

ENTERPRISE RESOURCE PLANNING (ERP) SYSTEM IN HIGHER EDUCATION: A LITERATURE REVIEW

Prof. Balasaheb Ningappa Bhamangol

Sinhgad Institute of Management, C/8, Chandrama Residency, Near Sun City, Sinhgad Road,
Manikbaug, Pune – 411 051, Maharashtra, India

balasaheb99@yahoo.com

Dr. Vilas Dattu Nandavadekar

Sinhgad Institute of Management, 44/1, Off Sinhgad Road, Vadgaon (Bk) Pune – 411 041.
Maharashtra, India. vilasn073@yahoo.co.in

Prof. Sunil Hanmant Khilari

Sinhgad Institute of Management, 44/1, Off Sinhgad Road, Vadgaon (Bk)
Pune – 411 041, Maharashtra, India.

sunilkhilari@hotmail.com

ABSTRACT

ERP systems are the largest integrated software applications adopted by universities, along with quite significant investments in their implementation. However, unlike other applications little research has been conducted regarding these systems in a university environment. This paper aims at the impact of in-house and vendor or consultant's specific groups and different skill sets for implementing ERP Systems in Higher Education. The researcher also focuses on benefits, security check lists and percentage of customization of Educational ERP system, based on ERP system literature review in Higher Education.

Keywords—Enterprise Resource Planning System, Higher Education, Implementation, Specific Groups, check lists and Business Intelligence

I. INTRODUCTION

India has more than 100 million people in the 18-24 yrs age group. Only 10% of these have access to higher education. For an economy that is growing at 9% and more projected to grow even more rapidly, and with an industrial growth of over 10.4 %, the need for skilled work force and trained graduates is estimated at 750000 annually. To achieve this, the quality and quantity of education institutions needs to be augmented. With this in mind the government of India set up an advisory body –The Knowledge Commission in 2005 with a view to bridge this gap and makes India a knowledge powerhouse [1]. To measure such quality, performance requirements and competitive education environments the pressure has built on organizations to adopt new strategies in order to improve performance. The higher education sector has turned to Enterprise Resource Planning (ERP) systems in the hope of helping them to cope up with the changed environment. To achieve more efficiency and accessibility for all members and improve end users performance by providing better managerial tools [2].

Despite the availability of powerful computers, advanced network, communication infrastructures, sophisticated software applications, university decision makers, still there is lack of 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 decision-making [3]. The ERP systems should provide micro-level decision making analysis for the management of organization which will help them to take corrective action to the problems occurred.

Educational ERP systems are most expensive that the management of organization will ever think of implementing the systems [3]. Looking at the costs of hardware, software, network upgrades, staff time, training and consultants an ERP system may cost around Rs. 20-50 lakh to implement depends upon enterprise architecture. More amounts are spent on getting the same level of information to the management. Due to huge cost overrun of ERP systems there are chances that implementation may fail as legal action taken against the ERP vendors or consultants by the organizational management.

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 [4] but the impact also depends on third party service providers like vendors or consultants and their specific groups like – Top management, Domain Experts, Project Executors, Human Resource and Financial Administration who are involved in success of implementing ERP in Colleges / Institutes / Universities.

Before implementing any ERP systems in educational Institutes they must develop a comprehensive security enterprise approach prior to ERP procurement [5]. This enterprise security systems will be implemented to ERP Systems and its associated third party product as well as other current futures such as e-mail, building-access management and the myriad other systems that have assumed enterprise-level importance [5].

The evolutionary nature of ERP usage should be increased from individual – collaboration – business partners – assist in a organization for Enterprise Edition as shown in figure 1 [15].

Figure 1: Organizational Enterprise Edition

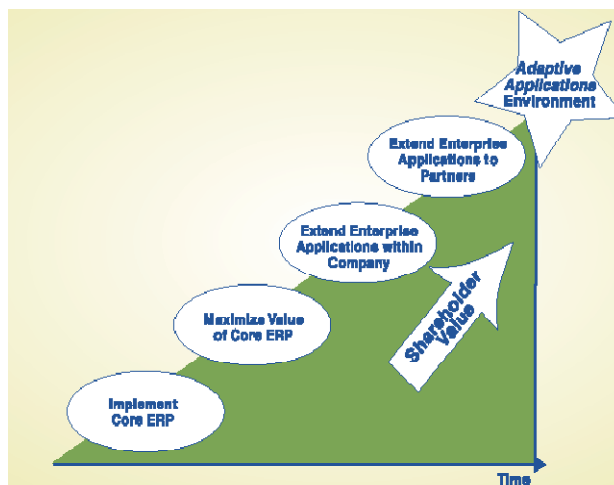


Figure 1: Source: Ernst and Young (2002)

II. SIGNIFICANCE AND CONTRIBUTION

The Meta Group reports that as many as 70% or 7 out of 10 ERP projects end in failure, which is two and half times the industry average (Lewis, 2001). A Computer Associates survey of 886 managers reports 44% of ERP projects lose \$1 million per year, 35% lose \$5 million per year, and 21% lose \$11 million per year (Dryden, 1998). Other causes of ERP failures include inexperienced analysts, long work weeks, poor communication, lack of employee involvement, incentives and management support (Barker & Frolick, 2003) [6]. AMR Research recently reported that ERP is regaining momentum. The latest data shows the market for ERP will grow from US\$ 13.4 billion in 2003 to a projected US\$ 15.8 billion in 2008, a compounded annual growth rate of 3% [8]. However little research had conducted on educational ERPs in a college / Institutes / Universities environment compared to other ERP systems environments. As college / Institutes / Universities differ from each other they need different environment and customized ERP systems to meet their expectation. The activities of educational institutes will be done through ERP systems for interacting with students, faculties and Management. This ERP system can give better information to the students and e-learning environment which will help to improve quality and performance of educational systems. The core part of these issues centralizes the study's aim on whether or not the system improves user performance, and also whether ERP systems meet staff requirements in higher education environments [6]. To study users' performance efficiency and effectiveness of educational ERPs for accessing the accurate and timely data so as to take the right decisions by taking micro-level various MIS reports. However, higher education institutions do not realize the significance of the ERP systems because of the very few successful implementations and adoption of these applications [6]. To study significance of pre-post implementation security check list, so as to fulfill the requirement of hardware, software, networks and third party service provider's integration with the existing and new ERP systems before ERP procurement. The impact of sharing knowledge with the help of ERP system from different sources - i) institutional values ii) employees' personal belief and their practices [7] and third party information providers like parents and industries. An ERP system requires significant commitments of money, time and human resources from departments across the colleges / institutes / Universities. Many institutions experience a sense of excitement in anticipation of the benefits that come with a modern ERP system [9].

III. LITERATURE REVIEW

Over the last 10-15 years, organizations have been in growing numbers, turning to ERP (Enterprise Resource Planning) systems to consolidate their information technology infrastructure, streamline business processes, and help them become more efficient and effective. The ERP software market has been very lucrative for both software developers as well as consultant firms. These systems are very large and complex, and as such, often require expert assistance for successful implementation [10]. Indeed, existing ERP research has neglected the higher education sector worldwide, even though most universities have implemented or are in the process of implementing an ERP system [2].

ERP systems tend to be very expensive, take a relatively long time to implement, and the massive task can sometimes take its toll on the staff tasked with its use and implementation [10], [8], [5][2].

There is more pressure to change business processes than in the past. These pressures include the need for long-term cost reductions, increased customer demands, increased competition for students and potentially, more governmental regulations. While some short-term cost reductions such as hiring freezes and budget reductions have been implemented, institutions will need long-term strategies to control costs [13].

There are “fuzzy” or unclear boundaries between universities, Institutes and other kinds of organizations, and while it is widely accepted that they engage in many of the same activities as others, they are still thought of as something a “bit different”. Rather than try to put forward a definitive account of the identity of the university, we have described how ERP systems create tensions regarding this unique identity [11].

Universities who have worked very hard to develop ERP curriculum are now in dilemma of evolving their curriculum to reflect the evolution of ERP systems and industry requirements [12]. Institutes that are achieving the highest level of process performance use more than just ERP implementations to improve their business processes. They are achieving above – average results by combining the functionality of ERP with the analytical capabilities of business intelligence tools and the self-service capabilities of the Web. And they are using these technologies to link transitions end-to-end and across departments [13].

It has become extremely difficult to understand how to securely configure an ERP system and the myriad of products purchased to integrate with it—products like report generators, data warehouses, learning management systems, imaging systems, portals, and others [5].

The overhead of managing access and authorization roles—for both the ERP and third-party software integrated with the ERP—is huge. Institutions said they had backed off from using role-based security because the overhead of managing it was just too high [5].

Check List before and after procurement of ERP System

The desired features to be checked before implementing ERP system in Higher Education are as follows:

- Have you found that you can encrypt and decrypt the data which institution desired to without affecting the performance of the system?
- Have you found that you can put check on as many fields as desired without degrading performance?
- Do you feel that creating duplicate records during data entry is not so easy as to cause concern about the integrity of the data?
- Have you found that the systems the vendor provides to avoid the creation of duplicate records work well and are not so cumbersome or so detrimental to system performance that your institution declined to use them?
- Do you find it relatively easy to deactivate access to the system for a user? [5]
- Have you found that the hardware, software and network accesses used currently may fulfill the requirement for more than decade?
- Have you found that this system will work with myriad product of other vendors?
- Do they provide any training and maintenance part of the systems implemented in Institutes?
- Do they provide advance level-up gradation with new policies, Technology and challenges adopted by the management of Institutes?
- Do the vendors go for customization of ERP system as per the need of Institutions with different environments?

Need of Customization

Those issues that are only critical to the organizations are listed below:

- Clearly defined goals and scope of implementation
- Proper project planning
- Proper implementation strategy
- Minimal customization [15]

Customization is the process of extending or changing how the system works by writing new user interfaces and underlying application code. Such customizations typically reflect local work practices that are not currently in the core routines of the ERP system software [14]. Examples of such code include early adopter features (e.g. mobility interfaces were uncommon a few years ago and were typically customized) or interfacing to third party applications (this is 'bread and butter' customization for larger implementations as there are typically dozens of ancillary systems that the core ERP software has to interact with). The Professional Services team is also involved during ERP upgrades to ensure that customizations are compatible with the new release. In some cases the functionality delivered via a previous customization may have been subsequently incorporated into the core routines of the ERP software, allowing customers to revert back to standard product and retire the customization completely [14].

Customization of the ERP software package should be avoided, or at least minimized as much as possible, in order to achieve the full benefits of the ERP system. This is because customization will increase the project time, ruin schedules, introduce new bugs into the system, and make the upgrade to the vendor's new released software harder [16].

As ERP system are designed for generalized for all the organization and there is less scope for customization due to complexity and expensive for implementation. Customization of the ERP system is limited and can be extended till there is no change in the structure of the ERP system. Change in structure of the ERP system means that the requirement of customization is more and there is a need of requirement analysis, planning and freezing the specifications. The top management has to play an important role so that communication with the vendors should be single point of contact for avoiding further implication.

The success of ERP implementation depends on specific groups [14]

Table 1: Impact of Specific Groups on Implementation Success

Group	Level of impact on success of implementation
Top management	28 % -- had a high effect
Academic administration	32% --greater than average Effect
Financial administration	32% --had some effect
Human resources	20%--had no effect
Academic departments	28%--had some effect
Their direct supervisor	32%--had no effect

The author has suggested the specified group from the organization where the ERP is going to be implemented apart from this the researcher has thought of vendors specific groups which can be equally important for the success of ERP implantation at customers side. The vendor specific groups are as shown in figure 2:

Figure 2: Vendor Specific Groups



Top Management – CEO, Delivery manager and Project Manager

Domain Experts – Expert level people in operation and its working of Educational Institutes.

Project Executors- Team Leader, Programmers, Testers and maintenance Team Members

Human Resources - Allocation of projects for proper employees.

Financial Administration – Proper allocation of funds i.e. Total cost of the project.

Benefits of implementing ERP system

- Improved management decision making
- Ease of expansion/growth and increased
- Increase productivity
- Headcount reduction
- Improves access to accurate and timely information
- Enhances workflow, increases efficiency, and reduces reliance on paper
- Tightens controls and automates e-mail alerts
- Provides user-friendly Web-based interfaces
- Streamlines processes and eases adoption of best business practices
- Establishes a foundation for new systems and integrates existing systems
- An ERP system creates a single version of the truth because everyone uses the same system.
- Knowledge Sharing
- Increases revenue
- Reinforces accountability and transparency
- Individual data security
- Interaction and collaboration with third Party for business.

CONCLUSIONS

The benefits and impact provided by ERP systems need rigorous evaluation. Before and after implementing ERP system in organization check list like functional and non-functional specification should be prepared for the readiness. The ERP systems should provide micro-level decision making analysis for the top management of organization. Most existing evaluation studies are focused on implementers' specific groups and not vendors or consultants specific groups. The evolutionary nature of ERP usage should be increased from individual – collaboration – business partners – assist in a organization for Enterprise Edition. Customization of ERP systems should be minimal which will help for successful implementation; more customization affects the structure of ERP systems which will increase the project time, ruin schedules, introduce new bugs into the system, and make the upgrade to the vendor's new

released software harder. There is lot of scope for the researchers were they contribute on before and after ERP system implementation check list preparation and evolutionary nature of ERP system usage as Enterprise Edition for Organizations.

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