

Implement Interactive E-Learning System Based on Cloud Computing

Dr .Raheem Abdul Sahib Ogla

Computer Sciences Department, University of Technology/ Baghdad

Email:110137@Uotechnology.edu.iq

Mohammed Jasim Mohammed

Computer Sciences Department, University of Technology/ Baghdad

Email:mohammedj4321@gmail.com

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ABSTRACT

Due to the urgent need for the development of higher education system in Iraq and move it from the traditional learning system to an interactive e-learning system, There is a need to find essential applicable solutions to fit with the technical and scientific development taking place in the field of e-education and e-learning nowadays.

In this research, a set of solutions that are faced in education in Iraq has been studied and processed to make them applicable electronically; the most important problems facing the transformation of higher education in Iraq from the traditional case to the electronic case have been studied and analyzed. All issues related to the traditional education (education administration, educational content, learning curricula, examinations, registration, distribution of professors and all interactive processes) have been studied and analyzed. These issues are converted to electronic case.

In this research, a dynamic integrated centralized relational database operating under the Web environment using (SQL), e-learning management system (LMS) and content management system (CMS) using the environment of (VS.net version 2015), all interfaces and interactive communication necessary for the learning process electronically, have been analyzed and designed. All possibilities, techniques, facilities and characteristics offered by cloud computing are invested. The research applicable results were examined and published on cloud computing through the allocated account on private cloud computing. In order to present a practical solution we have been designing and implementing e-learning system interactively to be served as a basis used in all Iraqi universities. This system provides immediate and interactive solutions to students who live in cities and rural and remote areas.

Keyword: Cloud Computing, E-learning system, Screen sharing, Discussion room.

Introduction

The usual learning in this time [1] is maintained and created by schools, institution or universities, also they are developed their courses, contents and other applications by themselves. Therefore, the expense of servicing, materiel investment, management and development are afforded by universities and institution staff, which would take a lot of expenditure [2]. If e-learning system using out to the universities, Schools or institution, expense its building, maintenance, promotion and managements to the vendor, opening the system to multiple-users through the cloud computing or the Internet and letting the clients or students use on-demand and the payment of the system is based on the amount of servers that used by the clients, students or faculty member, it can't only reducing the fees or cost for universities or institution, but for provider it can also achieve economies of scale. This model of the electronic Learning system is called e-learning cloud model base on cloud computing [3].

Cloud based e-learning [4, 5, 6] on educational field for the e-learning application is the sub part of cloud computing .It is the infrastructure and the future for e-learning technology. Cloud computing based e-learning has all the materials and contain such as HW/SW resources used to improve the

usual learning infrastructure. At the same time of the e-learning materials uploaded on cloud these materials will be available for use, view or download to students and other users. The e-learning can't completely replace tutor; it is only an updating in IT technologies, concepts and materials, giving new content, concepts and tools for education, so the teachers roles cannot be replaced at all situations. The tutor will still leading class, taking the responsibility and participate in developing and benefit from the e-learning based on cloud. Internet has had a deep influence on the way that we interactive learning and work. It is the beginning of as a medium to interchange information between PCs [3].

The topics of the research can outlines as below: the related work implemented in section II, purposed work implemented in section III and finally, the simulation and result are implemented in section IV.

Related Work

There are some of related papers or projects that based on cloud computing services in e-Learning application. Some of the research is focus on comparing between tradition learning and e-learning on cloud. In this we will discuss some of the proposed work where: In 2008 Marenzi, et al. proposed e-learning system on cloud computing where realized how we can used the social software in formal learning or traditional work environments, and how to promotion and join the models and tools into an open source infrastructure for the storing, interchange and creation, of learning materials, acceptable information's resources as well as learning expertise. To consolidation lifelong learning and improvement learning experience they presented the "Learn Web 2.0" infrastructure. This infrastructure brings together information stored on universities or institution servers, centralized warehouse, locally on learner PCs and online sharing systems such as Flickr and YouTube [7].

Also, in 2015 Saurabh Malgaonkar, et al. have proposed a anew application using real time e-learning on cloud computing. Where application can provide to the faculty member to get acknowledge about of how there student are ravening about the topic that they are teaching. Also, a student is able to get the notice of the teacher instantaneously by means of the pull notice module that generates a push information on the teacher's device and also, the faculty member is able to push declaration that to student. This proposed application is accepted performance and possibility to make both faculty member and student easy to use this application when this application uploaded on cloud computing [8].

In this paper we attempted to design a complete application using e-learning system on cloud and also compare between e-learning without cloud and e-learning on cloud.

Cloud computing Concept

Cloud computing is an internet based technology that enables both small businesses and organizations to use highly sophisticated, computer applications without having to own expensive hardware, software, office computing space and staff. In short, cloud computing allows for the sharing and scalable deployment of services, as needed, from almost any location, and for which the customer can be billed based on actual usage.

This research utilized internet-based cloud computing, exploring the characteristics, service models, and deployment models in use today, as well as the benefits and challenges associated with cloud computing. Also, the communications services in the cloud are exploited (including ways to access the cloud, such as web APIs and media control interfaces) and the importance of scalability and flexibility in a cloud-based environment. Characteristics, and services associated with internet-based computing, commonly referred to as cloud computing. Characteristics, such as infrastructure, provisioning, network access, and managed metering are presented. The primary business service

models being deployed (such as software, platform, and infrastructure as a service) and common deployment models employed by service providers and users to use and maintain the cloud services (such as the private, public, community, and hybrid clouds) some of them are invest in the research.

Proposal Work

In this section, proposed application is implemented where proposed is represented communication between faculty member and student through cloud computing and also represent a synchronized e-learning on cloud. The whole of proposed application process explained in algorithm-1.

Algorithm-1: Proposal Algorithm for E-Learning System on Cloud Computing

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- Step 1:** Create database
 - Step 2:** Open database
 - Step 3:** Create relation tables for all system
 - Step 4:** Designed master page
 - Step 5:** Designed login page and communicated it with database via relations table. Login page is also having link to registration page where the registration page is communicated with database via relations table.
 - Step 6:** Designed faculty member page, this page are communicated with database via faculty relations table, faculty member page is needed to design six pages:
 - 6.1:** Designed home page,
 - 6.2:** Designed add quiz page, this page is commutated with database via relations table.
 - 6.3:** Designed add attendance page, this page is commutated with database via relations table.
 - 6.4:** Designed add grade page, it commutated with database via relations table.
 - 6.5:** Designed upload lecture page, upload lecture page is commutated with database upload relations table.
 - 6.6:** Designed request page, request page is commutated with database via relations table.
 - Step 7:** Designed student page, student page are communicated with database by relations table, and it is needed to design six pages:
 - 7.1** Designed home page,
 - 7.2** Designed take quiz page, take quiz page is commutated with database via relations table.
 - 7.3** Designed view attendance page, view Attendance page is commutated with database via relations table.
 - 7.4** Designed view final grade page, this page is commutated with database relations table.
 - 7.5** Designed download and view content page, this page is commutated with database relations table.
 - 7.6** Designed request page, request page is commutated with database relations table.
 - Step 8:** Close database.
 - Step 9:** After complete designed system, e-learning system uploaded on cloud computing server.
 - Step 10: End**
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The system has three users: admin, faculty member, and student. Now, we are explained the whole steps in algorithm-1. **In first step**, we needs to create database to our system, database is considered as storage location that contains all tables that communicated with all the pages in the

system. After create database then open database and create tables inside it. Figure (1)show the relation database for e-learning system on cloud computing.

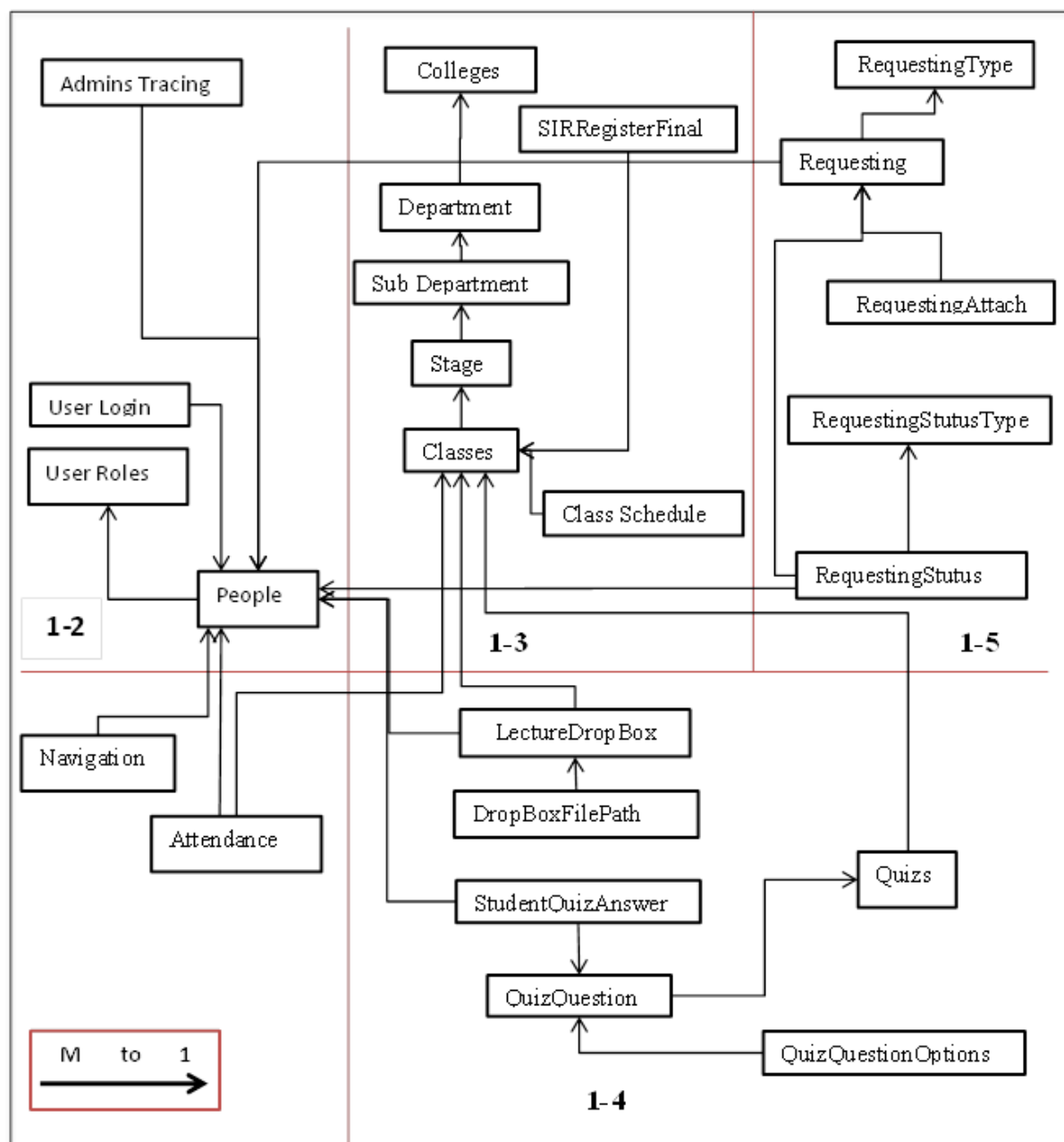


Figure 1: Relational database tables

In step 4, we need create admin page, admin is a responsible to management the whole system such as admin can accept and validate the new student or faculty members by accepting its signup information. Admin can discard any clients by directly deleting that client. DB is made public by the admin through validating that info to the faculty members. The Administrators have full

authority to: manage the learning management system (LMS), database, the network, the learning content management system (LCMS), colleges, and manage the whole system. Diagram (1) explained the whole responsible and process of admin is worked in system.

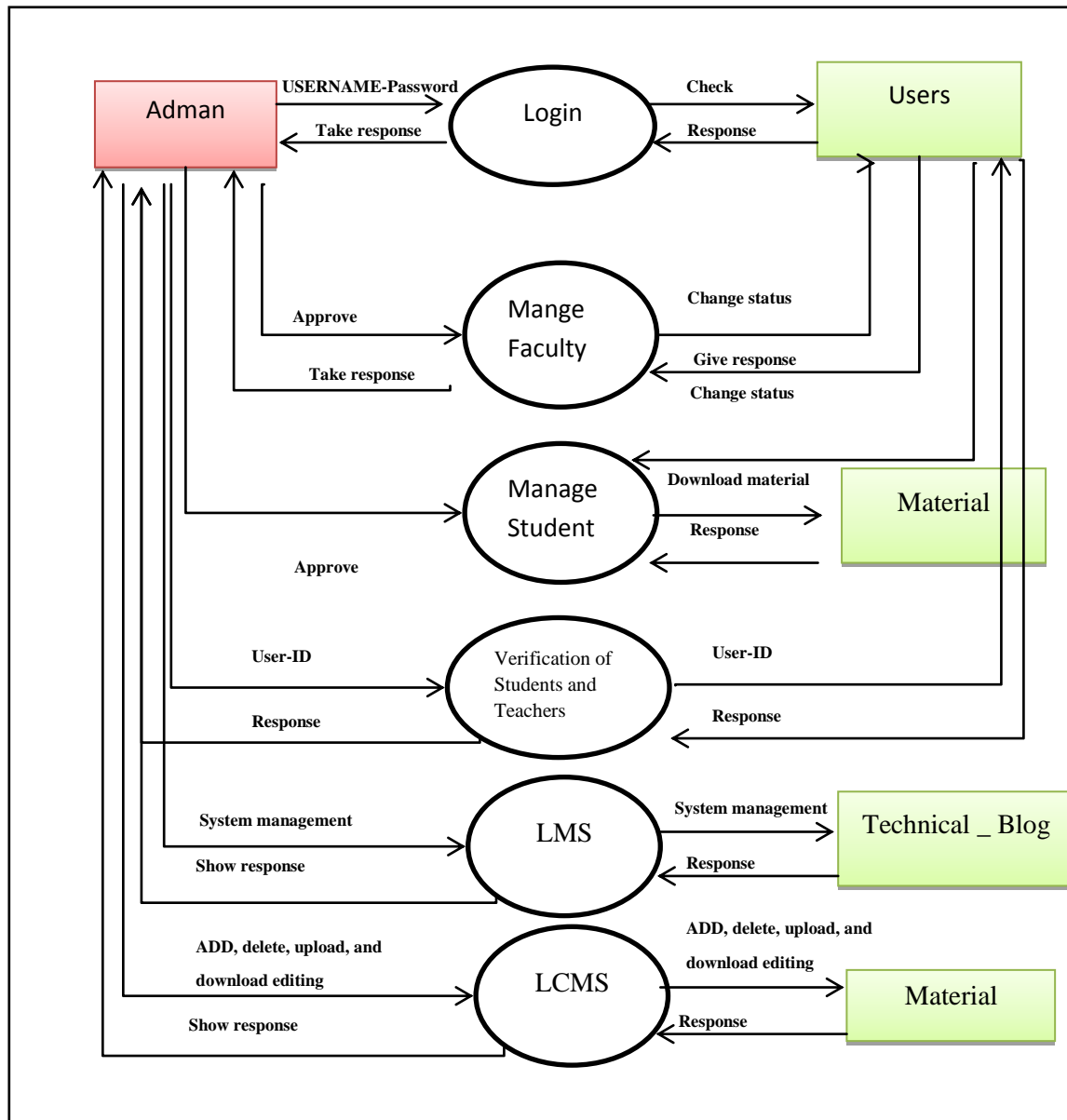


Figure (2): login user (sing in).

At step 5, we need to design login page, all three users must go to this page when user needed to enter the system. If user is already registered then he can directly sign in using our login page and control directing him to his home page while if the user is not registered then he must go to registration page link in login page and he must first signed up by asking registration employee

filling the registration form. After few minute the students are received email from admin contain user-name and password. If user is forget password, he can click on forget password for to obtain anther password. Figure (2) show login page.

The figure displays three screenshots of the ELearning portal interface, illustrating the login and registration process.

Admin Login Page: This page is for authorized University of Technology account holders. It features a "User name" field (Email) and a "Password" field. A "LOGIN" button is present. Links for "Registration" and "I forgot my password" are also visible.

Add new client Page: This page allows adding a new client. It includes a header with "ELearning portal" and a welcome message. The form contains dropdowns for "College" and "Department", and input fields for "First Name", "Middle Name", "Last Name", "Email", "DOB", "Address line1", "Address line2", "City", "State", and "Country". A "Personal image" upload section is also present.

Forgot Password Page: This page is for users who have forgotten their password. It includes a header with "ELearning portal" and a message: "enter your email and click send to send you email that help you to getback your account". The form contains an "Email" field and an "ASK FOR PASSWORD" button.

In step 6, design faculty member page, faculty members are the persons having profound knowledge in particular domain. This page contained six page, each of which page are made faculty members or tutor to authority: create lectures, manage course, creator information, add exam (MCQ exam and Text exam), view course information, manage tutor information, view course calendar and time of each lecture, add attendance, upload and download lectures in different formats (video, word, pdf, text...etc.), manage topics for a course, manage and view the students degree, and send comment/feedback. Diagram (2) explained the whole process of faculty member is worked in system.

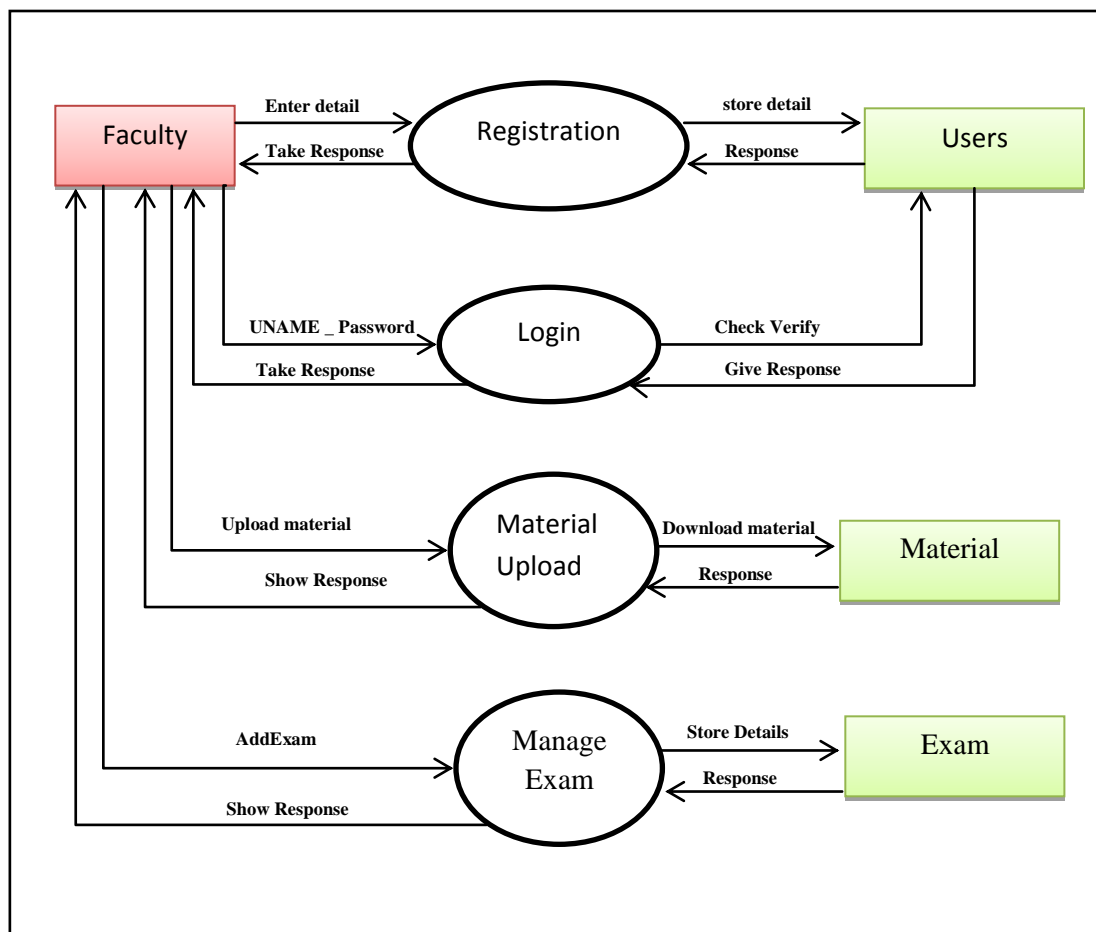


Diagram (2): Faculty Member Page

At step 7, design student page, this page contained six page, each of which student are made student to authority: view course calendar and time of each lecture, view colleges, view departments, view courses/lectures, take exam, view topics for a course, view and download course information, view tutors, download courses/lectures, view attendance, produce report to view the final and courses degrees and send comment/feedback. Diagram (3) explained the whole process of student is worked in system. **Finally**, updated database and loading it on cloud computing.

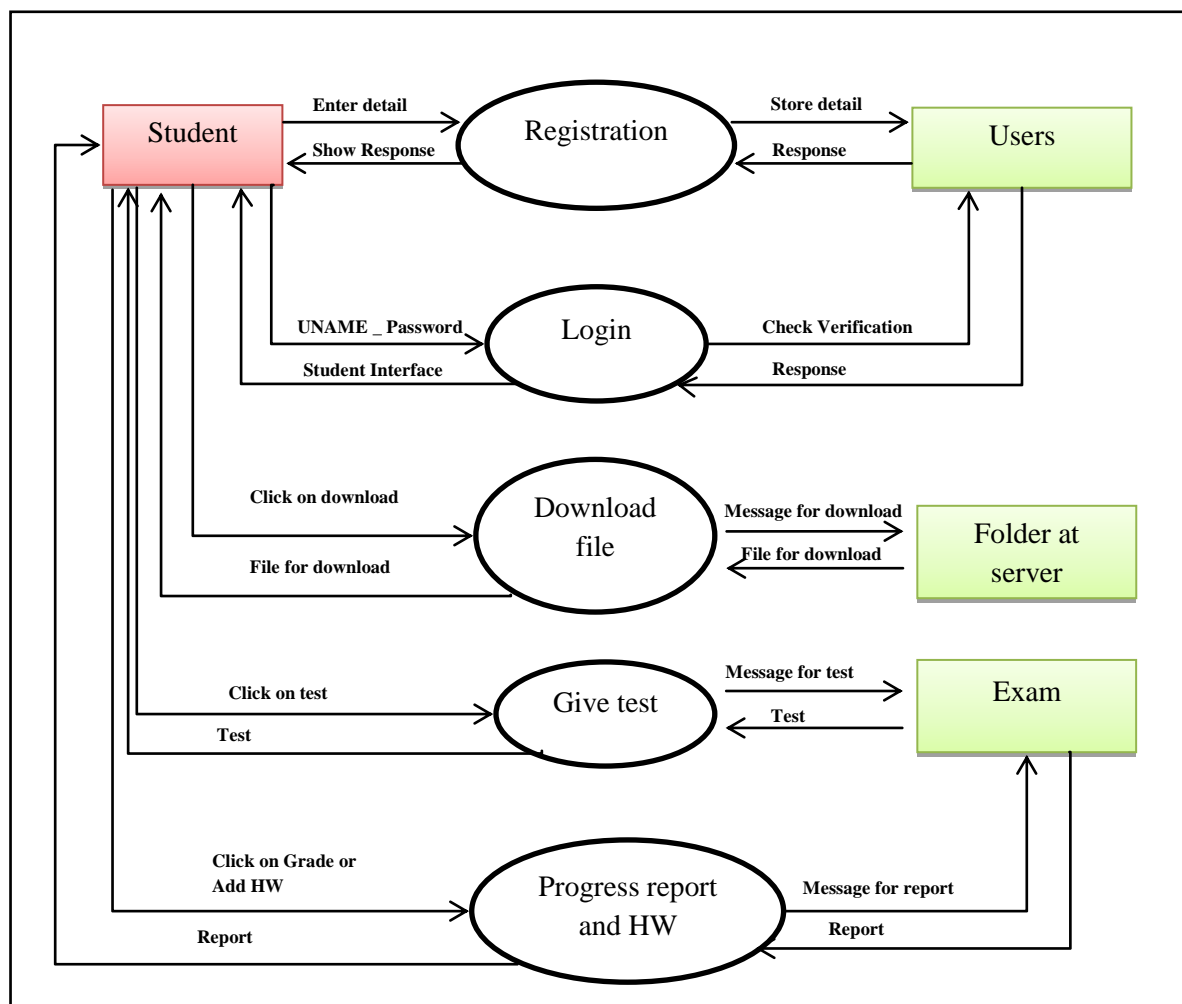


Diagram (3): Student Page

Additionally, system can be interactive: Interactive is considered one of the important features in e-learning, so in this system we achieve the interactive by achieving two features that are available in some of the e-learning classroom can be listed as:

- **Screen sharing:** Screen sharing is a powerful feature of e-learning classroom. It allows all class participants to see an application that is opened on faculty member PC. Every student in the class can see the shared application or screen as if it were running on their machine, this feature based on client-server architecture. Also the faculty member will see a list of the student's names that entered to the lesson and by one click on the student name checkbox → View Screen button the teacher will be able to view student's screens and displayed it on the central data show and teacher PC in order to be seen by other students.
- **Inactivate class (Class discussion):** Important part of each e-learning system, especially asynchronous system is discussions room. Discussions rooms are used for student to communicate with teacher, but also with another student. It enables students to see different opinions and communicate on their own in a simple way. This conversation will be controlled by the teacher.

- The architecture of the proposed above features is based on client-server architecture. The teacher PC (Server) is the machine which runs the shared application. The students PC (Clients) use a very simple and small application for connecting to server (Teacher PC) inside the class. Figure (3) shows the interactive between student and faculty member by using screen sharing and discussion room.

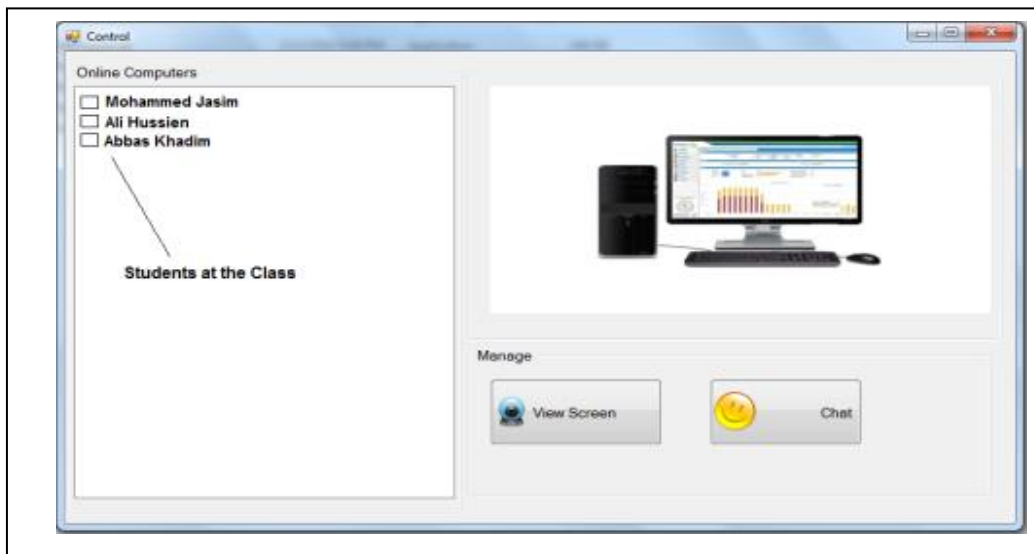


Figure (3): Interactive in e-learning system

Result and Simulation

The proposed e-learning system is developed on the Microsoft Active Server Pages by using ASP.NET technology and can be used in any network based on a Windows server. The database is created with SQL Server 2014 (Using stored procedure technique). The proposed system implemented on could compute. The actors of the system are: Administrator, Faculty members or tutor, and student. Figure (4) explained the faculty member page and in figure (5) explained the student page.

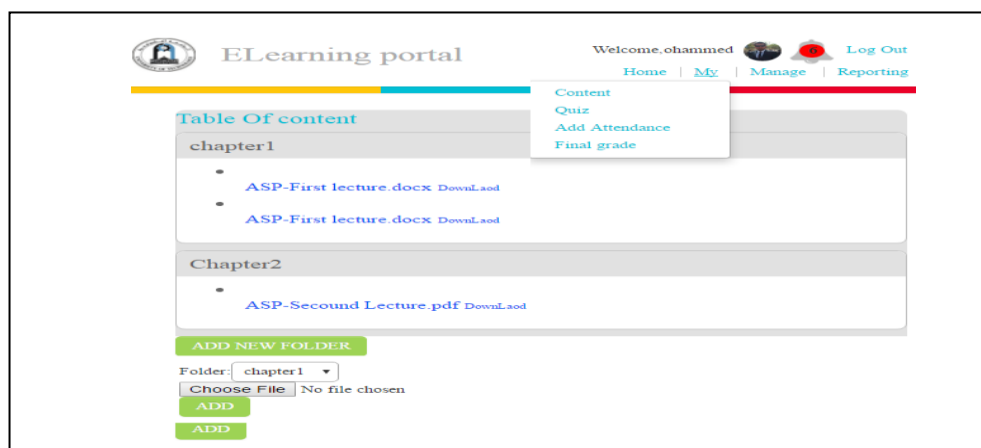


Figure (4): Faculty member page

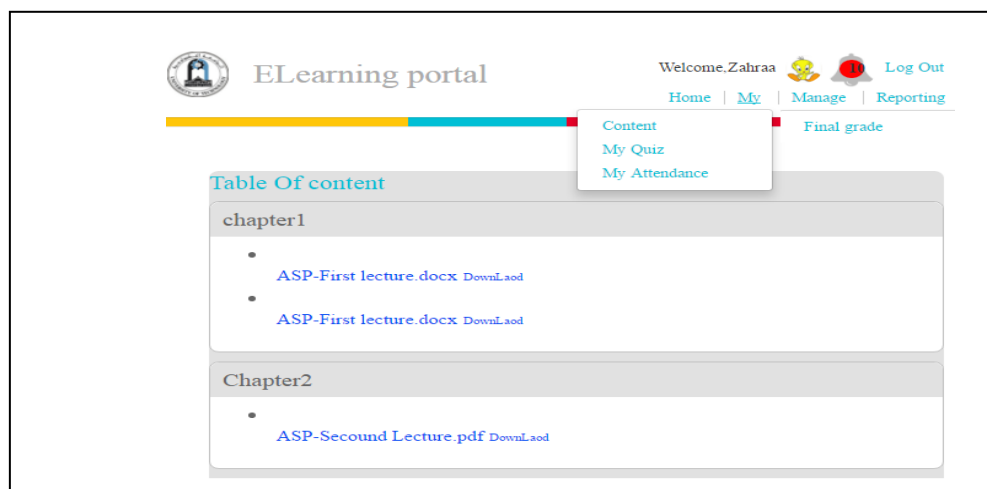


Figure (5): Student page

The users in system (faculty member, students and administrator) will gain a measure of benefits from Cloud-based classrooms. The students no longer need to install specific applications or buy an access code for training tool kits where the students will have high levels of interactivity with each other and with the educators since there are no hardware limitations; thus, the environment is scalable for audio and video streaming. Likewise, the cost lowering will be shared among all system users. Furthermore, the faculty member will no longer have to spend honorary hours preparing for assignments. The administrator will also save time because licensing, updating, and configuration issues will be rejected using the Cloud. All of these elements add to the cost reduction and ease of access. In table (1) the system users and corresponding benefits of using Cloud-based e-learning are presented.

Table(1): benefits of using Cloud-based e-learning are presented

Benefit	Student	Faculty member	Administrator
Ease of Access	Yes	Yes	Yes
Low Cost	Yes	Yes	Yes
Management	Easy	Medium	Medium
Interactivity Level	High	High	Medium
Ease of Use	Yes	Yes	Yes

Finally, we can compare the e- learning without cloud and e- learning on cloud computing and we find the e-learning on cloud is more suitable for both student and faculty member. In table (2) show the compare between e- learning without cloud and e-learning on cloud computing.

Table(2): compare between e- learning without cloud and e-learning on cloud computing

Criteria	E-Learning	E-Learning on cloud
Need for Infrastructure	Yes	No
Compatibility	Yes	Yes
Cost	High	Low
Need for Maintenance	Yes	No
Scalability	Limited	Unlimited
Accessibility	Yes	Yes
Resource Utilization	Not utilized well	High utilization

Conclusion and Future work

In this paper we suggest the implementation of cloud technology for e-learning of Iraqi government universities. Through the cloud computing based e-learning to reduces cost for education systems. Cloud computed is supported many features to e-learning system such us more security, easy to use and etc. In proposed model developed is very handy, user friendly and efficient. It is a very stable, less costly and has a lot of features like: easy to modify, friendlier, fast to access, addition to highly sophisticated database are included. This developed model is perfectly suited to implement all the features. This model supported by multi layers of security, the model is secure from unauthorized person to use. Easy navigation is provided in whole project. Finally, the developed model include three users administers, faculty, and student each of one users have some responsibility in the system. As a future work to improve the proposed system will extended to design the ahead of department page and also made both student and faculty member to request documentations graduation from the registration staff and monitor the status of the request.

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