

Relevance's of using E-Learning Systems & Technology in INDIA: Tutoring Practice

M. R. M. VeeraManickam¹, M. Mohanapriya² and Debnath Bhattacharyya³

¹Karpagam University (PhD Scholar, Dept. of CSE), Coimbatore, India

²Dept of CSE, Karpagam University, Coimbatore, India

³Department of Computer Science and Engineering,
Vignan's Institute of Information Technology,
Visakhapatnam-530049, India

¹manic.veera@gmail.com, ²mohanapriyaasaiithambi@gmail.com

³debnathb@gmail.com

Abstract

Traditional classroom teaching and learning processes are not in full-fledged utilizing latest new technology for teaching learning system at various college levels which in high demand. This article describe valuable concept to get awareness to the principal governing educational sector in India to the vital need of shifting from traditional system to an e-learning practice system using Data centers deployments and latest technology. In advance it focuses on significance necessity of infrastructure which is high demand to use in educational institute to improve effectiveness and value of teaching and learning process through e-learning. Major issues are in Indian Educational Sector is e-learning system decentralized model and proposed model provides solution for centralized system features and illustrate its importance of Cloud Datacenter model-Dac and its significances.

Keywords: *E-Learning, Educational System, Teaching & Learning, Indian Educational Sector, Data Center*

1. Introduction

On-line technology based platform e-learning accessible at minimum cost and at any time for teaching & learning. Every user can accesses shared notes materials easily using PC, mobile phones or tablets...Etc.

“Three Features said for E-Learning on basis using online technologies for executing teaching and learning systems as:

- Online,
- blended learning and
- use of online as additional to face to- face for learning activities.”[1]

A Combination of this functionality will be perfect in an e-learning system to use at all level of institutes. ***Reference 1 added to guide and demonstrates the importance of e-learning in India, data collected from eLearning scenario in the Commonwealth countries of the Asian region.*

All modern smart devices help in e-learning. “It is devices that indirectly help Conservation of greenery by replacing paper and eliminating the cost.”[2] Corporate sectors make use of E-learning to training their employees. It is possible for them to impart educational training by E-learning in an effective way to that people working in different parts of the globe, at a short notice, with much clarity and less faculty members.

It can make a shift in the method of education by switching to more practical oriented education. Students will be trained to think rather than remember.

1.1. Importance: E-Learning in Indian Educational System

Educational Sectors in India by and large depend on traditional methods of teaching. They lag behind in using E-learning for teaching except a very few universities. Among 650 universities only following few are using E-learning “A few of the public and private educational institutions which have are using E Learning in India are:

Mumbai University,

Amity University,

Amrita Vishwa Vidyapeetham,

IITB in collaboration with Amrita University,

Birla Institute of Technology and Science (BITS),

Educomp, Everonn Education Limited,

Tamil Nadu Virtual University,

Gurukul Online,

YCMOU Online,

IIS Bangalore,

IMT,

Symbiosis Centre for Distance Learning, MedVersity,

IIT Mumbai,

IIT Delhi, IGNOU,

Punjab Technical University.”[1]

“As per census 2011 report the literacy rate in India is 74.09 per cent (82.14% males and 65.45% females). The computer infiltration in the country is 3.2 per 100 populations; the figure of Internet users per 100 inhabitants is 7.5. One of the largest education systems in the world is India then 2nd USA based on the figure of educational institution, student users are registered and teaching faculty set out to hold educational work load.”[1]

“Internet facilities are availed of by using the computer or the mobile. Comparing their usage, the mobile users outnumber the computer users for obvious reasons. Public Mobile penetrations being in higher range than computer, e-learning application can be made available in dual formats: mobile & PC format.”[2]

The number of telephone users in India is 970.97 million as per end of December, 2014 according to the Telecom Regulatory Authority of India report. “77.58 mobile connections per 100 Indian citizens” [3] are highly countable figure to consider e-learning application. It should be available in customized way for every individual to work from anywhere using cloud system. Cloud system will provide easiest way to setup network, deploying application & connectivity among multiple users. These data reflect the need of computer technology in educational sector. Academic institutes have some basic issues due to infrastructure and connectivity of network system that leads some of these issues. “Technology: Due to the absence of a technical platform, a telecommunication capability, bandwidth limitations, faces problems in hosting and delivering eLearning courses effectively.”[4]

In India, literary rate is very good; however, very few academic organizations have

got concrete solid works and the implementation of their e-learning system. In order to widen its scope in such a way that each and every student accesses, adequate steps have to be taken by all institution duly backed by the government for using mobile and cloud infrastructure. To use cloud, government has to concentrate on creating new Data center for e-learning system which is focused towards network and developments.

2. Existing System: Independent system models lack in Centralized Structure Approach

2.1. Objective

Existing e-learning system in few universities are independents models. “All existing model not coordinated each other which lack in sharing their data each other. As results students using e-learning on their campus isolated from other e-learning system.”[2] This illustrate in detail about existing e-learning system in India.

Moodle Open Source LMS

LMS Software has been used for E-learning Platform throughout the World. “570 registered sites in India are using Moodle open sources; there are 53140 currently active sites that have been registered from 225 countries. As per Moodle user’s statics, just there is 1% usage level in India among worldwide comparative, which is of the least value for the country like India as the 2nd largest educational sector in the world next to USA. Moodle usage of 8561 registered site users from USA (16%) as well as 1st largest educational sector in world.”[5] These details collected from moodle open source website which is relevant to the above topic as per references data retrieved date. “‘Moodle’ for the most part accepted Open Source LMS among the educational institutions (46.2%) though 9.9% institutes have also developed their own LMS.”10 LMS are accessed through different ways. “84.6% College students accessing the LMS from home, 78% via computer labs on the Educational campus and 31.9% via designated tele- Learning centers /hot spots/access points”[1].

2.2. Illustrate List of Existing E-Learning System in India (Independent Structure)

A. Ugc-Infonet 2.0

“The UGC-Infonet 2.0 India, 2012 launched on April, from 2010 uses the fiber backbone of BSNL. But this Project is closed on 31st March 2012” [1] This is reality of e-learning schemes and Projects of India are governed by the government sector.

B. Nielit

“NIELIT is implementing a joint scheme of AICTE and Department of Information Technology, Government of India. The objective of the system is to develop excellence manpower in IT by make use of the proficiency available with the computer training institutes who are granted accreditation for conducting specific Levels of short term courses, subject to their meeting precise norms and criteria”[6].

C. Nptel

“The National Program on Technology Enhanced Learning is another national scheme started by seven IIT’s and IIS’s for development and generation of e-learning course content and provides eLearning through web and video courses in all field of Engineering”[7].

D. Def

“The Digital Empowerment Foundation is functioning for endorsement of infrastructural development of digital e-content.

The e-GyanKosh¹ is a national digital repository developed by IGNOU for distribution learning content to multiple users.

The Shakshat² Portal launched under the NMEICT by Government of India building all types of e-content at the national level.

The Media Lab Asia³ (MLA), promoted by the Government subsequent to not-for-profit approach, was formed as a research institutes with the major funding from Government of India in association with Massachusetts Institute of Technology.

The Azim Premji Foundation⁴ (a non-profit organization) is working for integration of ICT in education institutes at all levels in 14 states in India.

The Indian Institute of Technology Kanpur has launched ‘Brihaspati’⁵ – as an in-house planned and developed LMS using open source for distribution of eLearning courses and management of e-content.”[8] “The ICT launched from on regular basis show that India is prepared to garner benefits of Internet and e-learning. However, meeting the prerequisite of the E-content in different Indian languages is a real challenge.”[1]

However, there is no initiative from HRD ministry of Indian government to create a centralized system for every level of academics institutes to gain available resources from the common Database repository.

E.ClassTEacher

H.ExcelSoft

F.Tata Interactive Systems

G. CommLab

I. LIQVID

2.3 Users: Existing E-learning System

In Universities and colleges UG & PG students are users. Nptel e-learning system is freely accessible by every user in online which is available in NPTEL web link. “In private service providers e-learning are totally payable services so anybody can be user after paying for their services. Any institute can get those payable services to use in their campus”[2].

2.4. Cost Model

“Moodle open source LMS: Is freeware software platform services. So anyone can deploy it by using proper infrastructure and network. Governments NIELIT, NPTEL, DEF: Also freeware services provided to all which can be accessed by anyone. Tata Interactive System & other private services: are package based system can be used those who are deploying in their network”[2].

Existing Decentralized Systems Disadvantage

There is no common platform e-learning system platform for all users in single network which can be collaborated together using data centers. “Significance of proposed system is to overcome issues like independent model, package system of cost, to make everyone involvements as stakeholders. *etc.*”[2].

2. Research Perceptive: Short Survey for Common E-Learning Application

Simple survey conducted among engineering college students. To know real need of common e-learning application. Around 10 query given to students using Google shared

document. Around 220 responses received from various college students.

As per survey records only 50% students were using internet access on a regular basis. However, smart phone user is growing rapidly among engineering students and also more than 80% were using as per records. It clearly indicates that penetration of phone user's is very high in numbers. So we should provide e-learning application in a simple and efficient model using android platform which can be downloaded and installed easily.

Table 1. "Simple Survey Records on E-learning Importance" [2]

Data Collected among Engineering College Students			
Smart Phone User (Yes/No)	Internet User (Y/N)	Any E-learning applications currently in use?	Are you members of any Social Websites (Y/N)
54%	82%	18%	80%
Do you like to use any e-learning Apps. for learning subjects	Do you like to Share subjects notes to others thru- mobile application	Do you think college administration should take initiatives to develop E-learning Apps.	Government administration also can take initiatives to develop new E-learning Apps.
78%	90%	70%	78%

Reason to use android platform is maximum mobile operating system works in Android. Therefore, students can use e-learning application with e-content and notes among them even without WWW connectivity in their smart phones. Advantage of this application is it will extremely reach every one among students regardless of internet connectivity. This android application can be updated on a regular basis to release new improvised version student's users.

3.1. Research Questions

Too many research questions arise for common platform E-learning systems? Proposed 3 models which are focusing on call for of centralized system. "We have analyzed and found some basic suitable architecture on the basis research question to this specific problem like need of 1) centralized e-learning system, 2) importance of Data Center, 3) Role of every educational institute, 4) Government's Policy, 5) role of Indian Information technology industry to help governments"[2].

The 5 features things are measured to accumulate all research questions

1. *Need of centralized e-learning system?*
2. *Exact picture of existing system?*
3. *"Is there any government policy for implementing common e-learning model?"*
4. *What is the role of educational institutes in developing a common system?*
5. *Is there any contribution from private sector & educationalist to improve and build needed infrastructure for e-learning model*

6 *Is there any standard common e-learning application for student's mobile user in India?*

7 *Any centralized architecture describes and support its importance of Dac?"[2]*

8 *What is the role of IIT's to bring common e-learning system in institute's level?*

3.2. E-Learning Approach: Introduction

The Future of E-Learning

The medium of e-learning is Internet, and the computer or even mobile phones are the appliances required before the system to be in force. To provide Internet connection in schools and colleges is not a costly affair. Smart phone Mobile serves as an additional tool for use at ease. Various technologies are in use for e-learning implementation. Multimedia technology gets transformed into a digital world, where micro-learning is possible, which would avoid the need to have separate sessions for education. By getting authors, learners and trainers from worldwide, it is more effective and immensely beneficial to implement a highly interactive e-learning system at less cost and time.

“ELearning interest level of students increasing (47.5%);

Access & availability of e-content on relevant topics (46.3%);

Technical support (45%);

Appropriate and effective training (45%).”[1] These records reflect on basis of few institutes reply. But if it's for centralized system then it will have impact on every institute all over India.

“Micro-learning objective on the design of micro-learning activities through micro-steps in digital environments, by now is a daily realism for today's knowledge human resources. Micro-learning is an important archetype shift that evades the need to have separate learning sessions. Since the education process is entrenched in the daily routine of the every user. It is also absolutely suited for mobile phones where long learning programs can be over killed.”[9]

E-learning implemented institutes will get added advantages on teaching standards, reputation, growth, Quality.etc. “Goodness of institute in Sri Lankan perspective has a great impact on eLearning execution system. Integrated course material is also an important aspect for success of ELearning” [10]

3.2.1. Various Implementation Techniques on E-Learning:

Multiple techniques are used such as:

Online Learning,

Gamification

Virtual Learning,

Personalized Learning

Distributed Learning,

Automatic learning

Network and Web-Based Learning.

“Flexible learning based on demand -which anyone can right to use their own assigned exercise on demand basis on their Skills. New assignments can be given to teach them additionally.”[11] “The eLearning is used for training users, involved in rural development programs of specific region and state as well as Central government will prove to be cost effective.”[12] Financially effective models are possible to deploy for the level of infrastructure and application developments as well as maintenance activity. The Government has to plan for educational amenities not only to rural developments

but beyond.

3.2.2. Technologies used in E-Learning:

Many technologies are used to implement e-learning system

Instant messages	Moodle
Social Networks	Blog
Screen Sharing	Flash
LMS	Power Point slides
CMS	HTML5

“Technologies used to enhance content quality of courses are given in system. Opportunity to engage user games based learning is also provided in the system. It excites everyone to learn efficiently that they can immerse in learn knowledge through Games and thereby learn through their own mistakes.”[13] The role of the Governing Body role assumes importance in adding new courses, maintaining existing course content and its quality, regularizing role of academic member and governing e-learning policy and regulations for the entire centralized e-learning system. “Majority of institutions (31.7%) maintain quality of eLearning via Advisory Board followed by 22.8% institutions where individual functional units are responsible for maintenance of their quality”[1].

4. Proposed Model: Centralized E-Learning Architecture

4.1. Objective

E-learning systems are not in centralized model and independent each other. So there is need of common platform & infrastructure which will be helpful all stake holders. Proposed system on basis of Architecture of various models like Data Centers, Centralized system, Governments contribution, Role of IIT's.*etc.*

4.2. E-Learning System's Importance in India

India is the most populous country with “adult literacy rate of 74.04% (2011).”[10] In all, the demand for e-learning technology is high at institute's level... But the educational institutes lag in basic of e-learning system deployment. India is 7th biggest country in the world and 2nd largest in terms of populated people & educational sector in the world. “India is a country that has 650 universities geographically separated in different locality of 29 states with three union territories.”[14] By using centralized system for e-learning, it gives wide platform to share study materials and enable students to learn effortlessly.

“An averagely Indian using almost 5 hours in internet out of that 3 hours is spent on mobile device internet, only 45 minutes are used by doing any other works apart from social media.”[15] “This scenarios has to be changed from 45 minutes to more time usage especially for students, the perspective time spent for internet can be improved by giving availability of courses thorough e-learning for more than hour per day.”[2]

“Schneckenberg (2010) emphasized that communities of practice social and peer collection networks have an impact on the student involvement in eLearning.”[16]

Role of government initiatives also important in building data center's that will eradicate obstacle for non-availability centralized e-learning system. “Panda and Mishra observed that increase of motivating aspects was important for achievement of an eLearning initiative as removal of the possible obstacles.”[17]

4.3. E-learning Efficient System

“Efficiency of system stands on time, hard work, quality content, courses curriculum has to be implemented in e-learning system”[2].

- “E-learning supports the Organization’s objective like improved schooling costs, decreased material costs, increased output, Standardization”[18].
- Availability of course notes material content.
- All learning patterns design to be deployed.
- “In compiling these elements of effective design, it is because of this amplification of technological tendencies that the design phase is so critical. These six elements – activity, scenario, feedback, delivery, context, and influence – provide focal point for the educational designer, support in the navigation of the intricacy and the often conflicting pressures that weight the development of an effective e-learning design”[19].
- Student’s user friendly e-learning system.
- Cost Effectiveness for deploying new courses
- “3 points influences in favor of e-learning: It is really cost effective, it can adapt lessons and allow self-pacing to produce a more personalized learning experience, and it can gain access to countless users at their individual suitability via the Internet”[20].
- “Easy to navigate all functional system features.
- Course should be available to every student in system”[2].
- “One of the impressions of the credit critical point has been a renewed look at the probable of e-learning.
- Lower costs, high speed of delivery, more effective learning, Lower ecofriendly impact”[21].
- “E-learning supports the using learner Progress in many ways likes Real-time Access, Liberty to fail, improved retaining, personalized learning”[18].

4.4. Technology: E-Learning

Content Authoring: E-Learning System

Authoring tools used to create e-learning content will be deliverable to end users. According to Wikipedia.org, “An authoring tool is a software package which creators use to design and file content delivers to users. A content-authoring tool is a software application used to design multimedia course content usually for delivery on the WWW.”[22] Multiple variety of e-learning content can be included to the system which will make students comfortable on complete learning. “Various e-content is delivered to the users in number of ways, including LMS (77 %), downloadable from the WWW or links to OERs (61%), printed materials (57%) and through USB devices or Compact Discs (41%).” “The most widespread file formats for distribution of content, audio, video, and images with the users are pdf (88.3%), ppt (67%), and doc (56.4%)”[1].

4.5. Elements of E-Learning Courses

While creating courses for e-learning various criteria must be ensured to implement the system. List of important criteria are:

Content quality up to level

More interactive system (using LMS & CMS)

To conduct online tests (like quizzes)

Results summary (for online Tests)

Feedback system

Sample online test (to learn)

“Assessment is the course of seeking feedback and is particularly concerned with the progress of training members after training is completed. Based on Donald Kirkpatrick’s

Four Levels of Evaluation, feedback is apprehended in respects to:

Response: How participants like the training

Learning: In what way participants learned from the training

Performance: In what way actual performance changed as a result of the training

Results: How well the training program overall met your organization’s needs” [20]

Course content is developed by different people but still subject teachers and e-learning experts are more important. “Improvement of e-content for eLearning courses is a focused task involving several specialists. The people tangled in the e-content development groups are of subject experts (88.1%) & Teachers are the key foundation of e-Content developers in the educational organization (77.8%)” [1] An element of courses depends on multiple inputs. “The scheme for eLearning programmes includes coursework (80%), content available on the LMS (66%), functioning on projects (57%), quizzes (49%), GD (48%) and reading material (44%) among others”[1].

Following diagram typically represents importance of various e-learning content with comparing statistics.

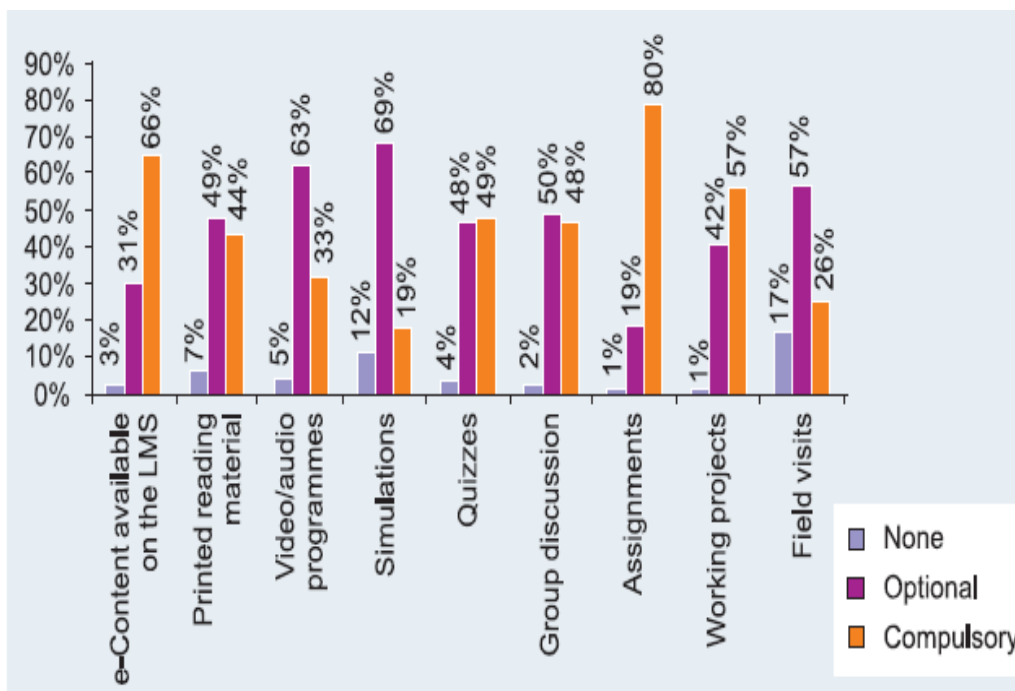


Figure 1. Instructional Design Components of E-Learning Programmes*[1]

4.6. Importance of Tests and Quizzes: art of E-Learning Activities

“Tools used for valuation of student progress are multi-options questions (92%); short answer (84%) and essay type (73%). However, 38% organization used all the above tools”[1].

It provides more benefits to learner and also instructor to know their level of understanding the courses.

- Implementation level work to be carried out
- Tests to be unique for everyone
- To know their grade level
- To get proper feedback
- Analysis of quality of the content
- To make environment friendly for every users
- To implement assessment tool
- Keep learners in engaged level , Further improvement

A highly interactive e-learning system can be used to club all universities and colleges under a single system. Due to this tremendous impact, educational systems can work under single medium on sharing a resource with everyone. Various subjects of discipline can be availed from a network of e-learning. To conduct lecture from corner of India, webinar can be used. So, at the college level all kinds of elective subjects can be given as a choice to learn under this, depending upon the interests of the students. Top officials and board members of different universities can form a forum and discuss on this platform about inducting new courses to different undergraduate and postgraduate degrees.

5. E-Learning Architecture Model

Proposed 3 Architecture Models provides solution for importance of e-learning on basis of “Infrastructure, Data Center Cloud usage, Zone wise Connectivity, Role of Indian Institute Technology IIT’s in New Data Center, Role of Colleges and Universities too.

1) Centralized E-Learning Infrastructure & System Connectivity Model

2) Centralized E-Learning Architecture Model” [2]

3) Interconnected Small Data Centers Architecture Model for E-Learning Services

5.1. Architecture of Centralized E-Learning Infrastructure and System Connectivity Model

Design & Delivery of Content in Common E-Learning System

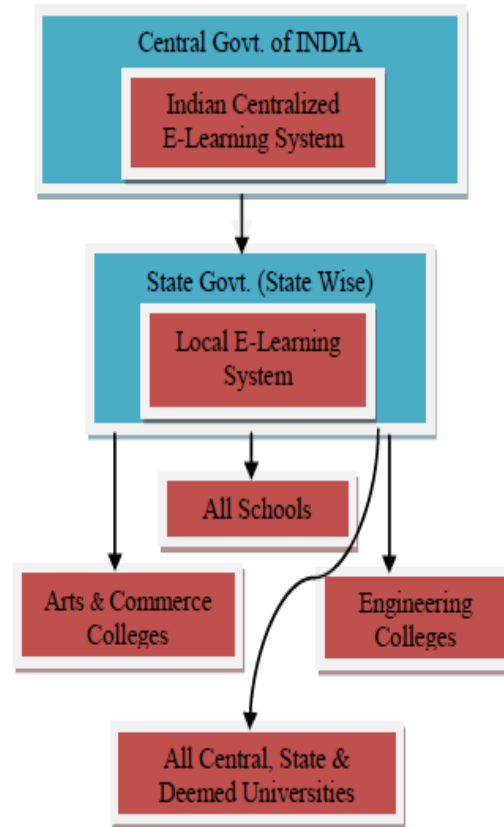


Figure 2. Centralized E-Learn. Infrastructure & Sys. Connectivity Model* [2]

Deploying an e-Learning system as a bunch together as single system using four networks developed under IIT's institutes and various organizations. "Which will be a well-coordinated team effort, and domain experts as diverse departments are involved in the deploying system. The phase by phase methodology to enlargement and launching of eLearning system helps institutes to work on different activities in an effective and efficient manner"[2].

Educational organizations can use their own and allows others to access their infrastructure for common platform systems.

- ✓ "Network 1 to club all Schools together under single E-learning system
- ✓ Network 2 to club all arts and Commerce College under single E-learning system.
- ✓ Network 3 to club all Engineering college under single E-learning system.
- ✓ Network 4 to club all university under single E-learning system"[2].

"Monitoring committee can have member from all four networks to govern activities of the e-learning system"[2]. "It was exposed that 31.7 % of the organization have advisory body to observe the quality of eLearning"[1].

5.2. Architecture of Centralized E-Learning Model

“This architecture focuses on creating a small cloud e-learning system to group the similar sets of institutes like Universities, Colleges & schools, to bring a common platform for sharing their academics related data, notes.etc.,”[2].

Course content productivity also increases by contribution from various authors from every platform. Purposes of using Cloud are easy setup of network model by n numbers of wide infrastructures under single systems. “Using www is another big advantage to handle easy updates, sharing of data resources, providing synchronized communication between n numbers of parties”[2].

Ultimately all schools, colleges and universities can have common platform using Cloud sources which will be using highly designed dynamics pattern of e-learning application for setup. Participation of Government public sector – Private sectors like self management’s colleges & Software industry and IIT’s role very important to bring this common setup. “Challenges for execution of eLearning.

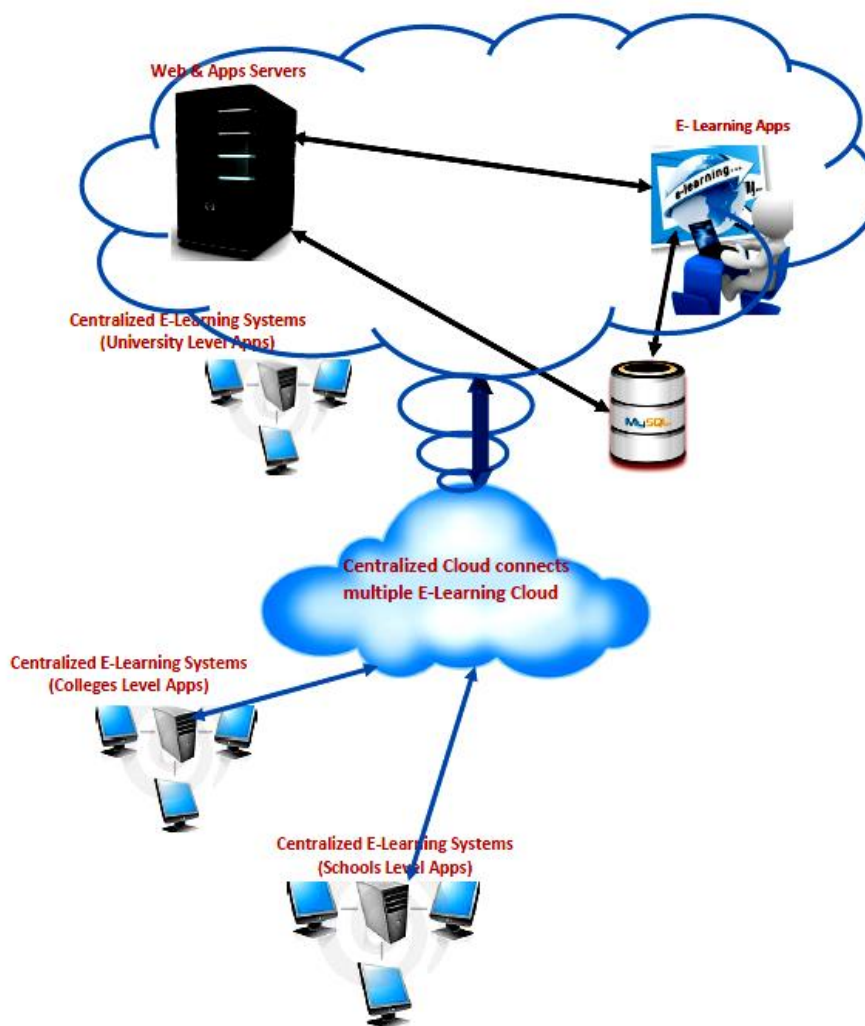


Figure 3. “Centralized E-Learning Architecture Model” [2]

programmes include: Deficiency of suitable training for those involved with eLearning (41.5%), Commercial Constraints (40.2%), Inadequate programme development services (39%), Non-tech-savvy individuals (37.8%)”[1].

5.3. Data Center Implementation Model: Proposed System to Utilize in E-Learning Service

Data Center at IIT's Level to utilize Cloud platform for E-learning Service

We need to focus on our E-learning services at the college level by working on new Data Center Network Model. These models describe importance of building data center for e-learning services data management by using university and college level infrastructures.

“International Data Corporation Model to be setup using SMALL Dac (Data Center) of 500 Servers” in 4 Zone levels.”[23]

Zone Division's

- ✓ Zone A- New Delhi IIT,
- ✓ Zone B- Gandhi Nagar IIT,
- ✓ Zone C - Guwahati IIT,
- ✓ Zone D- Chennai IIT Each Zone's 500 server can be made into 4 divisions of the virtual section to maintain easily by all three subdivision of IIT's from each zone.
- ✓ Zone A- (Roorkee IIT, Ropar IIT, Mandi IIT),
- ✓ Zone B- (Jodhpur IIT, Indore IIT, Kanpur IIT)
- ✓ Zone C- (Varanasi IIT, Patna IIT, Kharagpur IIT),
- ✓ Zone D- (Mumbai IIT, Hyderabad IIT, Bhubaneswar IIT).

Main zone A to D will handle 200 servers rest of each subdivision will have 100 servers to handle it own activities. Main Zone will act as backbone to an entire network of centralized E-learning system to connect all Small Dac (A to D). Five hundred servers of small Dac can be made into four virtual sections for maintenance purpose of Data center by every IIT's. This focuses on an importance of managing server's data by universities to work on activities of the e-learning system.

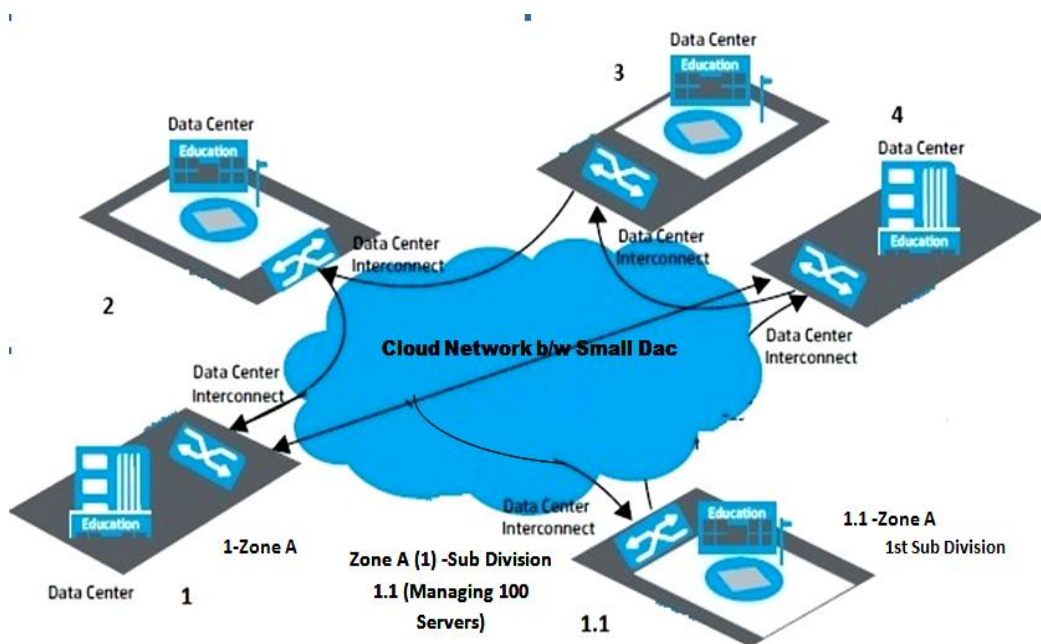


Figure 4. Interconnected Small Dac Architecture Model for E-Learn Services

Under 1-Zone- A, 500 servers are available and each section of 100 servers is handled by 1.1 Sub division of zone A; similarly two more sub divisions will handle it. So 200 servers are handled by the main Dac and then the rest of things are managed by subdivision Dac. Every zone’s subdivision can have “IZE, TU Berlin, and Innovations Zentrum Energies Model-based minimum of 11 servers.”[23]

These 11 servers can be used to do managing activities of those 100 servers which were located in main Zone level. So every main zone’s 100 servers are maintained by sub-zone will make easier way to handle it.

SUB GOALS – Small Dac (500)		1	2	3	4	5	6	7	8
1	Zone Infrastructure Investment cost	NA	■	■	■	--	□	□	□
2	Sub Zone Infrastructure Cost	□	NA	--	--	■	■	■	□
3	Process-power demand coverage	■	□	NA	■	--	■	□	--
4	High Power Supply	■	□	■	NA	--	■	□	--
5	Less maintenances & repair cost	□	--	□	--	NA	--	--	--
6	Operational process	■	■	■	□	■	NA	□	--
7	Resources Availability	■	□	□	■	--	□	NA	--
8	Environmental Hazards	□	□	--	--	--	--	--	NA

■ - Strong Competition □ - Competition -- No competition or Irrelevant

While designing a new small Dac, we need to focus on these features and criteria, which can be helped with clear understanding and, the need of implementation.

Data center using modern technology like MDC, EVI is used to handle multiple clients and it is easiest way inculcate multitenant activities. It increases of data centers and thereby increases heavy load. Due to that there is need of MDC to handle this in easier way for supporting more number of clients using cloud system.” “Multitenant Device Context (MDC) delivers single enterprise private cloud network to support multiple tenants. Ethernet Virtual Interconnect (EVI) reduces data center interconnectivity setup time from months to minutes” [24].

5.4. COST MODEL for DATA CENTER - Dac: Approximate Prediction

Master Plan Schedule – Implementation of Small Data Center & E-Learning Application Development

“eLearning programmes are propelled for the 1st time, it is significant to adopt on issues like who will be implementing the strategy, whether there would be a precise component to monitor and handle the events, whether self-sufficiency would be given to the apprehensive units and whether economical would be handled centrally or it would be given to each of the units involved in running of the programmes”[1].

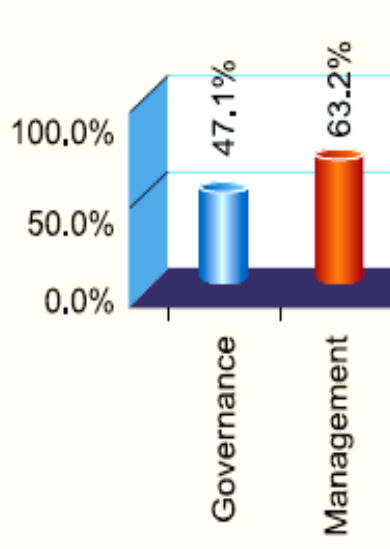


Figure 5. Different Components of eLearning Policy* [1]

“It clearly indicates importance of Governance & Management factor to handle centralized E-learning system by using colleges and university to setup huge infrastructure for e-learning system. [1] Cost prediction of small Dac by using major term as given below will give us a clear picture of total budget of this new project which to be implemented with different stakeholders partnership. While creating new data center, it’s very vital to understand and make clear the detailed terms of the data center in industry:

- | | |
|-------------------------------------|------------------------------|
| Total Space | Adjacent Total Lot Size |
| Whitespace (Raised Floor) | Critical Load Power Capacity |
| Effective Usable Space (Rack Space) | Power Density” [25] |

Number of cabinets needed for DAC administrative people, capacity of internet connection speed to connect DAC with end users, total power consumption for Dac with additional power for regular activity in universities, power density depending on usage of KW power to Dac basically calculates watts per square foot capacity of our data center total white spaces. Power & equipment maintenances are very important for a smooth run of Dac. Four Main Zones are needed to concentrate on rack space, raw lot size, power load & density by allocating funds to build Data centers. Power distribution based N number of features as listed below, by sharing the entire power load with multiple activities in Dac.

“Power distribution of a data center based on things like

- | | | |
|-----------------------|-------------------------|--------------------------|
| Hard discs | Compressors | Switchgears |
| Memory chips | Pumps | Power distribution units |
| CPUs | Fans (air conditioning) | Lighting, security |
| PC fans | UPSs | |
| PC power supply units | Transformers | |

”Cost Model is calculated using the formula given below

$$\text{“Cost}_{\text{total}} = \text{Cost}_{\text{space}} + \text{Cost}_{\text{power hardware}} + \text{Cost}_{\text{cooling}} + \text{Cost}_{\text{operation}}\text{” [26]}$$

Cost-Total: Final value, Cost-Space: Physical locality, Cost-Power H/W: Equipments & electricity, Cost-Cooling: Refrigerator for System Racks, Cost-Operation: Running & maintenance H/W.

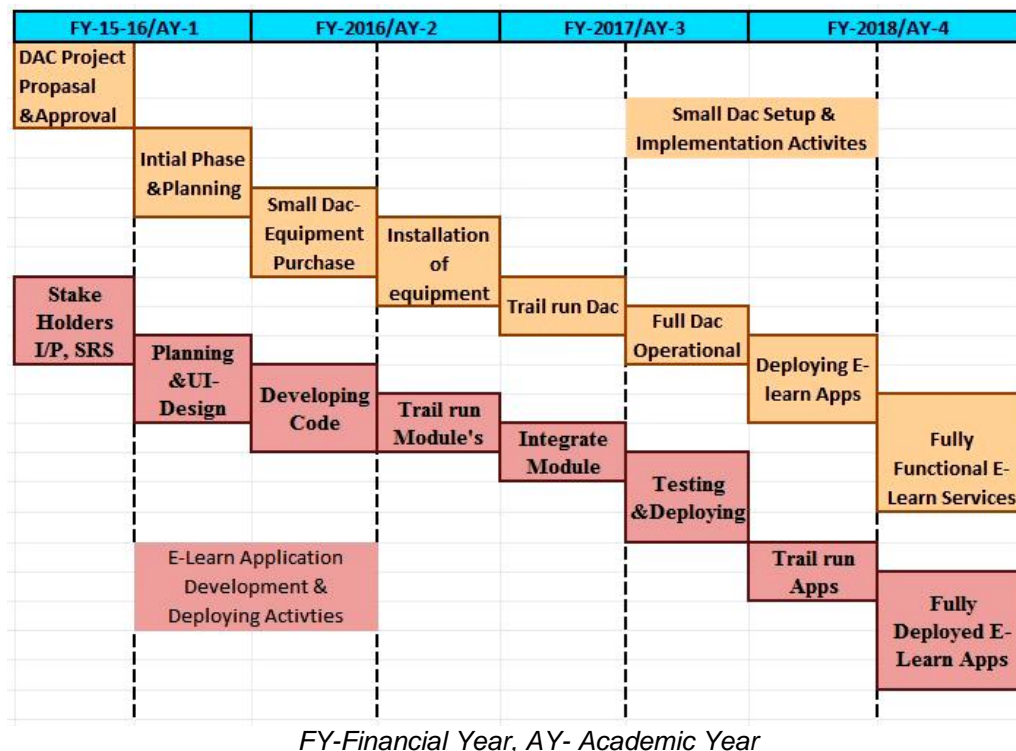


Figure 6. Master Plan - Small Data Center & E-Learning Applications

In this plan, two different flows are mentioned above -1st about data center & 2nd about E-learning application; both are important to give full fledged services to end users, using the cloud. An importance of data center to our application is that it is totally independent of cloud service providers. Government of India should have polices to generate data centers for educational activities in IIT's & NIT's institutes. As per this schedule, we can influence effect of implementation in a four year time period for both application & Data center implementation.

5.5. Central Government's New Policy; To Create New Data Centers in IIT's Institutes

Government of India should create a new policy to focus on developing a new data centers. As e-learning is growing rapidly everywhere, it is paramount that the government concentrate more on fund allocation, and encourage private partnership, to give a role to every big educational institute.

"India, however has enormous IT empowered companies, has not actually used the influence of eLearning till date completely."1 "Launch of new eLearning sustenance centers within the jurisdiction of the organization (36.3%)" [1] Can be thought off. IIT's can think on using Indian IT industry supports to remove.

Barriers based platform, domain, experts, governs.etc. "Gunawardana (2010) identified unpredictable IT infrastructure and unsuitable software as the blocks in effective implementation of eLearning." [10] Teacher can get additional pay apart from their salary to support e-learning in all possible ways. "Organization's incentives also play a vital role in sponsoring eLearning on the part of the educators (Garavan, Carbery, O'Malley & O'Donnell, 2010)"[27].

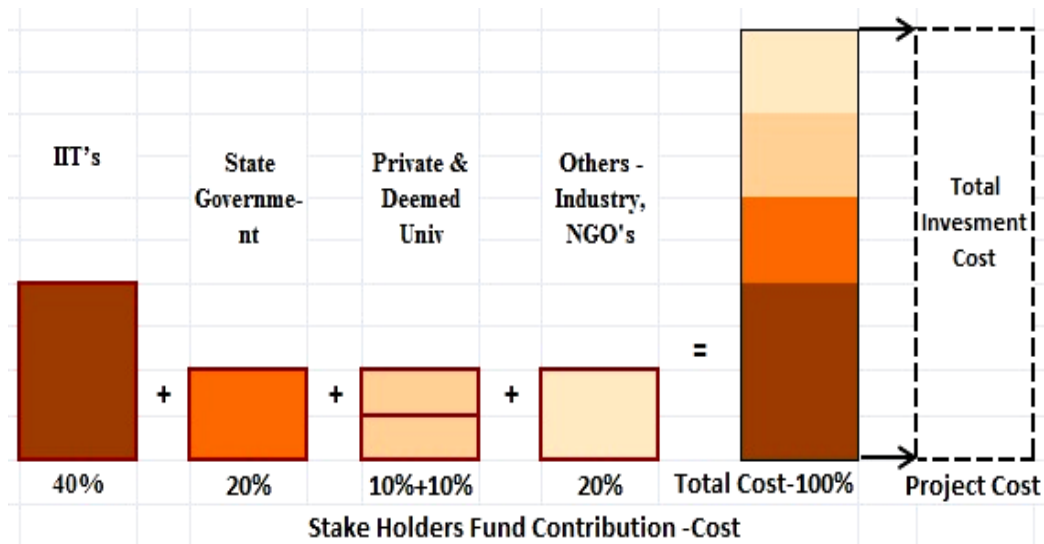


Figure 7. Fund Allocations –Stake Holder’s Project Cost Contribution

List of stakeholders are like Central Governments, Role of State Governments, IIT’s & NIT’s, Central & State Universities, Participation of Private & Deemed Universities, Role of Engineering colleges, Role of educationalist, Role of NGO’s.etc., IIT’s importance is to raise funds and stakeholder’s contribution to building Data center by using different resources.

Governments can make this as a new rules and regulation for every new colleges & universities to contribute their role in term of the fund as well as managing data center with e-learning application. E-learning Application should be common to all universities and college’s; This can be possibly implemented by creating a new department in every institute to play a vital role to contribute to activities on the pertaining to e-learning application’s data, managing their contribution in application.etc., So, it will be parallel and synchronized processes for every contributor’s activity. IT Industries can support the academicians in enabling it.

5.6. Conclusion: Making Policy for Data Centers to IIT’s for Data Sharing

Getting new technologies infrastructures into Educational institutes to support student’s learning is an important objective. However this focuses to evaluate the need of Data Center’s infrastructures in the Educational institutes. Need of data centers is basically to utilize cloud platform in sharing data between multiple organization.

Department of HRD Ministry (Govt. of India) related to educational institutional policy has to keep this in their consideration as they define goals and objective for new policy for educational sector. Basic purpose of these policies is to create platform for sharing their resources to every knowledge seeker (students) among multiple institutes into single tree network using wide accessibility of data center’s infrastructure. It derives more importance of data center for educational organization and students. Once it becomes regularized as institutional regular activities to the way using infrastructure for beneficial of students studying purpose.

5.7. Users: Centralized e-Learning System

Any Students can be user member of this common system. Users are allowed to create groups under common subject’s interest. “Freely Usable Educational Information System Architecture study intended to lead students to access and share various educational information more easily”[28] “Purpose of notes sharing among student

community increasing day by day by using efficacy e-learning technologies

Students Users Connectivity” [2]

- ✓ “IIT’s, Universities & Colleges Campus Network members
- ✓ Any Non members outside Network

Students Sharing Connectivity

- ✓ Sharing among Campus network members
- ✓ Sharing to non members
- ✓ Sharing through Payable access to both members and non members”[2]

Mobile learning is up-and-coming and transmuting the outdated educational style way. It leads new learning environs due to the rise of mobile and wireless technologies [29].

5.8. Advantages of Proposed Model

Massive common platform provide everyone to access and share e-learning materials, allow them to learn from any other trainer who is away from locality.

- i. Collaborated Learning from different locality,
- ii. To overcome independent model issues using centralized model,
- iii. Downgrade of payable package system of private services providers,
- iv. To dedicate role of stakeholders on handling Data Center
- v. To develop new Data Centers and its features
- vi. Cost Model of Data Center
- vii. Change in regulation for academic institutes to contribute their role in E-learning
- viii. Usage of cloud using Data Center to integrate and make centralized system

E-learning model need best system to synchronize with new data updates. “The synchronization system, implemented in the educational content viewer in this paper (Sun-Ock Kwon, Mihye Kim, Kwan-Hee Yoo), supports content continuity and content sharing features. [30] Every methodology and its parameter analyzed for best e-learning model “The parameter which has got the top priority should be given more importance for future implementations in e-learning methodologies so that it will have more reach among learning community”[31].

4. Conclusion

Centralized common E-learning systems for multitier advantages setup will be create big impact on teaching & learning practices among all educational organizations. Importance of Cloud Dac was insisted clearly to bring huge infrastructures by contribution from everyone. Role of public and private partnership will enlarge its importance heavily to reach mass students all over India. Smart Dynamic e-learning mobile application brings everyone to single system by using Dac centers for multiple resources systems accesses. So every user’s contribution as a content authoring to learning resources can be utilized by anybody in any corner of the world by using Cloud Dac for resources storages and its accessibility.

4.1. Future Enhancement of E-Learning Model

“Use of mobile technology are found in the areas of imparting instruction & distribution information with end users, in order to deliver with enriched mobility (53.8%); and to Integrate of social media with the existing eLMS (55%), Introduction of intelligent coaching practices to accommodate the diverse learning styles among the students (38.8%); and Geographical enlargement of prevailing eLearning programmes” [01] These statics reflect the need to inculcate new changes and upgrade in the e-learning technology, so as to fulfill the interest of the students. Importance of social networking in e-learning, intelligence to application, wide variety of learning styles, advanced assessments tools *etc.*

References

- [1] S. K. Pulist, “E-Learning in Commonwealth Asia 2013”, ISBN: 81-88770-12-4, ©CEMCA, (2013), <http://www.cemca.org.in>. Accessed: 05/02/2016.
- [2] M. R. M. Veeramanickam and M. Mohanapriya, “Research Study on Centralized E-Learning Architecture Model for Educational Institutes in INDIA: Teaching & Learning Process”, Proceedings of the 4th International Conference on Advancements in Engineering and Technology (ICAET) Sangrur, Punjab, (2016) March 18-19.
- [3] “Telecom subscriber base reaches all-time high at 97 crore”, http://articles.economicstimes.indiatimes.com/2015-02-08/news/58928605_1_subscriber-base-reported-month-97-crore. Accessed: 05/02/2016.
- [4] V. Kaveti, “Challenges Faced by Organizations during eLearning Implementation”, <http://blog.commlabindia.com/elearning-design/challenges-implement-elearning>. Accessed: 05/02/2016.
- [5] <https://moodle.net/sites/index.php?country=IN> & <https://moodle.net/stats>. Accessed: 05/02/2016.
- [6] <http://www.nielit.gov.in/intro.aspx>. Accessed: 05/02/2016.
- [7] <http://nptel.iitm.ac.in>. Accessed: 05/02/2016.
- [8] 1 <http://www.egyankosh.ac.in/jsui>, 2 <http://www.sakshat.ac.in>, 3 <http://www.medialabasia.org>, 4 <http://www.azimpremjifoundation.org>, 5 <http://www.iitk.ac.in/doaa/DOAA/brihaspati.htm>. Accessed: 05/02/2016.
- [9] “E-Learning Concepts, Trends, and Applications”, <http://www.talentlms.com>. Accessed: 05/02/2016.
- [10] K. D. Gunawardana, “An analysis of student perception of implementing e-Learning in the Sri Lankan private higher education sector.” (2010), <http://www.elearningap.com/eLAP2010/Abstract/Kennedy%20D%20Gunawardana.doc>. Accessed: 05/02/2016.
- [11] M. R. M. Veeramanickam and M. Mohanapriya, “Research paper on E-Learning Application Design Features using Cloud Computing & Software Engineering Approach”, Proceedings of the International Conference On Information Communication And Embedded System (ICICES), Chennai, India, (2016) February 25-26.
- [12] R. Anand and S. Saxena, “E-Learning and its impact on rural areas” in International Journal of Modern Education and Computer Science, vol. 5, (2012), pp. 46-52.
- [13] M. R. M. Veeramanickam and N. Radhika, “A Study on Educational Games Application Model in E-Learning Cloud System” Proceedings of the International Conference on Information Communication and Embedded System (ICICES), Chennai, India, (2014) February 28.
- [14] “States and union territories of India”, http://en.wikipedia.org/wiki/States_and_union_territories_of_India. Accessed: 05/02/2016.
- [15] B. Srivastava, “Mobile And Internet In India 2014: 349 Million Unique Mobile Phone Users, 70% Traffic From Mobile”, July 11, 2014, <http://dazeinfo.com/2014/07/11/mobile-internet-india-2014-349-million-unique-mobile-phone-users-70-traffic-mobile-india-shining-infographic>. Accessed: 05/02/2016.
- [16] D. Schneckenberg, “Overcoming barriers for e-learning in universities – Portfolio Models for e-competence development of faculty”, British Journal of Educational Technology, doi:10.1111/j.1467-8535.2009.01046.x, vol. 41, no. 6, (2010), pp. 979-991.
- [17] S. Panda and S. Mishra, “E-learning in a mega open university: Faculty attitude, barriers and motivators”, in Educational Media International, vol. 44, no. 4, (2007), pp. 323-338.
- [18] “The Rapid E-learning Blog Why ELearning is So Effective February 2nd, 2010, <http://blogs.articulate.com/rapidlearning/whylearningisoeffective>.” Accessed: 05/02/2016.
- [19] A. R. Brown and B. D. Voltz, <http://www.irrodl.org/index.php/irrodl/article/view/217/300> Elements of Effective eLearning Design, Accessed: 05/02/2016.
- [20] <http://www.strengtheningnonprofits.org/resources/elearning/Online/effectivelearning-Effective-E-learning>. Accessed: 05/02/2016.

- [21] <http://www.kineo.com/resources/newtolearning/>.
- [22] thebenefitsofelearning titled “The Benefits of E-learning | When should you use it?.” . Accessed: 05/02/2016. “Authoring system,” http://en.wikipedia.org/wiki/Authoring_system, Accessed: 05/02/2016.
- [23] “Planning Concept for Data Centers –published in October 2013”, <http://www.siemens.com>, Accessed: 05/02/2016.
- [24] “New Virtual Application Networks Innovations Enable Cloud Data Center Interconnectivity in Minutes”, <http://www.hp.com>, Accessed: 05/02/2016.
- [25] J. Neudorfer, “Total Cost of Ownership: An Executive Overview”, <http://www.datacenterknowledge.com/archives/2012/06/19/total-cost-ownership-an-executive-overview>, Accessed: 05/02/2016.
- [26] C. D. Patel and A. J. Shah, “Cost Model for Planning, Development and Operation of a Data Center”, HP Laboratories Palo Alto, HPL-2005-107(R.1), Accessed: 05/02/2016. (2005) June 9.
- [27] T. N. Garavan, R. Carbery, G. O’Malley and D. O’Donnell, “Understanding participation in e-learning in organizations: a large scale empirical study of employees”, in International Journal of Training and Development, vol. 14, no. 3, (2010), pp. 155-168.
- [28] J. Kim, “Analysis of Requirements for Implementation of a Freely Usable Educational Information System Architecture”, Indian Journal of Science and Technology, Doi no:10.17485/ijst/2015/v8iS8/70513, vol. 8, supp. 8, (2015).
- [29] D. H. Lee, J. G. Shon and Y. Kim, “Design and Implementation of OSMD Based Learning Management System for Mobile Learning”, Indian Journal of Science and Technology, Doi no: 10.17485/ijst/2015/v8iS1/57891, vol. 8, sup. 1, (2015).
- [30] S. O. Kwon, M. Kim and K. H. Yoo, “A Synchronization System for an Educational Content Viewer”, Indian Journal of Science and Technology, Doi no: 10.17485/ijst/2015/v8iS1/57881, vol. 8, supp.1, (2015).
- [31] A. R. Arunachalam, “Bringing out the Effective Learning Process by Analyzing of E-learning Methodologies”, Indian Journal of Science and Technology, Doi no:10.17485/ijst/2014/v7iS5/50380, vol. 7, supp. 5, (2014).

Authors



M. R. M. VeeraManickam is currently working as an Assistant Professor in Dept. of I.T., Trinity College of Engineering and Research, affiliated to University of Pune. And also working as part time Research Scholar in Dept. of Computer Science and Engineering at Karpagam University, Coimbatore, India. He received his B.Tech.degree in I.T. from LVEC, Anna Univ., Chennai, India, in 2006, and M. Tech. degree in Information Technology from Sathyabama Univ., Chennai India, in 2011. His main research work focuses on E-Learning, Social Network, and Cloud Apps. & IoT.



Dr. M. Mohanapriya is working as Professor & Head of Dept.- CSE at Karpagam University. She received his B.E.degree in Computer Science Engg. From SKEC, Bharathiar University, Coimbatore, India, in 2002, and M. E degree in Computer Science Engg. From CEC, Anna University, Chennai, India, in 2004, And Received her Doctor of Philosophy from Anna University, Chennai, India in Department of Information & Communication Engineering. She is working as REVIEWER FOR JOURNAL MANUSCRIPTS for following journal IEEE Transactions on Mobile Computing, Computers and Electrical Engineering, Elsevier Publications, Arabian Journal of Science and Engineering, Springer.



Debnath Bhattacharyya is working as a Professor with the Department of Information Technology at Bharati Vidyapeeth University College of Engineering, Pune. He has received M.Tech in Computer Science and Engineering from West Bengal University of Technology, Kolkata, India and completed Ph.D. (Tech., Computer Science and Engineering) from University of Calcutta. He has 20 years of experience in Teaching and Administration. His research interests include Bio-Informatics, Image Processing and Pattern Recognition. He has published 175 Research papers in International Journals and Conferences from August 2006 and 6 books to date. He is working as Editors of various International Journals.

