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Acadx : An ERP System

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ABSTRACT: The implementation of an information system, such as an Enterprise Resource Planning (ERP) system, within an organization instigates changes in how users carry out their work. Given that an ERP system spans various functional units of an organization, insufficient management during its implementation can result in resistance from users. Existing research on ERP systems has predominantly focused on areas such as adoption, success measurement, and critical success factors (CSFs). However, there is a noticeable lack of studies addressing user participation and their contributions to the successful implementation of ERP systems. This paper undertakes a literature review on ERP implementation, aiming to establish a compelling case for the active involvement of users in this process.

I. INTRODUCTION

Enterprise resource planning (ERP) system enables an organization to integrate all its primary business processes in order to enhance efficiency and maintain a competitive position. Successful implementation of ERP system enables an organization to realize benefits in terms of improved productivity and competitive advantage. Literature suggest that though ERP systems have been implemented all over the world by many companies but understanding and implementing ERP is a challenging task as there is high cost and risk involved. Since ERP implementation affects entire organization such as process, people, and culture, there are a number of challenges that companies may encounter in implementing ERP systems.

Information Technology (IT) systems have become one of the primary tools for many organizations to support, sustain and increase their businesses (Zakaria et al., 2018). Universally, IT represents an essential tool that helps countries enhance their respective economies in the educational and industrial sectors. Therefore, an Attendance Management System (AMS) is a critical standard that measures organisations' efficiency.

Traditional system which was mainly paper-based, required large amount of space to store information. It limits the exchange of information, updating and causes loss of documentation. A collaborative work in this system becomes rigid and degrades performance. This project on student information management system is one complete information management solution for students and staff of any educational institution. In today's world, it is a need to organize huge amount of data than ever before. In the absence of a great infrastructure for faculties, students and departments, management to exchange data, crucial information about students and organizations can be misplaced, which can cause loads of problems that can affect the reputation of the organization. For an academic institution, the data handling should be an easy task for which online approach is a must.

II. LITERATURE SURVEY FOR PROBLEM IDENTIFICATION AND SPECIFICATION

[1] Johansson, B., Sudzina, F. and Newman, M. (2011) 'ERP system implementation costs and selection factors of an implementation approach', International Journal of Business Information Systems, Vol. 8, No. 1, pp.87–105.

Johansson et al. (2011) studied relationship between factors influencing selection of implementation approach and companies' ability to stay within budget when implementing ERPs. The main findings are that: 1 the number of implemented modules influences selection of an implementation approach 2 companies with information strategies are more likely to stay within budget regarding ERP systems implementation. More research is required to understand

relationship between factors influencing selection of implementation approach and ability to stay within budget for ERP implementation.

[2] Madapusi, A. and D'Souza, D. (2012) 'The influence of ERP system implementation on the operational performance of an organization', International Journal of Information Management, Vol. 32, No. 1, pp.24–34.

Madapusi and D'Souza (2012) presented a literature-based and theory-driven model developed to examine the relationship between ERP system implementation and operational performance and also influence on operational performance. A better understanding541 of the contribution of ERP systems to operational performance can be obtained if researchers address and assess changes at modular and system level also the use of longitudinal designs to capture and tease out the time delayed effects between ERP system fine-tuning (at the module and sub-module levels) as well as changes in operational performance.

[3] Jacksi, Karwan & Ibrahim, Falah & Zebari, Shahab. (2018). "Student Attendance Management System". International Journal of Engineering and Technology. 6. 49-53. 10.21276/sjet.2018.6.2.1.

The system is a Web-based application developed for daily student attendance in departments within the university. It facilitates access to the attendance of a particular student in a particular class. This system will also help in generating reports and evaluating the attendance eligibility of a student. The system is not only improving the work efficiency, students' study and development, but also can save human and material resources.

[4] Ekta Chhatar, Heeral Chauhan, Shubham Gokhale, Sompurna Mukherjee, Prof. Nikhil Jha, "Survey on Student Attendance Management System", S.B. Jain Institute of Technology, Management and Research, Nagpur, 2016.

In this paper, the system deals with the maintenance of the student"s attendance. It generates the attendance of the student on the basis of presence and absence in class. The staffs will be provided with the separate username & password.

[5] Nuruldelmia Idris , Cik Feresa Mohd Foozy , Palaniappan Shamala ISSN 2714-7533 International Journal of Advanced Computing Science and Engineering 35 Vol. 2, No. 1, April 2020, pp. 34-40.

Sir Tim Berners Lee invents web technology. He is a British computer Scientist and worked as contractor at CERN. In 1989, Berners-Lee wrote a proposal about "Information Management: A proposal" but was rejected by the organization. He did specify the proposal to propose the sharing the information via an Internet based hypertext language which specifically HTML platform. He continues the research despite being rejected, this is the beginning of World Wide Web (WWW) as it was invented, and he was working on the project using a NEXT computer and getting help from his boss, Mike Sendall. In late 1990, Berners succeeds his 3-fundamental technology, which HTML, browsers, and Server. This is the foundation of Web Technology. The first web page was launched on open internet in 1991. The example of other programming language which is Python, the backend of Python is Django and Flask. The front-end is using Bootstrap. The databases that can store data from Python is by using MySQL.

III. PROBLEM STATEMENT

Problem Identification and Problem Statement –
The need to address the current inefficiencies and data discrepancies within educational institutions. These institutions struggle with fragmented and manual processes, leading to a lack of data visibility and poor user experiences. Moreover, data security and privacy concerns persist as institutions handle sensitive information.
The need for scalability and adaptability is also apparent as institutions evolve. To tackle these challenges, a comprehensive ERP system for education must centralize data management, provide real-time access, offer a user-friendly interface, prioritize security, support scalability, and ensure comprehensive reporting, all while remaining cost-effective.

IV. PROPOSED DETAILED METHODOLOGY OF SOLVING THE IDENTIFIED PROBLEM WITH ACTION PLAN-

- Action Plan
To address the preceding issue, we shall develop an ERP system known as "__SOFTWARE__NAME." __SOFTWARE__NAME is structured into various sections, which are as follows:

In the initial iteration of our application, we intend to primarily create five modules:

1. SAMS (Student Attendance Management System)
2. DLMS (Department Library Management System)
3. SAIM (Student Academic Score Management System)
4. DNOC (Digital No Objection Certificate Form)
5. DDFM (Department Data and File Management System)

The entire software package is segmented into two distinct applications, each designed to operate on distinct device platforms - namely, the computer system and the Android application.

Module	Platform
SAMS	Computer, Mobile Phone
DLMS	Computer
SAIM	Computer
DNOC	Computer, Mobile Phone
DDFM	Computer

SAMS (Student Attendance Management System) –

In the Student Attendance Management System (SAMS), we meticulously capture and document students' attendance records. SAMS efficiently processes and presents statistical attendance data through a variety of filters. To record attendance, faculty members are required to log in using their designated faculty accounts, select the academic year and subject, and input the number of absent students. SAMS seamlessly designates those students as 'absent' while marking the rest as 'present'. This attendance recording process is seamlessly executed through a PHP-based web application, which has been converted into a user-friendly Android application for added convenience.

Working of SAMS –

In the Student Attendance Management System (SAMS), the operational flow unfolds as follows: Initially, Faculty users log in to the Mobile Application Platform via their Faculty Login to mark attendance. The system securely stores the marked attendance data, utilizing it to generate comprehensive attendance percentage statistics. On the student's end, they access their individual attendance percentage information by logging into the Mobile Application Platform using their Student Login.

For more in-depth insights, Faculty and HOD users can access detailed and statistical data through the Computer Web Application. They gain access to this valuable information by logging in with their respective credentials. This multi-faceted system ensures efficient attendance tracking and provides accessible data analytics for both faculty and students.

DLMS (Department Library Management System) –

Department Library Management System (DLMS), the management of the departmental library is diligently executed. Noteworthy functions encompassed therein encompass the issuance of books, their timely return, and the judicious administration of fines. These functions serve to augment the overall efficacy of the module.

It is incumbent upon the Lab Assistant (hereinafter referred to as "User LA") to assume the mantle of responsibility for the DLMS. In addition to the generation of meticulously detailed receipts and the systematic archival of pertinent data, the act of issuing and returning books will also encompass the presentation of data in the form of enlightening statistical graphs.

Working of DLMS –

In the Department Library Management System (DLMS), Lab Assistant users can seamlessly log in with their respective IDs and Passwords. Lab Assistants wield the power to swiftly Issue and Return Books through this Module. Moreover, they gain access to comprehensive Statistic data and Late Return Fines, ensuring efficient library management. It's worth noting that this Module is exclusively designed for Computer Platforms, offering a sophisticated and streamlined experience.

SASM (Student Academic Score Management System) –

In the SASM system, student academic scores pertaining to lab manuals, assignments, micro projects, etc., are meticulously maintained in accordance with the prescribed format set forth by the Maharashtra State Board of Technical Education (MSBTE). This organized data repository facilitates the seamless generation of various reports, including but not limited to the No Objection Certificate (NOC) form. Additionally, this module is proficient in exporting data into Excel and PDF files, adhering to the prescribed MSBTE guidelines for internal marking purposes.

Working of SASM –

In the SASM system, Faculty and HOD users possess the exclusive ability to meticulously input Student's Academic Scores, various Test Marks, Project Marks, and other critical assessments. This Module, with its elevated security measures, grants limited access exclusively to Faculty and HOD users, ensuring utmost data integrity. Users are granted secure access through their respective Login Credentials, enabling them to seamlessly and efficiently carry out their tasks with precision.

DNOC (Digital NOC (No Objection Certificate) Form) –

The DNOC system is reliant upon the Module SASM. DNOC is responsible for the generation of a No Objection Certificate (NOC) form, which proves to be immensely beneficial for students during the process of semester submission. This initiative shall lead to substantial time and effort savings. DNOC accommodates two primary user categories: The Head of Department (HOD) and the students who require NOC. Students have the privilege of accessing their respective accounts for the purpose of NOC application.

Working of DNOC –

The DNOC Digital No Objection Form boasts Multifaceted Accessibility: Heads of Departments (HOD) users initiate NOC Forms, while Lab Assistants monitor Student NOC Status. Both HODs and Lab Assistants wield the power to harness DNOC via the Computer Platform Web Application.

Furthermore, DNOC Empowers Students: It provides Students direct access to their NOC forms, allowing them to seamlessly check, download, and utilize them for official academic purposes within the college.

DDFM (Department Data and File Management System) –

In the Departmental Data File Management (DDFM) system, all department-related information, including attendance records, academic scores, frequently used documents, software, and letter templates, is meticulously organized and maintained. DDFM facilitates the efficient retrieval of data, ensuring quick access to the desired information.

Working of DDFM –

DDFM Module Empowers Faculty and HODs: The DDFM Module grants comprehensive access to all faculty users and Heads of Departments (HODs). This dynamic module efficiently organizes shared academic data, software, and more. Upon logging in, users can seamlessly access, contribute, and maintain data in the meticulously structured common shared drive space, fostering collaboration and information management.

-Application Dataflow/Workflow

The subsequent diagram will illustrate the operational functionality of the application, essentially depicting its operational workflow of Computer Based Application.
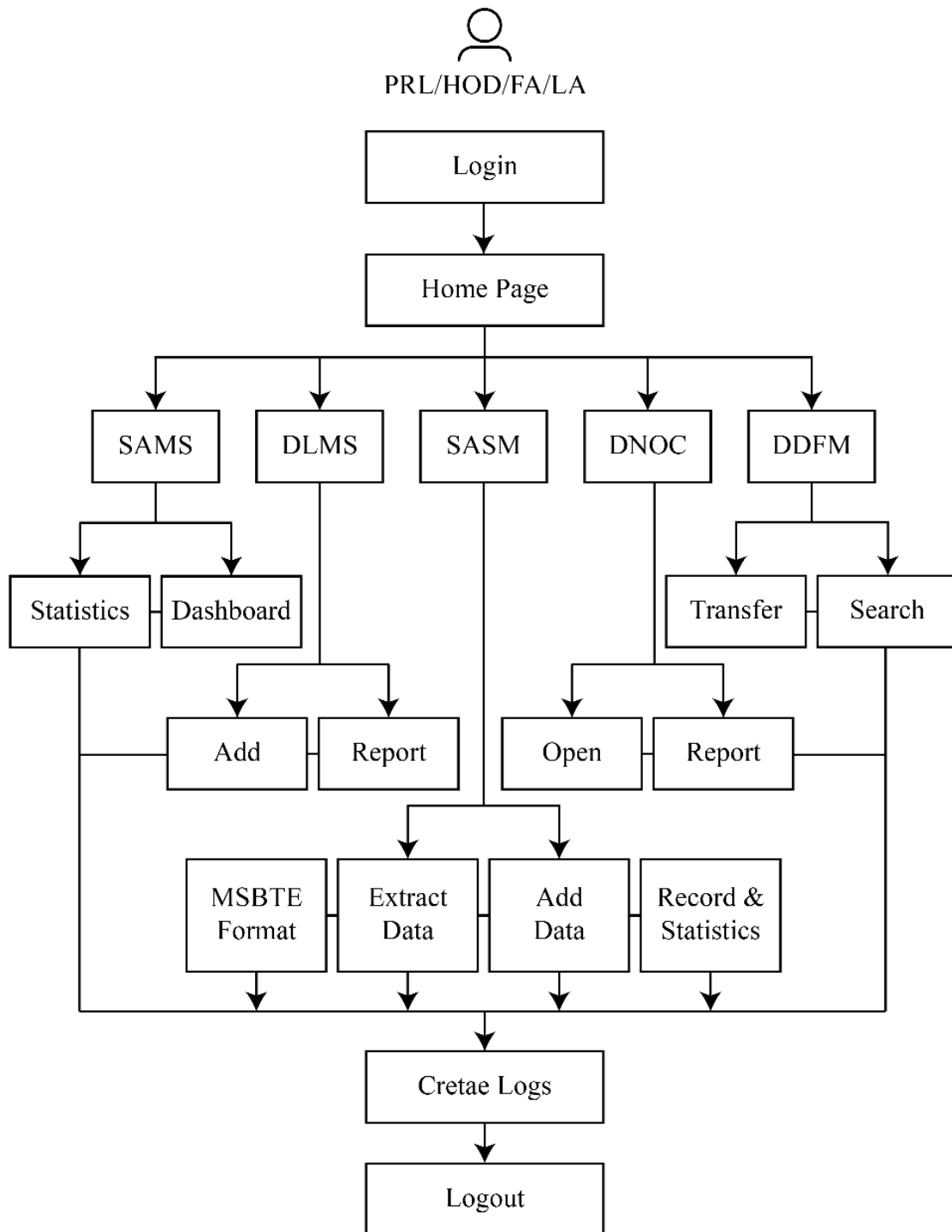
Fig. Computer Based Application Workflow

The subsequent diagram will illustrate the operational functionality of the application, essentially depicting its operational workflow of Mobile Phone Based Application.
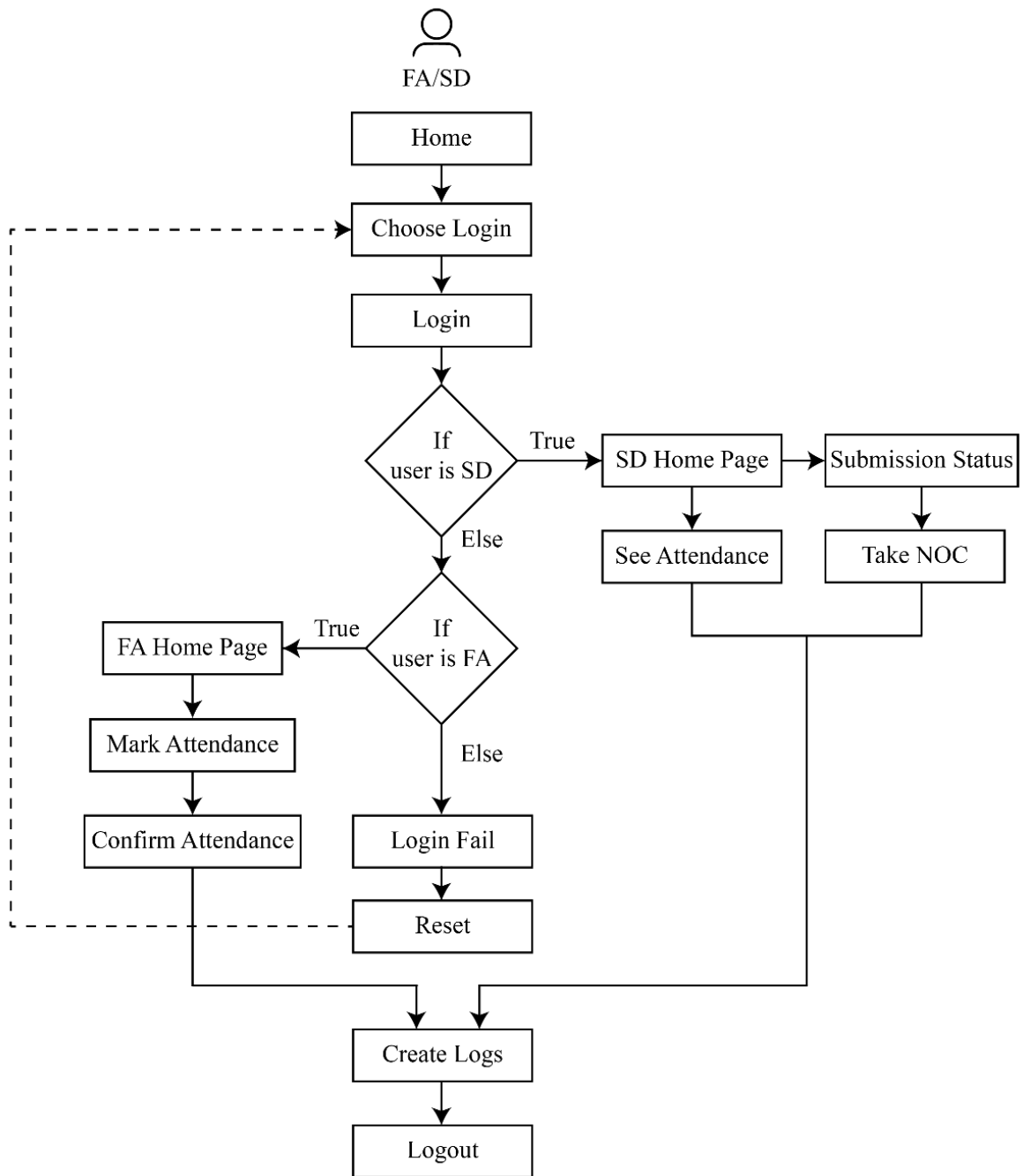
Fig. Mobile Based Application Workflow

- User Base

User/User ID	Description	Privilege
PRL	Principal	All Modules
HOD	Head of Department	All Modules
FA	Faculty	SAMS, SASM, DDFM
LA	Lab Assistant	DLMS, DNOC (Computer Based)
SD	Student	SAMS (Mobile Based), DNOC (Mobile Based)

Every user of the application is assigned a unique ID and password. The application will respond to the provided ID and automatically navigate to the specific module corresponding to that ID.

- Technologies and Tools Used to Develop Application

Sr. No.	Title	Description/Version
Technologies for Backend		
1	Python Django	4.02.02
2	PHP	8.02.04
Technologies for Frontend		
3	HTML	HTML5
4	CSS	CSS3
5	Bootstrap	5.2
Technologies for Database		
6	MySQL	8.1
Tools		
7	Visual Studio Code	1.83.1
8	XAMPP	3.3.0

- Requirements to Run Application

Sr. No.	Title	Description/Version
Requirements for Computer Based Application		
1	CPU/Processor	Intel Pentium or Above
2	RAM	2 GB
3	Disk Space	Min. 100 GB
4	Software Requirement - Browser	Any Browser with Latest Version
5	Operating System - Windows	Windows XP or Above
Requirements for Mobile Phone Based Application		
6	Operating System - Android	4.4 KitKat or Above
7	Browser	Any Browser with Latest Version

V. ADVANTAGES & LIMITATIONS

- Advantages

1. Improved Efficiency: ERP systems automate and streamline various business processes, reducing manual work, data entry errors, and the time required for tasks.

2. Data Integration: ERP systems integrate data from various departments, ensuring consistency and accuracy of information across the organization.

3. Enhanced Decision-Making: Real-time data access and reporting tools enable informed and data-driven decision-making, helping organizations respond to market changes more effectively.

4. Cost Reduction: By optimizing processes, reducing waste, and improving resource allocation, ERP systems can lead to cost savings.

5. Increased Productivity: Automation and streamlined workflows result in increased employee productivity, as tasks are completed more efficiently.

- Limitations

1. High Implementation Costs: ERP systems often require significant upfront investments in terms of software, hardware, and implementation services, which can be cost-prohibitive for small and medium-sized businesses.

2. Complex Implementation: Implementing an ERP system can be a complex and time-consuming process, often requiring significant changes to existing processes and workflows.

3. Resistance to Change: Employees may resist the changes brought by the ERP system, leading to challenges in user adoption and training.

4. Customization Challenges: Customizing ERP systems to fit the unique needs of an organization can be challenging, costly, and may lead to future compatibility issues during software updates.

5. Performance Issues: As the volume of data and users increases, ERP systems may experience performance issues, leading to slower response times.

6. Vendor Lock-In: Organizations may become dependent on a specific ERP vendor, making it difficult to switch to alternative solutions if needed.

VI. FUTURE SCOPE

1. AI and Machine Learning Advancements: ERP systems hold great promise as AI and machine learning advancements are poised to fundamentally transform the landscape of business operations. These technologies will drive unprecedented efficiency and data-driven insights, revolutionizing how businesses operate.

2. Cloud-Based Solutions: The increasing prevalence of cloud-based ERP solutions is a game-changer. These solutions offer unmatched scalability and accessibility, empowering businesses to adapt swiftly to changing demands, and ensuring data and processes are accessible from anywhere, fostering a more agile and connected organizational ecosystem.

3. Blockchain and Mobile Access: The integration of blockchain and the refinement of mobile access within ERP systems represent a watershed moment for data security and user mobility. Blockchain's immutable ledger adds an unparalleled layer of trust to transactions, while enhanced mobile access enables users to engage with ERP systems seamlessly, empowering a more flexible and secure way of working.

4. Evolution and Global Capability: ERP systems are in a constant state of evolution, with a focus on becoming more intuitive and globally capable. These advancements enable businesses to navigate the complexities of the global market more efficiently. With enhanced features and adaptability, ERP systems are becoming indispensable tools for making informed, strategic decisions and streamlining operations worldwide.

VII. CONCLUSION

Implementing a customized ERP system for educational institutions is essential to streamline operations, improve data accuracy, and enhance user experiences. This system ensures data security, scalability, and provides valuable insights through reporting and analytics, ultimately reducing operational costs and benefiting the education sector as a whole.

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