

Mobile Based College ERP System (M-ERP)

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Abstract—The Advancement in the mobile devices, wireless and web technologies gives rise to new application that make ERP system very easy and convenient. M-ERP means performing college register functions by using portable electronic device. M-ERP application will integrate all the business functions like Recording attendance, Student information etc in a single system and database. M-ERP promising the possibility of convenient, easy and safe way to handle business functions of college. This paper provides specifications and requirements for M-ERP application. We also described how the android mobile phones are efficient and can be used for ERP system.

Keywords - Android; M-ERP; digital register; ERP system.

I. INTRODUCTION

Since ages, marking attendance and other similar college functions has been most important activities of any school, college to keep records. This record helps the organization in generating their month-end progress report etc such system may be manual or automated. In this project, an attempt has been made to develop and deploy M-ERP application on Android mobile phones. The aim of this project is to create an android mobile application for ERP system that will integrate various the college register activities in a single system with a common database that can be used by teachers and other staff members of educational institute. In other hand the rapid development in operating system of the mobile phones gives rise to the application development on large scale. The main reason behind the tremendous development in the android application development is that android is an open source operating system. As well as software development kit provides tools to build and run android applications. This paper will be describing the basic idea of the project M-ERP system on android, its advantages, disadvantages, and applications.

II. LITERATURE SURVEY

1) Evolution of ERP Implementations in Higher Education Institutions

A) Implementation of ERP system in Traditional way

Half of the educational institutions in developing countries following the traditional method of managing information system with stand alone computer machines and store data in different departmental system due to lack of infrastructure. Different modules like fees management, attendance management, admission, payroll, grading etc are implemented in individual system or in network based system in ad-hoc way without having overall objective of comprehension ERP.

On these systems, the softwares implemented do not integrate processes and cannot interact to each other. In these kinds of system implementation no concept of service architecture being used.[4]

B) ERP On-campus Implementation

During the time of 1990's to 2000 many organizations, developed in-house infrastructure for ERP implementation and without any outside dependence. They tried hard to control data with in-house huge infrastructure, but not able to solve the problem of integration of processes.

C) Implementation of ERP with INTERNET Host Provider

During 2000, with advancement in technology and increase in the web based technologies, made easy way to implement ERP using web based cloud system. These kinds of implementations work on visualization system, it uses server side script or tool, database storage server and networking component is handled by the host who has been hired for providing services that helps to lower the cost of system.

2) ERP In Education Sector

Education system in developed countries of Asia has witnessed massive growth in the past few decades. Not only the quantum of intake in the group of colleges has increased significantly but the linked, procedures related to admission, teaching, examination, interaction with students also has grown [2]. ERP is an IT solution that integrates and automates attendance, admissions, financial aid, student records, most academic and admin services. ERP can be used for both administrative and academic purposes by universities and Institutes [3]. Admin functions include: accounting, payroll, HR and billing. Academic functions include: registration, admissions, recruitment, attendance, Teaching planning and all aspects of records of the students can be managed[4].

Kvavik, Katz, Beecher, Caruso, King, Voludakis, & Williams, (2002) observed that ERP solutions offer improved services for faculty, staff, and students; administrative, academic, and student data are standardized; university data is globally accessible over the Internet; and the new systems involve less cost and risk than legacy systems [4].

3) Reasons for Implementing ERP Systems in Education Institutions

Table 1

Factor	Percent
Replacing Aging Legacy system	30%
Improve Service to customers	21%
Transforming Institution Operations	16%
Modernize Campus IT Environment	12%
Keep Institution Competitive	7%
Increase efficiency	5%
Better teaching learning process	5%
Accountability/Regularity compliance	4%
Out of	100%

Reasons for Implementing ERP System in Education Institutions [5]

Few of the vital reasons for implementing ERP Systems for education sector are to improve the services to customers as students are stake holders of institution. It is important to manage their data properly starting from attendance to result will improve quality and there will be security in data which can be only accessible to college authorities and parents if required. In competitive world to keep institute competitive, increase in efficiency of teaching syllabus reportage can be entered as per syllabus and other activities conducted, which will help the institute to get good rank from different authorities of government. Better teaching and learning process as some learning management softwares are available for uploading teaching material and slides for students.

Implementation of ERP

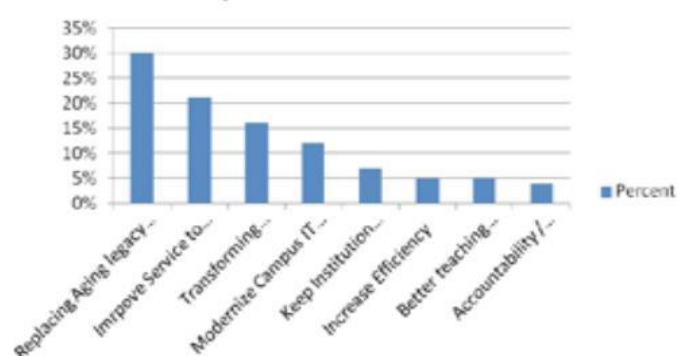


Fig. 1. Chart Representation of above table [5]

III. PROPOSED PLAN FOR WORK

The modules of the system are discussed below:

The starting interface will offers a login option and registration option.

A) User: New User

Student seeking for Admission in the institute have to download the M-ERP application. As he is new user he first of all register through the SIGNUP option. Here the candidate is required to enter his e-mail-id & password. Then for email confirmation and account verification an email is sent to the email-id consisting of link for activation of the account on the M-ERP application. After the account activation the student will login in application with the email-id and password. The candidate is provided with the form for filling up the details like personal details, qualification details, allotment number etc. After submitting the details the candidate is provided with QR code in his account. Now the candidate goes for the verification at the admin department of institute, where the verification officer ask student for QR-code, then the officer scans this code through his Mobile device. After successful scan all the details of students are fetched in the officers mobile, so he compares the details with the original hard copies of documents given by candidate. The verification officer completes the verification process through his account. After the Successful verification the candidate is provided with another QR-code, and the candidate is now eligible for payment of fees. After the Payment student enters the transaction id in the transaction id section in his application. After this he will get email and SMS consisting of STUDENT ID and PASSWORD and the Admission is done successfully. The STUDENT-ID is unique ID that is going to be same for the entire academic years. Now the student can login into application using STUDENT-ID as user-name and PASSWORD provided.

B) User module: Student

Student after login to his account on M-ERP application by using correct login details. Then after the successful login the user student will see the main page consisting of options that he/she can perform. These options are:

- 1) *View attendance*
- 2) *View unit-test marks*
- 3) *Gate Pass (QR-CODE)*
- 4) *Suggestion box/complaint box.*

1) *View attendance:*

This option offers student his current semester attendance details date and subject-wise. Student can check attendance anytime during semester.

2) *View Unit Test marks:*

This option offers students to check their mark obtained in the unit test of current semester.

3) *Gate Pass:*

This option offers functionality to student to apply for a gate pass request.

4) *Complaint box (Tutor):*

This option helps student to tell his problems to his respective tutor assigned.

C) *User module: Staff*

Similarly, faculty will have to login to the M-ERP application. After login the faculty's main page will consist of following options:

- 1) *Student information;*
- 2) *Mark attendance using Face Detection*
- 3) *Notice announcement;*
- 4) *Marks entry;*
- 5) *Apply for leave;*

1) *Student information*

This option is available in Faculty module. This option enable faculty to check the student details using STUDENT-ID.

2) *Mark attendance*

Marking Attendance would be easier with the android application. Here the teacher will login through M-ERP application on his android smart-phone. After login he selects the Mark attendance Option. Then he will be offered with the interface where he has to select the class and subject. The list will be shown of the enrolled students in that class. Teacher just has to uncheck in the box provided next to student name. Uncheck is for absent student. After submitting the Parents will receive the SMS of the absent of their ward.

3) *Notice announcement*

This option is used by teachers for announcement of urgent notices to the students. Student will get SMS containing the notice. Here teacher will select the class for which notice is to be announced.

4) *Mark entry*

This option enables teachers for entering the unit test marks of the student that are saved in the database. These marks are accessed by student through student login.

5) *Apply for Leave:*

This option allows teachers to apply for leave request.

D) *Admin Module:*

There are two types of admin modules

Type1: *HOD*

Type2: *Personnel*

Type 1: *HOD*

- 1) *Subject allocation*
- 2) *Leave approval/reject*
- 3) *Notice Announcement*
- 4) *Check Dashboard*

1) *Subject allocation*

Here the Head of Department allocate subject to respective teachers for current semester.

2) *Leave approval/reject*

Here the Head of Department looks for the leave request and send response (approved/rejected)

3) *Notice Announcement*

This option is used by Head of Department for announcement of urgent notices to the students. Student will get SMS containing the notice. Here teacher will select the class for which notice is to be announced.

4) *Check Dashboard*

Here Head of Department can look for the complaints submitted by any student through student module. The name is kept hidden.

Type 2: *Personnel Department*

Personnel Department officers use this module.

- 1) *Verification*
- 2) *Update Student Detail*

1) *Verification:*

This is used by the officers at the time of admission in the institute.

2) *Update Student Detail:*

If Student requests for any update in his personal detail then the Type 2 admin have privileges to edit or update the student information.

IV. MATHEMATICAL MODEL

Input:

$$T = \{T1, T2, T3, T4\}$$

Where,

- T1= Staff
- T2= Student
- T3=Admin
- T4=Personnel

T1 contains the set of input values which perform various operations such as mark attendance, update marks, apply for leave, and apply for leave, notice announcement.

Operations are,

$$opA = \{opA1, opA2, opA3, opA4\}$$

Where,

opA1=Mark attendance

opA2=update marks

opA3=apply for leave

opA4=notice announcement

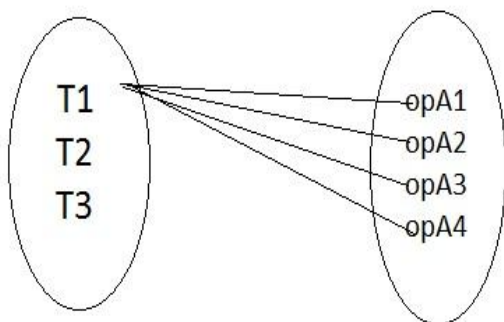


Fig. 2. Venn diagram showing Relation One-To-Many

Input T2 contains the set of input values which performs various operations such as view attendance, QR-CODE, view marks, view notice, post in the suggestion box.

$$opB = \{opB1, opB2, opB3, opB4, opB5\}$$

Where,

opB1=view attendance

opB2=view marks

opB3=QR-CODE.

opB4=post in suggestion box

opB5= view notice

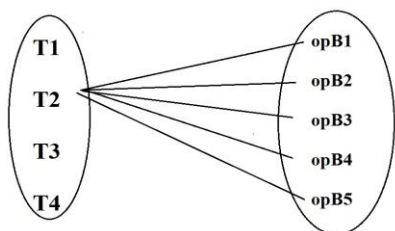


Fig. 3. Venn diagram showing Relation One-To-Many

Input T3 contains the set of input values which performs various operations such as Allocating gate pass to students by scanning QR-CODE, approve/reject of leave application, check dashboard, Notice announcement, Manage users.

Operations are,

$$opC = \{opC1, opC2, opC3, opC4, opC5\}$$

Where,

opC1= Allocating gate pass to students by scanning QR-CODE.

opC2= approve/reject of leave application

opC3= check dashboard

opC4=Notice announcement.

opC5= Manage users

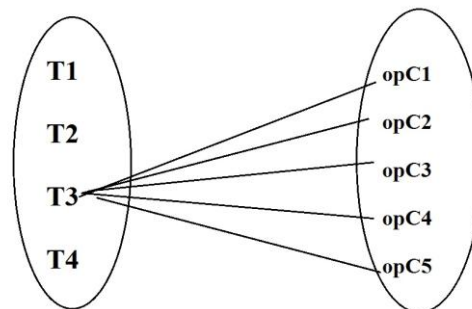


Fig. 4. Venn diagram showing Relation One-To-Many

Input T4 contains the set of input values which performs various operations such as Verifying documents and assigning unique id to student during admission process, payment and enrollment, publish messages, check gate pass.

Operations are,

$$opD = \{opD1, opD2, opD3, opD4\}$$

Where,

opD1= Verifying documents and assigning unique id to student during admission process.

opD2= payment and enrollment

opD3= publish messages

opD4=Check gate pass.

Output:

The output functions defines the output 'O' of the system i.e. O1, O2, O3, O4.

$$O = \{O1, O2, O3, O4\}$$

V. METHODOLOGY

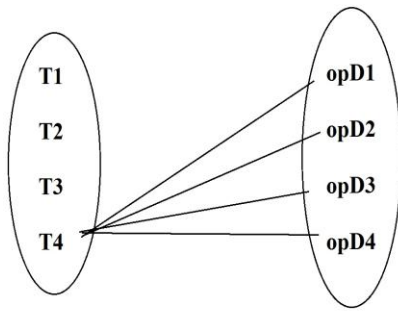


Fig. 5. Venn diagram showing Relation One-To-Many

Output:

The output functions defines the output ‘O’ of the system i.e. O1, O2, O3,O4.

$$O = \{O1, O2, O3,O4\}$$

Where,

O1=Attendance will be updated in database, Marks will be updated, Request of leave application will be sent to the super admin module for the approval, Notice will be broadcasted.

O2=Updated attendance will be displayed, QR-CODE will be generated, Subject wise marks will be displayed, Notice will be displayed, Suggestion will be posted.

O3= Allocate the gate pas for the student, Will approve/reject the leave application, Suggestion will be checked in dashboard, notice will be broad casted,will manage the users.

O4=Will verify the documents & assign the unique-id, payment &enrollment, notice will be published, checking gate pass and approval.

The following

fig5

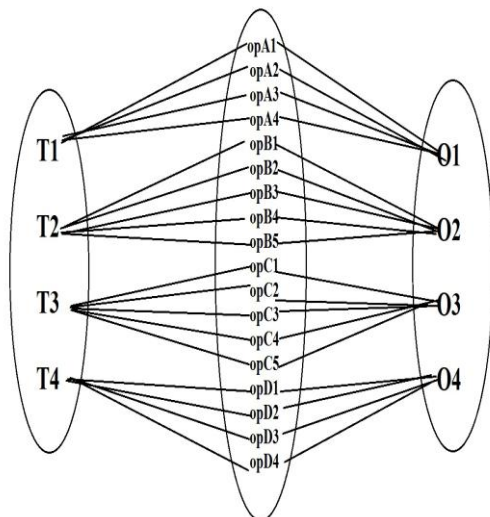


Fig. 6. Depicts the set of input values operations or functions performed on it and the set of output generated based on the given Inputs.

A) The three tier architecture

This application is based in three tier architecture also known as client-server architecture. In which client is the consumer of the services and server is a provider of services. The middle layer that is logic layer, it basically converts the user requests into server understandable form. The system developed contains Android Application in the front end i.e. client side. Jason(JavaScript Object Notation) Parser work as the middle layer is primarily used to transmit data between server and server application.

The server side comprises of Database. The Android API uses PHP to connect to database.

B) Operating Environment

The main component of M-ERP project is the software application which will be limited to the android operating system(android 2.3 and above). The application will depend on several functionalities built into android's Application Programming Interface (API), so ensuring appropriate usage of the API will be a major concern. Beyond that the application is self-contained unit and will not depend on any other android related software components.

The application will however, frequently interact with the M-ERP server, a virtual dedicated server hosted by HostingRaja.com. The server operates on a Linux platform with 1GB of RAM and 1GB of allocated storage space. The M-ERP database will be stored on the server using MySQL and will be interfaced with wrapper written in php.

C) System Architecture

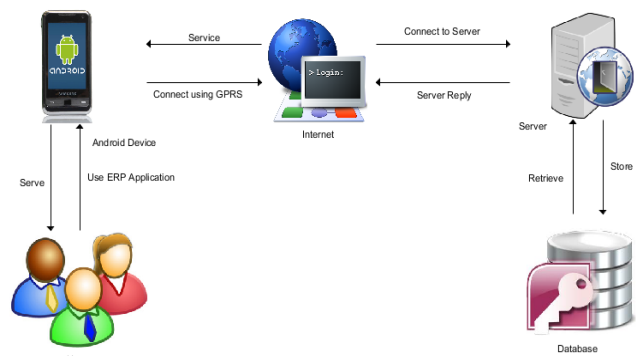


Fig. 7. System Architecture

In the above architecture it is shown how user interacts with this application and described how the application interacts with the services it requires to provide the functionality to the users. Users described in the architecture can be staff, students and admin. User handles the application using android smart phone. It is required that the android device must be connected to internet using GPRS/EDGE or Wi-Fi. M-ERP uses internet to connect to server where the processing is done. At server site database server is placed. All the interaction of the system is shown in system architecture diagram.

D) Backend

The Back-end is consist of Server database.

In the backend we are using Php. Php is server side scripting language used for storing and retrieving data from the database.

ACKNOWLEDGMENT

We are profoundly grateful to Prof. S.A. Ahirrao for his expert guidance and continuous encouragement throughout to see that this project rights its target since its commencement to its completion.

We would like to express deepest appreciation towards Dr. R.G. Tated, Principal SIEM, Nashik, Prof. U.B. Pawar, HOD Computer Engineering Department for providing valuable support and time throughout the engineering and further in the project course work.

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