



## INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION AND MANAGEMENT

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**E-LEARNING: THE DIGITIZATION STRATEGY**

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**ABSTRACT**

*With revolution in information and communication technology (ICT), internet, digitization and establishment of world trade organization (WTO), the world economies are making a transition from tangible economies to intangible/service/knowledge economies. In order to develop and achieve excellence in this new economic set up it is imperative to find an edge in knowledge and overcome any competitive disadvantage on this parameter, for which it is necessary to have an access to the knowledge and information at global level. To this end E-Learning has emerged as tool which helps in having access to global knowledge without transcending the geographical boundaries to thwart the locational disadvantage in an effective and efficient manner. It creates competitive parity on existing knowledge with huge potential to develop competitive advantage. Since libraries, primary knowledge resources, are integral to E-Learning and academia, it has, therefore, become all the more important to digitize the knowledge resources and to create digital libraries. Digital libraries, with the aid of new and better information and communication technologies, have become institutional access points for digital knowledge resources such as online books/journals and special media collections and thus have taken central place in eLearning. Not surprisingly, as faculty and instructors have begun to adopt E-Learning strategies as a part of their teaching repertoire, the libraries are playing a key role in helping to find and organize resources to complement programs and courses and to provide support to students in their assignments. With this background an attempt has been made in this paper to educate academia about E-Learning the role of digital library in E-Learning.*

**KEYWORDS**

Digital Library, E-Learning, Information and Communication Technology, Internet.

**INTRODUCTION**

Information and Communication Technology (ICT) revolution being witnessed for last couple of decades has impacted the way learners and educators acquire and deliver information and knowledge. Learners are not now facing the problem of paucity of information and knowledge or limited access to them but they are now flooded with information sources with easy access and online course content. ICT, through the use of Internet and Intranet, has made possible the online delivery of information and knowledge which has now become an integral part of the education and learning systems. In this form the delivery may be in structured, semi-structured or unstructured format. These developments, which form the core of E-learning, have revolutionized the learning and education systems by phenomenally increasing their scope and scale in a flexible, effective and efficient manner. ELearning, convergence of learning, digital repositories/library (DR) and ICT, by making information or knowledge accessible to users via digital or electronic interface technologies has reengineered and redesigned the learning and knowledge delivery processes. A promising direction in the current e-Learning strategies and activities points toward modern-day ubiquitous learning through the involvement of large-scale repositories of digitized knowledge in the learning processes. The creation of digital repositories/libraries, virtual libraries or electronic libraries and anywhere access through internet has made distance learning possible which is putting different learners and societies at competitive parity with each other. Thus eLearning, Internet and digital library have emerged as an opportunity to achieve learning and knowledge parity and overcome the competitive disadvantage of some over others. To this end, this publication is intended to discuss E-Learning and role of digital library in eLearning.

**EMERGENCE OF ELEARNING**

Past few decades have witnessed educational system undergoing many changes to cater to the developments at global level vis-à-vis technology, social, economic etc. Some of the factors that lead to such changes include:

**SOCIO CULTURAL:** Seismic shifts have taken place in society in the past few decades which have dramatically changed the nature and structure of families, workplaces and a myriad of other aspects of human life. Society itself is transforming into knowledge society in which knowledge worker has pivotal role in development, progress and excellence. Such societies are becoming seamless mainly due to the advance in ICT.

**TECHNOLOGY & ICT:** Economies and societies world over have been rapidly transformed due to Technological advances which has heavily impacted the education system. This is overtly evident by the fact that the investment in technology by educational institutions is increasing besides the student-per-computer ratio has also improved over the last few years. The explosive growth in ICT and Internet usage have more than ever increased the technological adoption and obsolescence rate which further pushes faster advance in technological and innovative developments in future. Technology platforms such as the Internet have created tremendous opportunities for new businesses and educational institutions, ushering in a "Knowledge Economy", which is driven by knowledge, information and ICT.

**GLOBALIZATION:** Globalization has created an opportunity for the corporations and the employees to operate at global level. This has put a challenge and opportunity before the education and training system to equip the youth to compete in a superior manner in global economy. This has required the educational institutions to create a system which ensures that learners have access to the innovative ideas with practical exposure that can make economy of a country powerful. Corporations are also required to regularly train their human resource and keep their processes up to date in order to avoid obsolescence and irrelevance in today's ever changing global village. Employees also at individual level have to take care of their own development by taking advantage of the trainings offered by their companies as well as using their own time to develop skills to stay relevant in a global economy.

Apart from these macro level changes the other trends/changes, which are similar to those found by Twigg et al (1998), taking place currently at global level particularly in education sector, include:

- Growing number of students in lower as well as higher education is still continuing.
- Various types of students are asking for different type of education and different students bring different experiences with them



- Participation of women, older students, and students from minorities is growing.
- Work and study being combined shows an increasing trend, and this leads to a need for more flexible learning arrangements in which the campus or school building is no longer central to the educational process.
- There is a need and trend towards lifelong learning. Lifelong learning leads to an emphasis on "learning to learn", which is the mantra in knowledge economy where knowledge becomes obsolete at an ever-increasing rate, and knowledge workers need to be able to refresh their knowledge on a regular basis.
- Because of the heterogeneity amongst the students, there is a need to accommodate different learning styles, customization and alternative learning routes. Courses have to take more into account the different experiences and backgrounds of students.
- Higher education institutions are losing the monopoly in providing education, as companies and public bodies possess knowledge that can be reused for educational purposes, not only for in-house training (knowledge management) but also to offer to external markets.
- Education is under constant budgetary pressure, thus there is a need for more efficient and effective education.
- Students more and more are behaving like consumers who want to make informed choices about how and where they want to be educated, which implies students are no longer committed to one institution.
- Teaching staff is exhibiting more job-hopping behaviour than they did in the past.
- There are too many dropouts in the current educational system.

Twigg et al (1998), who analyzed the changing learning situation are of the opinion that ICT has the potential to offer a solution for at least part of the problems mentioned above.

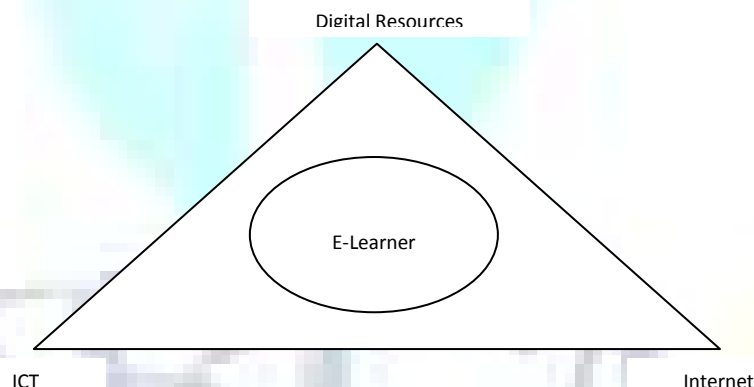
#### E-LEARNING

E-learning, online learning, virtual learning, distributed learning, network and webbased learning all refer to the educational processes that make use of ICT to intercede teaching and learning activities. Among these terms, e-learning, which comprises a lot more than online learning, virtual learning, distributed learning, networked or web-based learning, is the intentional use of networked information and communications technology in teaching and learning. E-learning includes all educational activities mediated by electronic devices whether carried out by individuals or groups, working online or offline, synchronously or asynchronously via networked or unconnected computers and other electronic devices. It includes the delivery of content via Internet, intranet/extranet, satellite broadcast, interactive Television, CD-ROM, DVD, audio and videotape, etc. E-learning covers a wide set of applications and processes, such as, web-based learning, computer based learning, virtual class rooms, and digital collaboration. It is a structured, interactive approach to learning and education where content, stored in digital form, is available and delivered online or in other e-devices.

Elliott Masie (2004) regards e-Learning as "the use of network technology to design, deliver, select, administer, and extend Learning". Piper Jaffray (1999) opines that e-Learning leverages various Internet and Web technologies to create, enable, deliver, and/or facilitate lifelong learning. As per CISCO Systems e-Learning is Internet-enabled learning. E-Learning is the delivery of content via all electronic media, including the Internet, intranets, extranets, satellite broadcast, audio/video tape, interactive TV, and CD-ROM, which makes it student oriented, active, open, collaborative and lifelong teaching-learning process. Moore and Ojedokun (2003) suggest that the anytime and anywhere characteristics of e-learning tools, and the fact that they are available from devices including desktops and notebooks, accelerate the productivity gains by making education more accessible. Indeed e-learning could be regarded as an improvement over the delivery of open and distance learning.

In today's fast-paced knowledge economies, E-Learning provides faster learning at reduced costs, increased access to learning, and clear accountability for all participants in the learning process. Organizations that implement e-Learning provide their work force with the ability to turn change into an advantage. E Learning is made possible by the union of digital knowledge/information resources, ICT and internet. They have been modeled in figure 1 as E-Learning triangle which depicts that digital resources, ICT and internet form the base or pillars of E-learning. Within this framework, content developers, content delivery in multiple formats, management of the learning experience, networked community of learners, and experts form the working components of E-learning. This implies that E-Learning attempts by nations and organization will succeed only if E-Learning triangle is appropriately developed and works in consonance with the learners.

FIGURE 1: E-LEARNING TRIANGLE



While ICT provides the necessary infrastructure/anatomy for E-Learning by way of electronic devices like computers, TV, satellite, CD-ROM, DVD, audio and videotape, etc., the internet provides the connectivity for interactive learning and online delivery of content. It creates the opportunity for web-based learning, computer based learning, virtual class rooms, and digital collaborations in real time across the globe with zero barriers to create competitive parity among nations, organizations and individuals. The Internet with its ability to level the learning field provides equal opportunity to all across the globe be it a high school student seeking assistance in some subject related questions or an employee who wants to improve upon his/her education by doing a relevant PG course e.g. MBA through distance education from a management institute/University. Individuals now have the power to learn in their choice time and at their own pace from their choice resources/institutes. Moreover, as the ongoing fast paced innovations and new developments in electronics and communication technology continue the memory/storage capacity, miniature, portability, reliability, versatility, flexibility, accuracy, efficiency and speed of electronic items improve at a faster rate, which coupled with the continuous improvements in bandwidth, video, and voice technology makes E-Learning all the more beneficial, user friendly, economical and more acceptable to users. This has created an ever increasing trend in demand for e-learning which is expected not only to sustain but to grow at an exponential rate.

Where as the Internet and electronic resources allow for the real-time performance, they are giving rise to new kinds of learning opportunities. This has also led to the emergence of new learning models ranging from 'formal' e-learning closely tied in to curriculum or courses, to more informal learning such as learners using the Internet to explore the topics of interest. They enable individuals to continuously improve by spending time on their deficiencies at their free will. This flexibility in E-Learning is provided mainly through digitization of knowledge and information sources which are then available to all with internet access anywhere any time. The digital form of knowledge and information stored in data bases are mainly comprised of digital libraries, which are much more than traditional libraries that used to store books, journals etc. They are set of electronic resources and capable to store, search, create and disseminate information. Digital libraries having diversified their functions are thus playing vital role in E-learning, research and education which creates a huge scope for their

establishment and transformation of traditional libraries into digital libraries. Since knowledge is stored in libraries forms core of learning thus it becomes imperative to understand digital library and its role in E-learning.

#### DIGITAL LIBRARY

Libraries store books, journals, magazines, dissertations, research reports, case studies, newspapers etc. in a very systematic and organised fashion. The storage in organized manner is must in order to make the storage, maintenance and retrieval easy and user friendly. In traditional libraries, searching and locating of the relevant information from the huge reservoir of knowledge is a major problem faced by the users. In these libraries, the organisation of the books is done by arranging the books primarily by subject, title, author and date, and accessed by following signs to the appropriate floor, room, bookcase, shelf, and spine-labelled book. This is comparatively a tedious task in this space age, where people have run out of time and want to accomplish their jobs effectively and efficiently (Ishtiaq & Rafi, 2006).

The digital library, a virtual world, is a venue for developing collaborative virtual situations that support shared work and shared "social play" (Benford et al., 2001). A digital library is a networked collection of electronic information resources which are diverse, dynamic and made up of different media (Adam et al., 2000; Wang, 1999). They are about information access. The term digital library is used less precisely and may refer to anything from a limited list of hotlinks to the entire content of the Internet" (Halliday et al., 1999). Sun Microsystems (2002) considers a digital library as the electronic extension of functions users typically perform and the resources they access in a traditional library. Miller (2002) argues that a digital library is based on the following two components:

- The commercially produced databases, electronic journals, and books and other electronic resources that are routinely purchased or licensed by a library for delivery via the library's interface to users both inside the libraries and remotely and for which library's funds are expended for their purchase or license;
- Those digital materials that are produced within the library or university and subsequently made available to users electronically.

Librarians see a digital library much as an electronic version of a traditional library (Xie & Wolfram, 2002), they consider it to consist of digital collections across subject matters. A computer scientist sees a digital library as a distributed and networked information system with attending databases and information services (Xie & Wolfram, 2002; Sharma & Vishwanathan, 2001). A computer scientist thinks of a digital library as a repository and interactively manipulative database system that provides access to scientifically useful data (Lynch, 1999). A user sees a digital library, collection of digital services and resources, as having the same accessibility as the World-Wide Web where an information source is only a click away (Xie & Wolfram, 2002). Wellman et al., (1996) see a digital library of the future in which software agents use principles of artificial intelligence (AI) to perform "monitoring, management, and allocation of services and resources." They define a digital library as a "community of information agents" that would retain most of the properties of the traditional library, but would perform them using intelligent software rather than human beings. Digital libraries have eliminated to a large extent the inconvenience caused by the traditional libraries, though it is assumed that they have the same basic purpose, functions, and goals as traditional libraries i.e., collection, development, management, subject analysis, index creation, provision of access, reference work, and preservation of the knowledge base, with some wider application and extensions. Digital libraries have some definite advantages over traditional libraries which motivate or force transition to them:

**BOUNDARY LESS:** The learners need not to visit physically digital library; people from all over the world can gain access to the same information, as long as an Internet connection and access is available.

**ANY TIME AVAILABILITY:** One of the major advantages of digital libraries is that learners can gain access to the information at any time.

**MULTIPLE ACCESS:** A number of users can access and use the same resources at the same time with equal efficiency.

**STRUCTURED APPROACH:** The more structured approach of digital libraries provide easy access to much richer content i.e. one we can easily move from the catalog to the particular book then to a particular chapter and so on.

**INFORMATION RETRIEVAL:** The user is able to use any search term belonging to the area of interest, title or phrase of the entire collection and get the list of probable collections. Digital libraries provide very user-friendly interfaces, giving clickable access to its resources.

**PRESERVATION AND CONSERVATION:** An exact copy of the original can be made any number of times without any degradation in quality.

**SPACE:** Whereas traditional libraries are limited by storage space, digital libraries have the potential to store much more information, simply because digital information requires very little physical space to contain them. When a library has no space for extension digitization is the only solution.

**NETWORKING:** A particular digital library can provide a link to any other resources of other digital libraries very easily; thus a seamlessly integrated resource sharing can be achieved.

**COST:** The cost of maintaining a digital library is lower than that of a traditional library. A traditional library must spend large sums of money paying for staff, book maintenance, rent, and additional books. Although digital libraries do away with these fees, it has since been found that digital libraries can be no less expensive in their own way to operate. Digital libraries can and do incur large costs for the conversion of print materials into digital format, for the technical skills of staff to maintain them, and for the costs of maintaining online access (i.e. servers, bandwidth costs, etc.). Also, the information in a digital library must often be "migrated" every few years to the latest digital media. This process can incur very large costs in hardware and skilled personnel.

According to Roes, (2001) "Digital libraries seem natural complements to digital learning environments. They are able to integrate the freely available information on the web with more formal literature for which increasingly consortium licences on electronic versions are arranged with publishers. These licences enhance and replace traditional collection development policies..... Much work done over the past decade in developing digital libraries will have an important payoff for education innovation. The main issue, of course is whether more active learning styles will become the norm, since many of today's courses are rather "self contained" nature in which educators present students with text to work through linear way and assessment is too often based on whether or not a student is able to produce the text prescribed by the teacher". The advancement of the ICT over the past decade has resulted in profound changes in the availability of knowledge and learning in digital form which helps learners to access wider choices of information sources. Today both learners and instructors need to have the ability to create, structure, locate, search, retrieve and use material in multimedia and digital forms. Neuman, (1997) notes that "there are few doubts about the potential of the digital library for providing unprecedented access to information and ideas. Wang (Wang, 2003) advocated that integrating a digital library into a learning environment requires considerable knowledge-building on the part of the organization involved. He suggested that the digital library should:

- Include all those learning resources that are relevant
- Classify the resources into logical categories
- Develop a knowledge vocabulary, including thesaurus
- Create Indexes and search mechanism
- Constantly refined the classification (subject) categories

Digital library offers some definite advantages in E-Learning which among others include:

- One reason for using digital libraries in E-learning is that it can store and manage large amounts of digital content such as full text, course materials, bibliographic databases, library catalogues, image and audio clips etc. Thus it provides an environment to bring together collections, services and people in support of the full life cycle of creation, dissemination and preservation of data, information and knowledge.
- Another reason to use digital libraries is that using various electronic tools, learners can search text materials and images easily and quickly, which can be applied broadly across all kinds of institutions. Advance intercommunication technology, sophisticated search engines, and affordable cost, large storage of digital content are the other reasons to implement a digital library in modern education.
- The library would allow learner to use electronic resources from anywhere, without even knowing where it is stored geographically.
- One copy of the documents could be viewed by any number of users simultaneously.
- It can be used for increasing course delivery for a large number of clients at a particular point of time.
- Study materials need never go out of print, and new editions can easily be created. One can carry several titles at once on a portable reader and, over time, build a personal library.



- It would be easy for non-specialist to use due to the simplicity of operation.
- Links to publisher's sites for full text journals.
- It provides and facilitate online and on demand enrolment, study and examinations,
- Search result will be delivered to an e-mail box to the user's choice.
- Protecting rare books that are rapidly deteriorating due to over use and poor storage conditions.
- It is cost – effective and cost-efficient for its ability of reuse.
- It provides faster learning, increased access, clear accountability and equal education for every body; the web is available on the desktop.
- It provides current information and helps in research work. To cope up with the advancements in technology, production of information in multidimensional forms, it became essential for a person to pursue additional knowledge at all times to keep him/her up-to-date in his/her field of interest. These factors are directing to the learning. The virtual conferences, collaborative work on projects, which are shared among institutions, exchange of useful material and experience among teachers provide up to date information for the research.

#### E-LEARNING ADVANTAGE

The benefits offered by the e-learning that are not possible with traditional textbook include:

*Individualized learning* — technology can enable a more personalized learning experience to help support independent learning — for example, students can elect when to take a test on materials they have been studying to progress at their own pace, or gather resources related to their own interests to build up a personal collection of learning materials.

*Group learning* — online learning can incorporate discussion forums or spaces for groups to share their learning experiences. There are online teachers forum, which includes teaching resources, information about using the library and online discussions. Such group areas can help learners in developing communication and team skills.

*Virtual learning environments* — online learning can include virtual learning environments, such as e-conferences or access to experts.

*Learner support* — e-learning can also incorporate advice, guidance, planning to help learners to negotiate and make meaning from the information available on learning pages.

*Flexible study* — in practical terms, e-learning enables provision which is oriented to the learner, online/offline, distance/campus, continuous/ interrupted.

*Tools for teachers* — online learning can also bring customizable resources closer to teachers and lecturers.

*Anywhere, anytime, anyone:* The growth of the World Wide Web, high-capacity networks, and high-speed desktop computers will make learning available to people 24 hours a day, seven days a week around the globe.

*Cost savings:* The biggest benefit of e-learning, however, is that it eliminates the expense and inconvenience of getting the instructor and students in the same place.

*Timely access to information:* Web-based products allow instructors to update lessons and materials across the entire network instantly. This keeps content fresh and consistent and gives students immediate access to the most current data. Information can be retrieved just before it is required, rather than being learned once in a classroom and subsequently forgotten.

*Higher rate of retention:* Since learners can customize the learning material to their own needs, they have more control over their learning process and can better understand the material, leading to a faster learning curve, compared to instructor-led training. The delivery of content in smaller units, called "chunks," contributes further to a more lasting learning effect.

*Higher interactivity/collaboration:* Teaching and communication techniques which create an interactive online environment include case studies, storytelling, demonstrations, role-playing, simulations, streamed videos, online references, personalized coaching and mentoring, discussion groups, project teams, chat rooms, email, bulletin boards, tips, tutorials, FAQs, and wizards.

*Learner controlled:* Technology has given the individual greater authority over the learning environment. Learning does not have to occur in a classroom. It may occur at one's own desk or the home.

*Self Paced:* An individual may proceed through a course or program as the information is fully comprehended. Learners can convert information to knowledge on their own timetable.

*Uniformity of content:* The information delivered can be consistent to all users, therefore reducing the possibility for misinterpretations.

#### CONCLUSION

The advancements in information technology have resulted in global village which is getting shrunk everyday. In this global village knowledge is emerging as the most important tool to achieve the goals of individuals, organizations and nations. This increased importance of knowledge warrants real time, replicable and same knowledge, available to all anywhere anytime. This demand has been addressed by the creation of digital library and E-Learning processes. In this paper an attempt has been made to highlight the role of E-Learning with special emphasis on digital library.

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