An experimental study of the problem, solution and implementation spaces of an integrated ERP system in Educational Institutes

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Abstract: This research study endeavors to identify the problems associated with selection of an ERP system in Higher Educational Institutes (HEI) with the aim of obtaining solutions to these common but imperative challenges. Furthermore, this study also determines means to increase impact and transformation abilities of existing ERP systems in the universities, the benefits to the various users and means to achieve optimal satisfaction from the system usage. In the Education sector the dynamics are rapidly changing and only those ERP systems can operate properly which can consolidate and transform to meet the varying needs of its diverse users. This problem also requires a long-term solution which the research study is investigating within its domain. The various stakeholders identified for the purpose of this research study in HEI context are students, staff (administrators /managers /technical) and academics.

Keywords: HEI-Higher Educational Institutes, IT-Information Technology

I. INTRODUCTION –ERP IN EDUCATIONAL INSTITUTES

The selection and implementation of ERP systems is a highly costly and time consuming process. There are numerous Educational institutions around the world that have adopted these systems but have been unsuccessful in fully realizing their benefits. There are many organizations that have even given up their adoption process midway after heavily investing into it due to unforeseen and uncontrolled factors which have resulted in failures.

This research study endeavors to identify the problems associated with selection of an ERP system in HEIs with the aim of obtaining solutions to these common but imperative challenges. Furthermore, this study also determines means to increase impact and transformation abilities of existing ERP systems in the universities, the benefits to the various users and means to achieve optimal satisfaction from the system usage. In the Education sector the dynamics are rapidly changing and only those ERP systems can operate properly which can consolidate and transform to meet the varying needs of its diverse users. This problem also requires a long-term solution which the research study is investigating within its domain. The various stakeholders identified for the purpose of this research study in HEI context are students, staff (administrators /managers /technical) and academics.

II. RESEARCH BACKGROUND AND MOTIVATIONS

Identified issues for Indian large enterprises issues are proved to be crucial in India but not for large enterprises such as proper system implementation strategy,   clearly defined scope of implementation procedure, proper project planning and minimal customization of the system selected for implementation, because of some limitations faced by the Institutes / Universities. System is branded as a success or a failure is a judgment, usually made at some point in time by one or more people with the benefit of hindsight. Most people, for example, consider that the new system at Heathrow airport's Terminal 5 was a failure when it opened in 2008. Now, however, that same system (more accurately, system of systems) is operating successfully with few reported problems on a day-to-day basis. The judgment of whether a project has 'failed' is not a simple yes/no decision. It is common for systems that initially did not live up to expectations to evolve over time to deliver useful services.

However, management usually regard a project tends as a success if it meets three high-level criteria like
1)   It should be delivered on time
2)   It should be delivered within budget.
3)   It should deliver the expected functionality.

Lesson learned from previous other project one should try to reduce the failure rates of ERP systems implementation projects is to build, both failures and successes. In the educational sector's dynamic and rapidly changing environment any Institution's competitive edge is determined by its quality of research and information systems by students and staff both. This research study aims to provide educational institutions with a better understanding of the functional issues, benefits and challenges of ERP systems. This study will provide the HEI with a better understanding of the complexity in ERP selection, post-implementation functionality and usage. The ERP systems are the largest software application packages that are implemented in the universities with a considerable commitment of its various resources. In the opinion very limited research has been conducted in a university setting as compared to other environments.

At present, the ERP systems are entrenched in the various activities and processes of the HEI such as research, academic, administration, finance and registration etc. and the majority of these institutions use the systems to enhance efficiency and increase effectiveness of routine work. The common challenge to all the HEI is the system's ability to change and modify according to the different requirements and growth of the institutions. The research findings of this study will also contribute to the institutions' future strategic vision

III. PROBLEM SPACES-IDENTIFIED FROM LITERATURE REVIEW

J. Hughes., R. Beer published article on A study of ERP security issues produced a checklist that shows institutions what to look for while letting vendors know what campuses consider important[10] Most of the attendees manage large enterprise systems, including ERPs, at their home institutions, and they recommended that institutions develop a comprehensive enterprise approach to security prior to ERP procurement. This enterprise approach, they noted, should be designed to include the ERP and its associated products, as well as other current (and future) enterprise systems such as course management, e-mail, building-access management, and the myriad other systems that have assumed enterprise-level importance. The task force recommends that any higher education institution issuing a request for proposal (RFP) for a new ERP include a requirement that the vendor explain how the ERP will work with the institution's to prevent security flaws in the ERP. The researcher finds that before implementation of any Educational ERP in the organizations the security checklist has to be prepared along with the vendor's recommendation and myriad other systems that has to be integrated with the enterprise system.

A. Ahed., S. Louis published their article on A study of ERP security issues produced a checklist that shows institutions what to look for while letting vendors know what campuses consider important[1] - The amount of investment in these ERP systems has been substantial. In the last few years higher education institutions spent more than 5 billion in ERP investment. The aim of ERP implementation in universities is to provide colleges, schools and departments, with an enhanced ability for research and teaching at reasonable or low cost. Unfortunately however, it has been claimed that as many as 60% to 80% percent of all ERP systems fail to meet expected outcomes, while other implementations did not improve performance with users explicitly expressing dissatisfaction with performance. In light of these facts and due to the significant investments of resources made by organizations to adopt or shift to ERP system, researchers have a strong desire to explain the causes and the factors that lead to good performance with ERPs, what factors influence implementation success and failure and the reasons behind the problems that occur with the

implementation of ERP systems. The Researcher has to study the amount of investment in implementing Educational ERP in Colleges / Institutes / Universities and percent of ERP system failure to meet the expectation. The researchers should find out the causes and factors and explain to the stakeholders.

M. Davis., Z Huang published their research paper on ERP in Higher Education: A Case Study of SAP and Campus Management[16] - This case study examines the application of ERP software to the student information management in higher education at a Midwestern university that has replaced its legacy software with an ERP system. This paper also explores critical success factors (CSF) for a successful ERP implementation discussed in the literature. In addition, this paper investigates user acceptance of this new system specifically examining the staff attitudes, concerns expressed and comfort level for the average user. As per author the Impact/Effect of Specific Groups on Implementation Success depends on groups like Top Management, Academic administration, Financial administration, Human resources, Academic Departments and their direct supervisor but the researcher has to study the impact on those groups as well as the vendors group of people who are involved in success of implementing ERP in Colleges / Institutes / Universities.

P. Frantz., A. Southerland. and J. Johnson published their research paper on ERP software Implementation Best Practices[21] - There is no shortage of reports about failed ERP software Implementations in business and industry. Higher educations simply do not have resources to cushion themselves from failed implementations, so administrators would be wise to conduct and support research to discover what works best. The study highlights the importance of campus leaders understanding the complexity of the implementation process and managing the changes that occur. Higher education institutes / universities choose ERP software for the same reasons as business and industry - to operate more efficiently and effectively in order to remain competitive. Also like business and industry, higher educational Institutes / Universities must be capable of enabling organization change as part of the reengineering process. This study focus on the same reasons as business and industries implementing ERP software in the organization. The same level of competitiveness is between business, industry and higher educational institutes / universities for to operate more efficiently and effectively there is need of implementing Educational ERP system.

D. Allen., T. Kern., M. Havenhand published article on ERP Critical Success Factors: an exploration of the contextual factors in public sector institutions[3] - New information technologies have brought public sector higher education institutions (HEIs) into increased competition, while their government funding in parallel has been continually eroded. In response to these growing pressures, there has been a call for HEIs to improve operational efficiency and to reduce duplication of resources by implementing advanced information systems that span the institution and improve processes. In response HEIs turned their efforts to implementing complex ERP systems.
The findings suggest that a careful use of communication and change management procedures to handle the often business process reengineering impact of ERP systems can alleviate some of the problems, but a more fundamental issue concerning the cost feasibility of system integration, training and user licenses may, in the end, impede ERP system utilization.
Critical Success factors of ERP Implementation are
- Strategic: Legacy systems, Business vision, ERP strategy, Top management, support, Project, schedule/plans.
- Tactical: Client consultation, Personnel, Business process, change and software configuration, Client acceptance, Monitoring and feedback.

The researcher will take this concept not only for the private educational sectors but also to the government and funded educational sectors were the outcome of this will be different for different scenarios.

J. Noguera., E. Watson published their article on Effectiveness of using an enterprise system to teach process-centered concepts in business education[12] - This article investigates whether the students' performance, self-efficiency, and satisfaction are enhanced by the use of an enterprise system as a support tool for learning business process and enterprise systems concepts. This also talks about traditional instruction method and second and third methods are based on computer based learning by giving full access to the students and simulation access through ScreenCam movies.
The information collected can be used to build a body of student-learning process knowledge in the context of operational decision making involved for planning and executing utilization of ERP System.
The researcher has identified that whether the use of traditional and computer based with hands on experience and simulation process run parallel for learning system will help the organization to come up with accurate / correct Information.

Y. Kim., Z. Lee., S. Gosain published article on Impediments to successful ERP implementation process[38] - This article talks about the one common issue faced by all organizations, which is that EERP software lacks some functionality to support existing business processes. Less successful organizations faced more problems with system expertise (perceived complexity of ERP software and only a few people in the organization with adequate understanding) and organizational support (lack of organizational change management expertise and managers not using system-oriented information to improve organizational performance). Relatively more successful organizations face issues of frequent ERP upgrade and a lack of human resources in terms of project implementation. This also provides insights for enterprises about the impediments they can expect to encounter in their enterprise system implementation projects. Our results suggest that, as is supported by anecdotal evidence, enterprises have not achieved significant success in implementing ERP systems. CIOs attribute problems with ERP projects to functional units frequently changing their requirements, not committing their human resources to the project teams, and not communicating enough with the project teams.

The researcher has to understand relatively more successful educational organization, as compared to less successful educational organization, make functional coordination a very critical issue, while less successful educational organization make software issues more critical.

P. Ifinedo published article on Impacts of business vision, top management support, and external expertise On ERP success[23] **-** The purpose of this paper is to investigate the impact of such contingency factors as top management support, business vision, and external expertise, on the one hand, and enterprise resource planning (ERP) system success, on the other. It was found that the three contingency factors positively influence ERP system success. More importantly, the relative importance of quality external expertise over the other two factors for ERP initiatives was underscored. It is argued that ERP systems are different from other information technology implementations; as such, there is a need to provide insights as to how the above mentioned factors play out in the context of EERP system success evaluations for adopting organizations. As was predicted, the results showed that the three contingency factors positively influence ERP system success. More importantly, the relative importance of quality external expertise over the other two factors for ERP initiatives was underscored. The implications of the findings for both practitioners and researchers are discussed.

This article gives Researcher the future scope about efforts could examine the effects of other contingency factors such as organizational culture and structure on ERP system success. A large data sample should be sought. The study underscores the relative importance of external expertise over the other factors, it would be useful if future studies investigated what the qualities and attributes of a good provider of external expertise are. Also, efforts could aim at discussing the theme from the perspective of organizational size. The researcher identifies that studies could investigate other enterprise systems, e.g. CRM in educational / universities level. Such an exercise would increase our knowledge about the impact of relevant contingency factors on complex IT systems and would serve the adopters of such systems well regarding the sorts of factors to pay attention to in order to enhance the success or effectiveness levels of such systems. The study also identifies the impact and comparative study of EERP and Non-EERP Systems.

L. Dyk published article on **A** Data Warehouse Model for Micro-Level Decision Making in Higher Education[14] -   Despite the availability of powerful computers, advanced network and communication infrastructures, and sophisticated software applications, university decision makers, still lack access to the critical information necessary for informed decision making. Business intelligence entails the gathering of data from internal and external data sources, as well as the storing and analysis thereof to make it measurable, so as to assist and sustain more efficient and decision-making. Considerable amounts of information and data are available and used to evaluate the effectiveness of the processes. The researcher will find the micro-level decision making for Colleges / Institutes / Universities with the help of Educational ERP (EERP) after implementing Business Intelligence (BI) on gathered information from internal and external data sources.

M. Joseph., M. Firestone., W. McElroy published article on Doing knowledge management", The Learning Organization[17] - This article tells about the importance of Knowledge management (KM) as a field has been characterized by great confusion about its conceptual foundations and scope, much to the detriment of assessments of its impact and track record. How to contribute toward defining the scope of KM and ending the confusion, by presenting a conceptual framework and set of criteria for evaluating whether claimed KM interventions are bona fide instances of it or are interventions of another sort. This paper also includes conceptual evaluation and critique of a variety of types of "KM interventions" and presentation of a detailed analysis of an unambiguous case where KM has been successful. The critical analysis indicates that the use of tools and methods associated with KM does not imply that interventions using them are KM interventions, and most "KM projects" are probably interventions of other types. The analysis also illustrates a pattern of intervention   that can serve as the basis of a long-term systematic strategy for implementing KM.
The researcher finds that the strategies and tools used for sharing knowledge Management using enterprise resource planning should be used for solving the organizational problems and performance.

G. Joseph., A. George published their article on ERP, Learning Communities, and Curriculum Integration[7] **-** Through the SAP University Alliance, has achieved substantial progress in encouraging several universities to incorporate ERP into the business curriculum (Fernandez et al. 2000). However, introduction of ERP in education is a major investment in time and money. Technology is characterized by volatility and change. There is increasing pressure on ERP vendors to continue to innovate and modify products as new products are introduced into the market (Borck 2001; Shah 2001). Therefore, investments in ERP made by universities need to be carefully evaluated. Justification for the introduction of ERP is dependent on the long-term impact on pedagogy. That is, even after ERP systems are no longer the state-of the art, will using ERP as the basis of business education meet the objectives of pedagogy? This article argues that ERP systems

help to address some challenges facing business education. These challenges can be understood from pedagogical and epistemological perspectives. Colleges are encountering challenges in pedagogy, particularly in enabling students understand, retain and apply material appropriately. In addition, knowledge areas in business education have been criticized due to the widening gap between academe and practice. The divisions between functional areas in business education, particularly in higher levels of education, also contribute to a blurred vision of the broad and interlinked aspects of business activity. ERP systems and learning communities applied to business education have the potential to address these challenges.

The researcher has to identify the environment of business and the challenges to be faced by the organization / Institutes and further follow the way of imparting the knowledge to the stakeholders of EERP.

M. Davis., Z. Huang published article on ERP in Higher Education: A Case Study of SAP and Campus Management[16] **-** Enterprise Resource Planning (ERP) software has been applied to industries to support financial accounting, procurement, human resources, customer service management and supply change management. Recently, it is being promoted to new areas, for example, higher education. This case study examines the application of ERP software to the student information management in higher education at a Midwestern university that has replaced its legacy software with an ERP system. This paper also explores critical success factors (CSF) for a successful ERP implementation discussed in the literature.

The results listed in Table 2 reflect the highest percentage of responses the average user's perceived had an impact on the success of the ERP implementation at the university studied. The largest impact is perceived to be in both the academic administration   and financial administration departments. It should be noted that at the university studied, both the financial and human resource modules of software were first to be implemented, but the average user feels the human resource department had no impact on the implementation success. In addition, it should be noted that 32% of the average users perceived their direct supervisor had no effect on the system success. This factor could also negatively impact a sense of personal "buy-in" of this new Campus Management system.

IV. SOLUTION SPACES-EERP

- Educational ERP solutions support all processes from front office to back office – including those involving prospects, students, and alumni, as well as financials, operations, procurement, human capital management, reporting, and analytics. Support for integrated workflow results in fast, organized, and productive management processes across the campus and research community.

- Students, faculty and staff with information and processes – Many higher education and research organizations spend the bulk of their IT budgets on maintaining existing infrastructure and integrating heterogeneous systems, leaving few resources for innovation. Educational ERP system platform integrates your students, faculty, and staff with information and business processes while reducing complexity and cost.

- Meeting compliance and governance requirements – Educational ERP allows you to meet demands for accountability and financial transparency with executive dashboards, alerting and reporting, security and identity management, content and records management, and workflow and business-process management. Deploying a common platform helps you meet risk mitigation objectives and comply with directives.

- Promoting a relationship-focused mind-set with constituents – Educational ERP solutions help you improve the efficiency of communications with various stakeholders and foster a focus on your constituents, such as students, faculty, alumni, and suppliers. In today's competitive academic environment, organizations must differentiate themselves by providing personalized, timely and easily accessed information.

The result is better management of campus activities, student life cycle, research, grants, financials, operations, human capital, procurement, and assets.

V. IMPLEMENTATION SPACES-EERP

Educational ERP system developed under different environment which can be suitable for Institutes which are going to implement and ensure the desired availability of IT resources to end-users whilst ensuring maximum cost reduction. To understand some of the possible architectures this comes under one of the following are:

Single Location

This is the solution when you are planning to install EERP in a single office only with single User connected to same machine or all the Users connected to the server using the LAN.

- **Standalone**
- Single server configured as Application and Database with backup devices
- User access the ERP on same machine.
- **LAN**
- Single server configured as Application and Database with backup devices
- Users access the ERP using the Browser over the LAN.

Multiple Locations

Software only at Central Server with central server at ISP

Here you can run the entire process through a single Application server and single database server **located centrally at the ISP premises,** irrespective of the geographical location and number of Users at HO/Different Campuses/Students etc. Different locations access the software at the central location. No copy of software is installed at individual locations. **Here for all locations, it is necessary to be connected to the internet while doing transactions.**

- **Software only at Central Server with central server at Head Office (HO)**

Here you can run the entire business through a single Application server and single database server located centrally at its HO premises, irrespective of the geographical location and number of Users at HO/Different Campuses/Students etc. Different locations access the software at the central location. No copy of software is installed at individual locations. Here for all locations except HO, it is necessary to be connected to the internet while doing transactions.

- **Software also at other locations with Data replication on central server using Internet**

Here each location will have Software and database installed on their local server. Each location will operate independently of other locations. At the end of the day, these locations will replicate the data on the central server using the internet/direct-dial-up by replication technology. Here it is not necessary to be connected while doing transactions. So this model permits offline data entry.

VI. CONCLUSION

The implementation of ERP system has been continuing to grow in the public and private sectors and hence there is need of implementation of Educational ERP in educational sectors. It is also important that organizational leaders understand the issues with which they could be faced when implementing EERP. This study explore on different factors which affects EERP implementation in the educational sector. Educational ERP provides the platform for Institutes to progress from a paper centric to process centric organization. It also provides tools to automate the key academic processes and it provides means of measuring the throughput of the processes through numerical and graphic reports. Academic processes will be streamlined, leading to smooth and fast functioning. Model suggested by researcher will be more cost effective and hence more Institutes can buy it. Decision making ability of management goes up, as a result saving time and enhancing effectiveness. Reduce human errors

and efforts. Information from this study may be useful in determining how well the needs and expectations of other Universities/ Institutes have been met when implementing EERP

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