CHAPTER 1: INTRODUCTION

Chapter 1. Introduction

Enterprise resource planning (ERP) is a system of integrated software applications that manage day-to-day business processes and operations across finance, human resources, procurement, distribution, supply chain, and other functions.

Introduction to concept/idea:

ERP systems are the kind of software tools that are used to manage the data of an enterprise. ERP system helps different organizations deal with different departments of an enterprise. For instance, a College ERP System will manage the data related to their students, which include the management of Employees, Students, Books and Library Records, Parents' details, Assignments, Admission Process, Results and Reports, Exams, Events, Attendance, Timetable, Fees and Other. Reports. It provides one-point access to manage this wide range of activities both effectively and efficiently. Before an ERP system, there are different databases of different departments which they managed on their own. The student of one department does not know anything about another department.

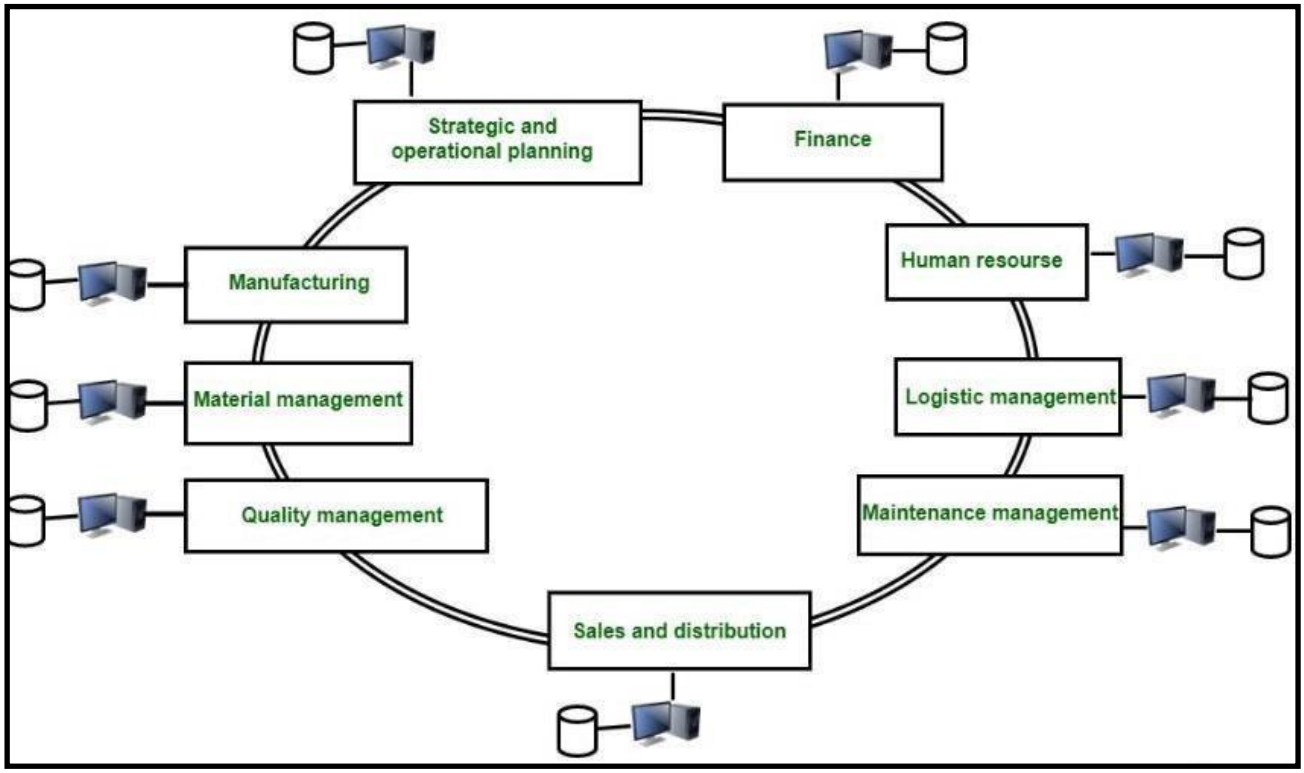


Fig 1.1.[1] ERP system

After the ERP system, databases of different departments are managed by one system called the ERP system. It keeps track of all databases within the system. In this scenario, an employee of one department has information regarding the other departments.

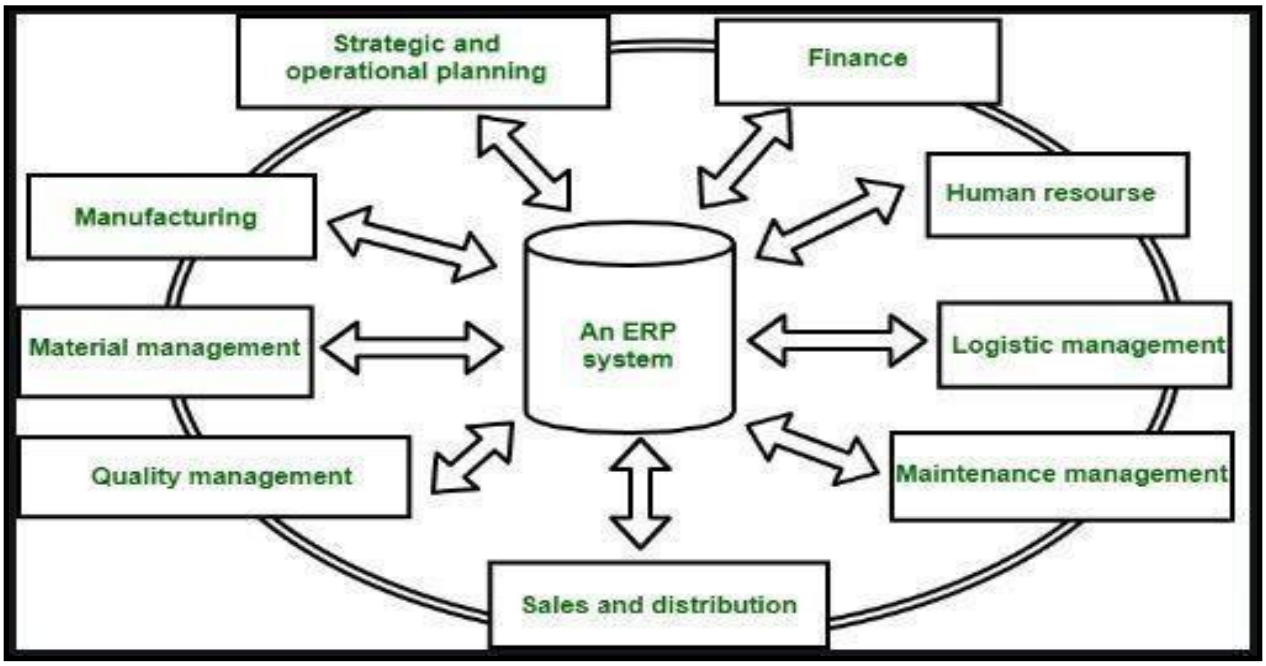


Fig 1.1.2[2] ERP System

Modules of College Management System

Some of the modules are as follows:

1. Student Record Management
2. Admission Management
3. Attendance Management
4. Fees Management
5. Assessment/Exam Management
6. Library Management

1. Student Record Management:

Easy Record Maintenance:

With advanced reporting and unified data core features, you can manage largeamounts of student data within a few clicks.

Online Fee Management:

Effectively manage student's fee payment and discounts. With a single login, students can get information about program fee, financial aid, scholarships, debtmanagement, etc.

Conduct Different types of assessments

Enable effective planning, designing, creating, and executing various types of assessments, which includes, unit tests, quizzes, MCQ tests, descriptive exams, etc.

2. Admission Management

The organization can handle all complicated process of admission with ease. Thisincludes prospectus sale, student registration, verification etc.

3. Attendance Management

This module provides a convenient platform for taking student's attendance online viasmart phone. Parents will receive SMS about their ward's presence in the campus.

4. Fees Management:

The administrator needs to keep a tab on daily fee-related transactions in educational institutions.Payment reconciliation, which incorporates cross-check methodology is the best way to track everyday transactions.

5. Assessment/Exam Management:

Using this module, schools can define class-wise examination schemes, subject-offered grades, and passingcriteria. Any type grace and exam rules can be defined by users.

Fig.1.1.3[3] Modules of ERP System

CHAPTER 2: REVERSE ENGINEERING

Chapter 2 Phase 1: Reverse Engineering

2.1 Introduction and Study of Components/Artifact/Products forReverse Engineering:

Reverse engineering is the process of analyzing a system to understand its design andimplementation. Reverse engineering can be used to learn how a system works, to identify security vulnerabilities, or to create a new system that is compatible with theexisting system.

Now, we have to research and work on the reverse engineering topic on An ERP systemfor the Institute Management system.

In this topic, we have included a student management system which contains the study material option, attendance management, grade management, the syllabus options of thestudents.

This concept is similar to our topic for design engineering. And we would use somefunctionality of the idea as a student can see progress using the ERP system.

We learned about some additional features like application security options, studentgrade tracker, faculty can share the results of each student account, etc.

These characteristics may benefit us in the development of an effective application.

2.2. Observation Record Sheet (AEIOU Framework)

2.2.1 Activity Framework

These are goal-directed sets of actions- a path toward things people want to be done.

General impressions / Observations :

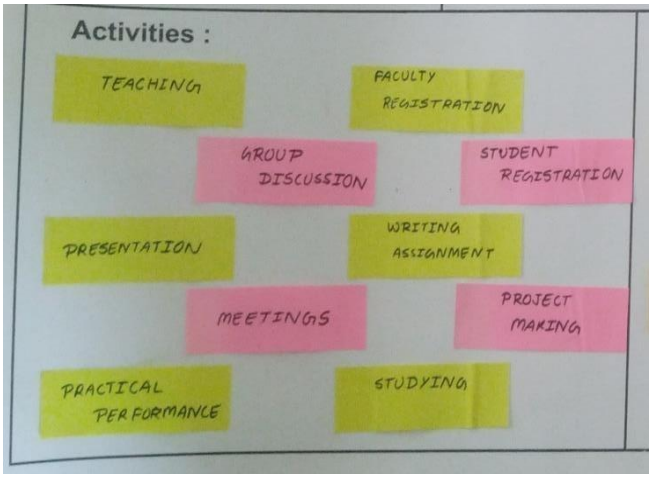


Fig: 2.2.1 Activity Framework

The above Activity canvas includes:

- Group Discussion
- Faculty Registration
- Student Registration
- Writing Assignment
- Presentation
- Studying

2.2.2 Environment:

- It includes the atmosphere where all the activities take place.

General impressions / Observations :

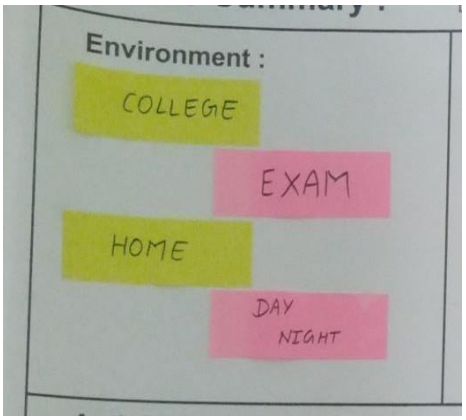


Fig: 2.2.2 Environment Framework

The above Environment canvas includes:

- College
- Exam
- Home
- Day
- Night

2.2.3 Interactions:

It includes all the interaction which we did during the activities

General impressions/Observations: -

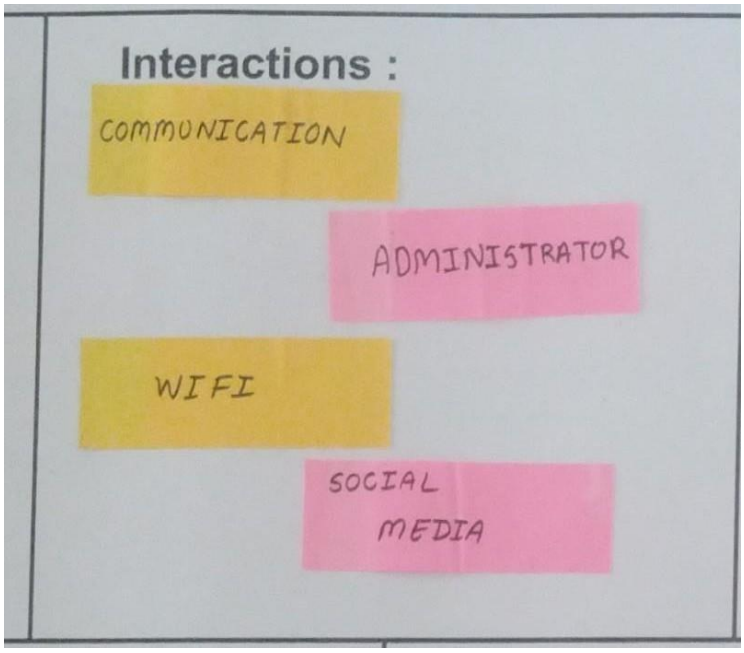


Fig: 2.2.3 Interactions Framework

The above Interaction canvas includes:

- Communication
- Administrator
- Wifi
- Social Media

2.2.4 Objects:

Objects are used in the performance of the activity.

General impressions / Observations:-

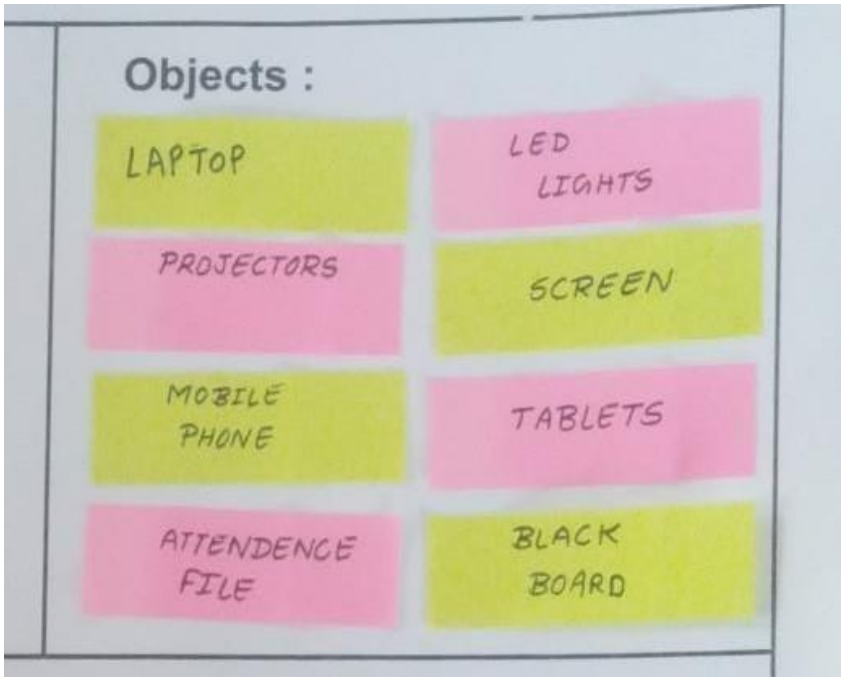


Fig: 2.2.4 Object Framework

The above Object canvas includes:

- Laptop
- LED light: lighting
- Projector
- Screen
- Tablet
- Black Board
- Mobile phone
- Attendance file

2.2.5 User:

It includes the people who take part in all the things being done around the environment.

General impressions / Observations: -

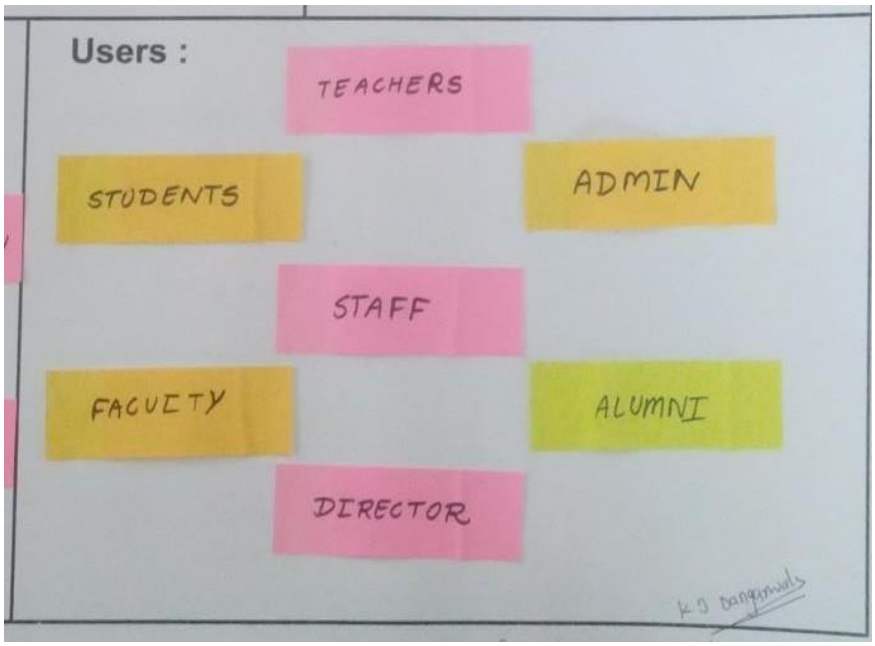


Fig: 2.2.5 User framework

The above Environment canvas includes:

- Students
- Faculty
- Admin
- Staff
- Director
- Alumni

2.2.6 Empathy Mapping / Framework: -

Empathy maps are being used to give the researcher/observer/Developer a stimulating experience ofthe applicant (User), so they can understand, build, improve or update their application.

This canvas has 4 aspects for resolution.

- **User:**
  - Staff
  - Students
  - Teachers
  - Faculty
  - Administration
  - Alumni
- **Stakeholders:**
  - Parents
  - Librarian
  - Technician
- **Activities:**
  - Teaching
  - Group Discussion
  - Faculty Registration
  - Student Registration
  - Writing Assignment
  - Presentation

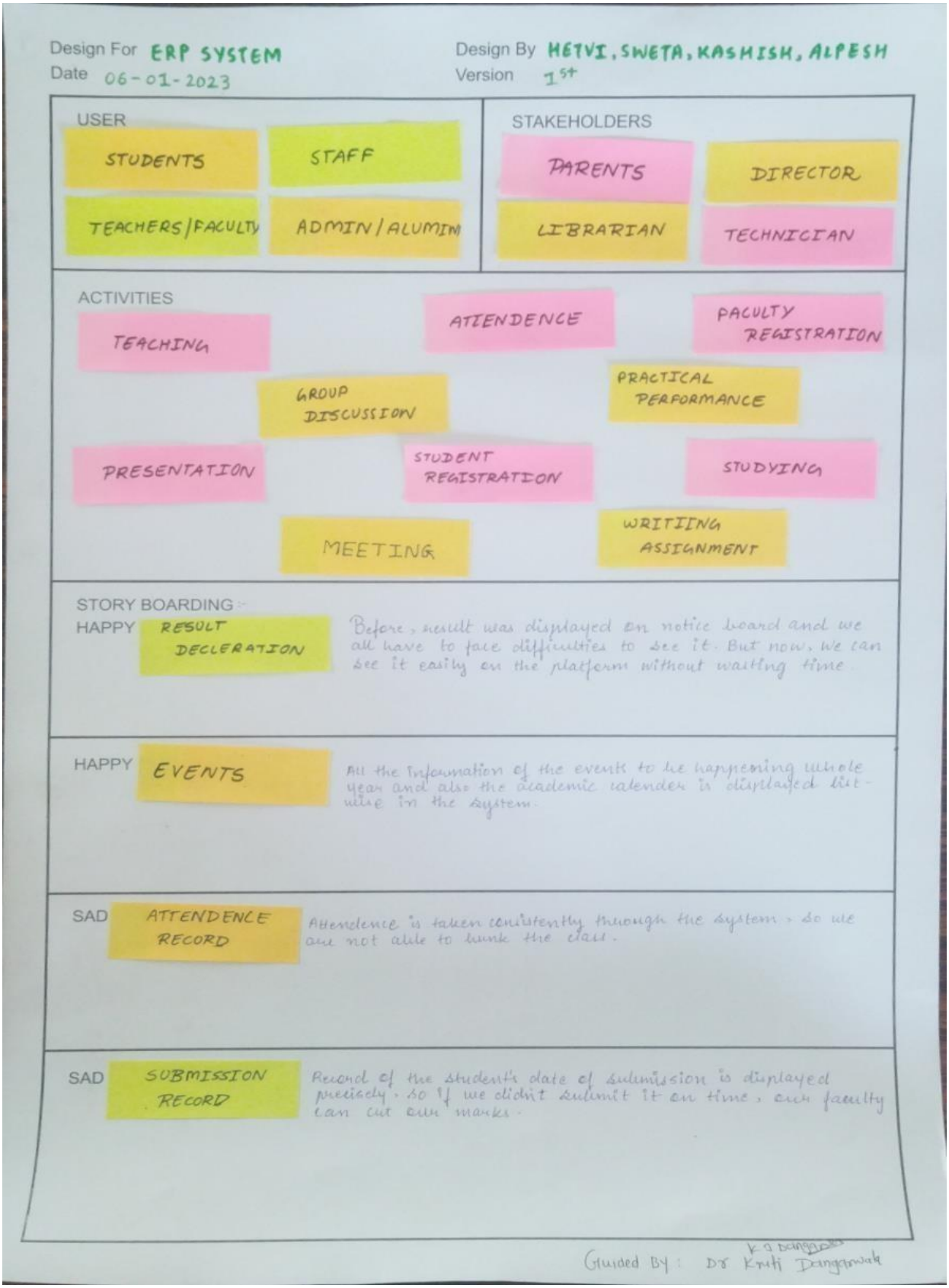


Fig: 2.2.6 Empathy Mapping / Framework

2.2.7 Mind Mapping/Framework:

Mind mapping is more accurate way of deciding, implementing, upgrading, structuring. It takes out most of your brain in order to Connect one entity with another with some particular relations. By one's aspects of reasoning, a logical and creative way of thinking this methodology gives a better view of Ideas; in other words, it means mapping the ideas to terminate problems and define proper relations between different entities, by giving them identifying keywords.

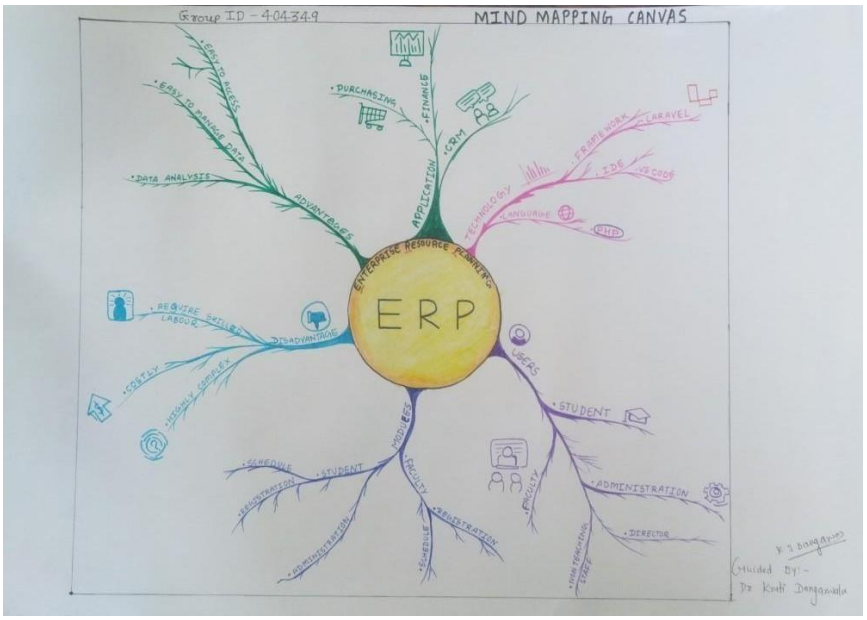


Fig 2.2.7 Mind Mapping / Framework

2.2.8 Ideation Canvas / Framework

Ideation canvas is needed when we've reached the point where we got an eye on the issue/problem/difficulty in performing tasks by our subject (say, user). This canvas performs as the front implement our idea in everyday real life.

For that, we need to consider.

- **People:**

- Students
- Teachers/Faculty
- Staff
- Administration
- Director

- **Activities:**

- Teaching
- Group Discussion
- Faculty Registration
- Student Registration
- Writing Assignment
- Presentation

- **Situation/context/location:**

- Laboratory
- Library
- Administration office
- Admission process
- Exam Form
- Book Borrow

- **Props/Tools/Objects/Equipment:**

- Laptop
- Wifi
- Laravel
- Visual Studio

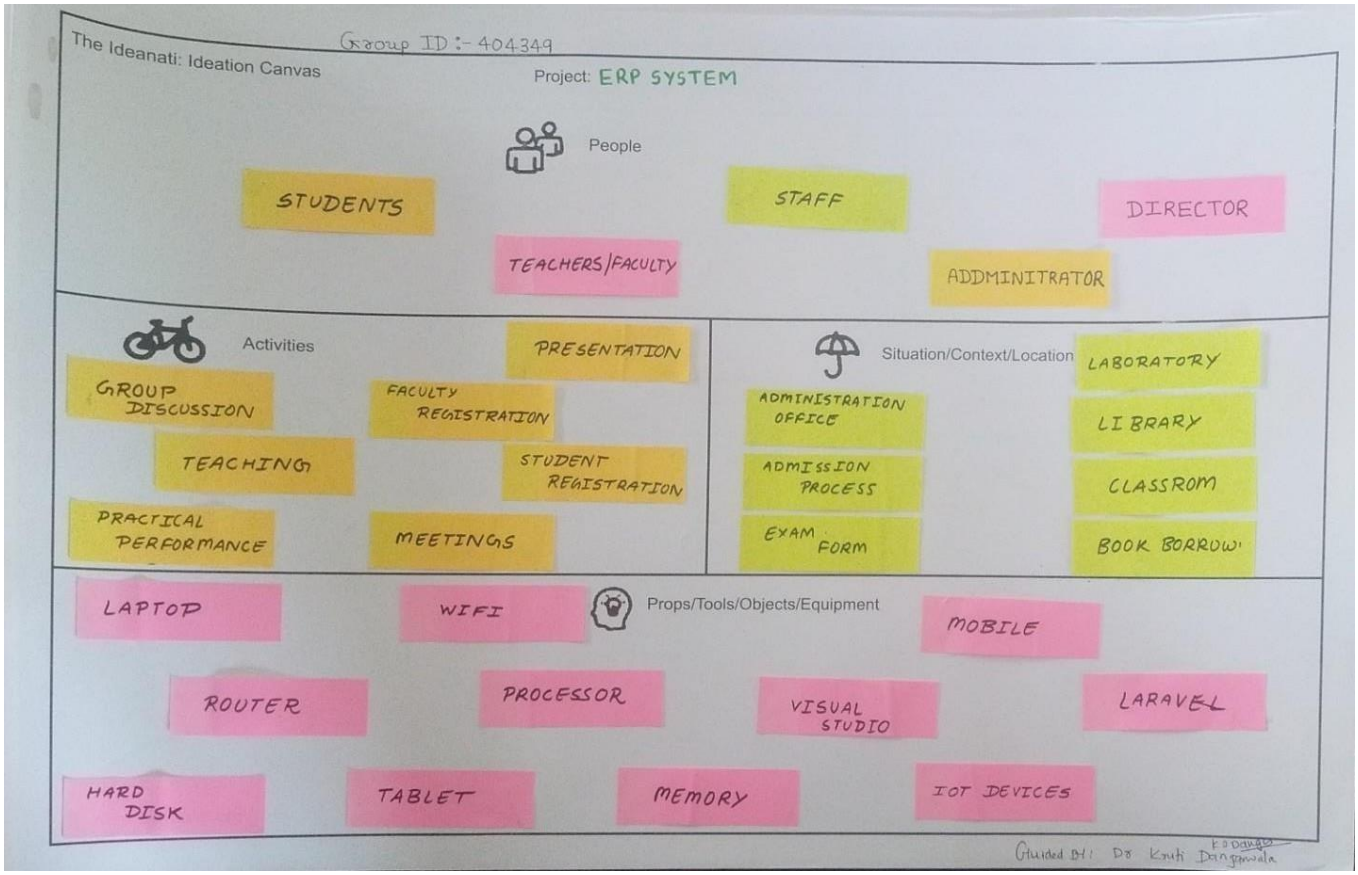


Fig: 2.2.8 Ideation Canvas / Framework

2. 2.9 Product Development Canvas / Framework:

It's the closer to phase two, where our objectives are clear and ready to approach. What solution as over product should give, what features we need,how to function them properly in order to fulfill the requirements, surveying on our domain of buyers to reject/redesign/retain components of our product.

The canvas includes the following parts:

- Purpose
- People
- Components
- Product Experience
- Product Functions
- Product Features
- Customer Revalidation
- Reject, Redesign, Retain

➢ Purpose:

- Attendance
- Time Table
- Finance management
- Feedback

➢ People:

- Students
- Teachers/Faculty
- Staff
- Administration
- Director

➢ Components:

- Laptop
- WIFI
- Mobile Phone
- Hard Disk
- Tablets
- Memory

➢ Product Experience:

- Easy to manage
- Excellent Analysis

➢ Product Functions:

- Department
- Fees
- Attendance
- Time Table
- Student Information

➢ Product Features:

- Branches
- Tutor, Student Attendance
- Easy to Access
- Data Analysis
- Reporting

➢ Customer Revalidation:

- Easy Access
- User Authentication
- Satisfied
- Language unavailability

➢ Reject, Redesign, Retain:

- Connectivity
- Cost
- Highly complex
- Requires Training

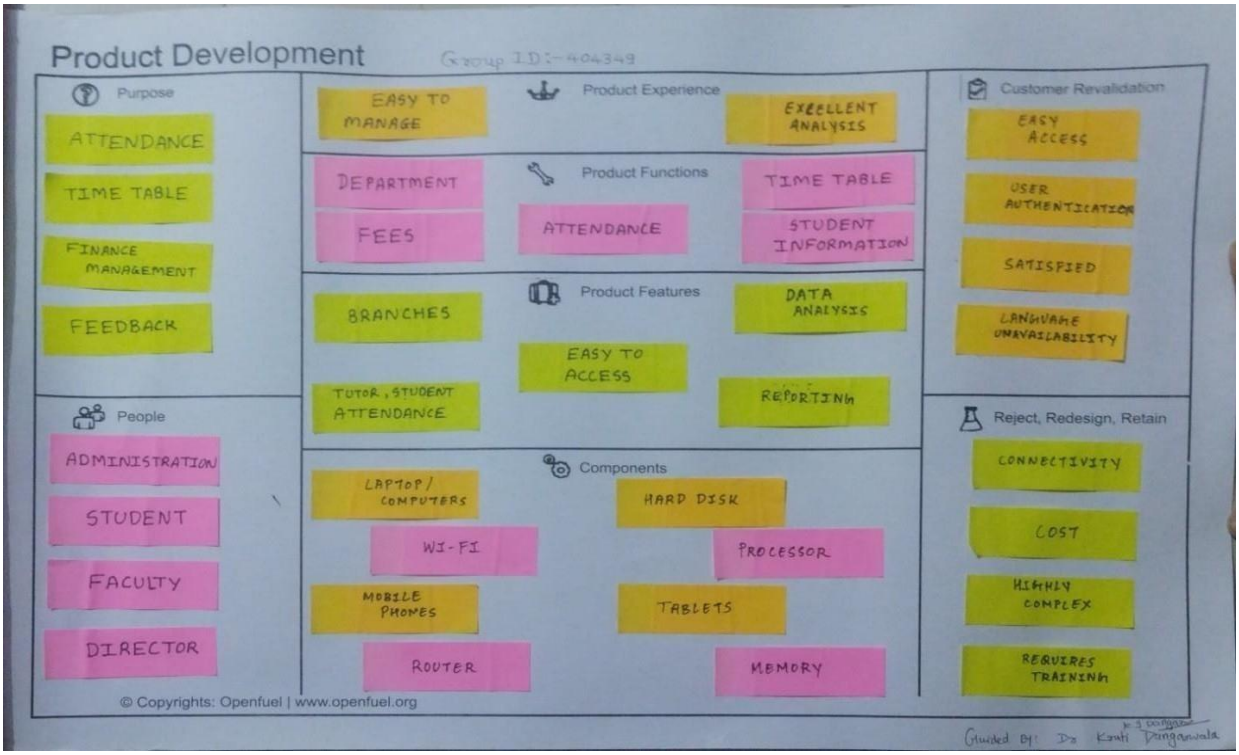


Fig:2.2.9 Product Development Canvas / Framework

2.2.10 Learnings Need Matrix Canvas:

➢ Methods:

- Probability & Statical data
- Learning PHP 7.8
- Web data Programming
- Android Programming

➢ Simulation/Skill:

- Java script
- PHP
- Graphical User Interface

➢ Components Morerials Strenght Criteria

- Laptop
- Mobile
- User Interface

➢ Applicable Standaeds and Design Specification Principles and Experiments

- Institution Head Permission
- Faculty Permission

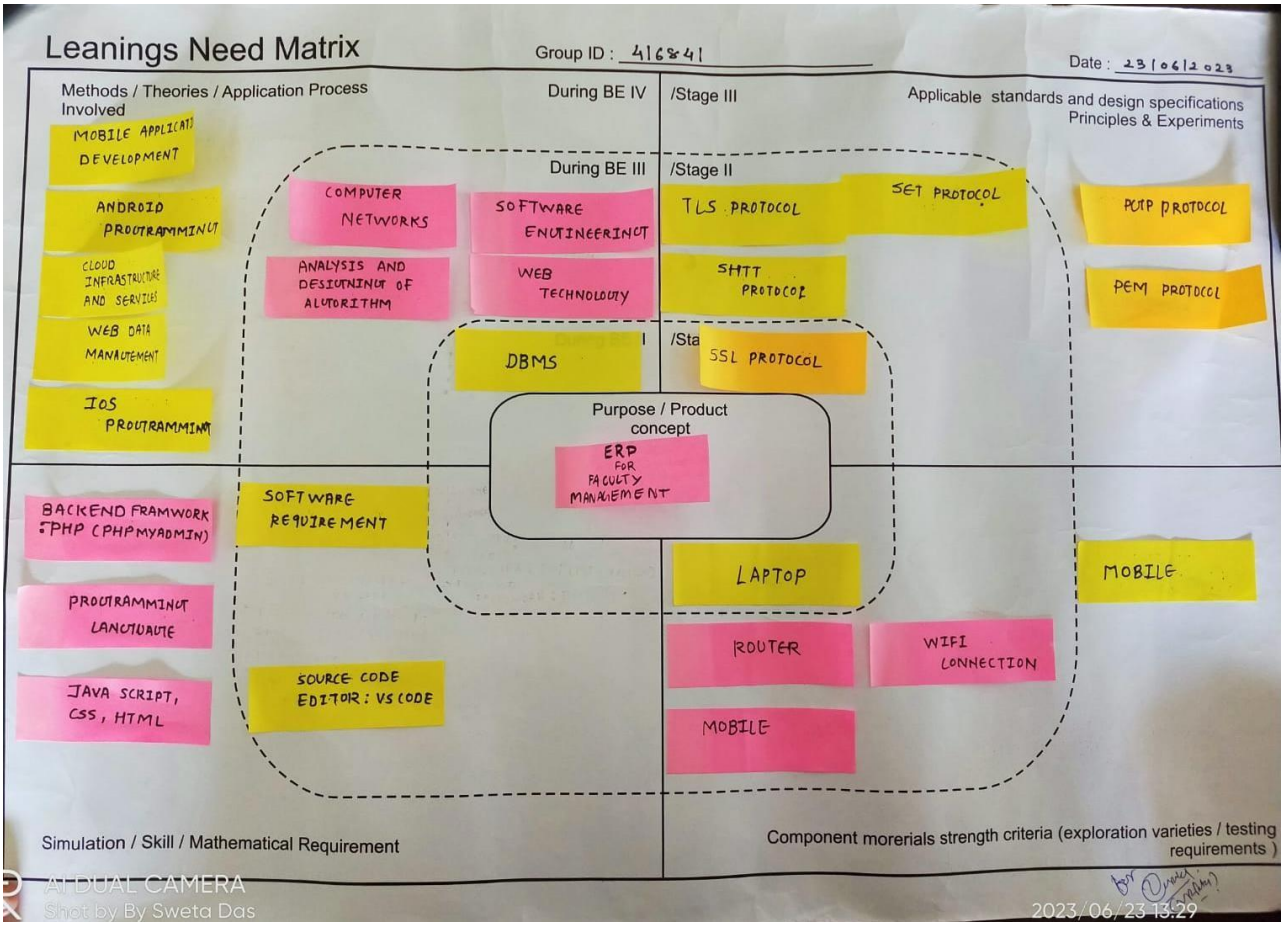


Fig:2.2.10 Learning Need Matrix Canvas

2.3 Literature Review / Prior Art Search:

Example of ERP Model:

1) SVMIT's ERP-

Fig:2.3.1 Dashboard

Fig:2.3.2 Controller Menu

At SVMIT's SIM ERP, Smart School Management Information System is a Collective and competent solution for information management in an educational Organization. A versatile MIS, designed by putting together the best of cloud technologies, it provides efficiency and effectiveness in strategic decision making concerning any educational Organization.

2) MasterSoft

MasterSoft is a highly trusted ERP solution provider company with over 800 software implementations across the globe. They offer all aspects of educational solutions such as a learning management system, faculty management system, accreditation management software, and others. The faculty management system is technologically advanced and highly secure software for managing faculty's data, attendance, payroll, and hiring processes. The software is equipped with features and stores large amounts of data.

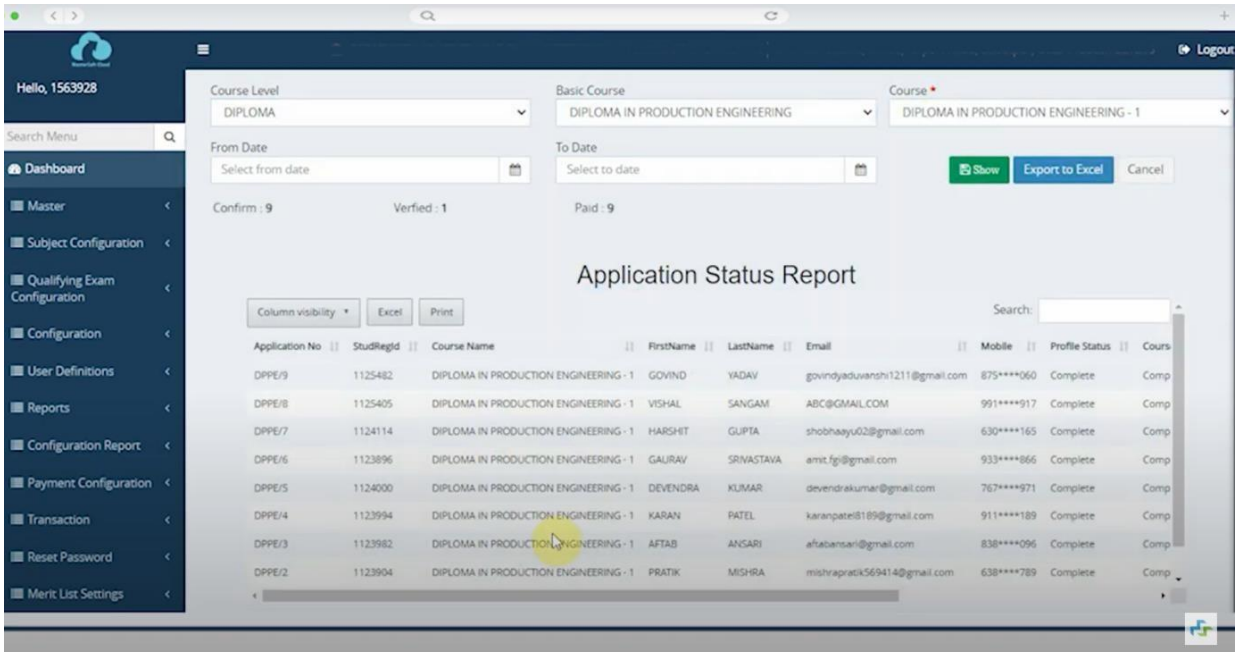


Fig:2.3.3 Mastersoft ERP System

Features:

- AI-Powered Analytics Dashboard
- Analytics-enabled Dashboard
- Multi-campus Structure
- Accreditation Related Reports in a Click
- Auto-generated Daily Reports such as DCR
- Free Upgrades & Instant CCMS Software Implementation
- ERP Software with Role-based Access

Fig 2.3.4 Features

- 24*7 Access to Student Data from Anywhere
- Integration with Advanced Mobile Apps, SMS & Emails
- Complete Control, Visibility & Transparency
- Modular ERP Software- Implement in Phases

Here is a list of technologies that power the core of Mastesoft:

- **Framework:** .Net Framework: provides a comprehensive and consistent programming model for building Windows-based applications, web applications, and services.
- **Programming language:** PHP
- **Frontend**: CSS & HTML
- **App:** Android & iOS,MasterSoft App
- **Browser Support:** Chrome, Mozilla Firefox, Internet Explorer, and others.
- **Database**: Microsoft SQL Server

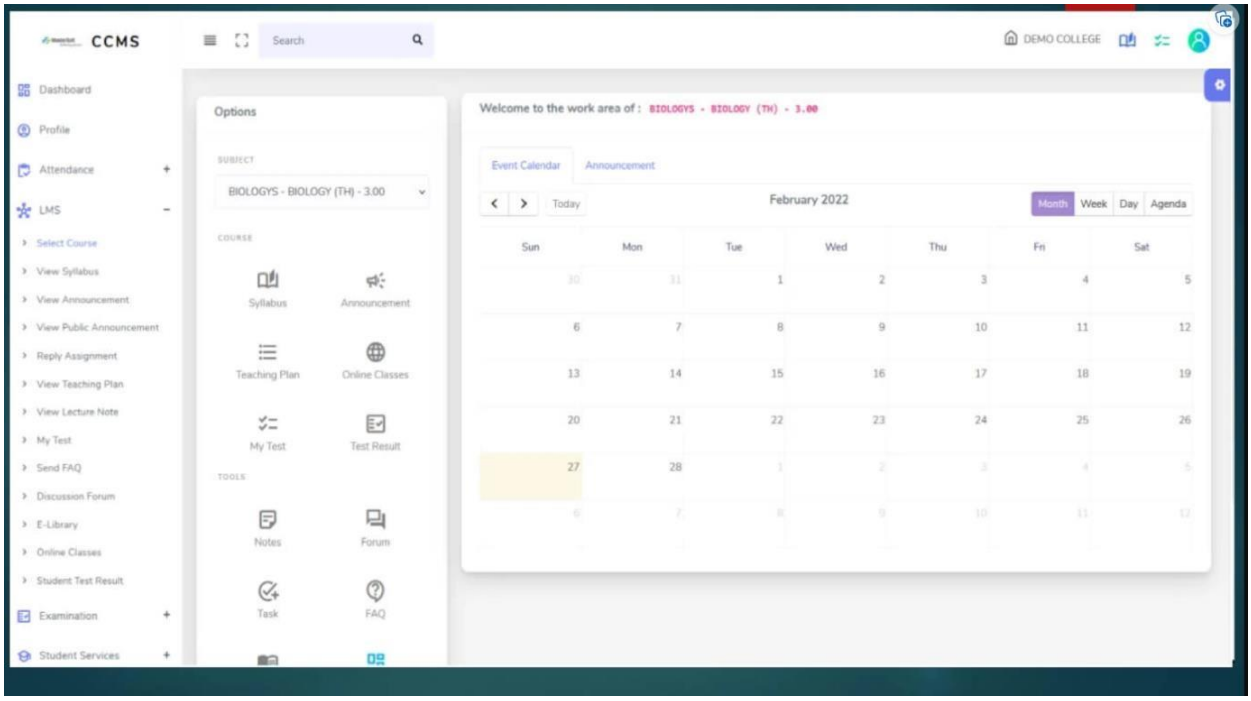


Fig:2.3.5 Framework

Disadvantages of Mastersoft's ERP:

1. Speed:

Slow processing speed sometimes

2. Cost:

Master Soft's ERP software price is very high, which is costly as compared to other ERP systems outthere, including initial setup costs, licensing fees, customization expenses, and ongoing maintenance fees. This can be a significant financial burden for smaller colleges or universities with limited budge

3) Deskera's Faculty Management software

Deskera's Faculty Management software allows you to maintain comprehensive faculty management information, including qualifications and skill sets, contract documents, define triggers to remind facultyand administrators of contract expiry dates and more, in the Faculty Management system. Capturing faculty data in multiple ways results in data inconsistencies and raises questions about how best to enhance data quality, accuracy, security, ease and timeliness of reporting while increasing cost effectiveness.

Fig:2.3.6 Deskera's Faculty Management software

Features:

- Faculty Profiling
- Career Portal
- Faculty Scheduling
- Feedback Management
- Research Information System

Here is a list of technologies that power the core of Deskera:

Backend: Java, Javascript, PHP, Go

Frontend: Node Js

Disadvantages of Deskere:

1. Faculty attendence traking:

Deskera is unable to track the details about on which date the faculty was absent and how many leaves he had taken in a month or year.

2. Difficult terminology:

The terminology/prompts on many screens are somewhat difficult to decipher, even for someone with accounting software experience.

4) Skolaro

Skolaro is a cloud-based ERP system designed specifically for K-12 schools. It provides a suite of modules that help schools manage their academic and administrative operations efficiently. Some of thekey features of Skolaro include admissions management, student information management, fee management, attendance management, timetable management, and examination management.

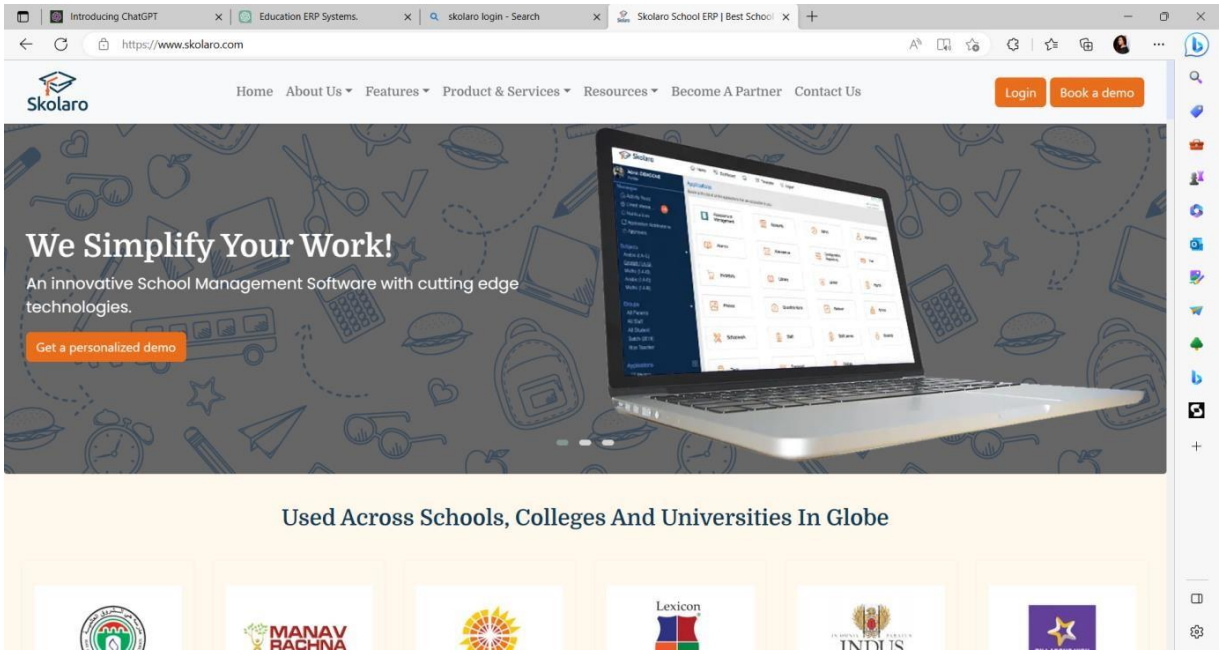


Fig 2.3.7: Skolaro ERP System Dashboard

Fetures:

1. Student management:
2. Fee management:
3. Library management
4. Payroll management
5. Examination management
6. Inventory management:

Here is a list of technologies that power the core of Skolaro:

1. **Framework**: Laravel Framework: Skolaro is built using the Laravel framework, which is a PHP-based web application framework.

2. **Frontend**: Vue.js
3. **App**: Android, iOS
4. **Browser Support**: Internet Exlorer, Crome And other
5. **Database**: Skolaro uses the MySQL database management system to store and manage all the data

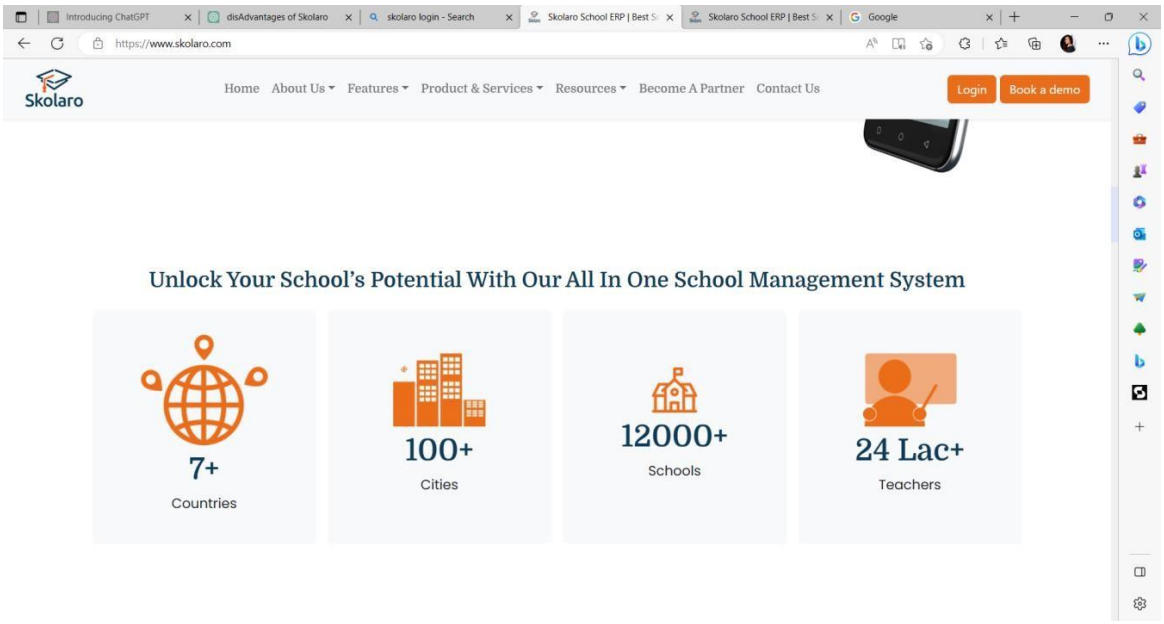


Fig 2.3.8: Features

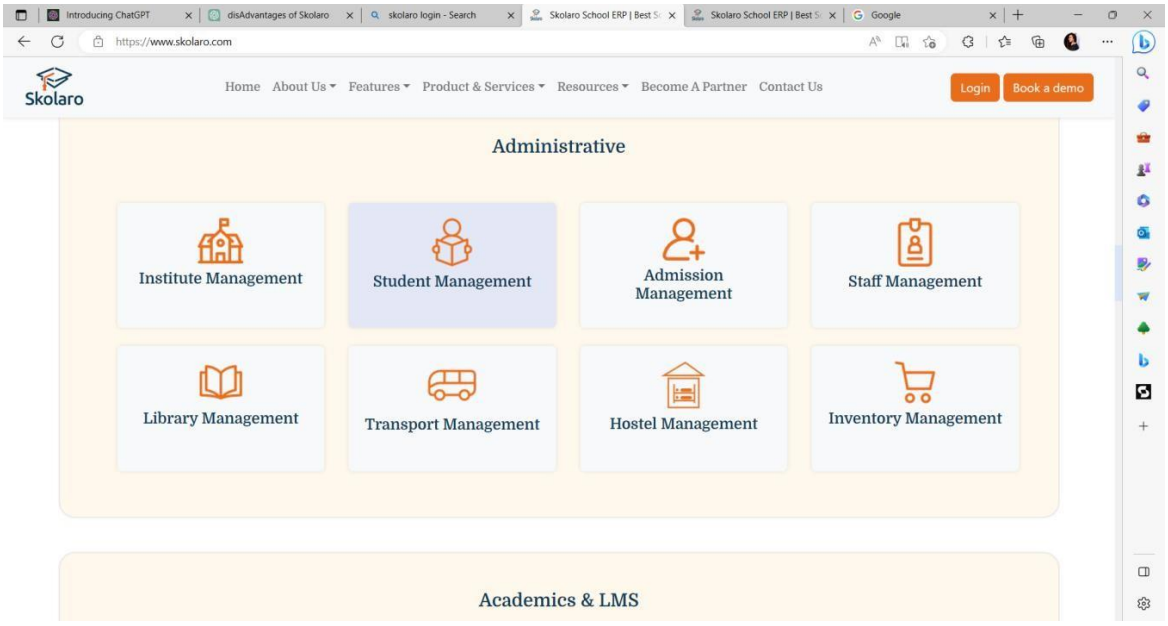


Fig 2.3.9: Administrative

Disadvantage of Skolaro:

1. **Cost:**

Implementing and maintaining a college ERP system can be expensive, including initial setup costs, licensing fees, customization expenses, and ongoing maintenance fees. This can be a significant financial. burden for smaller colleges or universities with limited budgets

2. **Complexity**:

ERP systems are complex and require thorough planning, implementation, and training. They can be challenging to set up and configure correctly, and may require significant technical expertise and resources to manage effectively. This complexity can result in a steep learning curve for college staff, which may lead to resistance and difficulties in adoption.

5) EDUSYS

The EduSys College ERP is the cloud-based college management software system that automates the entire campus operations, reduce operating cost and engage or save more time by bringing management, professor, staff, parent, and students under one roof.

Fig 2.3.10: Dashboard

Features:

- Staff Management System
- Branch Management
- Student Management
- Human Resource Management
- Visitor Management
- Document Management
- Fee Management
- Placement Management
- Report Management
- Exam Management
- Admission Management
- Hostel Management
- Library Management
- Attendance Management

Here is a list of technologies that power the core of EDUSYS:

Framework: .Net Framework: provides a comprehensive and consistent programming model for building Windows-based applications, web applications, and services.

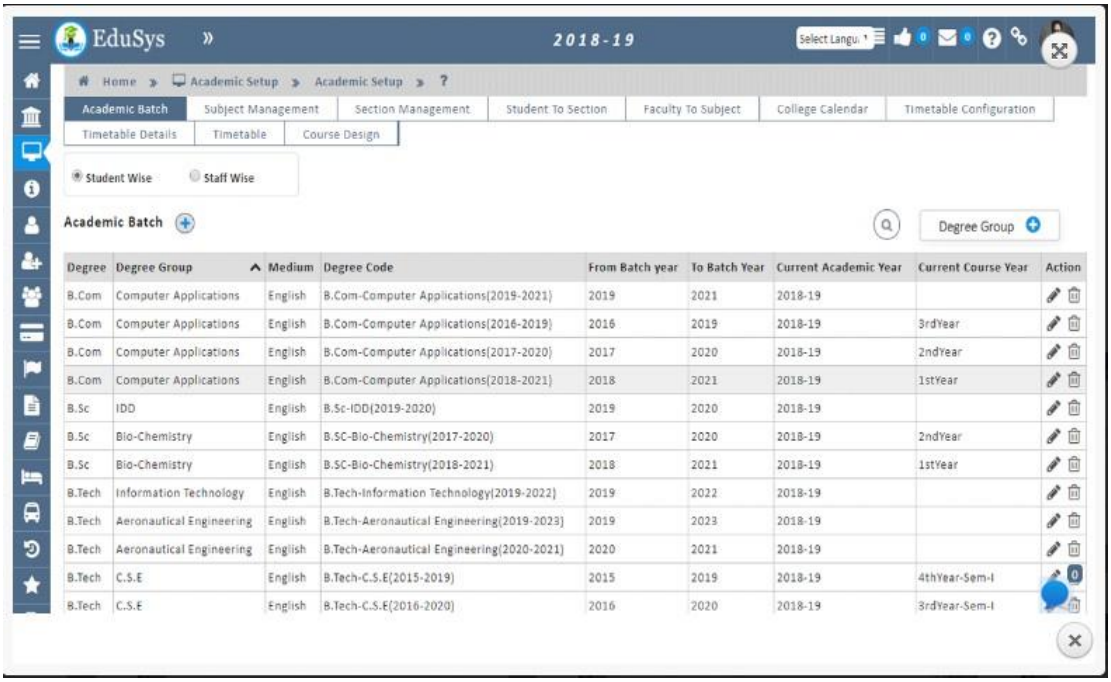
Programming language: C#, Visual Basic, and F#

Frontend: Blazor

App: Android & iOS

Browser Support: Chrome, Mozilla Firefox, Internet Explorer, and others.

Database: Microsoft SQL Server



Degree	Degree Group	Medium	Degree Code	From Batch year	To Batch Year	Current Academic Year	Current Course Year	Action
B.Com	Computer Applications	English	B.Com-Computer Applications(2019-2021)	2019	2021	2018-19		
B.Com	Computer Applications	English	B.Com-Computer Applications(2016-2019)	2016	2019	2018-19	3rdYear	
B.Com	Computer Applications	English	B.Com-Computer Applications(2017-2020)	2017	2020	2018-19	2ndYear	
B.Com	Computer Applications	English	B.Com-Computer Applications(2018-2021)	2018	2021	2018-19	1stYear	
B.Sc	IDD	English	B.Sc-IDD(2019-2020)	2019	2020	2018-19		
B.Sc	Bio-Chemistry	English	B.SC-Bio-Chemistry(2017-2020)	2017	2020	2018-19	2ndYear	
B.Sc	Bio-Chemistry	English	B.SC-Bio-Chemistry(2018-2021)	2018	2021	2018-19	1stYear	
B.Tech	Information Technology	English	B.Tech-Information Technology(2019-2022)	2019	2022	2018-19		
B.Tech	Aeronautical Engineering	English	B.Tech-Aeronautical Engineering(2019-2023)	2019	2023	2018-19		
B.Tech	Aeronautical Engineering	English	B.Tech-Aeronautical Engineering(2020-2021)	2020	2021	2018-19		
B.Tech	C.S.E	English	B.Tech-C.S.E(2015-2019)	2015	2019	2018-19	4thYear-Sem-I	
B.Tech	C.S.E	English	B.Tech-C.S.E(2016-2020)	2016	2020	2018-19	3rdYear-Sem-I	

Fig 2.3.11: Academic Setup

Fig 2.3.12: College Management App And Modules

Disadvantages of EDSYS

1. Cost:

Starting price of the Edusys system is 4,999/-, which is costly as compared to other ERP systems out there, including initial setup costs, licensing fees, customization expenses, and ongoing maintenance fees. This can be a significant financial burden for smaller colleges or universities with limited budgets.

2. Dynamic Features

There are no setup profile attribute features available in the system thereby making it static and complex software and less flexible as compared to other ERP systems.

➢Research Paper Analysis:

• Case Study – False Bay College, Muizenberg, South Africa

Educational institutions are facing very different challenges than they did ten years ago. With the continuous improvement in technology, institutions need to be agile to keep up with the ever - changing demands and needs of the education sector. A modern, fit-for-purpose Student Information System/Service (SIS) should not only support the attainment of the College's strategicgoals but also be flexible (configurable) enough to accommodate changing business models and support new or changing strategic objectives/direction.

2021 saw False Bay Technical and Vocational Education and Training (TVET) College break new ground. We were the first TVET College in South Africa to implement Academia Student Information System (SIS) and go live for applications and registrations. It is an amazing accomplishment as all project meetings, workshops, and training were delivered remotely due to the outbreak of Covid-19. While this was no easy feat, it illustrates the pioneering journey that False Bay TVET College undertook to adopt a robust SIS and replace its existing systems.

"We wanted a customizable solution as per the needs of our vocational & occupational programmes. Academia ERP was the system of choice as it provided us with rich functionalities and customization as per the College SIS requirements. We are very satisfied with the implementation and post-implementation services provided by Academia that helped us achieve automation and digital transformation".

2.4 Feedback/Summary of the Learning from Reverse Engineering Activity:

Reverse engineering is the process of taking something apart and putting it back together again, opening in new window in order to see how it works. It's not a technique specific to computer science; instead, it can be used any time someone wants to understand a process or project. Using Reverse Engineering, we examined so many applications which are already existing and also observed some features which can be helpful to the users of the application.

We learned some additional features like security options of the application, grade tracking record, Students management, attendance management, etc. These features can be advantageous to us in developing an efficient application.

CHAPTER 3 PREDESIGN

Chapter 3 Phase 2 Predesign

3.1 Pre-design Calculation:

➢Hardware Requirements:

To accomplish our project on a ERP for Institute Management System, we need hardwarecomponents such as,

- Mobile phone
- Laptop / PC

➢Software Requirements:

The basic requirement of software for developing this application is,

- Laravel Framework
- XAMPP
- Visual Studio

3.2 Learning Need Matrix:

➢ Purpose/Product Concept:

- Helping students, educators, libraries, etc.

➢ Tools/Methods/Theories/Application Process Involved

- Learning PHP 7.8
- Database Concept
- WEB Technology
- OOP Concepts
- Advance WEB Technology
- Data Integration

➢ Applicable Standards and Design Specification/Principles &Experiments

- Institute head permission

➢ Component Material Strength Criteria

- LAPTOP
- PC
- Android Smartphones
- Bootstrap, XAMPP, PHP 7.4
- Laravel Framework
- MySQL

➢ Software/Simulation/Skills/Mathematical Requirement

- Visual studio
- XAMPP

CHAPTER 4 PROTOTYPE MODEL

Chapter-4 PROTOTYPE MODEL

4.1 Features/Functions of proposed system

A **prototype** is basically an early access design just made for testing, and evaluation to improvise later on, before releasing the official product in the market. It is initially used by system analysts or applicants (users). We as engineers intend to minimize the differences that arise between the prototype and the ideal model of how the prototype should perform. *I.e.* if a virtual prototype isn't approachable due to components are not available for that, Developer has to find an appropriate substitute component that can give similar outputs

.

4.2 Fast Prototype Model/Conceptual Plan Layout

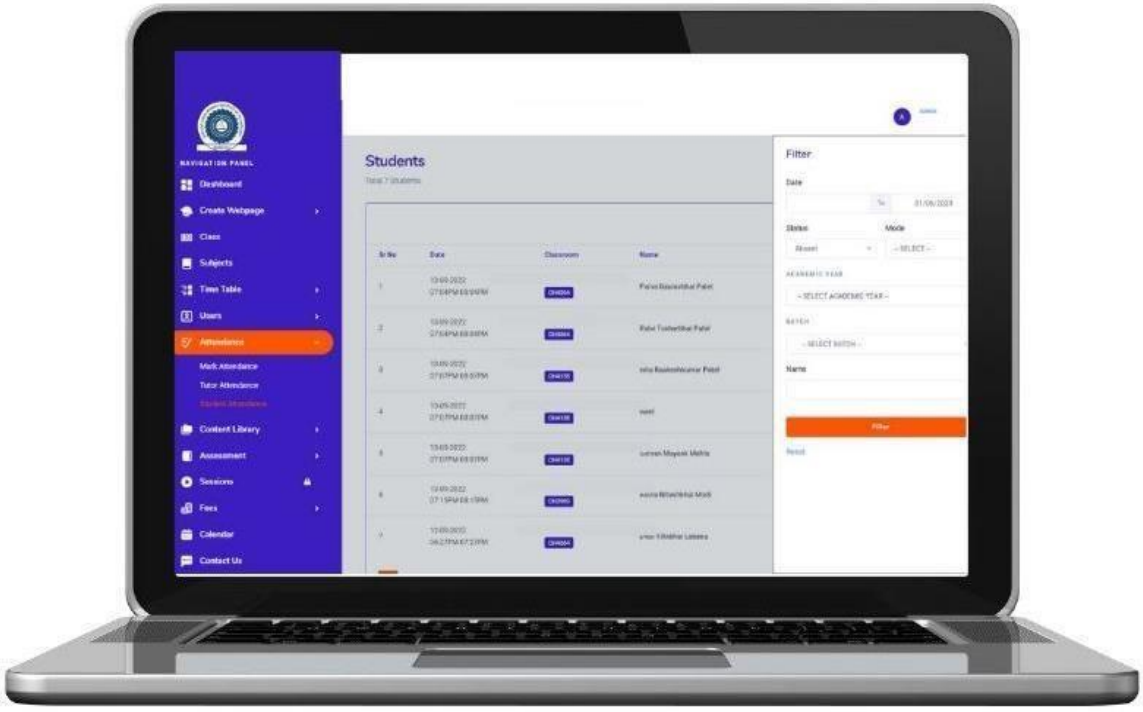


Fig 4.2.1: Registration dashboard of the student

Fig 4.2.2: Sign-in page

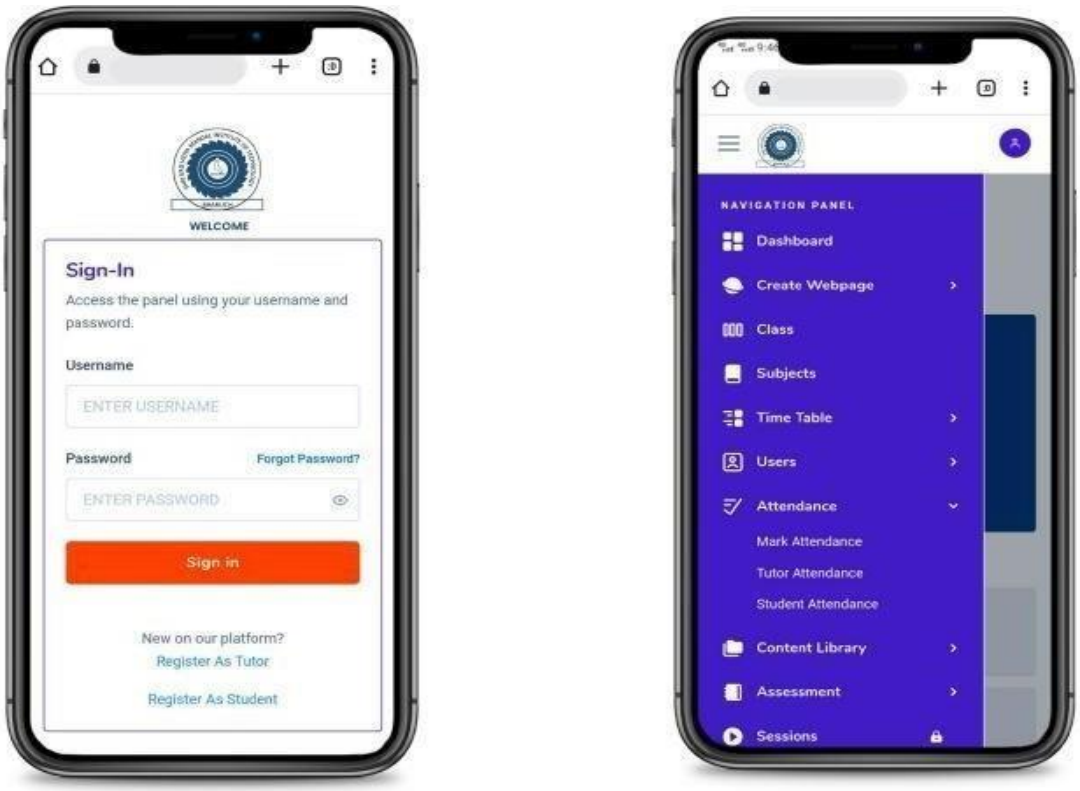


Fig 4.2.3: Layout of the main system along with sign-in process in mobile configuration

Future Scopes:

For the upcoming semesters, these are the flowing goals that we are going to follow:

1. Designing a blueprint of the ERP system and designing a user-friendly UI and UX using software like bootstrap, angular, etc.

2. Using a third-party integration for better understanding and display of the data in the ERP system.

3. Integrate various modules of the ERP system at the college level like student management system, fee management and student registration system.

4. Using Laravel as our base framework to work with the backend and front of the system along with Visual Studio code as our IDE.

Conclusion

This report was made to introduce the reader to the problem, idea, concept, and solution in the form of a virtual prototype of database management in college permeases. This is WEB based virtual interface representing a prototype model of our ERP (Enterprise Resource Planning software). The aim was to demonstrate how the actual model will look alike after implementing all necessary components. Furthermore, the rest of the canvases illustrate how the idea was generated, its cause, effect, and design implications. Over all the empathy and ideation process and need for administration took us to take up this project, which we think/hope would be extremely applicable in the large area of the education system and individuals.

References:

1. https://www.geeksforgeeks.org/introduction-to-erp/ access on 11 Jan2022,14:25
2. https://www.cio.com/article/272362/what-is-erp-key-features-of-top- enterprise-resource-planning-systems.html access on 11 Jan,15:35
3. https://ieeexplore.ieee.org/document/6516344 access on 12 Jan,13:45
4. https://www.tandfonline.com/doi/abs/10.1057/s41303-017-0060-3 access on 12 Jan,16:22
5. https://www.iitms.co.in/college-erp/student-administration-management/ access on 12 Jan,15:33
6. https://www.edusys.co/en-in/college-management-software.html on 3 Jun,15:09
7. https://www.iitms.co.in/blog/faculty-management-system-software-becoming-a-necessity.html on 3 Jun,15:30
8. https://www.skolaro.com/college-erp on 3 Jun,15:42
9. https://www.deskera.com/lms/faculty-management on 3 Jun,16:08