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Architecting a Comprehensive Digital Infrastructure for Academic Institution

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ABSTRACT: A lot of schools have already begun implementing sophisticated ERP systems; nevertheless, these systems aren't as intelligent as they could be—they don't currently allow for cross-network communication. The need to use ERP in education was spurred by practical issues such as difficult-to-access data, difficulty locating original data, and numerous hours lost to manual data collection and rework. The study aims to assist VJTI College in solving these issues through the development of a new ERP system. It encourages data management, simplifying administrative tasks, and improving information accessibility. The system is build/developed using the Django framework, the goal of this system is to optimize the use of available resources, enable better decision-making using advanced analytics, and promote seamless departmental communication inside educational establishments.

As this ERP system advances, it could revolutionize VJTI's university administration procedures by facilitating ongoing information handling, simplifying ad hoc reporting, and promoting data-driven decision-making. The organization is dedicated to leveraging automation and strong digital technologies to improve operational efficiency and transparency by implementing Django. Future versions of the system will feature collaborative maintenance efforts and ongoing enhancements to maintain it adaptable and flexible enough to suit the changing demands of VJTI College.

KEYWORDS: ERP, education management, university management, university operations, digital transformation, efficiency, automation, integrated systems, academic technology, software solutions, higher education, student information, administrative processes, paperless transactions, digital transformation

I. INTRODUCTION

The making of the ERP system for the VJTI has multiple functionalities which enables the user to make use of multiple integrated methods to increase the working streamline of the college institution. Today the importance of the ERP system has become crucial to tackle with the daily issues. This article will study the VJTI's daily operation and its architecture of the ERP system. Also, VJTI college's implementation of an ERP system to address problems with data control, information accessibility, and challenging administrative tasks. The System was created with the Django framework, to maximise the resource allocation, improving the decision-making process and analysing the daily day to day work. Thus promoting for the smooth functioning of the academic activities amongst the student, teachers and other important people.

By introducing this system in place, it will be possible for managers at VJTI to manage the flow of information continuously, allow ad-hoc reports preparation; suppose take data-driven decisions when needed. The use of Django is indicative of an institution's conviction in leveraging robust digital technologies and automation towards achieving greater transparency and efficiency in its operations. Ongoing improvements and collaborative maintenance are part of future iterations required ensuring agility and flexibility that would match changing nature of tasks performed by VJTI college students today.

It is evident that architecting the VJTI's internal working as ERP will result into the change of the workflow for the administrators. This would be a huge change for the system but eventually be adopted by the people of VJTI By decreasing redundancy and speeding up reaction times, different departments may easily share and access vital information through a single platform. The system's analytics capabilities will facilitate proactive management and strategic planning by providing a deeper comprehension of operational patterns and results. This ERP system will serve as a solid foundation for the college's future growth, adaptability, and enhancement of the educational possibilities available to all.

II. LITERATURE SURVEY

Various research work related to higher education on enterprise resource planning (ERP) systems has developed many important discoveries and advances in this field. In ERP, courses in colleges and universities, Hu and Zhou (2011) proposed a three-dimensional teaching model that covers to integrate academic knowledge with practical implementations and gaining knowledge through it. This method improves students' preparedness for using ERP systems in real-world scenarios.

The main aim of Fan et al.'s (International Education Studies) reform of ERP in teaching sector was to better match industry demands with educational practices as well as encourage students to develop application-oriented abilities. The study showcases how crucial it is to provide students with the skills necessary to use ERP systems efficiently in work environments.

Pollock and Cornford (2005) carried out a huge work study and examined the implementation of ERP in higher education, which emphasizes the revolutionary influence on administrative procedures and institutional governance. Their research work greatly offers the importance of preparing graduates who can effectively navigate ERP systems in professional settings.

Abugabah and Sanzogni (2010) contributed a literature review paper on this topic which amalgamates existing research on ERP systems in higher education. Through their established effort, they have discovered a solid understanding of the adoption of ERP in academia by identifying important trends, obstacles, and consequences for employing ERP systems throughout educational institutions.

In a study published in the IJMB in 2011, Garg and Aggarwal compared the features of ERP and non-ERP institutes from the viewpoint of the professors. Their research looks at the advantages and difficulties of using ERP and clarifies how it affects instructional strategies and institutional performance over time. Their dedicated research looks at the advantages and challenges faced of using ERP and makes the people crystal clear on how it affects instructional strategies and institutional performance over time.

Sun concentrated on evaluating ERP system deployment success based on important success indicators. Their hard work and dedicated study provide useful recommendations for ERP project optimization in learning environments, also guaranteeing integration success and long-term operational results.

An ERP system specifically designed for college administration was created and put into use by Pawar (earlier known as G N Sapkal College of Engineering). The work study demonstrated on how ERP systems may be used in daily day to day life to improve institutional operations while also increasing efficiency in academic and administrative activities. Zornada and Velkavrh (ITI, 2005) investigated the methods and difficulties associated with putting ERP systems into place at universities. Their study covers efficient methods for handling organizational complexity, streamlining instructional operations, and managing ERP integration.

III. PROPOSED SOLUTION

Our goal for the creation of an Enterprise Resource Planning (ERP) system for VJTI was to improve the working and fill the empty space which was caused due to the nonexistence of the proper ERP system. Also to streamline the numerous time-consuming administrative and academic duties. The main goal was to develop and create from scratch a complete system that increases the administrative efficiency, data management, and information accessibility using the Django framework.

The main goal of our ERP system was to bring together functions like student enrolment into the academic system, student profile view, their course management, scheduling the exams, grading them for the subscribed courses, management of the resources and facilitate them with management into one cohesive platform. By doing this, we hope to reduce the need for manual processes and paperwork, making operations more efficient and accurate.

Specifically, flexibility and scalability of this framework played a significant role in the project selection of Django. This means that adaptation of separate modules for different functions was possible, and when done, it was always ensured that the modules could interface with each other seamlessly. These actions do not only facilitate management

of academic and administrative functions but are also essential for intelligent decision-making from data analysis and reporting.

It suggests that the system is laid down in such a way that will enable the institutions to have clear and coherent view of institutional data in the administrative and financial sectors, which should reduce the level of opacity. ,can bring a lot of positive impact toward the overall satisfaction of students, faculty and staff due to easy access on information and services. Speaking of the opportunities it creates, the systematic delegation of multiple tasks means that everybody can better dedicate their efforts to such efforts that advance the institution.

However, as with any project, this ERP system also had its own potential risks and issues that emerged throughout its creation and adoption. One of the biggest challenges was that the expenses accrued at the beginning of the project Read more about Social Media Integration: Challenges and Opportunities The High Costs First and foremost, the costs of integrating new software into an organization’s IT landscape are relatively high. But, minimalist and friendly user interface design as well as applications of the digital technologies and automation in order to increase the operational effectiveness and reliability has been our motto while implementing this project.

The future maintenance is as important as the current development because regular updates and mutual work will allow making the system as free-flowing as possible to fit the development of VJTI. It is not farfetched to expect improvements to the application in the form of compatibility with mobile devices and inclusion of Artificial Intelligence ability to help in analysing and predicting the optimal use of resources.

Just as it was the case with many other aspects in the business, it was not easy to go through the process of implementing the ERP system, but the process of deploying the system on Linux was not very challenging. While the first few steps of the implementation process proved to be challenging, particularly when it came to the level of synergy between the system under discussion and the already present network or hardware environment, using Linux, as a platform, had its benefits. The stability, security and scalabilities of Linux contributed to making deployment relatively easy while offering a stable framework under which the ERP system function optimally. This minimized deployment on Linux did not only enhance efficient running of the system but also ensured that the necessary platform for further development of the institutions system was well and strongly established.

Sr. No.	Functionality	Sr. No.	Functionality
1	Institution Profile	8	Course Registration
2	Staff Profile	9	Library Management
3	Student Profile	10	Staff Recruitment Platform
4	Feedback Mechanism	11	Payroll Management
5	Syllabus	12	Research and Development Consultancy
6	Grade / Mark Entry	13	Time Table
7	Staff Management	14	Ad hoc Reporting

IV. RESULTS

Based on the created ERP for VJTI, the technical advances specifically the ERP system plays a major role in the enhancement of the smooth running of the administrative and the more so the academic functions. What was heretofore a series of disparate applications for student enrolment, course creation and delivery, exam scheduling, grading, resource tracking, and financial management are now part of one unified platform. This integration has provided the benefits of actualizing workflow, eliminating much paperwork, and enhancing information disclosure and comprehensiveness.

Key Achievements:

Increased Efficiency: There are numerous ways and areas where this system has minimized or removed the uses of writing and paper work in the organization.

Improved Data Accessibility: Improved accessibility of data within students, faculty, and administrators to enable increased transparency of the system.

Better Decision-Making: Business intelligence and knowledge management tools and enhancements enable better decision-making and detailed planning.

Enhanced Collaboration: One key area that has been enhanced in relation to communication and co-ordination across the academic departments is as follows.

User Feedback:

The feedback from the users, such as student, courses instructors, and other staffs, are positively perceptive. The customers have been receptive to the concepts in terms of user interface, convenience and quick and easy access to information and minimizing production of duplicate work and optimizing response time.

System Overview Diagram:

ERP System Database Design This is general view of the ERP systems' database where the important core modules are presented with the lines indicating how they are connected.

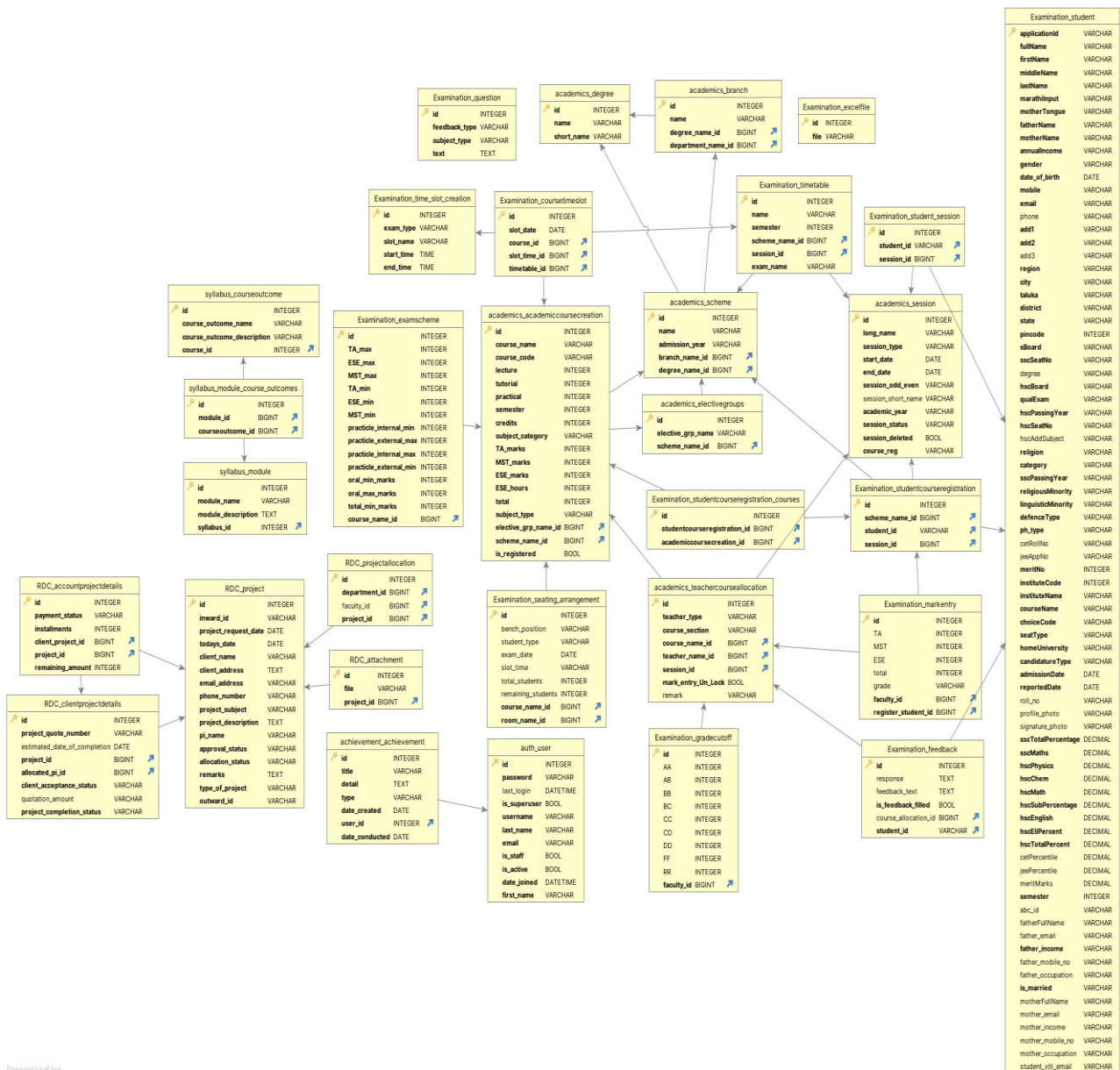


Figure 1: ERP System Architecture

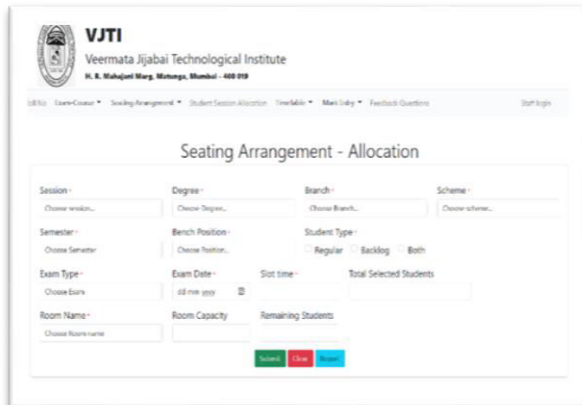


Figure 2: Student Seating Arrangement

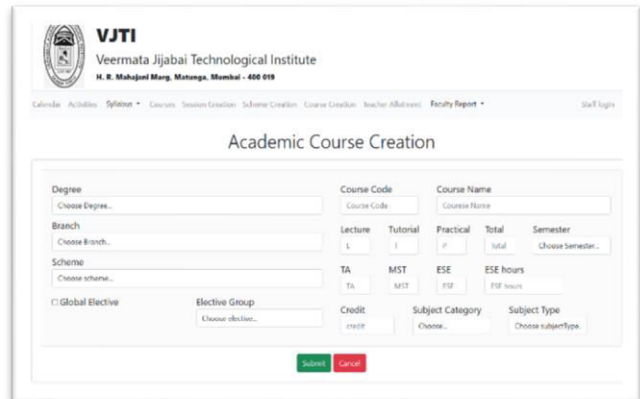


Figure 3: Academic Course Creation

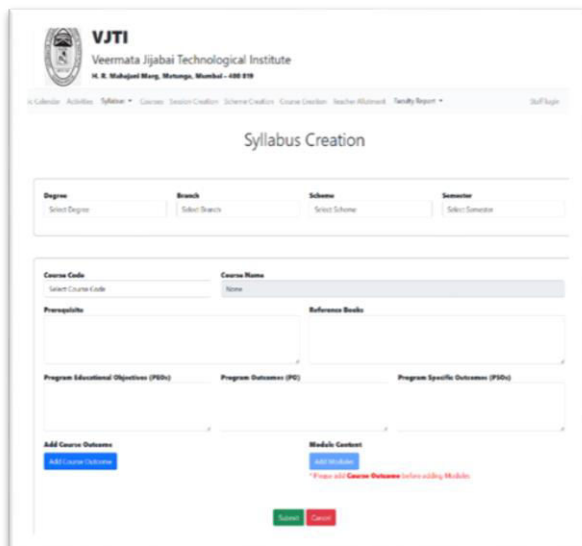


Figure 4: Syllabus Creation Module

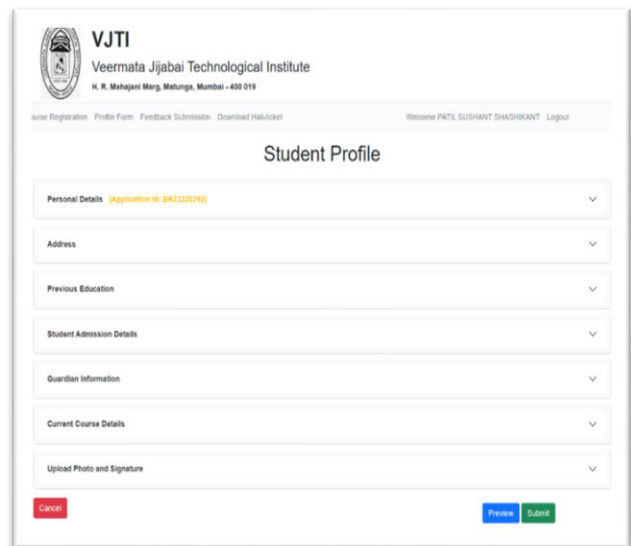


Figure 5: Student Profile View

V. CONCLUSION AND FUTURE WORK

The future of maintenance and additional developments which need to occur in VJTI's ERP system will include adding more modules to the ERP system, making the ERP System mobile and using artificial intelligence in analysis of the ERP system. Stable operation and security are achievable through performance-tuning and optimized UI solutions as well as updated security features and key compliance measures. User education packages, User Support, and efficient Reporting capabilities will ensure easy implementation and rationally efficient usage. Feedback loops, routine updating, and ongoing communicative work with educational intuitions and other open-source communities will dictate further development cycles.

To make the ERP system future-proof, portable, and always in line with the latest advancements and trends such as cloud migration the key objectives would be in the following: Thus, considering the best optimization approaches we hope to keep the ERP system scalable and more importantly flexible to address VJTI's future needs and support the institution in achieving its goals and strategic directions.

At VJTI, while they are tomorrow implementing the ERP system with higher features added to it, they have also planned to fix the system for updates periodically. These updates will maintain accuracy of the system as they will help in covering the increasing needs of the institution.

Besides simple applications' updates that are the main focus of maintenance, the current phase should incorporate new

possibilities specifically for the system's improvement. These features are being progressively incorporated to promote the maximization of administrative performance, efficiency in data handling and management plus other related organizational performances.

In this way, the ERP improvement strategy of VJTI can be considered as based on the primary focus on maintenance as well as on enhancements of new features, which allows the establishment of a strong ERP framework that will be aligned with the strategic goals of the institution. This approach also tests the institution's ability to benefit greatly from a well implemented and managed technology based project, where efficiency and flexibility is guaranteed from into the future with a functioning ERP system.

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