



RESEARCH ARTICLE

Thi-Qar University: Web Based Information Management System

Kadhim H.K.Alibraheemi¹, Wafaa M.A. Alkhefaji²

¹Department of CS, Education College for pure science, Thi-Qar University, Iraq

²Department of CS, Education College for pure science, Thi-Qar University, Iraq

¹Email: alshemkhy@gmail.com

²Email: wafaam20142015@gmail.com

Abstract: Thi-Qar University Information Management System (TUIMS) provides a simple interface for maintenance of university staff and its accounting information system. It can be used by all colleges and research centers in the University. The creation and management of accurate, up-to-date information regarding accounting is critically important in the university as well as to the colleges. TUIMS deals with all kind of staff details (technical staff) or (teaching staff), academic related reports, accounting reports, scientific plan reports, researchers' curriculum and other resource related details too. It tracks all the details of University staff from the first day to the end of the work which can be used for all reporting purposes, progress of the work, and completed staff's personal information. Also, it will have college details such as batch execution details, staff' details in all aspects, and the various academic notifications to the staff updated by the college administration. It will also facilitate us to explore all the administrative activities happening in the college, different reports and Queries can be generated based on vast options related to staff, batch, college, accounting, certification, and even for the entire college. TUIMS have the potential to provide wide range of services for the staff and accounting system at the University. In order to assist in the design and implementation of proposed TUIMS, we present an overview, software architecture and prototype implementation of our proposed system.

Keywords:

Thi-Qar University Information Management System, Database, Query, Accounting Information System, PHP, MySQL.

1. INTRODUCTION

Most of the contemporary Information systems are based on the Database technology as a collection of logically related data, and DBMS as a software system allowing the users to define, create, maintain and control access to the database [1]. The design and implementation of a comprehensive university staff information system and user interface is to replace the current paper records [2]. The process of constructing such kind of systems is not so simple. It involves a mutual development of application program and database. The application program is actually the bridge between the users and the database, where the data is stored. Thus, the well-developed application program and database are very important for the reliability, flexibility and functionality of the system [1]. Colleges' administrators are able to directly access all aspects of college staff information through a secure, online interface embedded in the college's website. The system utilizes user authentication, displaying only information necessary for an individual's duty. Additionally, each sub-system has authentication allowing authorized users to create or update information in that subsystem [3]. All data is thoroughly reviewed and validated on the server before actual

record alteration occurs. In addition to a staff user interface, the system plans for teaching staff user interface, allowing authorized users to access information and submits requests online thus reducing processing time. All data is stored securely on SQL servers managed by the college administrator and ensures highest possible level of security [3]. The system features a complex logging system to track all users to access and ensure conformity to data access guidelines and is expected to increase the efficiency of the college's record management thereby decreasing the work hours needed to access and deliver a required record. Previously, the college relied heavily on paper records for this initiative. While paper records are a traditional way of managing staff data there are several drawbacks to this method. First, to convey information to the staff it should be displayed on the notice board or on printing papers and the staff has to visit the notice board to check that information. It takes a very long time to convey the information to the staff. Paper records are difficult to manage and track. The physical exertion required to retrieve, alter, and re-file the paper records are all non-value added activities. This system provides a simple interface for the maintenance of staff information and accounting information system. It can be used by all colleges and research centers to maintain the records of staff easily. Achieving this objective is difficult using a manual system as the information is scattered. It can be redundant and also collecting relevant information may be very time consuming [3]. All these problems are solved using online TUIMS. The paper focuses on presenting information in an easy manner which provides facilities like insertion, deletion, searching, and updating staff's records thus reducing paper work and automating the record generation process in a college or research center.

1.1 Problem Statement

The purpose is to design a database system impeded inside Thi-Qar University website and also in its colleges' website which contains up to date information of staff members. This should improve efficiency of college records management.

1.2 Problem Discussion

This system should consist of an application program, on one hand, and a database (repository of data) on the other. The program should perform the basic operations upon the database such as searching, inserting, updating and deleting data. Any additional functionality is a goal of a further module development. It is a kind of strategy to start the development from designing and constructing the database, as this structure will determine the further structure of the application program. The logical database model (tables, their content and the relationships between them) should respond to the given task and cover the basic requirements. The Interface of the program should be user-friendly, and the program should be as easy for use as it is possible. Both controls and forms should logically and functionally be related within the program and fully respond to the structure of the database. Another problem is establishing the connections with the database, every time, when a query is needed to be performed upon it. Exception-handling should also be taken into an account during the system's development due to eventual exceptions that may occur.

1.3 Objectives

- Giving online interface for academic staff, Colleges administration, and scientific research centers administration, accounting administration, etc.
- Expanding the effectiveness of college record administration.
- Decrease time required to access and delivers staff records.
- Make the system more secure.
- Decrease time spent on non-value added tasks.

2. TUIMS DESIGN

This deals with data flow diagram, detailed flow graph, collecting requirements and analysis, and the database design process of the front and back end design of Thi-qar University Information Management System [3].

2.1 Data Flow Diagram

A Data Flow Diagram (DFD) is a graphical representation of the "flow" of University's staff information system. A data flow diagram can also be used for the visualization of Data Processing [4].DFD shows the interaction between the system and the end users. This context-level DFD is then "exploded" to show more detail of the system being modeled. A DFD represents flow of data through a system. Data flow diagrams are commonly used during problem analysis. It views a system as a function that transforms the given input into required output [5]. Movement of data through the different phases in the system is shown in Data Flow Diagram of Fig. 1.

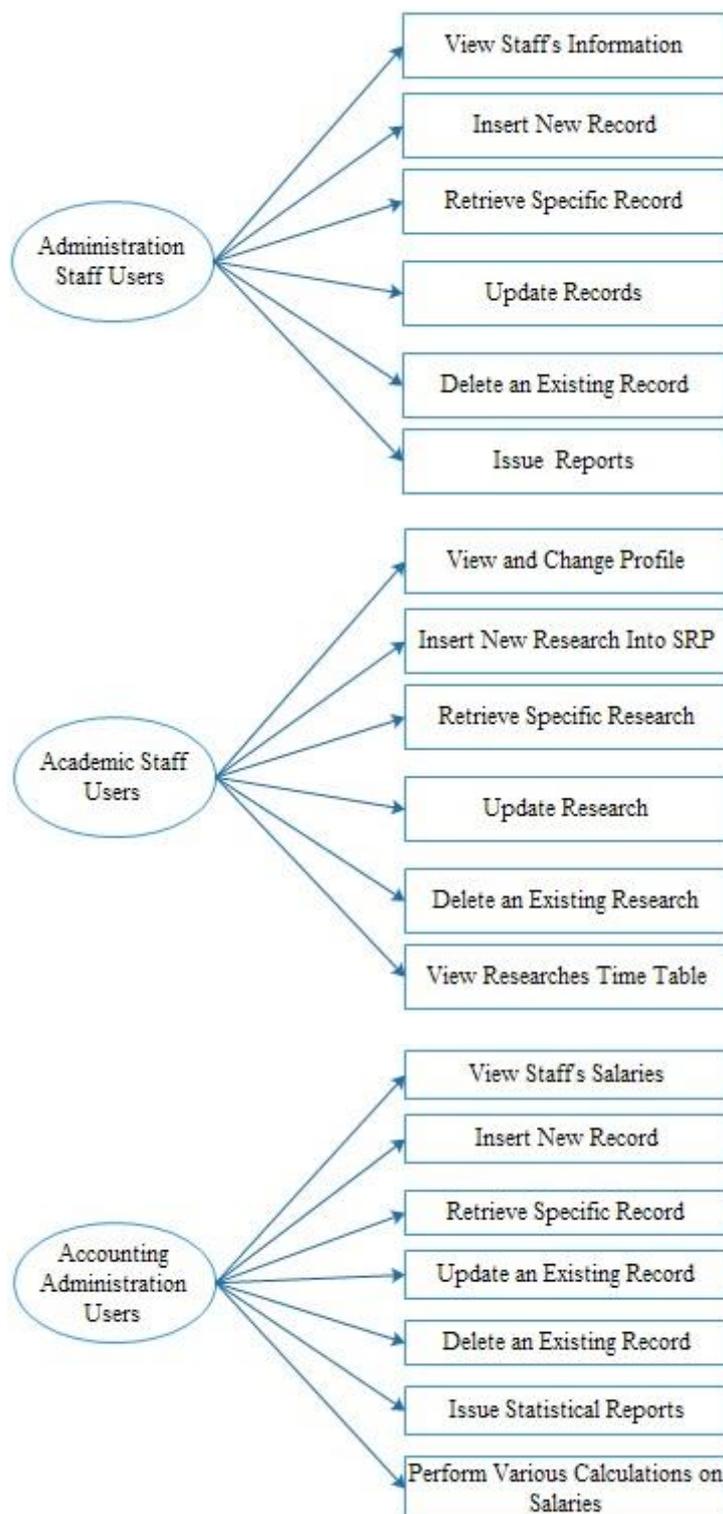


Fig.2 Detailed Flow Graph

The newly designed system will primarily have three main groups of users; administration staff users, academic staff users, and accounting administration users. Each of these users will be able to access the system using any standard web browser

- **Administration Staff Users**

The administration staff which includes Heads of administrative department, head of administrative department in scientific research center, deputy dean of college for administrative affairs, deans of the colleges in the University, and academic services staff are directed to the administration menu pages. The administration menu page has choices such as profile, staff details, scientific research plan, and reports. The administration staff except dean of college, and deputy dean of college are responsible

for entering the new employee (either teaching member or technical member), managing the employee accounts like any changes regarding to the name, address etc. The administrator also manages the college accounts like entering a new college, updates the college related information like calendar of events. The administrator will issues the required reports such as statistical reports; delete an existing employee record, searching for specific record, check the all updates i.e. employee updates, college updates, employee work history, etc. The administrator also makes a backup for database. The administrator has the highest level of power in the University information system. Deans of colleges and deputy deans of college for administrative affairs are able to view, search, and issue required reports based on different staff records.

- **Academic Staff Users**

The academic staffs include lecturers, senior lecturers, and professors. They can log into the system using staff ID and password, upon verification of ID and password they are directed to academic staff menu page. The academic staff menu page has options such as staff profile, curriculum, and Scientific Research Plan (SRP). The system allows the staff members to view and update their profile, insert new research into SRP, update an existing research, view and update curriculum, delete an existing research from SRP, view the time table of researches recorded in SRP, and also view full his/her record, etc.

- **Accounting administration users**

The accounting administrators in the colleges and in scientific research center are responsible for managing salaries of all employees in the university. The administrators are directed to the menu page. The administration menu page has choices such computing salary of new employee, update salary of existing employees, search for specific record issue statistical reports, etc.

2.3 Requirements Analysis

The basic requirements for the design of the TUIMS are:

- a) Every member of teaching staff, head of administrative unit, and head of accounting unit in the University should have their own identity
- b) Login facility.
- c) Authorized Users can view, search, insert, update, and delete the required information in the database.
- d) Scientific research plan is accessible only by members of teaching staff.

2.4 Functional Requirements

Thi-Qar University Information Management System aims to improve the efficiency of information management in the colleges, and in the scientific research centers. The main function is managing and maintaining information [6]. The administrator and member of teaching staff have two major functional requirements in the system. The Administrator will be given more power (enable/disable/ update) than other users. Teaching staff use the system to query and enter their researches information only.

2.5 Non Functional Requirements

- **Performance Requirements:**

The proposed system that we are going to design and implement will be used as the chief performance system for helping the University in managing the whole database of the employees working in the University. Therefore, it is expected that the database would perform functionally all the requirements that are specified.

- **Safety Requirements:**

The database may get crashed at any certain time due to virus or operating system failure. Therefore, it is required to take the database backup [5].

- **Security Requirements:**

We are going to design a secured database. There are various categories of people namely the Administrator and the member of teaching staff who will be viewing either all or some specific information from the database. Depending upon the category or role of the user, the access rights are decided. It means if the user is an administrator then he can be able to modify the data, append etc. All other users only have the rights to retrieve the information about the database.

2.6 Database Design Process

The database play a critical role in almost all areas where computers are used, including business, electronic commerce, engineering, medicine, law, education, and library science. A database is collection of a related data.

A database has the following implicit properties [1]:

- A database represents some aspect of the real world, sometimes called the mini-world or the Universe Of Discourse (UOD) changes to the mini world are reflected in the database.
- A database is a logically coherent collection of data with some inherent meaning. A random assortment of data cannot correctly be referred to as a database.
- A database is designed, built, and populated with data for a specific purpose. It is an intended group of users and some preconceived application which these users are interested.

Database Management System (DBMS) is a collection of programs that manages the database structure and controls access to the data stored in the database. The DBMS serves as the intermediary between the user and the database. The database structure itself is stored as a collection of files, and the only way to access the data in those files is through the DBMS Contents. Having a DBMS between the end user's applications and the database offers some important advantages. First, the DBMS enables the data in the database to be shared among multiple applications or users. Second, the DBMS integrates the many different users' views of the data into a single all-encompassing data repository. In particular, a DBMS provides advantages such as: Improved data sharing, improved data security, Better data integration, minimized data inconsistency, improved data access, and increased end-user productivity [1].

Manipulating a database includes functions such as querying the database to retrieve specific data, updating the database to reflect in the mini-world, and generating reports from the data. Sharing a database allows a multiple users and programs to access the database simultaneously [3].

Application Program accesses the database by sending queries or request for data to the DBMS [7]. A query typically causes some data to be retrieved; a transaction may cause some data to be read and some data to be written into the database.

3. TUIMS SOFTWARE ARCHITECTURE

TUIMS has user interface designed using HTML, CSS and PHP, which simply collects data from the users and posts it to the server for processing, and then displays the processed data back to the user. Apache was used as a web server while MySQL is used as database server. In the following sections we briefly explain the technologies used in the design of our proposed system.

3.1 Database server: MySQL

MySQL is free yet full-featured relational database server. It was developed in the 1990's to fill the ever-growing need for computers to manage information intelligently [8]. There are many features which made MySQL the most popular open-source database server in the world among beginner's users and enterprises, alike some of these features are: speed, portability, reliability, flexibility, ease of use, licensing, and MySQL supports wide range of data types [8].

3.2 Web server: Apache

A web server is the server software behind the WWW. It listens to the requests from a client, such as a browser like Netscape or Microsoft's Internet Explorer. When it gets one, it processes that request and returns some data. This data usually takes the form of formatted page with text and graphics. The browser then renders this data to the best of its ability and presents it to the user. Web servers are in concept very simple programs [9]. There are more than one server, some of these are: Microsoft IIS, iPlanet, and Zeus, but the Apache is widely used where more than 60 percent of the web servers in the world use Apache, according to a prominent web server survey company called Netcraft. In this research we used Apache 2.4, this web server have many features, some of these features are: Apache is a highly configurable web server with a modular design, works very well with Perl, PHP and other scripting languages, Apache runs on Linux, Windows, and other Unix system, Apache support for the HTTP 1.1 protocol, Java Servlet support, and Apache is a free open source technology [9].

3.3 Server-side programming and scripting languages

1. PHP

PHP stand for PHP: Hypertext Preprocessor. PHP is a powerful server-side scripting language for creating dynamic and interactive websites. PHP is perfectly suited for web development and can embed directly into HTML. PHP is compatible with various web servers like Apache, Microsoft Internet Information Server (MIIS), and Netscape enterprise server [10]. All the PHP scripts are executed on the server and it supports various databases like MySQL, Oracle, Solid, and Generic ODBC.

2. HTML

HTML is a hypertext markup language which is in reality a backbone of any website. Every website can't be structured without the knowledge of html. If we make our web page only with the help of html, than we can't add many of the effective features in a web page, for making a web page more effective we use various platforms such as CSS. So here we are using this language to make our web pages more effective as well as efficient.

3. CSS

CSS Stands for "Cascading Style Sheet." Cascading style sheets are used to format the layout of Web pages. They can be used to define text styles, table sizes, and other aspects of Web pages that previously could only be defined in a page's HTML. The basic purpose of CSS is to separate the content of a web document (written in any markup language) from its presentation (that is written using Cascading Style Sheets). There are lots of benefits that one can extract through CSS like improved content accessibility, better flexibility and moreover, CSS gives a level of control over various presentation characteristics of the document. It also helps in reducing the complexity and helps in saving overall presentation time. CSS gives the option of selecting various style schemes and rules according to the requirements and it also allows the same HTML [3].

4. RESULTS

Login Form:

The system starts with login page with three choices administrative area, accounting area, and scientific research plan area, when the authorized user can enter the required area with his/her user name and password to be able to access the system. Fig. 3 shows login form.



Fig. 3 Login Form

Administration Form:

When the authorized user sign in the database of administrative area then all privileges granted to that user will open. It will show his registration number and all buttons associated with corresponding functions that were mentioned in Fig.2, containing insert new record, delete an existing record, update an existing record, search for specific record, etc. When he will click on insert new record button the following basic form Fig. 4 will ready to use.



Fig. 4 Insertion Form

Delete Form:

If user wants to delete specific record he receives confirmation form, Fig. 5.



Fig. 5 Delete Form

Scientific Research Plan Form:

If authorized user login to scientific research plan area he/she login to specific database with three choices publications, seminars, and documents as shown in Fig. 6.



Fig. 6 Home page of Seminars

If the user click on seminars he/she login to the database of seminars with many choices which enable user to perform a required action as shown in Fig. 7.



Fig. 7 Seminar Form

5. CONCLUSION

This system will work on the network. Authorized users get their desired information without any delay. This system is only for colleges and scientific research centers in Thi-Qar University. The information which is stored in the database can be accessed any time by using this system there will be no wastage of resources in colleges and scientific research centers. The objectives of this research are achieved and they are functioning well. This system assists in automating the existing manual system. This is a paperless work. It can be monitored and controlled remotely. It always provides accurate information. There is no need to arrange the university staffs records manually this system will give better performance in arranging the staff records. Also this system contains complete accounting information system with all required facilities. Information gathered throughout the years can be saved and can be accessed at any time.

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