

E-College: An ERP for Educational Institute

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Abstract— ERP systems way from the manufacturing sector are entering rapidly into universities and colleges. ERP now is experiencing the transformation that will make it highly integrated, more intelligent, collaborative, and web-enabled. Reason for choosing ERP for education are accessing information from paper files is difficult task, lack of means to access old records, wastage of hundreds of hours by staff each month manually entering information or performing task that could be handled automatically like evaluation & generating results. E-college will solve these lacunas and help educational institutes to save their valuable time. This paper provides a limited set of modules and their implementation which are required by educational institutes to function smoothly.

Keywords— Enterprise resource planning, higher education, Modules, implementation, web enabled.

I. INTRODUCTION

Enterprise Resource Planning system, popularly known as ERP system, the descendant of MRPII offers the answer to the economic and productivity troubles of manufacturing and service enterprises. Thus, the ERP system has become very popular as an enterprise management software tool. It was the larger companies that have opted to use the ERP systems initially. However, the use of ERP has changed and today the term can refer to any type of company, no matter what industry it falls in. In fact, ERP systems are used in almost any type of organization - large or small. The latest ERP tools available in the market today can cover a wide range of functions and integrate them into one unified database. This made ERP to land up into higher educational institutes. In today's competitive business world usage of ERP system is becoming a must for any educational organization to meet the challenges faced in their business process and to have a cutting edge. Studies also reveal that organizations that don't have an ERP implemented are facing numerous problems in their internal processing like attendance management, payroll management, quick decision making, etc. So in order to be different and ready for action the institutes need a central resource planning that can manage the entire information and operations of the institutions.

This paper deals with the implementation of E-college ERP, the technology used and why every higher educational institute should opt for an ERP. Higher education environments are extremely dynamic, where the education system has been fundamentally changed.^[1]

Higher education institutions and the state should leave behind the question of Information support for business processes and should focus on informatics as one of the key

factors of quality assurance in higher education.^[1] ERP provides a unified enterprise view of the business that encompasses all functions and departments as well as an enterprise database where all business transactions are processed, monitored, and reported.^[2] But implementing an ERP system requires careful exercise in strategic thinking, precision planning, and negotiations with all stakeholders.^[2]

II. WEB ENABLED

ERP means the techniques and concepts for integrated management of business as a whole, from the viewpoint of effective use of management resources to improve the efficiency of enterprise management.^[7] A fully integrated web-based ERP will capture and create accurate, consistent and timely relevant data, and assist in intelligent business decision-making. The primary purpose of E-college is to provide mechanisms for automated processing and management of the entire institution. It reduces data error, ensures that information is managed efficiently and is always up-to-date. Complete student histories for all years, can easily be searched, viewed and reported on press of button.

It is made after extensive study of all the departments like student, faculty, etc of colleges and is provided with the extract of everything a college requires for their database handling, department management and student/staff management. The security issue within ERP has been there for a long time, but most of the solutions are based on the assumption that an ERP system is a closed environment.^[3] Higher education institutions are persisting in the IS era by adopting and implementing ERP system.^[4] The need to evaluate their benefits and impacts on organizations and individuals are increasingly essential.^[4]

III. ARCHITECTURE

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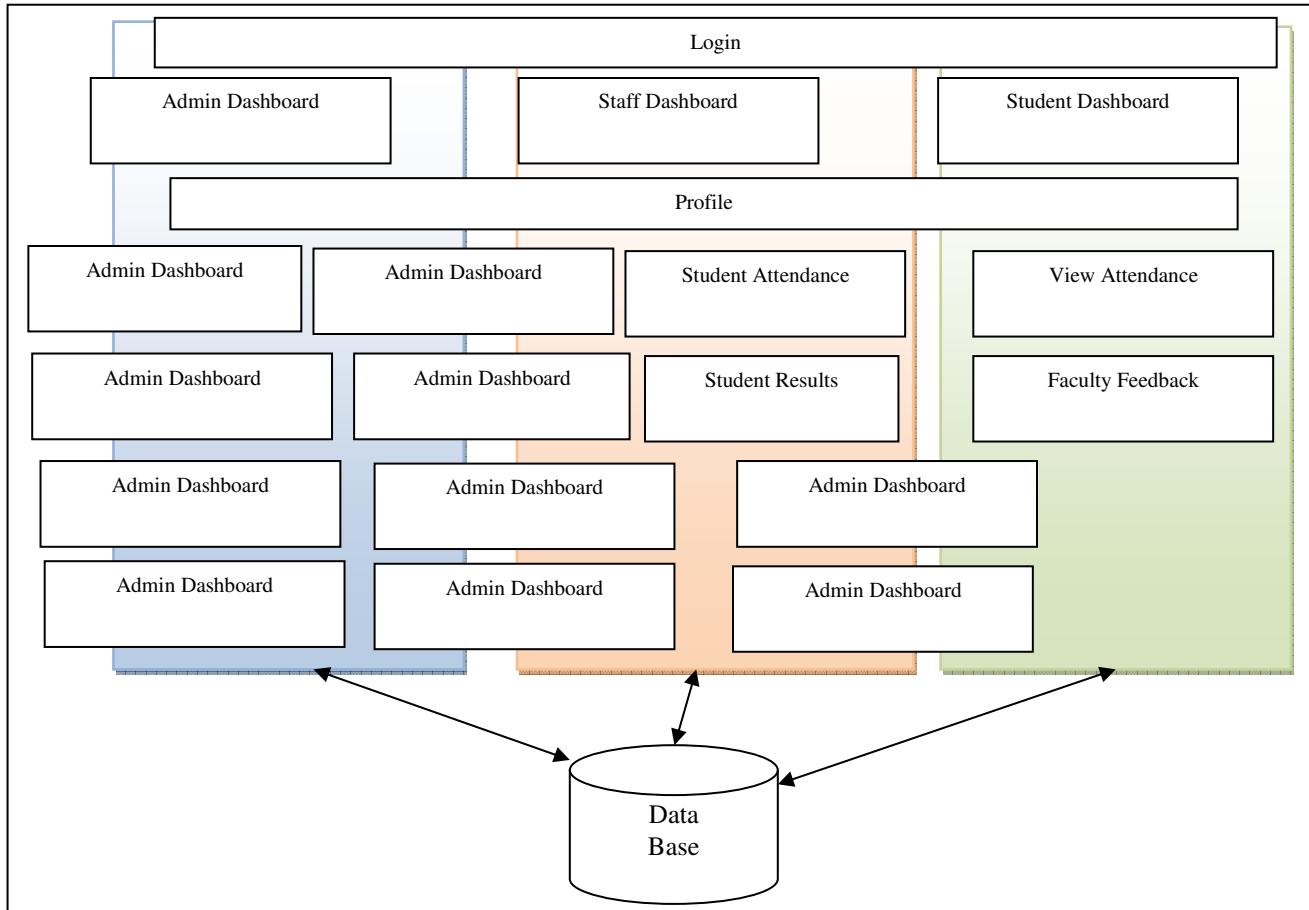


Fig-I: E-College Architecture

The architecture comprises of various modules as given in the figure. There are 3 major categories in which the whole architecture is divided. These are administrator, staff and student. The architecture is designed such a way that it is self explanatory. The admin roles are user management, staff management, student management, staff attendance. Staff and admin perform some common functions like news management, leave management, time table management, exam management.

The role of staff includes student attendance entering, student examination management, time table management, leave application management, and put on news on e-notice board. While the roles of students are few in number and includes their complete profile viewing, view their attendance, give feedback to their respective faculties, view notice and view academic time table.

Generalizing E-college architecture is 3 tiers. The 3 tiers comprises of presentation layer, application logic layer and data layer. [\[3\]](#)

Any Information System needs to communicate with external entities, human users or other computers. Presentation layer allows these entities to interact with the

system; it can also be implemented as a GUI interface and can be referred to as the client of the IS.

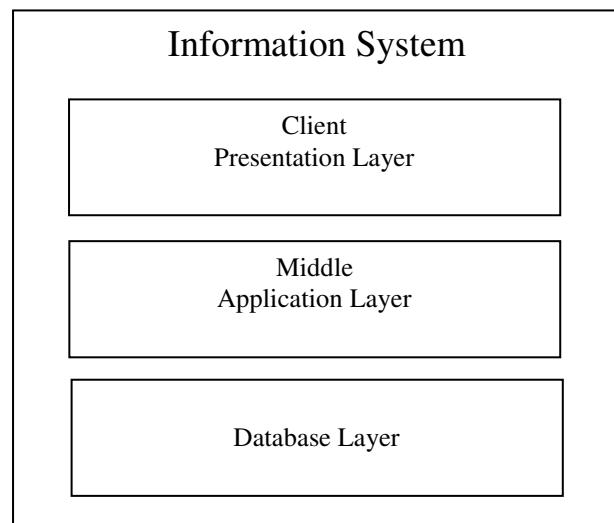


Fig-II: 3-Tier Architecture

Application layer do more than information delivery, they perform data processing (Business Logic & calculation)

behind the results being delivered. This tier is often referred as

1. Services
2. Business logic
3. Business rules
4. Server

The database layer is implemented using a Database Management System which in our case is MySql.

IV. MODULES

1. Student Information System
2. Staff Information System
3. Attendance Management
4. Assessment (Term Work) Management
5. Time Table Management
6. Student/Faculty Dashboard
7. Notice Board
8. Academic Activities Management
9. Student Results
10. Leave Management

V. TECHNOLOGY

The developer should decide which technology will be perfectly suitable for their on-demand application infrastructure.^[6] Since the ERP we are implementing is web enabled thus the technology to be used has to be optimistic and efficient. Today the world relies mostly on PHP for building the web and that's why it is the choice of language for our ERP. The database requirement is obviously fulfilled by MySql and for the Web Server we are opting for the most trusting Apache Server.

A. Advantages of PHP:

- Platform independent can run on Windows & Linux servers.
- Run faster on the internet and easily integrate AJAX, etc.
- Interfaces very easily with Apache/MySQL

B. Advantages of MySql:

- MySQL includes solid data security layers that protect sensitive data from intruders.
- MySQL can handle almost any amount of data, up to as much as 50 million rows or more.
- MySQL server has been thoroughly tested to prevent memory leaks.

C. Advantages of Apache:

- Operating system platforms like UNIX, Windows NT, Mac OS operating systems support apache.
- There is built in support from apache server for a wide range of programming languages.

VI. MAJOR PRODUCERS OF ERP SOLUTIONS

The main ERP Vendors for higher education in the world are Oracle, SCT, PeopleSoft, SAP, Jenzabar and Datatel.^[11]

Advantages of individual solutions can be noticed in different areas. PeopleSoft emphasise the role of Internet and web technologies (reaching virtual organisation through portals), SAP is in favour of ERP systems centred on users (student part which is student-oriented, etc.), and Oracle connected the Internet and back-office operations in E-Business package.

Table I: Major Vendors of ERP

Vendor	Products
Oracle	Contracts, e-business, financial, human resources, learning, maintenance, project, manufacturing, marketing, order, product lifecycle, procurement and supply chain
PeopleSoft	Asset lifecycle, campus, customer relationship, distribution, enterprise, financials, homebuilder, human capital, manufacturing, project, self service, service, storefront, and supplier relationship
SAP	Corporate services, customer relationship, e-commerce, emissions, financials, human capital, mobile services, operations, portfolio analysis, supply chain, and web services
SSA	Global Customer relationship, financials, human capital, performance, product lifecycle, resource planning

VII. MATHEMATICAL MODEL

Finite State Machine (FSM) for E-college ERP:

A change from one state to another when initiated by a triggering event or condition; this is called a *transition*. A particular FSM is defined by a list of its states, and the triggering condition for each transition.

As there are no mathematical calculations to be implemented in our project thus we have designed this FSM for our E-college. The Fig below shows the states and path which describes the flow E-College. It consists of M-set of tuples, Q-set of states, q₀-Initial state, and F-final state.

$M = (Q, \Sigma, d, q_0, F)$

$Q: \{q_0, q_1, q_2, q_3, q_4, q_5, q_6, q_7, q_8, q_9, q_{10}, q_{11}\}$

$\Sigma: \{1, 2, 3, \dots, 16\}$

q_0 : Homepage

F : Homepage

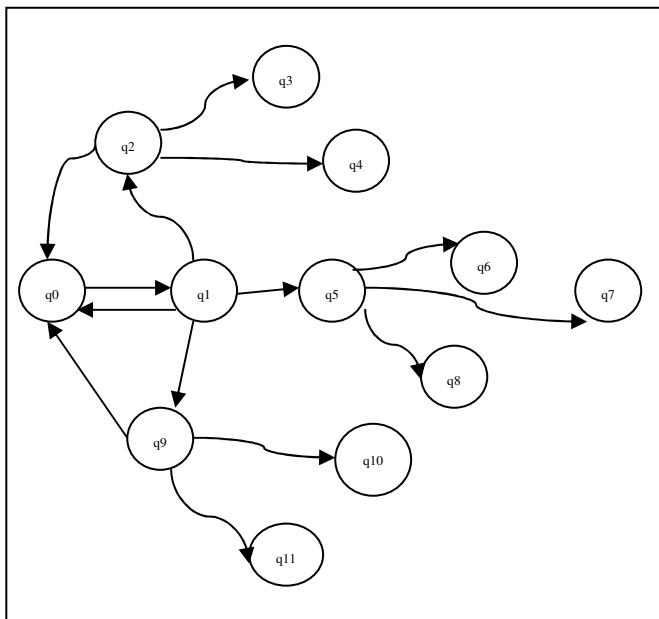


Fig-III: FSM for E-College

Detail description of states present in the above figure is shown in the following table.

Table-II: FSM State Description

State	Description
q_0	Homepage
q_1	Login
q_2	Admin Dashboard
q_3	Managing users
q_4	Managing time table
q_5	Employee Dashboard
q_6	Student Attendance
q_7	Leave Management
q_8	Student results
q_9	Student Dashboard
q_{10}	View Attendance
q_{11}	View Result

VIII. CONCLUSION

The benefits of a properly selected and implemented ERP system can be significant. The future of successful ERP implementation does not rely on further improvements of technology, but on bringing people and business up to speed on the appropriate use of ERP technology to fit their defined business needs and objectives. [2] ERP systems are rapidly beginning to embrace the demands forthcoming for e-commerce applications such as online billing and payment, e-procurement, etc. The data warehouse and data retrieval tools are maturing and will play a more important role in the future. [5] Hence, every educational institute should use ERP for proper planning, management and to improve quality.

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