Emerging Technologies and Paradigm Shift in E-Learning Architecture

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ABSTRACT
E-learning has taken the world through a new educational revolution. This improves the human zeal to get the education irrespective of their age, resources and position. Many tools, techniques and modes are in front of learner who wishes to learn. E-learning extends its hands to the entire knowledge seeker to turn their businesses into learning cultures, delivering training and expertise on demand as and when needed. The understanding of e-learning varies from person, culture and demand. An instructional designer often means with e-learning merely a course or learning materials directed to meet and objective as a need of program development. A corporate trainer may view e-learning as a combination of courses and knowledge management. Moreover emerging of new technologies are also possessing threat to the modern e-learning environment. The present work is to enhance the e-learning architecture and to make it best suited with the emerging technologies like web3.0 and semantic web. It also emphasizes the importance of Vedic leaning and their inclusion in the current e-learning scenario.

Keywords--- e-learning, LMS, LCMS, informal learning, Vedic Learning

I. INTRODUCTION
People come across with many technologies, modes and program when e-learning is talked about. Our own experiences present an image of e-learning that reflects what we have encountered in the due course. It may be e-learning in a classroom, online, blended, or embedded. Every type of e-learning is effective when properly matched with the appropriate learning environment and desired outcome.

E-learning "puts people in charge of their own careers," said Steve Abernathy, Director of human resource development, Halliburton Energy Services. Delphi Group, a Boston based research group, defines enterprise e-learning as “integrated throughout the value chain, involving suppliers, partners, customers, and knowledge management systems”. David Park rightly quoted "E-learning is used to deliver just-in-time information to the right person at the right time, all delivered through a bidirectional portal." “E-learning is the delivery of a learning, training or education program by electronic means. E-learning involves the use of a computer or electronic device (e.g. a mobile phone) in some way to provide training, educational or learning material.”[1]

II. DEFINITION
E-learning term covering a wide set of applications and processes, such as Web-based learning, computer-based learning, virtual classrooms, and digital collaboration. It includes the delivery of content via Internet, intranet/extranet (LAN/WAN), audio- and videotape, satellite broadcast, interactive TV, CD-ROM, and more.

It can also be defined as any learning that utilizes a network (LAN, WAN or Internet) for delivery, interaction, or facilitation. This would include distributed learning, distance learning (other than pure correspondence), CBT delivered over a network, and WBT. It can be synchronous, asynchronous, instructor-led or computer-based or a combination. [2]

III. ENTERPRISE E-LEARNING
Enterprise e-learning is the unification of enterprise applications such as human resources (HR), customer relationship management (CRM), enterprise resource planning (ERP), work-force management systems along with the knowledge management systems with an e-learning infrastructure. “Successful organizations understand that investing in workplace learning and performance is the key to a highly skilled workforce,” said Tony Bingham, president and CEO of ASTD.[3]

Cisco Systems is running an innovative training program called E-Service Training (EST), which makes the most of the potential of Internet capabilities and technologies. The basic aim of the EST program is to ensure that Field Engineers are ready to repair and maintain new merchandise as soon as they’re released to consumers. Owing to the speedy nature of new product deployment, the growing number of products, and the global location of consumers, training all of the FEs in time becomes very complicated.[4]
The modes of learning may be it is CBL (computer based learning) or CBT (computer based training) or LMS (Learning Management System) or LCMS (Learning content Management system). The tools and delivery modes are the choice of user. One can opt for the synchronous traing mode like VoIP, Messaging or Asynchronous like supportive tools, or discussion boards. The learner may choose online or offline faculty. One can have also the option of intuitive learning (learning on its own) through available resources.

### IV. INFORMAL LEARNING

There may be many ways of learning. Informal learning is perhaps the most dynamic and versatile aspect of learning. Informal learning is the most appealing and utmost by common people.

Jay Cross (2003): states that: “At work we learn more in the break room than in the classroom. We discover how to do our jobs through informal learning -- observing others, asking the person in the next cubicle, calling the help desk, trial-and-error, and simply working with people in the know. Formal learning - classes and workshops and online events - is the source of only 10% to 20% of what we learn at work.”

The formal structure of informal learning is like below.

- **Learning at own pace** (Open space of learning and attaining skills)
  - Learning as and when needed at work
  - Learning at house or rest
  - Third party centre’s (Paid Centres for learning skills)

The Kumon method uses a self-learning approach in which the student sets the pace according to his own abilities. Ryochi Suemane, director of the Okinawa regional Kumon office in Naha, Japan says,”The Kumon approach, is more conducive to learning and builds the student’s confidence through repeated successes”.[5]

- **Personal Knowledge Management** (To gain knowledge with the help of intuition, one called it supra-mental knowledge or knowledge source is divine, mystical or it can be attained through various shastras or with a help of guru’s (teachers).)
  - Intuitive
  - Shastras
  - Gurus

Personal knowledge management (PKM) refers to a collection of processes that an individual carries out to gather, classify, store, search, retrieve, and share knowledge in his/her daily activities. [6]

- **User based tools**: Web is also another useful platform of informal leaning. Dr. Michael G. Moore rightly quoted that, “The potential for change in learning, in teaching, and in the structure of educational organizations is enormous [7]. If we only think of using new technology for teaching the same old subjects to the same kinds of learners with the same methods within the same kinds of institutional structures, we completely miss the potential of the technology . . .” [8]

- **Webtool**
  - Blog
  - Wiki
  - Google Docs

- **CBT** – Computer Based Teaching (The Computer Based Teachings provide learning stimulus beyond traditional learning methodology from textbook or classroom-based instructions.) It is usually worked with the help of CD-Rom. CBTs offer user-friendly interface and environment for satisfying continuing education requirements. The Software both application and customized are used for the training.

- **Application Software**
- **Customized software**

- **CBL**: (Computer Based Learning). It refers to the use of computer as a prominent component of educational learning. In other words it will be a class with computer which is used for teaching. The interactive and attractive CD regarding the subjects covering day to day activities gives the user an easy way to learn. The type of computers have changed over the years from cumbersome, slow devices taking up much space in the classroom, home, and office to laptops and handheld devices that are more portable in form and size and this minimalization of technology devices will continue. [9]

- **CD’s / DVD’s**
- **Online**

There may be some definite e-learning services i.e. CSCL (computer supported collaborated learning and Technology enhanced learning).
CSCL: Computer Supported Collaborated Learning – it can be called as an innovative way to learn and teach using the modern ICT. E-learning 2.0 is the foremost example of the CSCL. In Datacloud: Toward a New Theory of Online Work, Johndan Johnson-Eilola describes a specific computer-supported collaboration space: The Smart Board. [10] - a specific computer with rear projection, touch screen and many more innovative features. The modern I-pad is another fair example of CSCL. The iPad comes with several applications, including Safari, Mail, Photos, Video, YouTube, iPod, iTunes, App Store, iBooks, Maps, Notes, Calendar, Contacts, and Spotlight Search. [11]

Technology enhanced Learning: (TCL) is supposed to provide socio-technical innovations for improving efficiency and cost-effectiveness of e-learning practices, regarding individuals and organizations, independent of time, place and pace. Prolearn, Kaleidoscope and Stellar are the projects in the field of TEL.

Knowledge Management: The knowledge management consists of a wide range of strategies and practices used in an organization to identify, create, represent, distribute, and enable adoption of view and expert experiences. These views and experiences guide the organization in the difficult situations and probably provide an alternative to be implemented in crisis. This also improves the company objectives like innovations, performances at various levels, competitive edge along with improvement and integration among the companies canvass. The key features of the Knowledge management are as follows.

- Experts Database
- Capturing and storing Resources
- Repository of previous experiences
- Case studies

Technology and Modes of Deliveries: The tools and modes of elearning delivery also varies on the environment and the usage of the learner. The synchronous, Asynchronous, Ubiquitous are the modes of e-learning. LMS (learning management system) is software to provide delivery, tracking and managing e-learning trainings over the internet. LCMS (Learning content management system) is an extended version of LMS and provides some additional features like editing and indexing the e-learning contents.

The following figure indicates the characteristic of the various technologies involve in e-learning.

Vedic – Gurukul based Learning processes: The vedic traditional education shows an indepth knowledge generation and delivery. The tools and technologies may differ in name but the contents and the mode of delivery were quiet effective in centuries ago. The basic learning at the vedic period was divided into two segments onsite (Gurukul Aranyaks) and offsite (pravajya). Upanishads mentions many gurukulas like Yajnavalkya, Varuni. Ramayana also focused on training of Lord Rama and his brothers in Vashishtha Gurukul. Ram & his brothers are welcomed by the inmates of the gurukul which include other boys, animals and birds. Gurumata Arundhati takes charge of them like a mother. [12] Mahabharata also cited the gurukul of Dronacharya where Kauravas and Pandvas have gone through their formal education.

Gurukul – Aranyaks: The Gurukul system of education supported traditional Hindu residential schools of learning; typically the Guru’s house or a monastery where the student resides with his Acharya (Guru). The student helps the guru and his family members in their house hold activities along with getting the education and attaining physical-social-mental development. “In vedic period the people worship forests. The Rishi - munis resided in the forests. While residing in the forests, the rishi were able to write Vedic Vangmaya.” [13]

The basic difference of Gurukul and Aranyaks was that the Gurukuls were designed for to attain education and personality growth whereas Aranyaks were designed for the dissemination of education and to mold the persons for social services. The golden era of the society were all because of these gurukuls and Aranyaks.[14]
Parivjya _ Parampara: “Charveti – Chareveti” was the slogan of Maharishi’s in the vedic period. Moving around the world and dissemination of the knowledge was the key in the vedic period. Many saints, prophets and reformers were on parivjya just for the sake of propogating and giving knowledge to the seekers. In Vedic Vangmaya, the saint- brahmins were bound for parivjya as an important and compulsory social responsibilities.[15]

Shastras: The Vedic literature is filled with shastras. The glory period was full of vedic scriptures started from Sanhita. The famous four samhitas are Rigveda, Yajurveda, Samveda and Atharveda. The Rigveda’s were having five branches – Shakal, Vashkal, Ashwalayan, Shakhalayan and Mandukya. Yajurveda was divided into two parts- Krishna and Shukla. The main writers of Yajurveda sanhita were Kanav, Yagyavalkya, Vaishampyan, Atrey etc. The Samveda was in poetry format having three branches Kauthum, Jaimineya and Ranayaniya. The Atharveda is the fourth sanhita mainly related with Ayurveda and Tantra.

Shruti (listening) : The Upnishads literal meaning is to sit near by. In another words, it refers to sit near the teacher and to attain knowledge. Most of the Upnishads are passed down in oral traditions. Out of 108 upnishads, the Brihadaranyakya, Jaiminya Upanisadbrahmana and the Chandogya, are the most important and the oldest upanishads. The Aitareya, Taittiriya, Kausitaki, Mundaka, Prasna, and Kathaka Upanishads are cited upanishads. Apurushev (Intuitive): The Hindu Vedas are Apurusheya (not from human agency). [16] They are supposed to be revealed by its own and they can also be called as Smriti.

Smriti (Remembered): Vedic Texts not considered to be shruti are known as smriti "the remembered", of human origin. This indigenous system of categorization was adopted by Max Muller. Earlier before the written format of the Shastras (literature) they had been transformed from one generation to another by oral tradition. The oral tradition of the Vedas (Śrāuta) consists of several pathas (recitations or ways of chanting) of the Vedic mantras. The various pathas are designed to allow the complete and perfect memorization of the text and its pronunciation, including the Vedic pitch accent. The Jata-patha, Ghana-patha [17] and the dhvaja patha are the some techniques through which the pathins (scholars performing patha) memorize the vedic mantras.

Innovative way of learning: Emerging economics, china and India, have large population and huge market potential. Innovation having impact on nation’s economy may depends on Technological innovation in terms of products and processes. Business innovation in term of business process reengineering, and Education innovation in terms of innovation-centric education and training. Education innovation is basic that prepared ground for technology and Business innovations.[8]

E-Learning Framework: the framework must be categorized into the following aspects.

- Interface design: The e-learning look and feel must be user friendly.
- Methods and Strategies: It must lead to a certain goal both for the learner and trainer. The subject analysis must be done thoroughly.
- Technology: the basic infrastructure should be adequate and easy so that every one can adopt. Regarding the software and hardware, the e-content development should be preferably in the open source and plug and play.
- Evaluation: The assessment of the learner is must but it should also include the time to time evaluation of the course content, relevancy and the techniques through which it is delivered.

V. FUTURE ARCHITECTURE OF E-LEARNING

Looking around we may find many architecture of elearning. We are proposing herewith a platform, infrastructure and service independent future elearning architecture most probably it is based on cloud environment. Moreover the scenario of computing is changing enormously and so is the learning.
The new avatar of Ubiquitous computing is specially mentioned over here, as it gives a new vision of learning. It is omnipresent and the learning is moving away from machine centric to user centric computing. The data repository may support contextual computing based on the requirements of the user. Moreover the users can use their hand held, pocket or traditional devices to access the contents of e-learning easily. The apps may support all the devices as they are platform and infrastructure independent. This will reduce the cost wise investment of learning and may be a supportive tool to have the new waves of e-learning environment.

REFERENCES