Cloud Based ERP framework for educational ERP system and its benefit to the Management, Staff, Students, Alumni and Industry

Dr. Balasaheb Bhamangol

Professor, MCA Coordinator,
Sinhgad Institute of Management, Pune

Abstract: Execution of the Educational ERP system depends on how we achieve to keep integral with Technology, Vendors, Performance and Stakeholders satisfaction. Educational ERP symbolizes the implementation of various educational services for the advantage of Management, staff, students, alumni and industry through which they can avail 24*7 services anytime and anywhere. The features for successful Educational ERP system are clear objectives, dedicated and effective team, planning, management controls, repeated reassessment and communication. This research gives perception on various central dimensions which are user responsiveness, performance, satisfaction, communication, inter-department interaction. It is also on it occurred to the researcher to devise a layered framework for the successful implementation of Educational ERP system. A cognizant attempt was therefore made to construct such a framework. The researcher therefore offerings a "Cloud based Educational ERP Framework for Educational Institutes" by considering all the encouraging aspects of Information communication Technology.

Keywords: e-ERP-Educational Enterprise Resource Planning, ICT-Information Communication Technology.

I.   NEED OF ERP IN EDUCATIONAL INSTITUTES

To study the ERP operational requirement, it is very important to determine the flexibility of the ERP systems to support organizational changes. The ERP systems environment which focuses on EPR software suitability, information quality and system quality are the features to be accessed. In educational sector the survival of ERP systems are on it training of staff and technical staff, user involvement and user characteristics. The maintenance of ERP systems is an ongoing process of integration and transformation of the business needs and there is a requirement to understand its impact on the key organizational activities and processes. There are very limited research studies that endeavor to understand the user involvement–satisfaction relationship; although the ERP systems are more likely to succeed when user involvement is high and they have realistic expectations about the scope of the system and its functionality.

Success of the Educational ERP system depends on how we manage to keep intact with Technology, Vendors, Performance and Stakeholders satisfaction. The term Educational ERP represents the implementation of various educational services for the benefit of Management, staff, students, alumni and industry through which they can avail 24*7 services anytime and anywhere. The factors for successful Educational ERP system are Unambiguous objectives, Committed and effective team, Planning, Management Controls, Repeated reappraisal and Communication

For successful implementation of Educational ERP system, there is need to focus on various central dimension which are user friendliness, performance, satisfaction, communication, inter-department interaction, Third party software plug-ins, navigation-Help file, data security and Technology etc. The impact on implementation of Educational ERP is to improve 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 and establishes a foundation for new systems and integrates existing systems.

The researcher has combined all the functionalities and operations of the successful implementation of Educational ERP system services and has developed a new framework to serve the need of today's environment. For designing framework, researcher has referred several significant initiatives have been taken by AICTE, DTE and government to promote ICT in educational sector which helps to increase in rate of growth of GDP. The current developed Frameworks from ION, Academy one Inc, Global Educational Network and connect2gurukul Educational ERP system which don't have promotion and transferring of previous records to the new system for further compliance of the students, staff, parents and industry information like Unique SSN (Social Security Number) in USA for unique identity, India has also implemented UID / Aadhar Card for unique Identity of each citizens using this UID. Researcher has developed Educational ERP framework by using UID through plug-in for UID information of students and employees. The current framework followed by the Educational ERP system is not adequate to the unique identity of the students and employees. To my knowledge such a layered framework catering to the needs of the implementation of Educational ERP system has not been devised so far.

II.   ERP FRAMEWORK DESIGN –LITERATURE REVIEW

C. Moller published article on ERP II: a conceptual framework for next-generation enterprise systems[2] - This article gives the emerging business requirements and conceptual framework for ERP II. The model compiled sets the concept into a comprehensive outline of ERP II and thus composes a generic map and taxonomy for contemporary corporate enterprise systems. The model is offered as a first step towards a tool to analyze the completeness of the ERP II vision in an enterprise to analyze the system from an ERP vendor. There is need of an instrument to measure the usage of the ERP II vision and also to enhance the conceptual framework to be able to measure which processes are used and how they are executed. This also argues about inter-organizational integration which is   crucial to reaping the benefits of ERP II. ERP II is a new vision that has only recently been embraced by ERP vendors, and it will take a while before we are able to actually evaluate the impact of ERP II on Educational Institutes. It has also categorized ERP II as a non-disruptive technology based on the ERP theory and the retrospective analysis.

The researcher will mostly work on generic ERP concepts are needed and also have not yet managed to fully comprehend the complexity of internal process change. The tremendous challenges faced by the stakeholders and its inter-organizational business process integration, will emerge – the next challenge for researcher.

## III.   CONSTRAINTS FOR DESIGNING CLOUD BASED ERP

Constraints used for designing Framework of Educational ERP system: Constraints used for designing and for assessment of new innovative cloud based framework are Infrastructure facility, Constraints of required infrastructure facility, Security, Business process re-engineering, Request for business process re-engineering, Access control Plug-in and Types of Access control Plug-in used. Further for each institution are required to consider following sub- Constraints as-

- Hardware
- Software
- Database
- Backup Utilities
- Internet Bandwidth

IV.   DIMENSIONS AND DESIGN OF CLOUD BASED ERP FRAMEWORK

In the course of the study, it occurred to the researcher to devise a layered framework for the successful implementation of Educational ERP system. A conscious attempt was therefore made to construct such a framework. The researcher therefore presents a **"Cloud based Educational ERP Framework for Educational Institutes"** by considering all the positive aspects of Information communication Technology. It is therefore presented in the following Figure 1.

Figure No. 1: Cloud Based Educational ERP Framework
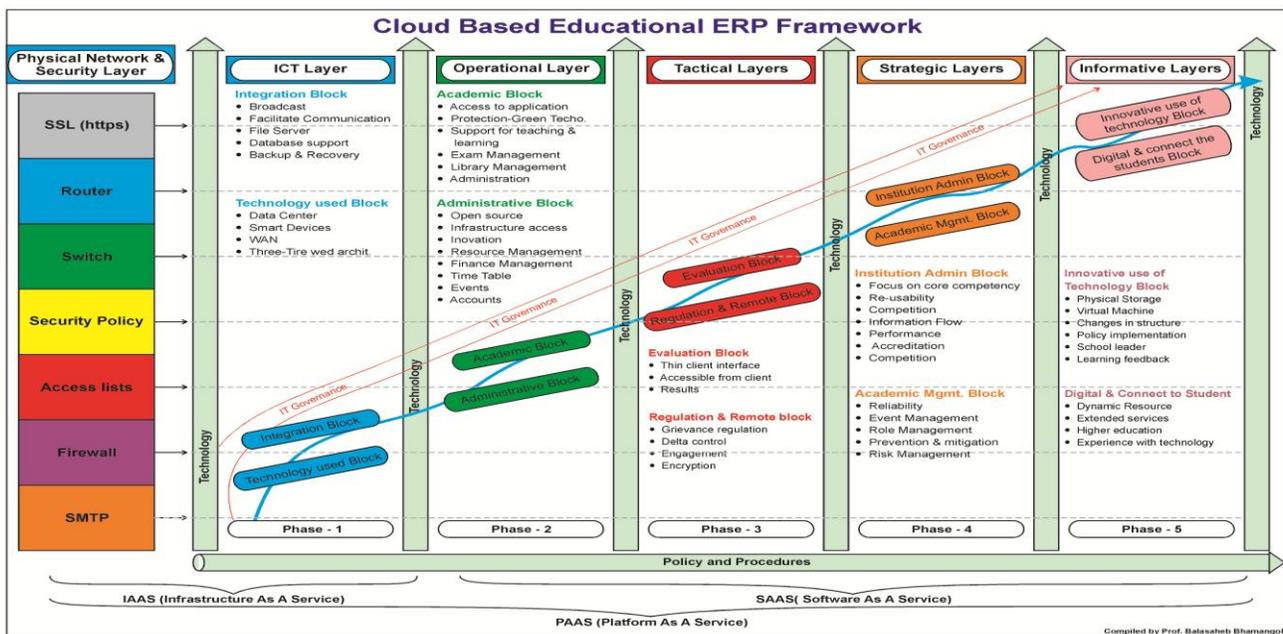
Any framework consists of various layers, components and a few other factors. Considering all these components, **Figure No. 1** gives the detailed mode of operation and functions of the Conceptual cloud based Layered Framework for the Implementation of Educational ERP system. This framework is created and presented based on earlier studies, the researcher's experience and the conclusions arrived. The researcher has presented this conceptual framework knowing full well that it can't immediately replace the current framework. It requires some extra time as well as basic preparation before implementation. This framework is so designed based mainly on the unique identity of students from KG to PG and employment through UID / Aadhar card. This

framework is the best combination of the unique identity of students, staff, parents, alumni and employment in industry with high security of confidential data. As we studied in Educational ERP systems status according to students, staff, parents, alumni and industry point of view, this framework is the best combination of all the studied frameworks implemented by various vendors across globe.

The detail design of the cloud based framework is based on the input from as third party service provider to the educational institutes for further process and security of data. There are Internal as well as External inputs to the system. Internal inputs from Administration, Staff, Students, Placement and for External input Vendors, Parents, Industry, Alumni, authorized body like University, AICTE, DTE and Third party service provider. The user can avail Educational services through various delivery channels like mobiles, kiosks, web ports, personal computers, digital TVs as well as through video conferencing. The UID code will be first taken from UID system of each individual student and then the progress of education will be maintained by institutes and pass this information to other educational institutes where ever he/she moves for taking admission / further study. The report can be given by institutes in the format specified by the Authority of educational Institutes which will be implemented in Educational ERP system. During the interaction, proper authentication and access management will take place for security purposes and after completion of the transaction the details will be stored in the particular database.

V.   LAYER TAXONOMY IN CLOUD BASED ERP

The Educational ERP system platform will consist of mainly six layers namely Physical Network and security layer, ICT layer, Operational layer, Tactical layer, Strategic layer and Informative layer. The importance of each layer specified is as follow:

Physical, Network and security layer consist of physical communication between end stations. Physical layer controls are Locked perimeters and enclosures, Electronic lock mechanisms for logging & detailed authorization, Video & Audio Surveillance, PIN & password secured locks, Biometric authentication systems, Data Storage Cryptography and Electromagnetic Shielding. The Network layer is concerned with the global topology of the internet work - it is used to determine path and which packet would need to take to reach a final destination over multiple possible data links and paths over numerous intermediate hosts.

ICT layer with Integration and Technology block consists of application server like file server, database, tools, backup and recovery and UID like Web, SMS, Smart card, Web Services, Universal Description Discovery and Integration, Web Services Description Language and Simple Object Access Protocol.

Operational layer consists of academic modules like students, human resource, finance, research, placement, and time table, library so on and administrative like configuration, assigning roles, authorizing events, news and content so on.

Tactical layer it focuses on evaluation and regulation remote block which consist of Remote students and outcomes of the system. Remote students mainly focus on grievance whereas outcome is related to result, engagement, and encryption of data. The tactical level factors help to Increase efficiency, Reduce operating cost, Respond more rapidly and flexible to a changing environment, Need to extract business intelligence from data over time, Retention and visibility and Students Relation Management (SRM).

Strategic layer consists of Accreditation and Institute profit like completion, information flow, performance, event management, role management, prevention and mitigation and risk management.

Informative layer which focus on Innovation use of technology and digital and connect with stakeholders technology consists of Promote equity and experience with technology for stakeholders, changes in structure, policy implementation, learning feedback and leadership whereas educations focus on appearance with technology.

- **Information Services:** This category of capabilities addresses the support of information services. Information services provide a uniform way of representing, accessing, maintaining, managing, analyzing, and integrating data and content across heterogeneous information sources. This approach is known as the Information as a Service (IaaS) approach.
- **Information Integration**: This category of capabilities addresses the support of information integration and enables capabilities for information services.
- **Basic Information Management**: This category of capabilities addresses basic information management concerns such as metadata and unstructured data management.
- **Information Security and Protection**: This category of capabilities addresses the support of information security and protection concerns.
- **Business Analytics**: This category of capabilities addresses the support of business analytics and business activity monitoring. It enables organizations to leverage information to better understand and optimize business performance.
- **Information Definition and Modeling**: This category of capabilities defines fundamental constructs of SOA information and events.
- **Information Repository:** This category of capabilities addresses support of the information repository in order to persist data such as metadata, master data, analytical data, operational data, and unstructured data.

Furthermore this Layered Framework is post implemented with Cloud computing. It is cost effective and saves implementation and maintenance costs.

This framework is prepared on the basis of my knowledge and actual experience in the light of the present research study. The researcher has also discussed it with a technical

and network expert in this area. It can be improvised in the light of actual experience so that it can be widely implemented and applicable at various levels.

Software and Data Dimensions on central using Cloud Computing

Here each software and hardware are on cloud computing and therefore it is fully scalable. Even though there is increase in users or Institutes using cloud computing it is scalable and can increase storage, there is no need to plan for a new server. The allocated space expands automatically and the charges are only for utilized capacity. No maintenance cost and up gradation cost as demand needs change the business process or change in the flow and to connect to the internet while doing transactions.

There are three types of models on which EERP can be implemented on cloud, the deference between those models are as shown in Table No. 1.

Table No. 1: Main Differences between Public, Private and Hybrid models of cloud

Model Feature	Public	Private	Hybrid
Owned and managed	Service provider	University	Service provider and University
Access	By subscription	Limited to students, faculty, staff of the university	By subscription and Limited to University stakeholders
Customization and control	None	Yes	Partially customization and control

Cloud based activities provided by different vendors to Universities / Institutions

Universities implementing various cloud solutions provided by different vendors along with cloud services and type used by them are as shown in fig. 2 which will give Universities / Institutions to know about the activities.

Fig No. 2 Cloud Solutions for Universities

Cloud service	Cloud model	Activities / Solutions	Business Intelligence	Student Lifecycle	E-learning	Admission	Accounting-financial	Human resouces	Aquisition	Case management	Building administration	Digital library
SaaS	Public	Microsoft Live@edu			✓							
SaaS	Public	Microsoft Office Live Workspace			✓					✓		
SaaS PaaS	Private Hybrid	Microsoft Dynamics CRM Online		✓		✓		✓		✓		
SaaS IaaS	Private	CampusEAI Private Cloud		✓	✓	✓						
SaaS IaaS	Private Hybrid	Jaspersoft and RightScale	✓									
SaaS	Public	Google Docs			✓					✓		
SaaS IaaS	Private Community	educationERP .net		✓		✓		✓				✓
SaaS	Private Community	Campus management	✓	✓	✓	✓	✓	✓		✓	✓	
SaaS	Private	Coupa e-Procurement							✓			

NOTE: In all the options in Multiple Location, instead of Internet, dedicated Point to Point lines / Private Network / VSAT links can also be used. Any form of connectivity will work.

VI.   BENEFITS OF CLOUD BASED FRAMEWORK TO THE MANAGEMENT, STAFF, STUDENTS, ALUMNI AND INDUSTRY

The type of benefits arising from ERP systems use can be classified as operational, strategic, managerial, organizational and IT infrastructure benefit at different times during the ERP experience. These EERP system modules should cover all area of education management

The proposed ERP benefits framework is as follows:

- **Operational:** Cost reduction, stakeholders service improvement, cycle time reeducation, productivity improvement and quality improvement.
- **Strategic:** Build business innovations, build cost leadership, build external linkages (Students and Industry), generate customization, and support business alliance and support organizational growth.
- **Managerial:** Better resource management, improved decision making and planning and performance improvement.
- **Organizational:** build common visions, empowerment and facilitate business learning.
- **IT infrastructure:** build business flexibility for current and future changes, increased IT infrastructure capability and IT cost reduction.

EERP system modules should cover all area of education management

VII.   CONCLUSION

Achievement of the Educational ERP system depends on how we accomplish to keep complete with Technology, Vendors, Performance and Stakeholders satisfaction. The term Educational ERP represents the implementation of various educational services for the advantage of Management, staff, students, alumni and industry through which they can avail 24*7 services anytime and anywhere. The features for successful Educational ERP system are Unambiguous objectives, Committed and effective team, Planning, Management Controls, Repeated reappraisal and Communication

For effective implementation of Educational ERP system, there is need to focus on various central dimension which are user friendliness, performance, satisfaction, communication, inter-department interaction, Third party software plug-ins, navigation-Help file, data security and Technology etc. The impact on implementation of Educational ERP is to improve 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 and establishes a foundation for new systems and integrates existing systems.

In the course of the study, it occurred to the researcher to devise a layered framework for the successful implementation of Educational ERP system. A conscious attempt was therefore made to construct such a framework. The researcher therefore presents a **"**Cloud based Educational ERP Framework for Educational Institutes"** by considering all the encouraging aspects of Information communication Technology. Model suggested by researcher will be more cost operative and hence more Institutes can implement it moderately.

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