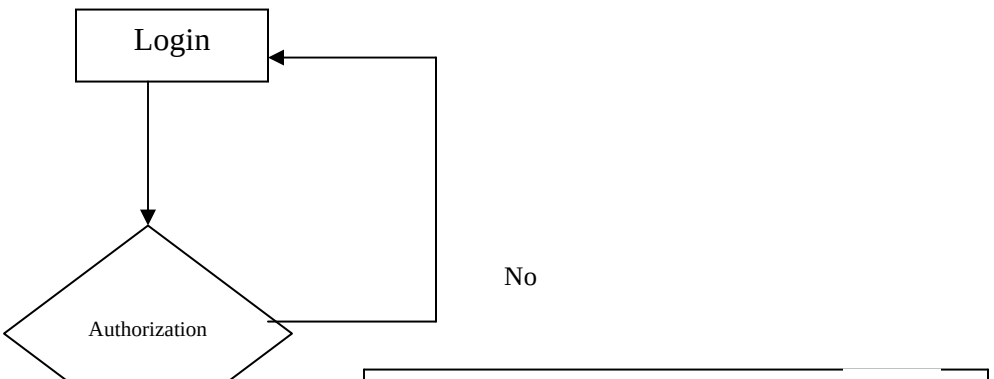
To attend the courses there is a students control panel. Where the students have options to attend the courses. All these options are based on asynchronous mode of communication.

To enter into the students control panel, a login window appears, which will ask for the user name, user-id, department and password. If any of the provided information is incorrect then the system tells you about it and asked for the correct entries. When the entries are correct then the system allows the students to enter into the students control panel.

The working of Students Control Panel is shown in (Figure no 6.4)

Control Flow Diagram Of Students Control Panel

(Figure 6.4)



6.2.4.1 Download Lectures

This is one of the most important options in the students control panel because students can only attend their classes through this option. This is Asynchronous mode of communication.

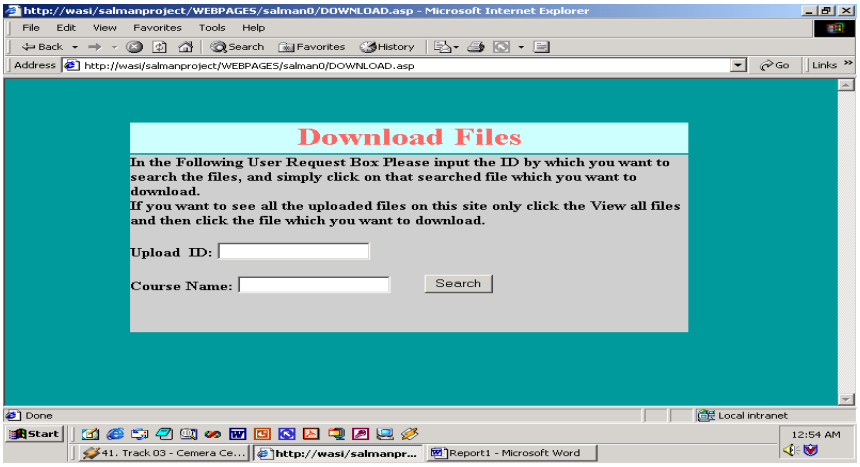
When students wants to check for the new uploaded lectures of the course, for which they are registered. Students click on 'Download Lectures' option, a new window opens, in this students fill two fields.

First is 'Upload ID'. This ID is a password for that particular course in which the students are enrolled. Which does the faculty member generate at the time of uploading the files. Each course has its own unique ID. Then this ID is e-mailed to all those students, which are registered for this course, by the course instructor.

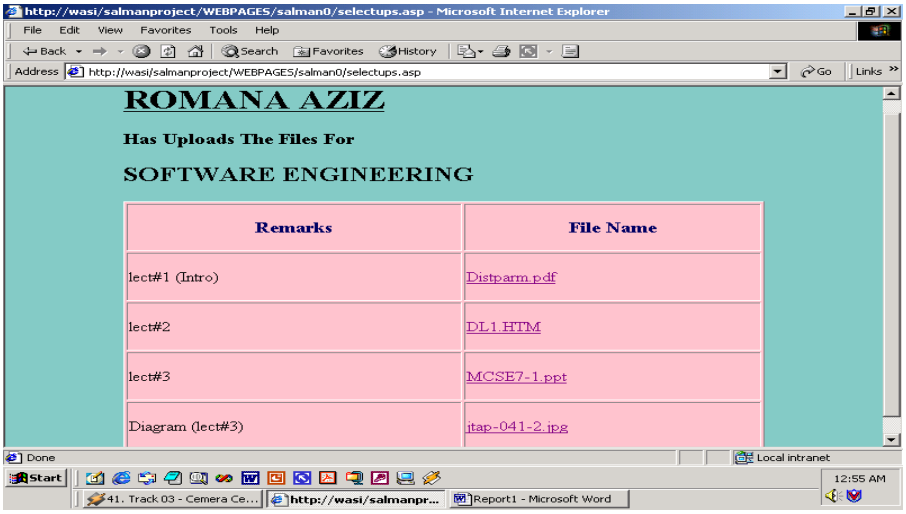
Second is 'Course Name'. The Upload ID will only work with the appropriate course name only.

After filling these two fields. When the students click the submit button then a new window opens. This window contains all the uploaded files for the particular course, which are uploaded by the course teacher.

These uploaded files can be in any format of text, audio, video and images (doc, txt, pdf, ppt, zip, wav, dat, mp3, jpeg, bmp). These video and audio fields are not in real time they are available on demand.



These two views show the downloading procedure. First one requires the subject ID and the subject name and the second one shows the uploaded files along specific comments on each file.

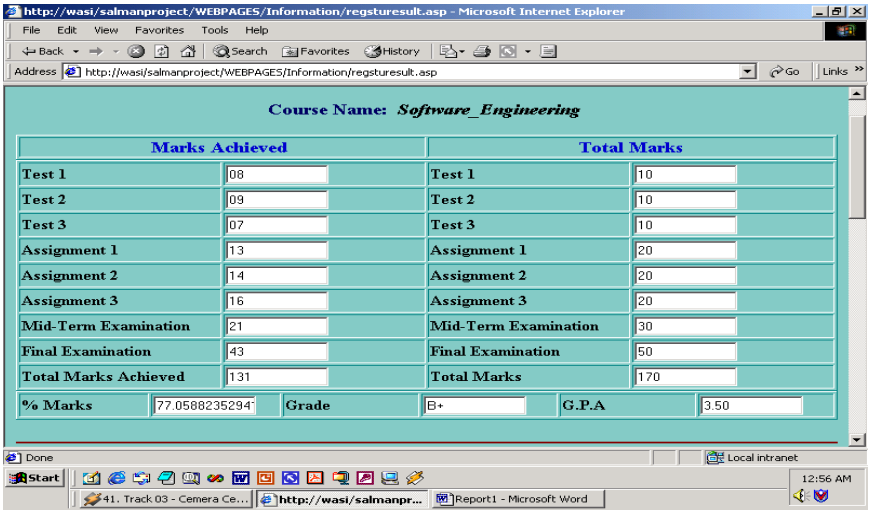


6.2.4.2 Result

The next option in the control panel is ‘Result’. Through this option the student can view only his/her result only. When students click this option a window opens, containing all the marks regarding those subjects, in which the students are registered. The result window contains the all the marks, which are gained by the students. These are Assignments numbers, test numbers, different examination numbers, total percent marks, course GPA and the course grade.

Students can only view these marks but cannot change these marks. So for these all fields containing the marks could be in disabled form or in normal form. If a student tries to change the marks but he/she cannot submit it into database.

In case of any doubt the student can contact with the teacher immediately, through e-mail system and can requests the course instructor for re-checking. In case of any mistake in result, the result will be updated immediately, which can be viewed through the student’s result portion.



6.2.4.3 Notice Board

The next option in students control panel is Notice Board. Students' notice board option is divided into two portions. Students notice board area and the administrator notices.

First option is Students Notice Board. The student can sends the notices (messages, news, announcements and information) in his/her own department and can also broadcast these notices into whole students area (different departments). Similarly the student can also read the notices from his/her department and from general notice board, in the students area, which are send by other students or faculty.

The faculty member can sends the notices to the students of his/her department and can also broadcast these notices into whole students area.

The second option is Administrator Notice Board. Here the student can only read the notices that are send by the administrator. These notices could be for single department or for all the departments.

To write departmental or general notices students fill two different types of notices forms. The only difference between these two is that, there is an additional text field of 'Department Name' in the departmental notice form as compare to general notice form.

While filling the notice board form, the most important field is 'Date', because after this due date the will be removed by the administrator. If student wants to extends the due date then he/she has to inform the administrator for the next due date. The next important field is 'Heading' because this field shows the importance of the notice.

6.2.4.4 Assignments and Papers

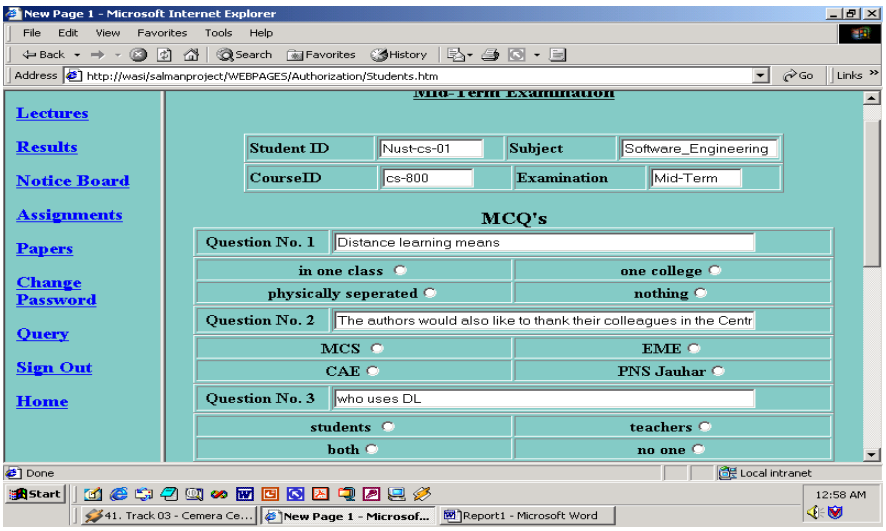
This is the asynchronous way to give the assignments and examinations. There are three methods in this virtual university for managing assignments and examination.

First method is E-mailing. Students receive the assignments, paper and tests from their instructors on their e-mail addresses. After completion Students send them back on teacher's e-mail address

Second is the Upload method. Instructor uploads the tests and papers through file upload area. From there students can download the paper and tests. After completion students send them back on teacher's e-mail address.

Third is by using Database. When students click the Paper and Assignments links, a widow appears, in which student fills three fields. Paper and assignment number, course-id and course name. Through this, the student can retrieve the papers and assignments from database. After completing these assignments and papers, students submit them back into the database.

In the third method (University Database). The Paper and assignment format contains student name, roll number, course name, course-id, type of examination, assignment number, multiple choice questions (mcqs), and descriptive questions

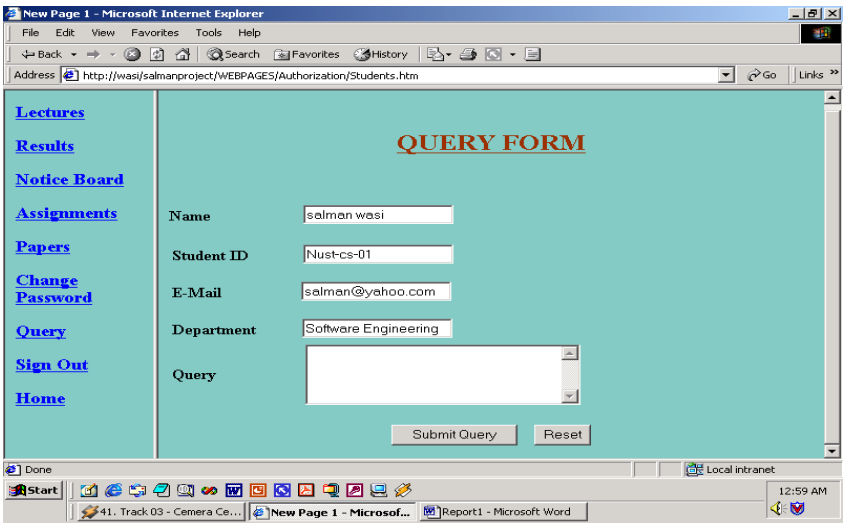


6.2.4.5 Change Password

The next option is Change password. If the student changes the password regularly then the password can be save from hacking. To change the password, firstly the student has to provide the User-id, old password, new password and then confirm password. If any of the information is not submitted correctly then the system will not change the password and indicate about the incorrect entry. When the entries are filled correctly then the system will change the password. Then this will be the new password for the next time, when the student logged in. If the student forgets the password or the password is been hacked, then he/she has to e-mail the administrator immediately. Then administrator issues them the new password.

6.2.4.6 Query

If the students have any query then they can make this from administrator. For this the students have to fill the form, which contains these fields, student name, student-id, e-mail address, department name and the query. The administrator answers the query on his/her e-mail address. This form collects all the information about the student (student name, student ID, e-mail address and department). So the students fill only the query field, for their query.



6.2.4.7 Sign Out and Home

The next options are Sign Out and Home. On clicking the Sign Out option the student can end his/her session on the web. Once the student has singed out, then he/she or any one else cannot enter into student control panel and performs any kind of operation. For this student has to log in again once he/she has sigh out.

Through Home option the student can view the home page and performs any sort of work without ending the session and can again enter into the student control panel without logging in again.

This is Asynchronous Method to attend the classes. So the students can attend the classes through text, audio and video on demand and images. For feed back from the teachers, E-mail system is the most efficient way to communicate.

6.3 Conclusion

Distance learning especially distance learning via virtual universities has a central role in education in the new century. Social, economic, political and technological forces are all pulling this form of education to the center of the policy stage.

Teaching and learning at a distance is demanding. However, learning will be more meaningful and deeper for distant students, if the students and their instructor share responsibility for developing learning goals and objectives; actively interacting with class members; promoting reflection on experience; relating new information to examples that make sense to learners; maintaining self-esteem; and evaluating what is being learned. This is the challenge and the opportunity provided by distance education. That is how virtual universities will encourage all traditional universities to be more learner-centered.

Most of the universities in Pakistan including NUST are trying to put their courses on-line. This software system is the first indigenous attempt to provide a customizable website for virtual universities with course authoring software for faculty members.

6.4 Future Enhancement

Apart from the objectives of the project, there is stillroom for the improvement in the present features. Still this project could be enhanced and updated for the improvement. The future prospects of the project are as follows: -

- Facilities can be provided to faculty and students in the Asynchronous method like On-Line testing system, E-Mail System for university
- Especially we can also develop Synchronous Mode of Communication like Audio/Video conferencing, Chatting room, Navigational tools and white boards.
- On-Line Library System can be a good sub-module of this university.
- The university can be interlink with different universities in both, Synchronous and Asynchronous mode.

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