

E-LEARNING IN EMERGING NATIONS - DAWN TOWARDS DEVELOPMENT

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ABSTRACT

Globalization and technological change—processes that have accelerated in tandem over the past fifteen years—have created a new global economy “powered by technology, fueled by information and driven by Knowledge.” The emergence of this new global economy has serious implications for the nature and Purpose of educational institutions^[1] As the half-life of information continues to shrink and access to information continues to grow exponentially, schools cannot remain mere venues for the transmission of a prescribed set of information from teacher over a fixed period of time. Rather, schools must promote “learning to learn,” : i.e., the acquisition of knowledge and skills that make possible continuous learning over the lifetime. Information and communication technologies (ICTs)—which include radio and television ,as well as newer digital technologies like computer and the Internet—have been touted as potentially powerful enabling tools for educational change and reform .When used appropriately, different ICTs are said to help expand access to education, strengthen the relevance of education to the increasingly digital Workplace, and raise educational quality by, among others, helping make teaching and learning into an engaging, active process connected to real life.

KEYWORDS

ICT, infrastructural, distant learning, blended learning, e-learning, digital divide

INTRODUCTION

ICTs stand for information and communication technologies and are defined, for the purposes of this primer, as a^[2] “diverse set of technological tools and resources used to communicate, and to create, disseminate, store, and manage information.” These technologies include computers, the Internet, broadcasting technologies (radio and television), and telephony. The United Nations Educational, Scientific and Cultural Organization (UNESCO) uses the term *ICTs*, or information and communication technologies, to describe^[3] “...the tools and the processes to access, retrieve, store, organise, manipulate, produce, present and exchange in formation by electronic and other automated means. These include hardware, software and telecommunications in the forms of personal computers, scanners, digital cameras, phones, faxes, modems, CD and DVD players and recorders, digitized video, radio and TV programmes, database programmes and multimedia programmes”. Any kind of technology Can be understood as a tool or technique for extending human capacity.

In this sense, ICTs extend our human capacity to perceive, understand and communicate. The mobile phone enables us to speak from wherever we are to others thousands of kilometres away; television permits us to see what is happening on the other side of the planet almost as it happens; and the Web supports immediate access to, and exchange of, information, opinions and shared interests. In recent years there has been a groundswell of interest in how computers and the Internet can best be harnessed to improve the efficiency and effectiveness of education at all levels and in both formal and non-formal settings. But ICTs are more than just these technologies; older technologies such as the Telephone, radio and television, although now given less attention, have a longer and richer history as instructional tools.^[4] For instance, radio and television have for over forty years been used for open and distance learning, although print remains the cheapest, most accessible and therefore most dominant delivery mechanism in both developed and developing countries.^[5] The use of computers and the Internet is still in its infancy in developing countries, if these are used at all, due to limited infrastructure and the attendant high costs of access. In the field of formal education, ICTs are increasingly deployed as tools to extend the learner's capacity to perceive, understand and communicate, as seen in the increase in online learning programs and the use of the computer as a learning support tool in the classroom. Although universities were certainly leaders in engineering the Internet and interoperable computer systems to connect researchers for e-mail and data exchange, the use of ICTs for education and training has lagged behind other sectors in society. Education is seen as key in the process of achieving sustainable development. However, in order for formal education to contribute to sustainability, traditional systems and methodologies need to be re-oriented (Tilbury *et al.* , 2002; Huckle and Sterling, 1996; UNESCO, 2003). Visser (1997, p. 2), for example, explains that:

“Centuries of development in education have not been able to avoid that nearly one billion people in the world are illiterate, more than 130 children don't attend school, and many of those who do, acquire knowledge that doesn't sustain them or is irrelevant for their needs. There is a clear indication that yesterday's solutions are inadequate for today's problems, and there couldn't be a clearer signal that doing more of the same is not a valid solution.”

Hence efficient use of ICT in education sector is perhaps the solution for tomorrow.

BRIEF HISTORY OF ICTs IN EDUCATION

^[6]The history of the use of ICTs in education is relatively short. Before 1979, computers existed primarily in tertiary level educational institutions. Then, in the eighties, microcomputers began to be distributed to schools, and teachers began to grapple with the question of how to use computing for education rather than simply educating about computing. Starting from the mid-nineties, the use of ICTs in schools rapidly expanded in developed nations through curriculum support, networking, the professional development of teachers and software improvements. A growing number of researchers and educators began to develop applications that used hypertext, multimedia and networking to build cognitivist and constructivist learning environments aimed at improving learning.

In recent years, bandwidth has greatly increased and user familiarity with the Web and ICTs in general has evolved, contributing to an evolution of the Web. Some are referring to this

evolution as numbered “versions” or “generations” (Web 1.0, 2.0 and 3.0). Web 1.0 refers to the first implementation of the Web which mainly allowed users to search for information and read it. The main goal of organizations creating such Web sites was to establish an online presence and make information available to anyone at any time. The Web as a whole hasn’t moved beyond this stage yet. Web 2.0 refers to the trend in social networking, user-generated content and software as a service rather than a product. Many of the social networking tools have been around for a number of years (forums, chats, etc.) but there are new trends in communication and collaboration tools which are emerging (e.g., folksonomies, wikis, blogs, tools like Facebook, etc.).

Web 3.0, an emerging concept, is used to refer to the artificial intelligence applications that will increasingly become integrated into the Web, as well as to the increasing interoperability that users will have between the diverse information databases and information sources on the Web. It is also called the “semantic Web,” defined as “an extension of the World Wide Web in which Web content can be expressed in a format that can be read and used by software agents, thus permitting it to be found, shared and integrated more easily.”² Information and applications on Web 3.0 are expected to adopt a “microformat” as the use of personal devices such as mp3 players, cellular phones, TVs. The increasing trend of social networking is also proving to be very efficient tool for transmitting and sharing educational material and necessary knowledge towards a wide spectrum of people. Thus even very basic elements of ICTs could be used as potential tools for development of educational standards and levels.

E-LEARNING

It is a collective term for all the integrated learning methods that uses computer or the internet or various elements of element.

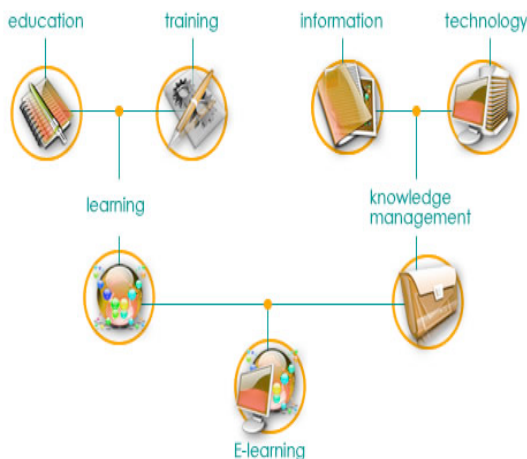


Fig 1: concept of E-Learning

E learning has basically 2 components, learning and knowledge management. Learning is providing of academic education based on the curriculum of the course and giving adequate training by efficient electronic methods.^{2nd} component is the knowledge management. This refers to both information management and technology management. Information management refers to management large quantity of information in form of electronic content and arranging that information in various courses, chapters and topic and then to different users from different

fields. Technology management refers to the management of technology i.e software and hardware used in the management and distribution of the information in various ways. Thus these two elements and with the the necessary monitoring and infrastructure govern the E-learning phenomenon. The worldwide e-learning industry is estimated to be worth over thirty-eight (38) billion euros according to conservative estimates, although in the European Union only about 20% of e-learning products are produced within the common market. Developments in internet and multimedia technologies are the basic enabler of e-learning, with consulting, content, technologies, services and support being identified as the five key sectors of the e-learning industry. Hence economically E-Learning provides a very lucrative opportunity especially to the developing economies like India to strengthen their economy by investing in this sector and increasing FDI in this sector.

BLENDID LEARNING

^[7]Another term that is gaining currency is blended learning. This refers to learning models that combine traditional classroom practice with e-learning solutions. For example, students in a traditional class can be assigned both print-based and online materials, have online mentoring sessions with their teacher through chat, and are subscribed to a class email list. Or a Web-based training course can be enhanced by periodic face-to-face instruction.

“Blending” was prompted by the recognition that not all learning is best achieved in an electronically-mediated environment, particularly one that dispenses with a live instructor altogether. Instead, consideration must be given to the subject matter, the learning objectives and outcomes, the characteristics of the learners, and the learning context in order to arrive at the optimum mix of instructional and delivery methods.

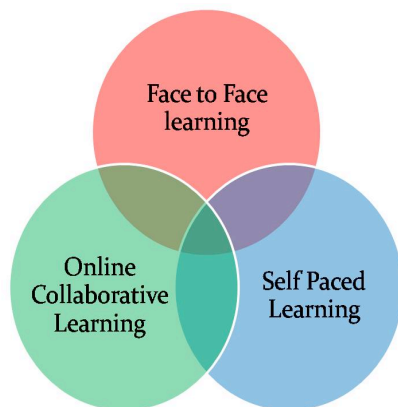


Fig 2: concept of blended learning

OPEN AND DISTANCE LEARNING

^[8]Open and distance learning is defined by the Commonwealth of Learning as “a way of providing learning opportunities that is characterized by the Separation of teacher and learner in time or place, or Both time and place; learning that is certified in some way by an institution or agency; the use of a variety Of media, including print and electronic; two-way communications

that allow learners and tutors to Interact; the possibility of occasional face-to-face meetings; and a specialized division of labour in the Production and delivery of courses. Such courses are beneficial where the distance between the teacher and the learner is very large and hence face to face learning is not possible. Thus the electronic learning material is provided to the learner by post or by internet. Nowadays instructions and lectures are also delivered online to assist the students in distant learning. And there are provisions of electronically submitting the assignments and giving exams and evaluation and grading. Distant learning have taken education, specially specialized courses and language courses to the places where face to face learning never reached or if reached was never utilized. It has made education more reachable and understandable to each and every section of the society. Nowadays people from urban areas as well as villages are taking to distant learning courses. These have specially helped women who after marriage often have to sacrifice their education. But now they can take to distant learning and get the desired course at their door step without moving out of their homes. Distance learning has also made the children and youngsters to explore greater options in education. They now increasingly take to variety of courses during their vacations and enhance their intellectual abilities.

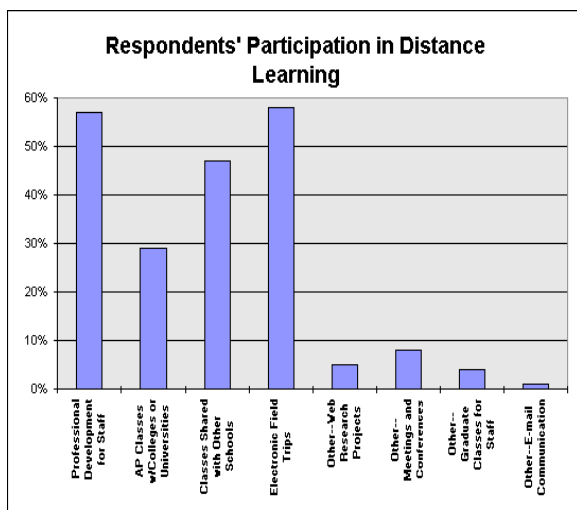


Fig 3: response to distant learning

This graph shows that the response of people towards distant learning through various means is quite high. People are increasing using this form of learning to enhance their technical skills in a very short span of time and in an economical way. Thus distant learning has given education a new meaning where it is not bounded in a classroom but freely spread towards the whole spectrum of people from all walks of life.

E-LEARNING CHALLENGES IN DEVELOPING COUNTRIES

^[9]These challenges are course challenges, challenges related to characteristics of an individual, technological challenges and contextual challenges.

➤ COURSE

The most frequently mentioned challenges concern issues relating to the course given. Concerns are raised about the content of the course, the activities undertaken during the course, the support functions provided, and the delivery mode of the course. The first issue identified here is the curriculum which stipulates much of the course actions and content. There are discussions on the need to develop new curricula specifically designed for an e-learning setting; thereby showing awareness that e-learning is different from traditional class-room based teaching. The subject content of the course also matters and refers to what is actually being taught or learned. Some discuss whether the content is interesting and relevant, accurate, up to date and in line with the needs of future employers. The Teaching and Learning Activities (TLAs) used during a course evidently affects e-learning. Another course issue is the delivery mode of the course. One talks about different levels of flexibility and how much personalization is needed for the students to be able to pass a course. The factor concerns whether students should be allowed to learn at their own pace and take the examinations when they want and if they should be allowed to choose the medium of content delivery. This factor is often discussed in a context of the global mobility of learners where the education is not nation-bound. Localization is also discussed.

➤ INDIVIDUALS' CHARACTERISTICS

The characteristics of the individual student, and in some cases the teacher, are much researched in developed countries, less so in developing ones. Student motivation is a factor that is frequently discussed in surveys on what affects students' satisfaction and capacity. Highly motivated students perform well in most cases whereas non-motivated students tend to drop out. The relation between motivation and other e-learning factors is rarely elaborated; the reasons for success or failure in the studies are simply referred to as "personal motivation" or "lack of motivation". Another factor is conflicting priorities that has to do with the amount of time students have to, and want to, devote to the course. Having enough time for learning is an important predictor of a students learning and retention and those who study more hours are generally more successful in their studies. A third concern is the student's *economy* and the economic prerequisites for studying. Financial difficulties and lack of student funding can be a predictor of student withdrawal. The student's *academic confidence* seems to be another good predictor of a student's success or failure in e-learning courses. According to some research academic factors such as previous academic experience and qualifications are the best predictors of a student's performance. The students also need some technological confidence; just having access to the technology is obviously not enough. The students also need to have the necessary computer skills and feel confident in using computers. Lack of experience with computers can be a major hindrance for learning especially for students who are

entirely new to computers whereas computer confidence accounts for much of the predictive power of good achievements. A further aspect, not directly related to the student's personal characteristics (but to individual circumstances), which has an impact on the students performance is the home environment. A stable and supportive study environment affect e-learning to a very large extent and some research even suggest that this is the most important factor influencing drop out and retention. Social support can be about the time and help the student get from family and friends (parents influence is very important here), but also about the attitudes on studying in itself.

Finally, the teachers' qualification and competence (in general and in online teaching in particular) and the time they have available for developing and taking part in e-learning courses matters.

➤ **TECHNOLOGICAL CHALLENGES**

Issues discussed are choices of technologies – radio, computers, audio cassettes, different Learning Management Systems (LMS) and so forth; the costs of using the technologies, how they are accessed and in what language they are available. One commonly discussed factor is access. The use of ICT for distance education evidently makes access to the technology an enabling or disabling factor and in developing countries the issue of access is often discussed in terms of availability of so called telecentres and Internet cafés. Access refers not only to whether one has physical access to a computer and an Internet connection, but also to the reliability of the connection and the bandwidth – basically everything that is needed to access the full range of the content needed. A second factor is the cost of these technologies. This factor is only discussed in developing countries where there is a need for affordable and low-cost ICT alternatives (such as television, radio and telephones) and low user charges. A third factor corresponding to the technology is the software and interface design. Aspects that are discussed are whether the LMS chosen supports the chosen learning model and pedagogy and if the software is easy to use (i.e. human-computer-interaction issues). Finally there is the issue of localization; to what extent the technology and software should be adapted in order to fit local culture and languages. Most research suggests that localization is of benefit for the students and the language used is often a good predictor of outcome. Localization in this case is about embedding cultural and religious values and aesthetics into the design of the technology and software.

➤ **CONTEXTUAL CHALLENGES**

The context of e-learning includes the context of the delivering organisation (typically a university setting) as well as the context of the society in which the e-learning takes place, including culture, traditions, rules and regulations. A frequently addressed issue here is that of the organisation's knowledge management or knowledge building. This

factor is addressed in terms of the need for a knowledge repository built on research and evaluations and some discuss the importance of sharing experiences among e-learning institutions and to establish e-learning units. E-learning programs also need economy and funding for their activities (both in terms of human resource development and for the technology). In the papers this issue is also discussed in terms of getting return of investments and cost sharing for e-learning projects. Another institutional issue is to make provision for the required training of teachers and staff, an often neglected factor.

CASE STUDY OF INDIA

^[10]India has formulated a department of information technology which comes under the ministry of communication and information technology. Its vision is the e-Development of India as the engine for transition into a developed nation and an empowered society. e-Development of India through multi pronged strategy of e-Infrastructure creation to facilitate and promote e-governance, promotion of Electronics & Information Technology- Information Technology Enabled Services (IT-ITeS) Industry, providing support for creation of Innovation / Research & Development (R&D), building Knowledge network and securing India's cyber space. Various programs undertaken by this dept. in the field of e-learning are:

➤ **Multimodal Digital Distance Education for IT & other Critical Technologies**

PROJECT OBJECTIVE: To evolve appropriate Courseware Engg. methodologies for making available quality coursewares at reasonable cost. Field experiments with different modes of Digital Distances Education modes.

ACHIEVEMENTS AND OUTCOMES:

- PG Courses in 6-semester M.Tech. IT (Courseware Engineering) has been designed, developed and offered through Multimodal Digital distances Education format.
- 6 semester ME in Software Engineering course in Multimodal Digital distances Education format (Eleven module have been designed, developed).
- 4 semester M.Tech. IT (Courseware Engineering) course has been designed, developed and offered through face-to-face mode since July 2004.
- 4 semester PG Diploma course on Multimedia and Web Technology has been designed, developed and offered through Multimodal Digital distances Education format.

➤ **Training of Trainers in E-learning**

PROJECT OBJECTIVE: To introduce fundamentals of E-learning, H/w and S/w and train teachers for implementing e-learning for the better educational methodologies.

ACHIEVEMENT AND OUTCOME:

- 240 teachers trained (120 from each centre) in use of e-learning in education.
- Trained teachers will be able to locate and use/ reuse the course contents and create their own content in e-learning in their area of specialization and they will act as master trainer for their parent Institute.

- Create multiplier effect to use ICT technologies and create awareness about the usage of information tools, blending it with traditional skills to enhance quality and productivity in education.

➤ **Content-Based Streaming and Real-Time Regional Language Captioning of E-Learning Video Data**

PROJECT OBJECTIVE:

- To develop new standards and algorithms for e-learning adaptive streaming applications that can optimize the bandwidth utilization. For this, a real-time system is proposed for dynamically changes the resources allocation within a live video streaming session.
- A Regional language captioning is proposed for complementing the end user's comprehension of the lectures delivered in English. The product will have to be deployed and tested through ERNET in few Navodaya/ Central schools.
- A standard Media Markup language needs to be designed to apply the principles of the Web to multimedia, creating continuous Media Web.

ACHIEVEMENTS AND OUTCOMES:

- Standardized development tools for E-learning courseware.
- Software for content-based delivery and distribution of E-learning courseware.
- Documentation and dissemination in terms of research papers of the methodologies and framework for enhanced E-learning.

NATIONAL DIGITAL LIBRARIES CELL

Various digital libraries formulated by different agencies in collaboration with the dept. of information technology are:

- Indian National Library in Engineering Science and Technology Consortium (INDEST), IIT-Delhi- www.indest.iitd.ac.in
- Indira Gandhi National Center for Arts (IGNCA), New Delhi - www.ignca.gov.in
- Vidyanidhi Digital Library, University of Mysore. - www.vidyanidhi.org.in
- ERNET, India New Delhi, Digital Library - <http://www.digitallibrary.ernet.in>
- Information and Library Network Centre, Ahmadabad - Gujarat - www.inflibnet.ac.in
- National Institute of Science Communication and Information Resources (NISCAIR), Dr. Krishanan Marg, New Delhi-110012 - <http://www.niscair.res.in>
- V.V.Giri National Labour Institute, Noida: www.vvgnli.org

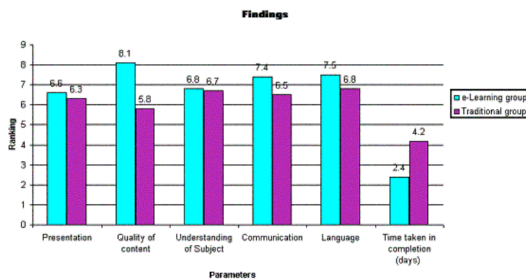


Fig: 4 comparison between e-learning and non e-learning groups.

DIGITAL DIVIDE

The term digital divide refers to the gap between people with effective access to digital and information technology and those with very limited or no access at all. It includes the imbalances in physical access to technology as well as the imbalances in resources and skills needed to effectively participate as a digital citizen. In other words, it is the unequal access by some members of society to information and communication technology, and the unequal acquisition of related skills. The term is closely related to the knowledge divide as the lack of technology causes lack of useful information and knowledge. The digital divide may be classified based on gender, income, and race groups, and by locations.^[1] The term global digital divide refers to differences in technology access between countries or the whole world. This is same as the monetary divide between the rich and the poor. Rich having many education facilities and poor having no facilities at all in remote regions.

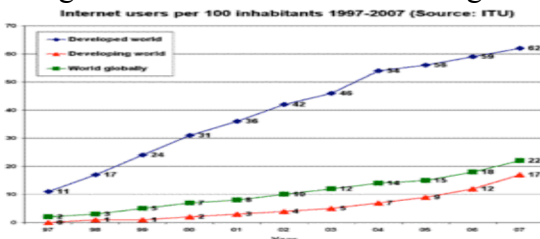


Fig 4: growth of internet users in developed and developing nations.

CONCLUSION

Thus we can say that ICT has the potential to replace a teacher by a computer and it is doing so with greater pace. The policy makers should make greater effort to solve the various issues coming in the path on implementation of ICT effectively in education like cost and infrastructural needs. If these issues are dealt with effectively then the ICTs could transform the face of education in an unimaginable better way. It could take the education to the roots where it is most needed to bridge the digital gap. And once this is achieved then it is very much possible to achieve the high levels of literacy by developing countries like India.

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