

Tools and Techniques for E-Learning: A Comparative Study of Global and Indian Scenario

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ABSTRACT

E-learning has been successful globally in various universities mainly in US and Europe, where the cost is not a major factor, where as in Indian universities e-learning is designed, developed and promoted for mainly distance education through correspondence courses. India has not yet explored this mode of teaching and learning effectively for many reasons despite all the merits the e-learning practice has with it. This factor motivated the current investigation to study the scenario and status of e-learning in global and Indian context. This paper is a review of tools and techniques used for e-learning in the global and Indian scenario. In this study, a thorough survey has been carried out on all modes of e-learning that are in practice. The information from service providers and users have been collected and analysed for the merits and limitations in their e-learning practices. The hardware, software and other requirements for various modes of e-learning are surveyed, compared and analysed and possibility of implementing the same in Indian scenario has been discussed.

Keywords: Hardware, Software, Tools and Techniques e-learning, Indian Scenario, Global Scenario.

INTRODUCTION

Several modes used in e-learning in global scenario are e-mail, world wide web service, computer conferencing, database e-learning, online support, self paced learning, interactive environment, mobile e-learning, discussion boards and collaborative software, radio, TV and many more. The developments in internet sector and multimedia technologies have enhanced the scope of e-learning. The major share of e-learning in India is from the popular radio and TV programmes dedicated to particular sections such as schools (10th Standard), colleges and general public. In fact, apart from programmes such as Advices to Farmers, a few English Speaking Courses have gained popularity among farmers, house wives and other general public. Recently, the establishment of TV Channel Gyan Darshan has created ample opportunities for the students of various sectors including those from higher education. The other modes of e-learning viz., internet and web based learning are in their initial stages in India. Universities, corporate and research organizations are the frontiers in this practice. On the other hand, tremendous advancement in using all the new technology and innovations has been observed in the global scenario to cater to the need of e-learning.

In this paper, the pros and cons all such e-learning practices and the possible consequences for implementing the same in India with emphasis on the cost of the technology and the effect of cultural and educational background on the implementation have been discussed. Further, recommendations are made for upgrading the standard of e-learning in India to the global level.

E-Learning: E-learning is generally defined as teaching and learning with the help of electronic media, which has proven its potential in terms of benefits reaped. E-learning is getting popular both in traditional education and business. E-learning is not just limited to teaching in universities but has spread across educating the public and reaching each and every person in the society. Due to this advantage, radio and television have been used extensively by the government and department of education to educate the public, be it regarding farming, social aspect, birth control, warning against natural calamities, popular programs for house-wives, education programmes for school children and so on.

In global scenario, the e-learning has advanced to a great extent involving almost all sectors of society. In advanced countries the e-learning tools and techniques have been very successful in imparting the education to the needy. Factors

such as easy availability of technology, related techniques and the mentality of personnel and the receivers involved in these programmes have all been responsible for the success observed.

However, in India situation is not encouraging despite a few efforts from universities and department of education of government of India. Various reasons are attributed for the lack of implementation of e-learning practices despite availability of necessary technology and personnel.

The intention of this paper is to provide a thorough review of techniques and tools that are in practice globally and to explore the means for implementing the practices of e-learning in India.

LITERATURE REVIEW

In this section a few important published literature pertaining to implementation of e-learning across various regions is reviewed and a base for the current study is established.

Singhal Madhuresh [1], discusses about the scope, elements and techniques of e-learning situation in India. The situation according to the author is far from reality but does not seem to be impossible to achieve the goal of e-learning. The use of ICT has the potential to enhance students learning outcomes. The challenges were substantial. From these discussions the author concludes that e-learning is not a myth. It is a reality which will influence the educational system in its own pace in future.

A I Saleem [2], highlights about the proposed laboratory e-learning tool that has web based component access by the users. This paper also deals with the motivation factor and experience in implementing hardware into interactive web-based e-learning system. According to the mixed reality environment proposed by this author, virtual components can be applied on real system's components. The learning model is required to provide appropriate teaching materials to each learner according to his/her learning level. The author concludes that the authorized learners can access the server selected for certain experiment, reading of related teaching materials and setup of experiment components and parameters through the home page, where the learner is connected to get the required results.

In Australia the identified problems for falling behind in the effective usage of e-learning is traced to the declining resources and staff for traditional and modern teaching [3]. Colin J Birch [3], in his paper entitled 'computer based learning- dealing with increasing knowledge volume and declining teaching resources', highlights the sources of hardware and software, special source in simulation models with future development and students responses to computer assisted learning.

The philosophy and scope of teaching with computers is a part of a total teaching and learning approach. There were two philosophy recognized one is the staff teaching and resource based the second is the analysis of data and integration of information in a decision making environment. The both were supportive to each other in educational sense. The supply of software and hardware were available commercially and were designed to assist the resource manager in decision making rather than for use in classrooms. The advantages include – students gaining experience in commercial software relevant to local systems. Disadvantages include the need to adapt the content of practical classes to suit the features of software. The author [3] concludes that the use of computer based learning will increase knowledge and stimulate the increase in computer literacy for students.

Traditional higher education learning practices was based on information transfer model where knowledge is passed from experts to learners by means of lectures and text books. The author Triantafillou [4], in his paper titled 'synchronous e-learning rooms scenarios, tools and usages', highlights the synchronous and asynchronous e-learning which describes to enhance the traditional learning model, to introduce online, synchronous, interactive e-learning tools. The author [4], introduces three scenario supported by technical infrastructure like the hardware and software: the first scenario the author speaks about the utilization of educational materials in slide form. The second scenario is an enhancement of first scenario through which live events take place in the e-learning room. The third scenario is the ability to watch the event live from any place. The advantages of these scenarios are low load work for the e-learning studio [4].

E-learning has more to do with management's acceptance of training in general with organizational spanning across the globe and their employees present across. It is becoming increasingly difficult to impart training to the employees in the traditional classroom modes. The author Karthik [5], in his article, electronic way of skills enhancement has highlighted the advantages of e-learning is to deploy training fast to large population located geographically. The author [5], also speaks about the e-learning scenario in India that e-learning in India has led to many success stories in many ways. Various organizations like Wipro are able to train their employees who are present in various part of the globe. Aditya Birla group who have various companies across the countries wanted to have common training in business and other skills.

The author [5], concludes that the trend in India has being to start with a pilot of few courses, since the hardware and software requirements is not very high and training departments go in for this initial investment to train a select group on specific subject.

Major part of any class room contact time, out of class support often makes the difference between success and failure of a student. The author Bruce Harrison [6], in his paper hardware / software to support distance learning classes, explore the software tools as electronic mail, world wide web servers, computer conferencing software etc. Further he also identifies the problem to be considered with modern technology and global connections, various points that need to be considered and the availability of internet access for all students. With the advent of technology the author points out that the students who are geographically placed can be reached at the same time. With the new technology students can retrieve information, participate in and out of class discussion and maintain contact with instructors.

With the rapid growth of information, internet has grown extensively. The author Teresa Monahan [7], in their paper virtual reality for collaborative e-learning presents the experience of developing an innovative collaborative e-learning system and discusses this system for the use on mobile devices. The author [7], provides the information about the learning management systems which are available to provide course administration tools for instructors which allows students to communicate with their peers and tutors by learning online together. Further the use of virtual reality and instant communication students can be more visually aware of their own classmate and can have conversation in real – time. The advantage of this technology is that the students receive immediate feedback from the tutors. Relating to the current state of e-learning internet is a convenient and ideal medium of storing learning content where the tutors upload course material including text, images and links to external knowledge sources. Initially these websites were a repository of knowledge and information providing in HTML format.

Another recent development the author [7], states the provision of learning service on mobile platform such as palmtops, PDAs, smart phones and mobile phones. It was also possible to provide access to learning content on mobile devices. M-learning has being explored for teaching specific tasks. The author [7], concludes that multitude of system are now available to manage and deliver learning content online which motivates online students to enhance the e-learning experience.

There are a wide range of educational schools of thought and learning theories , many of these are mapped to three broad educational approaches : Behaviorism, socio- cultural and constructivism, further various models for learning have been proposed such as Kolb's experiential learning cycle, Jarvis model of reflection and learning, Laurillard's conversational frame work and Barnett's framework for higher education.

Each model has a particular focus and emphasis and set of theoretical perspectives. One reason for the lack of application of models and theories by e-learning practitioners is that they find the diverse array of theoretical perspectives this is being discussed by the author G Conole [8], in their paper mapping pedagogy and tools for effective learning design. Further the summary of learning theories models and their characteristics were discussed. The model for design of learning as the author [8], identified were reviewing learning theories, identifying common characteristics across, learning theories, building a model using the characteristics and mapping learning theories to model. To enhance these models were used for mapping different learning theories articulating out practitioners understanding linking pedagogy with activities and associated tools. The author [8], concludes that the model can be used both at the learning design stage and as an audit check against existing approaches, which was particularly useful in the context of e-learning where the practitioners seek a clear understanding of the technology to be used in their teaching.

With the advent of multimedia technology in education arena, traditional educational materials can be translated into interactive electronic form through the use of multimedia authoring tools. Tse-Kian Neo and Mai Neo [9], highlights an interactive multimedia module using author ware, which is user friendly with features for interactive course content creation. This is delivered to the learners in various teaching and learning environments such as teacher centered, student centered or the mixed mode. This further enhanced the teaching and learning process to empower the educational institute to meet the expectation of twenty-first century society. Further the author [9], highlights about the instructional communication process (ICP) enhanced with multimedia, which is integrated into teaching and learning process. The instructional materials were delivered in the multi sensory environment using the multimedia element such as text, graphics, animations, sound and video. In multimedia design process, the author [9] highlights the five step process:

1. Assembling media to represent education content.
2. Digitizing the analogue media.
3. Editing the media elements.
4. Multimedia authoring
5. Packaging for delivery on a CD-Rom.

In the concluding remark, the author [9], states that multimedia technology is being used tremendously in educational field. Information is being exchanged more effectively and efficiently among the teachers and the students.

Bob little [10], highlights about the case studies of standard life, Gartmore investment management, Daimler Chrysler's e-learning being used effectively in different context to produce competitive advantage. The author [10], states traditional training methods which are no longer able to satisfy the demand for continuous staff development and re-skill. The author [10], concludes that the rapid growth of information technology is helping a rise in technology based training by just – in- time and just enough learning for employers across the world.

The exhaustive literature survey has helped the present paper to base on a strong foundation on the current practices and future expansions in the field of e-learning. Further, various commonly used modes of e-learning and their hardware-software requirement, merits and demerits have been discussed in the next section.

E-learning Practices in Global and Indian scenario:

Various E-learning practices in global and Indian scenario are categorized as follows:

Modes :

1. **E-mail :** This is one of the easier technological solutions as long as there is an access. The files can be attached for the users benefit and can be downloaded or printed any time anywhere, through e-mail the professionals can share their knowledge with other people [11].

Merits:

- It is available at very low cost.
- Interaction can be done through e-mail effectively.

Demerits:

- It is slow to check e-mails in absence of good bandwidth or good internet connection.
- E-mail clients require manual configuration which can be quite challenging to carry out without the help of professional or advanced area.

World Wide Web Service: This is one of the best tool as World Wide Web (www). This tool is suited posting information like course syllabus, class notes, study materials other links to internet materials. In addition word files, html, acrobat files can be downloaded and stored. Image files, graphics, audio files, video clips are also made available. Through web based service learners can acquire the necessary skills they need while learning the theory [12].

Merits:

- Inexpensive
- Efficient – the World Wide Web increases efficiency within any organization by reducing the amount of time an employee spends in searching for policies, procedures, manuals, reports etc.
- Ease of use – it is based on internet protocol which expands accessibility world wide. It has a ready to access information World Wide Web, low administration and maintenance cost.

Demerits:

- Maintenance – is the biggest problem in World Wide Web. There has to be procedures for updating materials and for reviewing and discarding items on the network.
- Lack of training interest – another possibility is that people might not use the World Wide Web.

Computer Conferencing: This is a software tool that allows multiple users to participate in group discussions exchange text, images in real time. The internet connection can be through LAN [13], using this software it is possible to schedule an online classroom discussion anywhere. The central computer based conferencing packages require a lower level of hardware and network complexity, but are text only.

Merits

- In computer conferencing more dynamic question and answers can be created using text based chat sessions, virtual learning environment.
- In computer conferencing presentations are more attractive and lively It is more accessible, flexible and convenient in their approach for students, teachers.

Demerits

- It lacks human face to face environment.
- It is suitable for higher education only and not for primary students.

- There is no scope for testing the entry level behavior, thus a teacher cannot judge the degree of disparity among students.

Database e-learning: Online database are a form of e-learning which is used today. With online databases users can browse through different topics to look for explanation of various questions. Online database provide step by step instruction for installation, activation on certain products [14].

Merits

- Reduces data redundancy
- Improves data access to users through use of host and query language.
- Improved data security.
- Reduced data entry, storage and retrieval cost.

Demerits

- Database e-learning system are complex, difficult and time consuming to design.
- Substantial hardware and software start up costs.
- Initial training requires for all programmers and users.

Online Support: This is more interactive form of e-learning. It provides an opportunity for the user to interact when they are looking for an explanation to a given problem. These online supports can be in form of chat rooms, forums, e-mails, bulletin boards etc that can provide instant answers to the users [15].

Merits

- Convenience – in this type the employee or the user can come back anytime at their convenient time to work back.
- Cost – online training is much more cost effective for small business than offline training.

Demerits

- Personal contact – there is no direct contact to training professional or a teacher. This makes the most difficult task for employees, if they have a question or does not understand a part of the training.
- Students feel isolated from instructor and classmates.

Self Paced Learning: E-learning helps the user to learn at his own pace, which means one can take short breaks in between without missing any valuable information. It means that one can take a particular topic to be read in depth for a long time or skip over topics which are already known. The user can use their own preferred sequence. An analysis of the use of e-learning modules can raise questions on the success of self paced [16], self started e-learning models.

Merits

- Is good for those who feel that they want or need extra time to understand the course materials.
- It allows access anytime and for as much time required.
- Learners are motivated to study at their own time

Demerits

- Instructors need to think ahead of time of issues that might arise when the learners is on his/ her own.

Interactive Environment: In this mode the learning objects can be readily adjusted, modified and manipulate [17], according to the user preference. This enhances the learning process further this can be enhanced by adding pictorial or graphic tools. Thus an e-learning user can learn more than the classroom lecture.

Merits

- It is important to understand learning atmosphere , perceptions, goals and interaction for optimal languages
- Grammar, vocabulary can be learnt in process of computer technology.

Demerits

- Learners do not depend only on technology to provide interactive learning since the tools can not always use optimal skill for all.
- Difficult for teachers to flexibly adjust their curriculum activities.

Lower Cost and Larger Capacity : In this type of e-learning the user need not attend classes, seminars or training programs [18], e-learning web based learning, where the user need not spend lot of time away from their work. Web based learning is less expensive to maintain. This is a small investment when compared to what is paid to the instructors.

Merits

- Maintenance – there is a option for maintenance with regard to design and upgrade of hardware and software.
- Performance – while migrating workload from intranet platform or merging them with intranet presentation this problem will reduce the enhanced internet technology.

Demerits

- Determines the reliability and currency of the contact.
- Architecture and infrastructure of an organization.

Radio E-Learning: Radio has been proven long time as an easy and effective mode of reaching anyone in any remote corner of the world. Radio is being used for broadcasting educational classes for students, for telecasting instructional and educational modules specially designed for farmers, house wives and other sections of society [19]. Although, the introduction of television into public domain was thought of reducing the influence of radio in distant learning, the easy access of radio to public domain has helped in keeping this mode at the top. Gyanvahini, the government owned channel of All India Radio has proven beyond anybody's doubt by reaching millions of remote students and helping them to realize their dreams.

Merits

- It is the cheapest mode of distant learning and reachable to all.
- It is convenient to listen and work simultaneously.
- The proper planned series of classes have already proved to be effective.
- Curriculum based programs are held for people across various sectors.

Demerits

- Since this is a limited audio media, the lessons which require visual demonstrations cannot be telecast.
- The broadcasting is limited to its own definite timings, this may not be able to reach the users anytime they require.

Television E-Learning : Educational televisions has a great advances in world wide inventive applications, yet TV is drastically under-utilized as a teaching tool in countries that have the highest prevalence of urgent education needs [20]. Huge numbers of non-literate or marginally literate individuals for whom formal education has little practical applicability, will live out their lives in print environment with few or no reading materials.

Merits

- This is another easily accessible mode of distant e-mode education module.
- Since this is a visual mode, many visually appealing demonstrations can reach the viewers.

Demerits

- Shortage of technical facilities for creating educational TV program often results in failures.
- TV for national development has emerged widely but does not have determined human efforts made to realize its impact of teaching.
- The programme telecast timings must be closely followed by the viewers to take the full advantage of the programmes.

Hardware Requirement for computer/internet related e-learning:

- Pentium / AMD / with atleast 1.0 GHz or higher.
- 512 MB RAM – 1 Gig preferred.
- Atleast 1GB free space (to install a browser if necessary, additional space for other programs if applicable)
- DSL modem, Cable modem or 56 kbps.
- Printer (laser or inkjet)
- CDROM
- Video card resolution 1024x768
- Sound card and earphones.

Software Requirement for computer/internet related e-learning:

Windows operating system (Vista , XP,2000, NT)

- E-mail account
- Word processing software (MS word or open office).

Browser Requirement

- Microsoft internet explorer 7.0
- Netscape navigator 9
- Firefox 2x and higher.

Media downloads

- Adobe acrobat reader.
- Microsoft office 2007
- Power point 2007
- Real player G2
- Macromedia author ware web player.
- Macromedia flash player
- Windows media player
- Java
- Macromedia shock wave player.
- Apple quick time player.

Implementation of Hardware / Software E-learning in Indian Scenario

The implementation of e-learning hardware / software in Indian scenario can be achieved using one of three approaches. The implementation depends upon the level of readiness by any educational or organization in terms of budget, infrastructure, manpower.

Some institutions are already practicing e-learning in one way or other without using the network but by deploying the computer stand alone learning materials such as CD-ROMs, Course ware etc.

The main approaches to use e-learning within education are:

- Technology support to supplement traditional face to face learning programme.
- Integrating online technologies into traditional learning by enhancing learning experience.
- Disseminating online courses.

Implementation of e-learning done in three phases:

- Design and development
- Evaluation
- Implementation and institutionalization.

Basic level of implementation includes:

Word or simple PowerPoint presentation without any experience in e-learning and instruction.

Middle level implementation includes:

Little experience on e-learning limited to using of power point presentation.

Advanced level includes experience by :

Producing power point presentation and using them in e-learning.

Gyan Darsan:

Topics covered in Gyan darsan are interactive distance education, engineering education, higher education. It is managed by IGNOU, the electronic media production centre , New Delhi. It is a 24hours channel produced by IGNOU.

Type of programmes run by Gyan darsan are for :

- School of management studies.
- School of computer and information science.
- School of education and STRIDES.
- School of social sciences.
- School of humanities.
- School of science and school of health science.

- School of engineering and technology.
- School of agriculture.

Transmission of educational and enrichment audio programmes through FM radio network of 25 Gyan vani stations located which are as follows: Ahmedabad, Allahabad, Bangalore, Bhopal, Coimbatore, Chennai, Delhi, Guwahati, Jabalpur, Kolkatta, Mumbai, Mysore, Rajkot, Raipur, Varanasi, Vishakapatnam, Lucknow, Shillong, Jaipur, Panaji, Indore, Kanpur, Patna, Hyderabad and Nagpur.

Pros of E-learning practices resulting in implementation in India

- Amount of information resources made available to learners.
- Access to all tools and services in e-learning removes hindrance to learners.
- E-learning makes the process of acquiring materials in a quicker manner than traditional methods.
- E-learning makes an attempt to raise learner's cultural awareness, and plays a significant role in fighting out various or few gender biases of today's education.
- Due to implementation of e-learning group projects in college curricula is increasing which means student's possess the skills for required group work.

Cons of E-learning practices resulting in implementation in India

- Easy access to resources concerning about any topic may lead learners to materials that would otherwise not be made available to them which means that learners should be educated about how to use the resources efficiently.
- The fact of web resources is that anyone with access to it can put information up on it, which is inevitable that there can be incorrect information put on the network. Where learners have to question the reliability of available information.
- If the learners are not aware and conscious of this problem they may use and learn wrong facts about anything from historical to scientific data.

Recommendations to upgrade the standard of e-learning in India to Global Level

1. To set up special committee on e-learning at national level to monitor the curriculum, online teaching – learning methods and materials. Training for teachers in information communication technology skills.
2. By creating this network all learners can receive high quality guidance and can participate in life long learning. Through computer based learning knowledge will stimulate and increase in computer literacy for the learners.
3. The provision of an excellent delivery infrastructure with the capacity and technical support to enable all groups of learners willing to participate in e-learning at location of their choice.
4. Development of skills in instructional design, graphic design and programming which facilitates the production of high quality web based materials, with the new technology students can retrieve information, participate in and out of class discussion and maintain contact with instructors.
5. E-learning models can be used both at the learning design stage and as an audit check against existing approaches to seek better understanding of technology to be used in their learning.
6. Through the combinational central support and faculty support, instructors will receive the technical and instructional design support to implement active learning.
7. Faculties are encouraged to ensure that students are capable of participating successfully. Related educational programs and resources will incorporate active learning strategies.
8. An instructor should be able to identify, acquire and integrate learning object. This can be achieved through a combination of enhanced professional development activities about digital resources.
9. The cost of providing support and maintaining teaching technologies must be considered.
10. In collaboration with academic staff, non academic staff, and the students, the higher education institution should develop a policy on intellectual property rights associated with online materials.

CONCLUSION

In this paper a review of tools and techniques used for e-learning in the global and Indian scenario has been carried out. In this study, a thorough survey has been carried out on all modes of e-learning that are in practice. The information from service providers and users have been collected and analysed for the merits and limitations in their e-learning practices. The hardware, software and other requirements for various modes of e-learning are surveyed, compared and analysed and possibility of implementing the same in Indian scenario has been discussed.

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