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Enhancing Efficiency and Sustainability: Implementing an Improved Exam Management System ERP in Higher Education

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ABSTRACT: This research paper therefore seeks to propose a case study of developing and practicing an enhanced Exam Management System-ERP in VJTI with the aim of providing efficiency, sustainability and user satisfaction. This research focuses specifically on the design, development, and implementation stages of the improved ERP system based upon existing insights into the current ERP infrastructure. The paper looks at how effective and efficient the new system is, besides studying qualitative analysis and feedback from users.

KEYWORDS: Enterprise Resource planning System; College Examination System; ERP; Higher Education; Implementation

I. INTRODUCTION

In today's world, managing academic tasks efficiently is very important for the smooth running of higher education institutes. Managing examinations successfully is one of them. Previous paperwork can be considered obsolete because it requires a lot of efforts, has a negative impact on nature, and can be erroneous. To address these issues, a number of the institutes are resorting to the use of technology.

The following research paper aims at proposing a new system which will help in managing exams without paper and has been implemented in our college's ERP system. It is used to improve the existing processes of examinations through fixing what is wrong with current methods and making the system better through the incorporation of technology.

While our current ERP system functions adequately, it suffers from drawbacks such as excessive paperwork, slow processing times, and the risk of inaccuracies. These issues not only affect administrative efficiency but also pose challenges for students and faculty. The enhanced system seeks to resolve these issues through automated scheduling, digital question banks, online submissions and grading, and real-time data analysis.

Our approach included a detailed review of the current ERP system to find its weaknesses and develop effective solutions using best practices in educational technology. This paper will describe our development process, including system design, implementation strategies, user feedback, and the positive outcomes we achieved with these improvements.

II. LITERATURE SURVEY

Examination management system is a software that assist in easy and efficient management of college examinations. Through the automation of this tasks, it becomes easier to handle many exams at the same time; a feat that would have taken a lot of time but for the reduction of mistakes as well. This integration also helps to lead the burden of administration and lessen the possibility of human error, which makes the exam process more accurate. However, the system provides current information and analysis that can enhance on the resources and other decisions to be made in the near future. It provides more security features for the sensitive data and has user friendly interfaces for the appropriate staffs such as administrator, student etc. In addition, the appropriate use of automation promotes enhancing the results of the exam and making the process clearer.

Muhammad Saiful Islam and colleagues (2015) studied the challenges of introducing ERP systems in higher education at the British Academy of Management conference. They found that obstacles like high costs, staff resistance to

change, and the complexity of integrating ERPs with existing educational processes are prevalent. Despite these challenges, the study highlights ERP systems' potential benefits: improved data management, enhanced administrative efficiency, and better resource allocation.

Mohamed Abdel-Basset (2021) conducted a survey on ERP systems in colleges, which discusses current trends and practices. It shows the importance of careful planning and involving all stakeholders for successful implementation. The survey points out benefits like better decision-making through real-time data analysis, streamlined administrative tasks, and improved communication between departments. However, technical challenges and the need for extensive training can make implementation difficult.

Sagar Pawar (2015) looks at how ERP systems are used in colleges, focusing on tasks like student registration and exam scheduling. The study highlights the need for user-friendly interfaces and strong support systems to help faculty and students use the system effectively. ERP systems can be used for reducing mistakes and save plenty of time.

Ayodele Adebiyi and Olufemi Awodele (2017) discuss how ERP systems enhance efficiency in education. They highlight ERP's ability to improve coordination between departments and seamlessly integrate educational processes. They also note that current/ ongoing maintenance and updates are essential to keep up with technological and educational changes.

Parth Goel & his team (2023) implemented a project for their own college in which they covered the development of an ERP system. Using information from their work, we can learn how automating exam management with ERP can have a positive impact and value added to it. They learned that through ERP implementation, accuracy and turnover time of information to students and faculties has been enhanced thus enhancing overall education.

III. METHODOLOGY

To undertake efficient exam management at VJTI the use of a better ERP system required certain course of action.

1. Requirement Gathering and Analysis: This was the first step in setting up the new exam management system
- By having group interviews with the faculty administrative staff and students we got to know their needs and problems with the current system. This included surveys, interviews, and group discussions.
- We carefully analyzed this information to find common problems, desired features, and possible improvements. This analysis helped us design the new system.

2. System design: With a clear understanding of the requirements, we designed the system architecture. During this phase, we concentrated on the development of a sound, standardized, and responsive environment that can support all the exam management operations.
The key points of design of application were the integrity of the data, integration with other modules of ERP, and scalability.

3. Database design: Post system design, we need to design a database to hold all the data collected. After consultations, we came up with an elaborate database policy to cater for all aspects of the exam management process.
This concerned data of the students, data of the faculties, data of all the staffs, information related to exams, details of the courses created, schedules, the distribution of teachers and courses, and student reports.

4. User-Friendly UI Design: The User Interface (UI) is how the exam department, students, faculty, admin, and the other staff will work with the system.
As the system had to be used by the general population, ease of use and accessibility of the UI became the paramount focus for us

5. Testing: During setting up the system it is equally important to conduct tests after implementing the system in order to ascertain whether it is functioning optimally and to fix any problems that might arise.
It involves unit testing, integration testing, system testing as well as user acceptance testing.
All the problems that might arise should be handled before the system is being deployed.

IV. MODULES

The system has several important modules:

1. Student:

The following are available for the student:
- Update their personal information, such as mobile number, email ID, and current address.
- Register for current semester courses and retake courses they failed in the previous semester.
- Provide feedback on faculty and campus facilities.
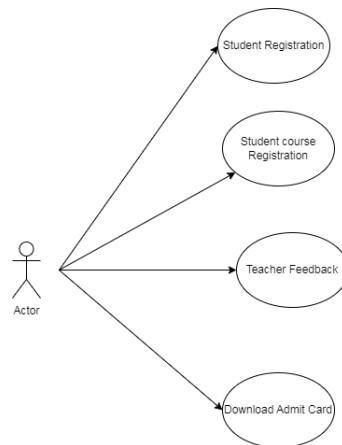- Download their admit cards for exams.

Figure 1: Student Use Case

2. Admin: The admin module has access over all the main tasks: Create, Read, Update, and Delete (CRUD). Admin is allowed to manage everything in the system, like adding or removing students, creating and handling courses, allocating faculty to courses, and creating schemes and sessions.

3. Faculty:
Faculty Module Functionalities:
1) Faculty login
2) Mark Entry
3) Mark lock & submit
4) Grade Adjustment
5) Mark Unlock (if required)
6) Logout

4. Exam Department: The exam department module is designed to manage all exam-related activities, such as:
- Student data upload
- Roll number generation (for students in first year and direct second year only)
- Student session allocation
- Exam course creation
- Exam course registration
- Course related reports
- Tabulation reports
- Seating arrangement allocation/ de-allocation
- Timeslot and Timetable Generation
- Faculty and facility Feedback Question creation

V. RESULTS

The management of examination procedures at VJTI is projected to be significantly strengthened by the application of the upgraded Exam Management System ERP. Here are some anticipated benefits based on the proposed system's design and functionalities.

- For students, the new system will streamline processes such as course registration, issuance, and downloading of admit cards, as well as updating personal information. These enhancements are expected to increase user satisfaction and efficiency, allowing students to navigate the system more easily and reducing their workload.
- For faculty, it simplified and enhanced the marking, grading mechanisms besides providing the reports in a compact way. The application of the automated aspects in the grading system eliminated human errors in grading and also made grading to be faster thus increased productivity.
- For Exam Department Things like generation of roll numbers, seating arrangement of students for exam and generation of timetable was also done among other things thus making the exercise much easier. The feature of the system to give real-time data helped in decision-making and cost control due to proper utilization of the allocated resources.
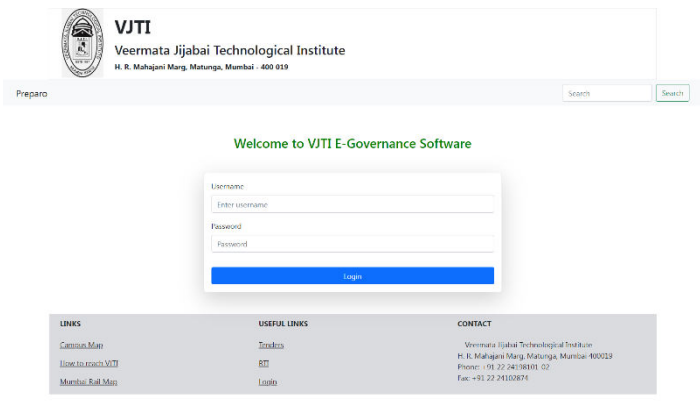
1. Student Section Results
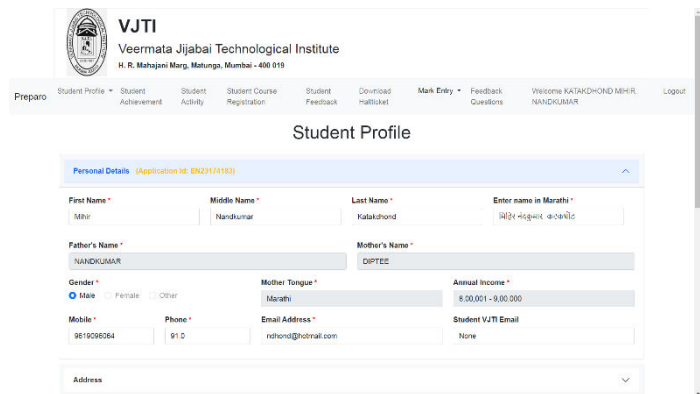

Figure 2: Student Login Page

Figure 3:Student Profile Page
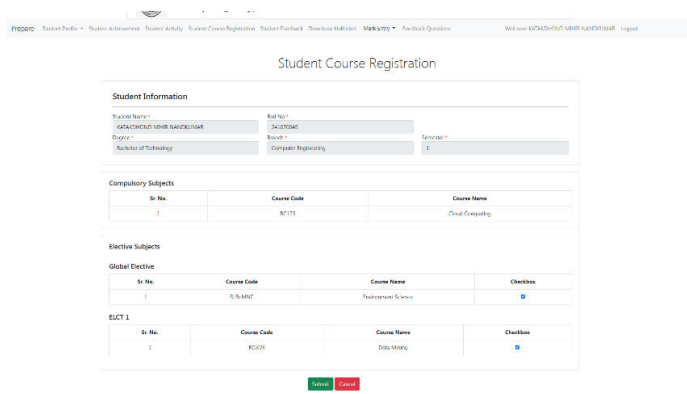

Figure 4: Student Course Registration

2. Examination Section Results
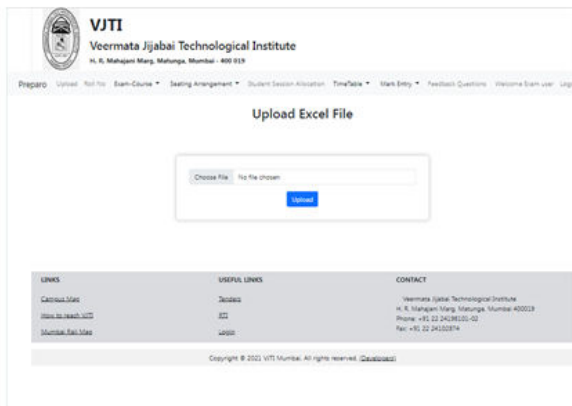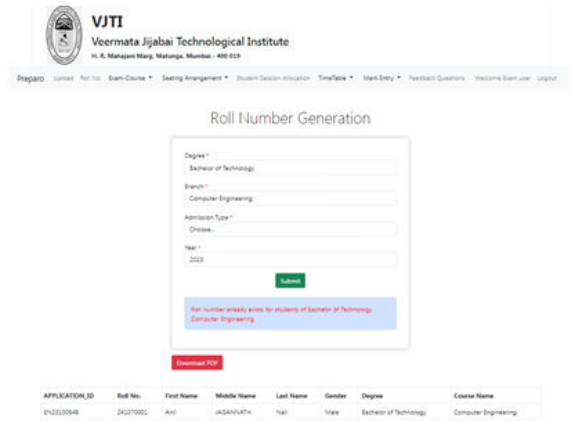

Figure 5: Landing Page

Figure 6: Student Data Upload
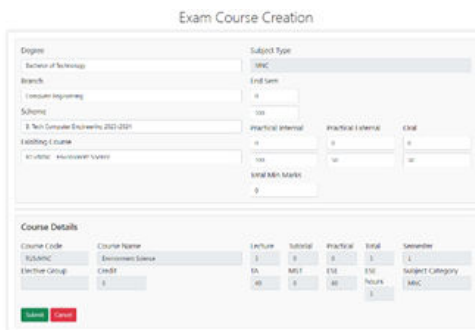

Figure 7: Roll No. Generation

Figure 8: Exam Course Creation
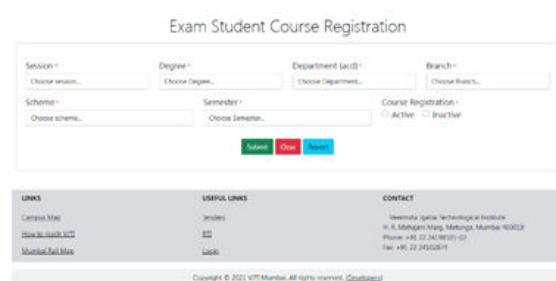
Figure 9: Exam Course Registration

Exam Slot Generation

Exam Type	Slot Name	Exam From:	Exam to:
Choose Exam	ex. 03:15 PM_to_04:45	Start Time	End Time

Submit

Existing Slots

Exam Type	Slot Name	Start Time	End Time	Action
MST	3:15 - 5:15 pm	3:15 p.m.	5:15 p.m.	Edit Delete
MST	10:00 - 12:00 PM	10 a.m.	noon	Edit Delete
ESE	10:00 - 1:00 PM	10 a.m.	1 p.m.	Edit Delete
MST	Morning slot	10:15 a.m.	11:30 a.m.	Edit Delete

Figure 10: Exam Slot Generation

Time Table Generation

Session	Degree	Branch
odd 2023-24	Bachelor of Technc	Computer Enginee
Scheme	Semester	Exam Name
B. Tech Computer I	Semester 1	MST

All	Course Name	Date	Time Slot
☐	RC123-Cloud Computing	dd-mm-yyyy	3:15 p.m. - 5
☐	RCel23-Data Mining	dd-mm-yyyy	3:15 p.m. - 5

Submit Clear

Existing Timetable

Timetable Name	Session	Degree	Branch	Semester	Exam Type
odd 2023-24 Sem 1 ESE	odd 2023-24	Bachelor of Technology	Computer Engineering	1	ESE
odd 2023-24 Sem 1 MST	odd 2023-24	Bachelor of Technology	Computer Engineering	1	MST
odd 2023-24 Sem 1 ESE	odd 2023-24	Bachelor of Technology	Information Technology	1	ESE

Figure 11: Exam Timetable Generation

Figure 12: Seating Arrangement Allocation (Exam room allocation)

Figure 13: Seating Arrangement De-Allocation (Exam room de-allocation)

Figure 14: Course Registration Report

Figure 15: Tabulation Report

2. Faculty Results

Figure 16: Mark Entry

Set Grades Range

Session	Course Name
odd 2023-24	RC5M12345 - Physics

Sr.no	Grade	Cutoff	Min Marks	Max Marks
1	AA	90	90	100
2	AB	82	82	89
3	BB	66	66	81
4	BC	54	54	65
5	CC	50	50	53
6	CD	45	45	49
7	DD	35	35	44
8	FF	0	0	34
9	RR	0		

Save

Figure 17: Grade Adjustment

VI. CONCLUSION AND FUTURE WORK

VJTI witnessed increase in effectiveness, resiliency, User success overall with the new test management system By transitioning to digital systems within the confines of our current ERP environment, we are able to work through problems such as: wasted paper, and data entry errors. Automated student management system Minimized e-postcard User Friendly attendance management Automated seating plan design

The example of this development emphasizes the necessity to utilize technology in the modernization of educational processes and is a sound solution for other institutions searching for a solution to the revision of their exam management process. Looking at the future, VJTI will carry out Business Process Reengineering (BPR) for streamlining their processes and will also look at improving and maintaining the ERP system. This means extending module functionality with mobile components, using AI for next-gen analytics, the list goes on.... We will also work to improve the performance of our systems, incorporate updates to improve the user interface and update security protocol, making sure our operations are secure and compliant.

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