

A Smarter Way to Improvise Learning Outcome based on Computer Application

Atul Sharma, Omead Ibraheem Hussain

Abstract-In any educational quality improvement endeavor, measurement plays a major role since it provides the information for any decision making mechanism. There is always a need to devise a standard teaching model which can be used as a benchmark to evaluate the quality of education imparted. Based on the output, preventive as well as corrective line of action can be taken, if required. The present research deals with a standard prototype application developed for a leading academic institution. It has served as a basis of a simple, user-friendly interface to manage the entire training cycle with excellent results. The project has been tested at a user level. The project has been developed in a less known relational database called FileMaker which is a product of Apple Company. The current project which has been named as EduGain version 1.0 which has been demonstrated practically during any research assignment.

Keywords: RDBMS, ICT, Information Technology, Edugain, FileMaker.

I. INTRODUCTION

Most of us are aware of the fact that a large number of the educational establishments all over the world are managing their business manually in the small & medium enterprises segment. We are unable to find an automated application which can be used as standard for the academic as well as non-academic educational establishments. Although we all are aware of the concept of database/relational database but still we have not been able to apply it effectively till date.

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Accurate planning and scheduling of orders, better data predictions, quick response to queries and online detailed information of orders is must for doing business. As a result in the past few years many industries have invested in integrated systems, along with strong infrastructure. The change from customized modular software to ERP is the current trend in most companies [3]. A small number of schools all over the world has deployed an ERP (Enterprise Resource Planning) to manage the day to day activities but still a lot needs to be done in this area. Considering all this in mind a comprehensive mini sized ERP related to academic domain was planned & executed.

II. MOTIVATION

Motivation plays a major role in the successful development as well as deployment of any project. A live example of motivation behind a project is well known Indian project called IRCTC to manage to entire travel business across the country. Indian Railway Catering and Tourism Corporation Ltd. has been set up by the Ministry of Railways with the basic purpose of hiving off entire catering and tourism activity of the railways to the new Corporation so as to professionalize and upgrade these services with public-private participation [2]. Similarly United States has done very well in the field of online business as a result of perfect motivation in terms of automation. The overall system to maintain the records of individuals related to the issuance of residency cards in the Kurdistan region is another perfect example of motivation. The current academic institution has been working on an action plan which aims at automation of entire academic as well as non-academic activities in the form of Information and Communications Technology (ICT). ICTs have multidirectional ability to perform tasks like teaching and training, educational administration, in library service and research conduct and analysis. The following figure describes the application areas of ICTs in Distance Education sector [4].

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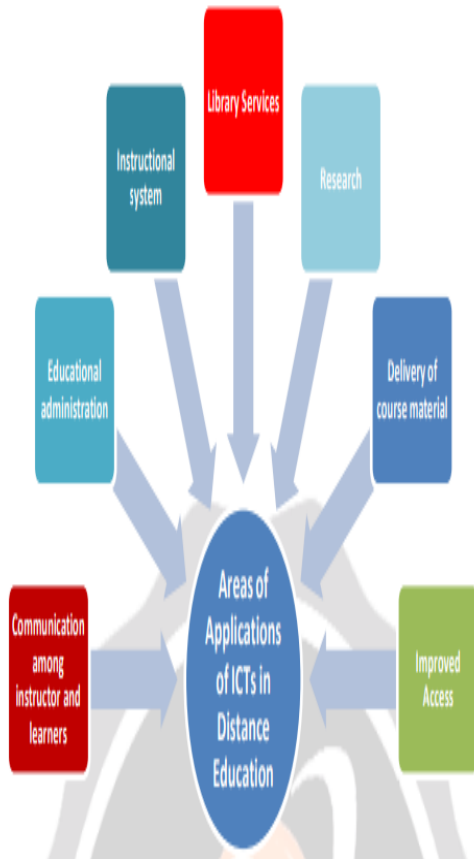


Fig 1: Applications of ICT in education sector

As shown in the figure 1 above ICT has various areas of applications in the education sector like:-

- Communication among instructor and learners.
- Educational administrators.
- Instructional system.
- Library services.
- Research.
- Delivery of course material.
- Improved access.

Therefore with all these terms in our mind it was decided to work on a system applicable to the whole University following the University laid down rules & regulations. With the initiative of the management and the dedication of a development team, the system was designed & implemented.

III. SYSTEM DEVELOPMENT

EduGain version 1.0 is being used as a standalone system currently. Later on there are plans to migrate the same application to Client-Server environment.

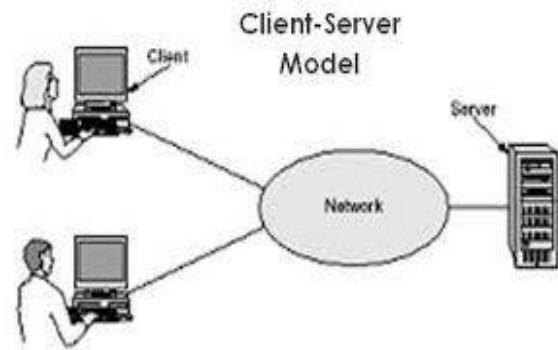


Fig 2: Client-Server Environment

A client/server system is "a networked computing model that distributes processes between clients and servers, which supply the requested service." (McFadden, Hoffer, & Prescott, 1999) [6]. We have tested our application on a standalone mode although the same works perfect on Local Area Network (LAN) as well. The usefulness of any project becomes manifold if the same is deployed over a network using Client-Server architecture. This can be worked out gradually in the next phase. There is always the availability of very fast & efficient file servers at the backend for fast data processing which is very crucial for any business. Further one thing has to be kept in mind that the application should be hardware as well as software independent. Figure 3 below shows the screenshot of the main screen of the application EduGain version 1.0

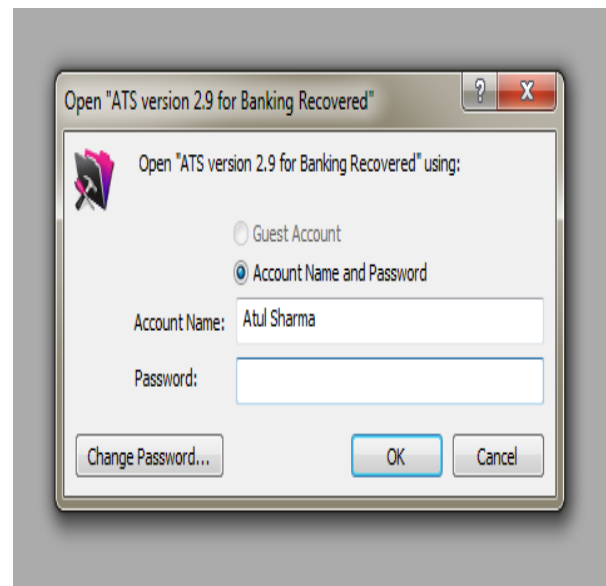


Fig 3: User Login Screen

Figure 3 above shows the user login screen. Here we have options like:-

- Guest Account
- Account Name and Password

- Change Password
- OK
- Cancel

- Reference book
- Plus more ...

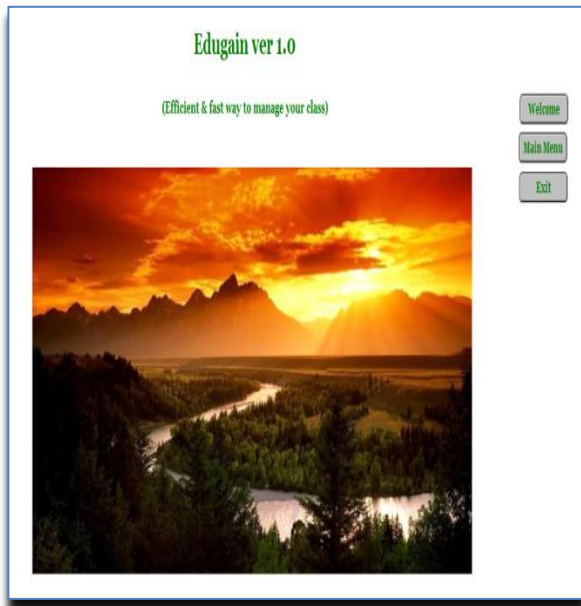


Fig4: Main screen of the Application

Figure 4 above shows the main menu for our application. It shows the name as well as version of our application. It has options to go to the various other options like Welcome, Main Menu or exit out of the application.

A. Analysis and definition

A continuous and regular series of discussions were held at all the levels to understand and design a full proof robust system. Based on these inputs SRS (System requirement specifications) was laid down. A software requirements specification (SRS) is a document that captures complete description about how the system is expected to perform. It is usually signed off at the end of requirements engineering phase[5]. The SRS usually consists of rich input to understand the existing procedures/activities performed in the entire business. We can incorporate our future requirements in the SRS as well. Paper documentation was prepared based on the inputs collected from all the required ends.

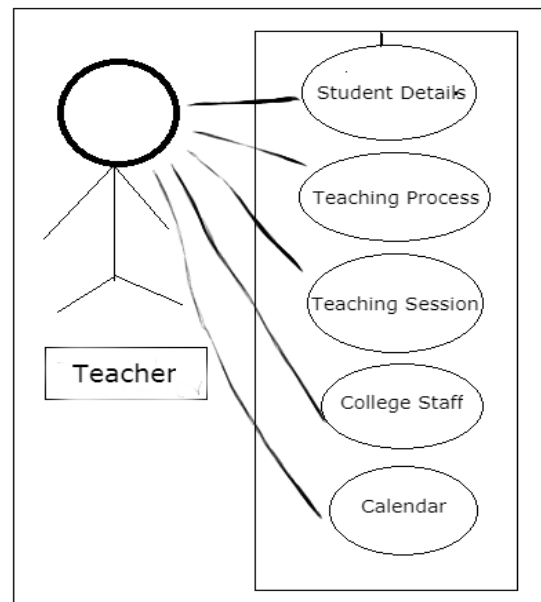


Fig 6: User-case Diagram

Figure 6 above shows the user-case diagram. Here we find that the teacher can handle student details like:

1. Student's details including Name, Class, Group, Session, Gender etc.
2. Periodic attendance i.e. daily, monthly etc.
3. Chapters to study.
4. Marks for Exams

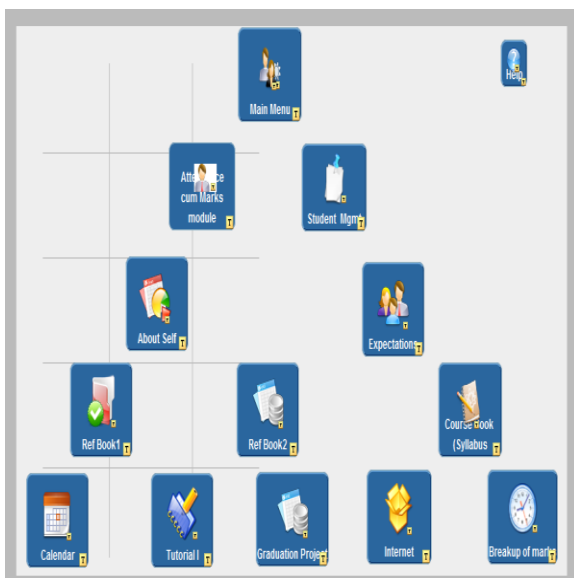


Fig 5: Sub modules of EduGain 1.0

Figure 5 above shows the various application modules that we have like:-

- Main Menu
- Attendance cum Marks module
- Student Management

Great Grand Fathers Name	Text	
Nick Name	Text	
Full Name	Text	Indexed
Name Arabic	Calculation (Number)	= Kurdish1 & "" & Kurdish2 & "" & Kurdish3
Class	Text	Indexed
Group	Text	Indexed
Session	Text	Indexed
Active	Text	Indexed
Notes	Text	Indexed
Total Attendance	Calculation (Number)	Unstored, = Count (Line Items:Actual Status)
Present	Calculation (Number)	Unstored, = Sum(Line Items:Actual Status)
Per Present	Calculation (Number)	Unstored, = (Present/Total Attendance)*100
Days Absent	Calculation (Number)	Unstored, = (Total Attendance-Present)
Per Absent	Calculation (Number)	Unstored, = (Days Absent/Total Attendance)*100
CM_Tot_Att	Calculation (Number)	Unstored, = Sum (Line Items:Tot Attn cm)
CM_Present	Calculation (Number)	Unstored, = Sum(Line Items:Actual Status cm)
CM_PerPresent	Calculation (Number)	Unstored, = (CM_Present / CM_Tot_Att)*100
CM_DaysAbsent	Calculation (Number)	Unstored, = Sum (Line Items:Actual Status absent cm
CM_PerAbsent	Calculation (Number)	Unstored, = (CM_DaysAbsent/CM_Tot_Att)*100
Contact No.	Text	

Fig 7: Details of Student Master Table

Figure 7 above shows the various fields present in the table Student Master. Other features include teaching process, teaching session, directory of all references, calendar, course book, breakup of marks etc. With some hardships the required system for this goal was understood from the users. There was indeed a lot of cooperation from the administrative staff.

B. Software Design

It is a well-known fact that software design forms the most critical element of any project. In other words the success of any project depends on the quality of the software design. Software Design is the study of the modern methods, technologies, languages, principles and practices that make it possible to conceive, create, validate and evolve complex software systems [1]. It consists of understanding user requirements completely & correctly. Further we need to complete the paperwork like SRS, DFD's, and ERD's as well. Making a complete sketch of Data tables & their fields is again a very important part of software design.

C. Data Model

Data modeling consists of defining a well thought of structure database based on our requirement. An example of entity as defined in a database is shown below:-

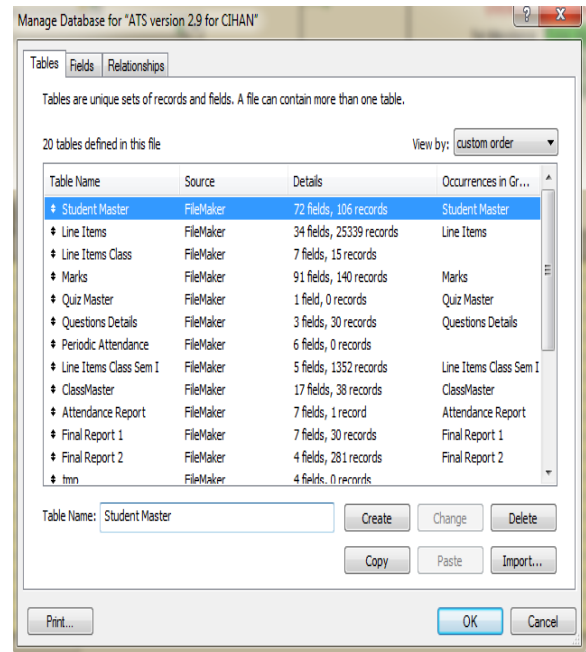


Fig 8: The database structure

The figure 8 shows a typical database structure as created in the FileMaker. It has been shown as a sample database structure for the application in figure 8 above. Like this we have other database structures as well. We need to link them together as per our requirement which is the most common feature of any RDBMS.

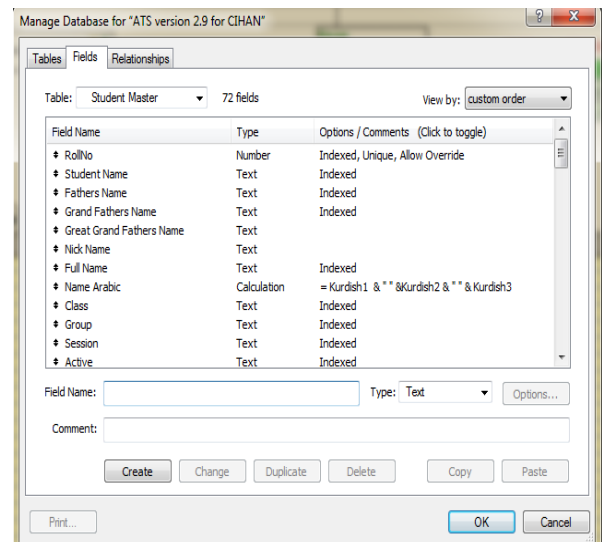


Fig 9: A typical FileMaker Table structure

Figure 9 above shows the fields of the table Student Master. A table comprises of various fields. These fields have a unique name, type etc. Like the table student master as shown above there may be various other fields linked to the other tables as well. Further we need to link tables to buildup relationship which provide desired

output. These are the basic building blocks of any application using RDBMS.

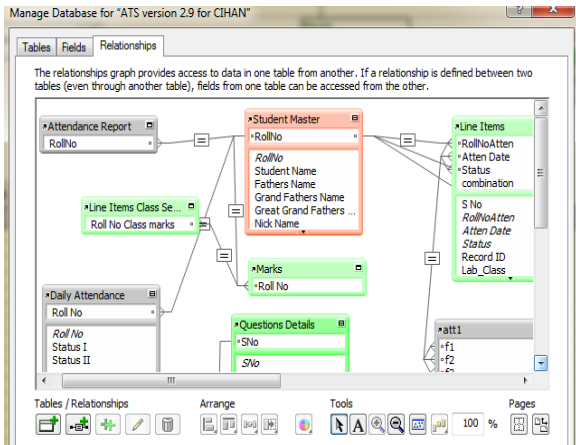


Fig 10: A typical Entity-Relationship diagram in FileMaker

During the designing of the database, we need to make right decisions to make the best use of an effective and efficient system. A well worked on database takes less time and efforts to process and produce end results. For the reason a lot of the success of the project depends on the designing of the data model. It should be scalable with the options to modify as and when required. It should be easy to understand & user-friendly. We need to take care of data redundancy. Further our application should be flexible so that it can be used anywhere with no hardware or software limitations and should work perfectly well with changing requirements with minimum efforts.

In figure 10 above we show the most important entities of the model and their relationships as defined & used in a typical class/session. Our whole project is usually based on this ER diagram (Entity-relationship) diagrams.

D. Implementation

The next step is the implementation of the application software which has been developed as a constructive effort of the entire team. The communication between the database and the software includes:

- Storing data/information in the database
- Retrieving the required data/information as required
- Modifying data/information as and when required

IV. CONCLUSIONS

The need of managing the information electronically has been growing manifold in all areas of the Kurdistan region. As we all know that education is considered to be very essential for the development of any nation. Therefore, Class Management Systems like EduGain version 1 have been suggested as the best option to manage schools/colleges in a perfect manner. The EduGain version 1 application software has been built based on actual procedures and practices being followed in the institution. Therefore, this system may be

considered as a very critical step aimed towards implementing digitally based information management in Schools/Universities. The practical aspect of the research paper would be demonstrated practically during the conference.

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The application has been developed as a result of perfect teamwork. The same has been highly promoted and appreciated by the Management of the Institution. Further we thank all those who supported the project by providing valuable feedback.

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