

# Is Information and Communication Technology

## Reshaping the Learner Support

**Manjulika Srivastava**

*(STRIDE, Indira Gandhi National Open University, Maidan Gahri, New Delhi-110 068, smanjulka@hotmail.com)*

**V.Venugopal Reddy**

*(Student Services Center, Indira Gandhi National Open University, Maidan Gahri, New Delhi-110 068"*

*E-mail: vvgreddy@hotmail.com)*

Twenty-five years ago it was only a prophecy that the home would be at the center of society - the "electronic cottage"- in which paid work, education, service consumption and leisure would be mediated, through new-technologies (Toffler, 1980). What was then a prophecy is more than a reality today. Rapid developments in technology, involving the convergence of telecommunication, computers and micro electronics, and the emergence of the Internet have revolutionised both the speed and nature of communications. These new information and communication technologies (ICTs), have not only facilitated the globalisation of society and economy on the one hand, but have also made a major impact on education, particularly the distance education.

In fact technology-mediated distance education came into existence 150 years ago, as an effort to replace live, face to face instruction. Ever since then distance education has evolved and taken on several distinctive forms that reflect the characteristics of different technologies. Essentially distance education has evolved through three generations:

p.43

correspondence education, open and distance education and virtual education. The evolution of distance education through these three generations is presented in Table 1.

The phenomenal developments in computer and tele-communication technologies are exuding enormous impact on the ways in which learning (instructional) materials are created, stored, acquired and delivered to potential end-users (Barker, 1999). It enables interaction between students and instructors and among students almost instantaneously. Thereby, opening up new opportunities for joint learning activities. Literally it is possible to deliver instruction through computer mediated communications media to learners anywhere in the world without any restriction of time, space and number of persons accessing the materials (Jegade, 2001).

Thus, the third Generation of distance education is providing distance learners with a powerful electronic learning environment, collaborative/ cooperative learning and Internet based education.

**Table 1 : Evolution of Distance Education**

	<b>First Generation, Correspondence Education</b>	<b>Second Generation, Open and Distance Education</b>	<b>Third Generation Virtual Education</b>
<b>Goals &amp; Target group</b>	To reach out to those at a distance from the educational institution	Respond to the problems of distance but mainly to the needs of the disadvantaged	Less about distance or disadvantaged. More about more education to more students anywhere, anytime to provide on campus, off campus access.
<b>Pedagogy</b>	Teacher centred modeled on face to face pedagogy	Guided independent study through SLMs	Collaborative/Co-operative (virtual) learning, using distributed learning resources
<b>Instructional Design</b>	Content centred <ul style="list-style-type: none"> <li>Learners' individual interaction with learning materials</li> </ul>	Learner centred Content centred <ul style="list-style-type: none"> <li>Improved quality of learners' individual interaction with learning materials, associated with clearly defined objectives</li> <li>Limited opportunities for social interaction to facilitate, effective learning through contiguous two way communication</li> </ul>	Learner centred problem based <ul style="list-style-type: none"> <li>Technology mediated flexible learning</li> <li>Enhanced interactivity both individual and social interaction</li> <li>Flexible access to learning resources asynchronous communication</li> </ul>
<b>Delivery (use of technology)</b>	Print	Print, audio & video tapes CML, CAL, Broadcast TV, Radio and Teleconferencing (Audio & Video conferencing)	Interactive multimedia, CD-ROM Internet based CMC

p.44

The simple acquisition of skills and knowledge is no longer the goal of education, as the third Generation distance education strives to develop certain competencies in its learners. Learning is moving beyond the recall of facts, principles or correct procedures and into the area of creativity, problem solving, analysis or evaluation. (Bates, 1996). ICTs are creating asynchronous learning networks which are providing distance learners not only a much richer environment for spontaneous interaction, but greater control over the subject matter being studied and thus creating a new kind of learning community (Nüller, 2001).

The asynchronous environment raises a number of concerns for institutions, the most essential being the support of the “distant” learner. The success of any distance education depends upon the effectiveness of the learner support system.

In the web-based instructional system too learner support is crucial. It is also dependent on human facilitation, contact and interaction which can be both synchronous and asynchronous and is provided by “live agents” (the tutors) supported by the web facilitator.

The role of the tutor is pedagogical, social, managerial and technical. Tutors contribute knowledge, keep the discussion on track, weave together various discussion threads, maintain group harmony and assess learners progress.

The role of the web facilitator is technical, to provide the technical configuration and maintenance of all online system components (website) database, simulation environment (Harasim, et.al., 1995).

With this brief background, the discussion in this paper is developed around the following points:

- review of literature;
- what is learner support;
- evolution of learner support: the changing face of learner support with the three generations of distance education;
- current practices: a few case studies of ICT based learner support
- emerging models of ICT - based learner support;
- some related issues.

## Review of Literature

There is substantial literature on web-based teaching and learning. In most cases these focus on Marshall McLuhan's notion of the "global village" the networked society of the Twenty-first Century and related issues such as that of access (the digital divide ?) institutional features, new organisational structures, cultural and ethical issues etc. (Bates, 1995; Gates, 1995; Tiffin and Rajashingam, 1995; Oblinger and Rush, 1997; Hawkins and Battin, 1998; Mason, 1998; Katz et.al., 1999; Lockwood and Gooley, 2001). The synergistic relationship between technologies and the different approaches to teaching and learning have been subjects widely discussed in several books (Laurillard, 1993; Bates, 1995; Harasim, 1999; Collis, 1996; Burge and Roberts, 1998; Peters, 1998; Ryan et.al., 2000; Joliffie et.al., 2001; Forsyth, 2001; Collis and Moonen, 2001).

The growing interest in virtual education has led the Commonwealth of Learning to undertake a massive study of the growth and development of virtual education across the world (Continent wise analysis) (Farrell, 1999; and Farrell, 2001). These two major studies have not only traced the development of virtual education in the major regions of the world, but has given a general synthesis of the trends, issues and forces shaping its development. Further evidence of this interest is presented in some of the recent studies that have examined the process of "e-education" (Bjarnason, et.al., 2000; Kerry et.al., 2000 and Johnston et.al., 2001). The primary functions of the learner support are three-fold - cognitive, affective and systemic. Cognitive, is basically supporting and developing learning through the mediation of learning resources; affective is providing an environment that supports students, creating commitment and enhancing self-esteem; and systemic that is establishing administrative processes and management information systems which are transparent and student friendly (Tait, 2000).

## What is Learner Support ?

The focus of much institutional effort has been directed toward the packaging and delivery of knowledge for the independent distant learner. There has also been an increasing realisation that simply assessing or assimilating information is not sufficient. There is a growing need for, and appreciation of, sustained two-way communication in the process of analysing and developing knowledge. As Keegan (1990) pointed out that the *planning and preparation of learning materials and the provision of student support services* is that which distinguishes distance education from private study and teach yourself programmes. Meeting the demands of an educational transaction at a distance is dependent upon communication

p.45

technologies which provide frequent and regular interaction between teacher and learner, as well as among learners. Thus, the term learner support can be defined as the range of activities which complement the mass produced materials (Srivastava, 2000). These include personal contact between learners and tutoring teachers, i.e., counselling, face to face or by correspondence, telephonically or electronically; interactive teaching through television and radio, providing feedback to the learners on their learning; providing access to additional resources such as libraries, laboratories, electronic networks etc., depending upon the designing of the course, infrastructure available, distribution of learners, available resources and the values and philosophy of the open and distance education provider (Robinson, 1995).

Simpson (2000) simply puts it, that learner support in the broadest terms is all activities beyond the production and delivery of course materials that assist in the progress of students in their studies. It falls into two broad areas: academic or tutorial support which deals with supporting the students with cognitive, intellectual and knowledge issues of specific courses or sets of courses. This will include developing general learning skills, numeracy and literacy. The second is the non-academic or counselling support - the support of students in the affective and organisational aspects of their studies, such as advising, informing, assessment, practical help to promote study etc.

## **Evolution of Learner Support**

### ***The First Generation (1850s - 1970s)***

The first Generation distance education was prevalent in the correspondence education phase, when instruction was provided by conventional teachers to distance learners by means of written correspondence. There was an absence of effective learner support. In the 19<sup>th</sup> century distance learners were provided only with the course outline, some written notes related to the course, previous examination papers and a list of places where the examinations were conducted. However, over a century's worth of research into cognition, there emerged pedagogical method, and the concept of providing effective support to the distance learners. Essentially the one-way communication offered by pre-prepared teaching material distributed by a variety of media was augmented by the limited use of two-way communications through face to face contact, written communication and possibly telephone contact with a tutor. However, distance education was a teacher centered model for nearly a century, rooted in behaviorism and limited to the teacher-student interaction.

### ***The Second Generation (1970s - 1990s)***

The Second generation distance education coincided with the establishment of open universities. Emulating the example of the first open university, the Open University of UK, many open universities provide learner support services through study centers and regional-centers. At study-centers, distance learners have face to face contact with teachers or tutor counsellors and the regional centers facilitate and oversee the functioning of the study centers. The genesis of such support lies in the belief that tutorial work is an essential component of distance education. Such thought and action are a consequence of how the founders of the Open University of the UK, as well as others who followed them, viewed distance education within the framework of conventional education which is essentially teacher centred. Newer technologies such as radio, audio and video tapes, telephone, and television were introduced in the last fifty years for delivery of distance education programmes. Initially these new technologies were being used to facilitate the teacher-centred model of distance education. Gradually interactive technologies, such as interactive television (ITV), interactive radio, computer based conferences, computer managed learning (CML), computer assisted learning (CAL) and interactive video were adopted by open universities and other distance education institutions. Thus, the second generation distance education goes beyond the use of mere text and postal correspondence which are typical of first generation distance education, by adopting multiple media. The aim being to maximise the educational benefits to a larger audience with one way flow of packaged knowledge (information and ideas), prepared by teachers and experts (involved in preparing the course materials) to learners. Another set of teachers (who are not involved in preparing the courseware) providing tutoring support to the learners. Learning takes place through the interaction of learners with those materials facilitated by their tutors. This represents the industrial model, that separates the development of courseware by the course team, from tutoring of students by the local tutors at the study centers.

### ***The Third Generation (1990 onwards)***

The third generation distance education evolved during the current virtual education phase. After the

p.46

establishment of open universities, the creation of virtual universities has been an equally dramatic shift in the world of open and distance learning, caused by rapid developments in information technology, specially the Internet. This technology promises greater learner-centredness than before, also better quality of interaction, and facilitates more constructivist methods. The continuing use of print-based correspondence had perpetuated a behaviorist view of learning whereas computer mediated communication is a tool for creating fundamental changes in distance education practices towards socio-constructivism and learner-centredness than ever before. ICT based learner support is

presented in Table - 2. Berge (1997) has classified the advantages of CMC in distance education into four areas : the time and space independence of asynchronous communication; collaboration made possible by synchronous chat or shared documents; a virtual space for interpersonal interaction, social networking and changing roles; and technical advantages such as chatting and access to information via the Internet. Davie and Wells (1991) pointed out that , in a computer conference, all students have an equal opportunity to contribute, which is not possible in face-to-face sessions where time constrained synchronous interaction is often dominated by the teacher and a few students. Thus CMC is providing an antidote to the main weakness of both the first and the second generations : The lack of contact between the students and a dependence on the teacher. Thus CMC has made speedy communication among students and teachers possible. Gunawardena and Zittle reviewed the literature up to 1995 on teaching and learning processes in distance education using all types of media. They found a shift in the literature towards the learner centred orientation.

This evolution is moving the locus of control of learning to the learner. This form of distance education also provides greater benefits to learners of all ages who are constrained by time, geography, disabilities etc. to give them greater access. ICT has also changed the focus of distance education asynchronous, interactive modes of assisting the learning process such as intelligent tutoring, access to resources via the Internet and interaction between the learners and teachers among themselves at different locations. Thus, the third generation distance education requires a move away from the industrial model, using new ICT technologies to enable more two-way communications and dialogue to take place between the learners and the course team and among learners themselves, one to one, one to many and many to many. Thus ICT acts as an important tool enhancing learning activities and in turn learning activeness. According to Kirkwood (1998) the most valuable contribution that ICTs can bring to open and distance education is from the media that enables those aspects of the learning process that have been least served by the industrial model, i.e., inter-personal discussion, collaboration, etc. The third generation distance education is based on the philosophy of constructivism i.e., learner centred collaborative environments that support reflective and experiential processes. Students and teachers can build meaning, understanding and relevant practice together and go far beyond the mere movement of information from teachers' (instructors) minds to students' notebooks (Jonassen, et.al, 1995).

### **Case Studies**

The bandwagon of providing online support to distance learners is fast becoming commonplace. The studies are representative of a wide range of online services, in different settings across the world.

#### ***North America***

Some 710,000 American students took online (distributed learning) courses in 1988, and the number is likely to triple by 2002 (2.2 million). (Kerry, et.al, 2000). Survey of the 1028 accredited institutions of the USA, 72 % offered online courses in 1999, compared with a mere 15 % in 1998 (Grimes, 2000). Within the next two years a projected 80% of all American colleges will be offering online courses (Ellin, 2000) (Quoted in Jegede, 2001). In the USA, the US military may be a driving force in developing online learning. The Pentagon is proposing a sizeable budget allocation - a \$ 600 million online item for the US Army over the next six years - to enable interested soldiers to take distance courses over the Internet (Carr, 2000).

The US is undoubtedly the world leader in the use of ICT in education and has demonstrated different models of virtual education in higher education. In the US higher education, specially distance education has become big business that has attracted commercial interests. Thus new alliances between education and industry began to emerge (Dirr, 1999).

#### ***National Technological University (NTU)***

NTU is a consortium of 51 US universities, providing 1400 engineering and technology courses at more than 1100 locations in the US and countries in the Pacific Rim. It is one of the largest educational networks in the world broadcasting more than 25000

**Table 2 : ICT based Learner Support**

Technology	Type	Characteristics	Utilisation
World Wide Web	One-way Asynchronous	Hypermedia text, graphics, diagrams (voice and vision) hyperlinks to other databases	<ul style="list-style-type: none"> <li>• general information</li> <li>• course content</li> <li>• library resources</li> <li>• assignments</li> <li>• registration and admission</li> <li>• examination</li> </ul>
Electronic Mail	Two-way Asynchronous	Text based	<ul style="list-style-type: none"> <li>• counselling and tutoring</li> <li>• mentoring</li> <li>• submitting assignments</li> <li>• providing feedback on assignments</li> <li>• assessment</li> <li>• transferring data (text, graphics, audio, video attachments etc.)</li> </ul>
Mailing List and News Groups	Many to Many Asynchronous	Text based	<ul style="list-style-type: none"> <li>• group discussion</li> <li>• conferences</li> </ul>
Bulletin Boards and List servs	Many to many Asynchronous	Text based	<ul style="list-style-type: none"> <li>• lecturing</li> <li>• group discussion</li> <li>• project work</li> <li>• symposiums</li> <li>• tutorials</li> </ul>
Chat	Many to Many Synchronous	Text based	<ul style="list-style-type: none"> <li>• group discussion</li> <li>• collaborative learning</li> <li>• debate</li> <li>• brainstorming</li> <li>• project group forum</li> <li>• counselling and tutoring</li> </ul>
White board	Many to Many Synchronous	Used to display illustrations, diagrams, slides etc.	<ul style="list-style-type: none"> <li>• used in chat sessions conferencing</li> </ul>
Conferencing (Audio/Viideo)	Many to Many Synchronous	Edge over chat sessions verbal and non verbal communications (voice & vision)	<ul style="list-style-type: none"> <li>• group discussion</li> <li>• conducting experiments</li> <li>• demonstrations</li> <li>• counselling and tutoring</li> <li>• lecturing</li> <li>• symposium</li> <li>• panel discussion</li> </ul>
Multi-user Dimension/ Domain (MUDs) Multi-user Domain Object Oriented (MOOs)	Many to Many Synchronous	Used to scan images and attach a movable on screen body used for role playing	<ul style="list-style-type: none"> <li>• Role playing games</li> <li>• Collaborative learning</li> <li>• Tutorials</li> <li>• Conferences</li> <li>• Project group forums</li> </ul>

Source: Minoli (1996); Porter (1997) and Pulist (2000).

hours of programming on 11 satellite channels in the US and one channel in the Pacific Rim. (ED/ x, About NTU, 2000).

NTU delivers its courses directly to the job site or one of the member colleges / universities in the desired area through satellite transmission where the courses are recorded for late use at home. Many courses are available through CD-ROM and the Internet (NTU, 2000).

### ***AT & T***

AT & T, the Telephone giant has set up the AT & T learning network, and through which it has assembled a virtual academy to provide in-service professional development opportunities for teachers. AT & T has collaborated with Western Governors University, George Washington University, Montana University, Penn States World Campus and T.H.E. Institute.

### ***Regents College***

The Regents College of New York State, proclaims to be America's first virtual university. It currently enrolls over 17000 students per year in its 30 plus programmes (Shive and Dirr, 2000). It offers a wide range of support services for its students. Its Electronic Peer Network supports discussion groups, chat rooms and a students' directory. The college has also partnered with Specialty Books, to provide its students with access to course books and computer software that can be ordered by phone, toll free, with shipment promised within 24 hours (Dirr, 2001).

### ***Australia***

The adopting of new teaching and learning approaches is occurring in all universities throughout Australia and are either driven by specific teaching learning units set up in universities, e.g., the University of Western Australia (CEDIR), Monash University (CHED), Griffith University (IHE) committee. Further, a number of the former Distance Education centres e.g., University of Southern Queensland, Monash University, University of South Australia, Charles Stuart University, have been particularly active in the development of online courses using traditional distance education courses as a platform. A number of Australian universities have established new campuses overseas and also within Australia which tended to adopt a range of ICTS. e.g., University of Southern Queensland, Monash Overseas Campuses and Central Queensland Universities Campuses. Some have set up new campuses with the objective of using flexible approaches. e.g., The University of Queensland Ipswich campus has a Learning Resource Development Unit. A number of universities have transformed existing courses available on campus for specific use either overseas or elsewhere in Australia. e.g., Central Queensland University has set up its own company "Campus Management Services" which has established Campuses in Sydney, Melbourne and Brisbane and overseas, (Hong Kong, Singapore and Fiji) using media such as video conferencing and the Internet to deliver lectures and locally based tutor support system.

Other hybrids of the above approaches are also evolving (Dekkers and Andrews, 2000).

### ***University of Southern Queensland (USQ)***

The USQ Distance Education Center uses a range of media such as print, audio/teletapes, video tape, teleconferencing (audio, video), CML/computer based exercises, CD-ROM, computer mediated conferencing and Internet based www material. The interactive learning services section supports the USQ flexible delivery initiative. This section provides a range of products and services which include multimedia, CML and network operations.

However, its Graduate Certificate Programme in Open and Distance Learning developed by USQ in collaboration with AT & T is offered solely via the Internet. The course makes extensive use of existing electronic journals on the www e.g., e-journals. Students gain access to these materials through the Internet browser such as Netscape. Because of the transient nature of many websites, the material after being cleared for copyright is stored in the local USQ servers. This electronic database is referred to as the AT & T treasure-trove. Interaction with peer group and teaching

staff, who act as mentors is achieved through CMC using web-based conferencing system. (Netscape's Newsgroups) and informal social interaction through the "Coffee Chat" Conference. Since the cohort of students comes from 12 countries covering seven time zones the use of synchronous communication (through video conferencing audio graphic communication) Internet Relay Chat is limited. More asynchronous methods are being utilised. Individual communication support is provided by the mentor through e-mail. Student projects are also being initiated through collaboration. (Taylor, 1998).

### ***Europe***

The ICT boom has also enveloped Europe. The European Union has been a major driver of

p.49

educational change in Europe over the last 10 years. The major issue confronting virtual education is that of language. English is the defacto common language for online teaching in Europe, but this excludes many Southern European participants : There are also marked cultural differences in pedagogical approaches to education: The UK, and the Northern Europe (Netherlands, Denmark, Sweden, Finland) are promoters of student - centred constructivist notions while France, Germany and Latin countries still believe in traditional teacher - centered transmissive approaches. The deregulation of telecommunication infrastructure of Europe is 10 to 15 years behind that of North America. The UK has led the way. Finally the system of credit transfer has never existed in Europe as it is established in the North America (Mason, 1999).

### ***The Open University of UK (UKOU)***

The UKOU has over 7000 students on the continent along with 32000 UK students who access the Internet for tutoring and other services (Mason, 1999). However, print remains the core delivery medium for the UKOU. (Bates, 2001). At UKOU for the past 30 years, each new manifestation of ICT has been examined, experimented and then used. Students of UKOU have been using e-mail for two decades. In 1988 UKOU introduced computer mediated conferencing for the first time for a single course. Today there are more than 110000 students using electronic conferencing in some 180 courses. There are about 16000 conferences going on at any one time, 2000 of which are organised by the OU Student Association and moderated by students themselves. All this is mainly done asynchronously. However more than a 1000 students use the conferencing system which is called Lyceum. This enables students to interact over the web in full-duplex audio with a dynamic onscreen whiteboard, concept mapper and image grapper. Besides conferencing, CD-ROMs have been produced for a number of courses. The web site receives 300000 hits per month. The OU's online library has gone up from 1000 active users to over 10,000 active users. Students also prefer to do all their administrative transactions online. The OU has provided students records online, registration and also student guidance (Daniel, 2000).

### ***South America***

All Latin American countries have adopted distance education. However Mexico is one of the countries with the greatest experience in the field. Telesecundaria a televised based programme which currently has an enrolment of 800000 students and 23000 teachers (1999). With this long tradition of televised instruction virtual education is taking off. Over 30 years ago, (1968), Mexico launched Virtual University of Instituto Tecnologicoy de Estudios Superiores de Monterrey (ITESM) ( Mexico) - ITESM is a private institution with over 800000 students on its rolls, and 29 campuses across Latin America and North America. All the 29 campuses are linked via satellite and a digital integrated network that can also be connected to other countries. 2500 courses are delivered using a combination of web-based instruction (using Lotus Learning Space) and interactive video teleconferencing sessions. Readings and assignments are available on the web in English while Hyper news discussions accessible through the web are also conducted in Spanish. Each of the courses, has a lead content professor who works to ensure successful transmission of the courses. ITESM has more than 6000 faculty. (Rice-Lively, 2001). Many institutions have collaborative agreements with ITESM which has 1302 receiving sites in Mexico and 127 in other countries in Latin America. Thus it is successfully using one-way satellite and Internet based communications for delivery of its 15 programmes (Oblinger, 2000). Every student has an e-mail address and each course makes use of moderated electronic discussion

group. The students at the remote sites have the opportunity to submit questions during class time via the online computer network which is known as the Interactive Remote System, (Taylor, 1996).

### ***African Virtual University (AVU)***

The development of the internet as teaching tool in Africa is fairly recent. Unlike many countries of the world Africa continuously struggles to procure infrastructure. Hence international organisations like World Bank have taken the lead by setting up the African Virtual University. AVU was set up by the World Bank in 1997, which mainly uses ICT to give the countries of Sub-Saharan Africa direct access to quality academic faculty and learning resources from all over the world, including Africa. Professors from universities around the globe (mainly US & Europe) deliver classes in a studio classroom which is beamed by satellite to AVU learning centres all across Africa. Students have an opportune for real-time interaction with the instructor using phone lines or e-mail. At each participating AVU learning centre moderators guide the learners through the materials and act as liaison with course instructors. All learning centres are equipped with Internet access and at least 50 computers. AVU also provides its learners access to an online digital library (Bates, 2001).

p.50

By mid 2000, AVU had expanded to include 25 learning centres spread across eight anglophone and seven francophone countries. More than 5000 students had completed semester long courses in services and over 2000 had taken part in seminars (Okuni, 2000).

### ***Asia***

As compared to North America and Europe, the proportion of population participating in the Internet revolution is small, but the rate of growth is rapid. The number of Internet users is likely to double by 2002, a faster rate than in the west (Robertshaw, 1999). The most active countries are Japan, Korea, Singapore and Hong Kong (China). In these countries where Internet infrastructure is reasonably well developed, pressure is increasingly to use the Internet in education because of the growing number of foreign universities offering virtual courses. In the field of ICT based education, South Korea has definitely taken the lead, at all levels.

### ***Korea National Open University (KNOU)***

KNOU founded in 1972 as a cable TV station to provide education to Koreans, serves 350000 students today (Oblinger, 2000). It has adopted an ICT driven distance education system consisting of video conferencing, CMC radio, cable TV and Video on demand (Taylor, 1996). KNOU is digitising the video and audio programming they produce each day (18 hours approx.) storing the content in a digital library, then integrating the material into a web browser accessible course shell (Lotus Learning Space), which makes education available at any time anywhere. While KNOU serves Korea today, its goal is to serve Koreans worldwide (Oblinger, 2000). KNOU has also developed CD-ROM titles and Internet courseware for some degree subjects. Recently KNOU has joined the government sponsored Virtual University Trial Project. The Korea Virtual University Consortium, which is offering more than 100 courses and is developing lifelong, non-degree virtual programmes for adults. KNOU also uses an interactive video conferencing network for reaching out to its geographically scattered regional and local study centres and conducting interactive tutorial sessions (Jung, 1999).

### **Emerging Models of Virtual Education**

What is emerging today is a very complex educational mosaic. Institutions offering distance education courses can be arrayed on a continuum from physical to virtual. The growth and development of virtual education is fostering the which are described below:

### **Model 1**

*Networked Model* - Institutions that use digital networks synchronously/asynchronously for the delivery and tuition of courses. Learner support is also provided online. They draw upon the best resources wherever they are located. Examples : African Virtual University (Africa), Australian Universities overseas campuses, and all Virtual Universities of the world.

### **Model 2**

*Advanced Open Distance Education Model* - Institutions that adopt internet based instruction and support to strengthen the existing courses already being taught at a distance. Examples, UKOU, KNOU, etc. Some of dual mode universities of Australia would come under this category that have adopted third generation distance education technologies for offering both instruction and support to their distance learners.

### **Model 3**

*Consortium Certification Model* - Pooling together of distance education courses offered by different institutions. Such a consortium does not provide instruction but are authorised to award credentials and to provide a variety of services such as registration, assessment, learning records etc. Examples are Regents College (US) Western Governors University (USA) Open Learning Agency (Canada), etc.

### **Model 4**

*Consortium Service Provider Model* - This is yet another consortium that offer a pool of courses offered by different institutions but do not have the right to confer certification/awards. Example: California Virtual University (USA), etc.

## **Some Issues**

### ***Dangers of Adopting ICT***

Undoubtedly ICTs shatter geographical barriers that signifies the death of distance. It is however feared that ICTs will create further social exclusion, creating a society of technological haves and have nots. Hence, the danger of new divisions, new disparities and cultural hegemony (UNESCO, 1999). Linked are the issues of quality, access and equity and cost-effectiveness.

Further, access is stratified by socio-economic

p.51

class, gender and profession. Further, there are huge regional disparities in the access to technological infrastructure and equipment. For most students, there is no access to network connectivity. Even when the connectivity is a possibility, there is no access to the equipment needed to use it. (Farrell, 2001).

Only one in 20 people the world over is online, and most of those (about 60%) live in North America, the home to just 5% of the world's population. On the other hand in all of Africa there are mere 14 million phone lines - fewer than in Manhattan or Tokyo (Billions, 2000).

“More than 80% of the people in the world have never heard a dial tone, let alone sent an e-mail or downloaded information from the world wide web” (Black, 1999) (quoted in Kirkwood, 1998). It is thus obvious that access cannot be achieved unless the basic infrastructure is available. Even in the USA where domestic TV and Telephone ownership has reached a saturation point and access to ICT is very high, there is still a significant difference between the use of ICT by various social groups. In 1998, there were computers in over 40% of households in the USA but only about 25% of the homes of blacks or Hispanics had a computer (US Department of Commerce, 1999) (Quoted in Kirkwood, 1998).

## Then Why Adopt ICTs ?

The new ICTs have facilitated the globalisation of society and economy, gradually transforming the society from industrial age to information age. The rationale behind introducing technology in education includes the social rationale, the need for education to reflect the concerns of society and to demystify technology for students; the vocational rationale requires the system to prepare students for jobs that require skills in technology; the pedagogical rationale, technology assists the teaching-learning process through better communications, higher quality materials and will enhance the teaching of traditional subjects in the curriculum, and the catalytic rationale, not only on education but also on society as a whole. It can improve performance, teaching administration, management increase effectiveness, make a positive impact on education system as a whole, after the power relations between teachers and learners, provide skills for the disadvantaged communities which can be used for liberating and transformational purposes (Hawkrige et.al., (1990)). A further rationale that is often cited is the potential cost effectiveness of ICT in education, which is a hotly contested view (Mackeogh, 2000). Increasing amounts of money are being spent for information technology so why not for educational purposes. Sharing of resources through the new ICT created network could possibly reduce costs in order to meet the new challenge of the new millennium. This would definitely be cheaper than faculty to create new courses and thus lead to expensive duplication of course development by educational institutions worldwide.

High quality education can be provided through the adoption of ICTs according to the OECD published report. The new technologies are capable of supporting the four faces of quality education namely: directed instruction, learning by doing, real-time conversation and time delayed conversation (Ehrmann, 1994)

## Conclusion

Provision for education will be the biggest challenge for all governments in the 21<sup>st</sup> Century. While many traditional universities are slow to respond to the increased demand for higher education, many new providers of higher education have entered the market, perceiving the international market opportunities through the use of ICT, such as: private providers of higher education. Example: Phoenix and Jones International University in the US and NIIT in India; Corporate Training networks, specialised service organisations and textbook publishers. Example : IBM Global Campus and McGraw Hill Learning Infrastructure; Business Corporations Example: Nine universities have joined NextEd, an online company in Hong Kong that produces technology for distance education, to form the Global University Alliance, which will offer graduate and professional courses online in Asia (Farrell, 2000). Many conventional universities are becoming dual mode, introducing distance education and virtual education programmes to meet these challenges.

Many educational intuitions worldwide have responded to new ICT but mostly in administration, Materials development and distribution and of late instruction (Farrell, 2001). A few institutions (as discussed in the paper) have developed relatively sophisticated technology based learner support systems. They have probably arrived at solutions to what is financially viable, pedagogically appropriate and logistically feasible to meet the needs of distance learners. There is of course no single formula that can be applied to all institutions. Educational use of technology has to be contextspecific. According to Taylor (1996) context evaluation would include :

p.52

- the target audience;
- appropriate technologies to provide access;
- students access to technologies;
- macro financial considerations;
- cost effectiveness;
- human expertise;
- time constraints;
- logistical consideration;
- potential of sharing costs through collaborations through the adoption of ICTS.

Negating this trend is the stark reality of no access to ICT networks and the prohibitive costs of access. Thus leading to what is known as the digital divide of the total Internet users in the world where 45 % are English speaking and majority of them are Americans. Lack of training to use these technologies is yet another major constraint. Transfer of course credit is yet another serious restraint. But what is most crucial for the success of any system is quality customer service or learner support in both off campus and on campus settings and even more so in distance education whether of the first, second or third generation.

Learner support should ideally be student driven rather than system driven. Institutions offering online education have to be particularly conscious of this fact since virtual education is often thought of as a technical solution to distance, and generally tends to forget the learning needs of the students and their satisfaction with the learning experience. Hence orientation to the learners about the system are essential. Many distance education intuitions have already compiled such guidelines. (For example the American Federation of Teachers “Distance Education: Guidelines for Good Practice 2000” ([www.aft.org](http://www.aft.org)) (quoted in Ryan, 2001).

#### References

- Bates, A. W., 1995, *Technology, Open Learning and Distance Education*, Routledge, New York.
- Bates, A. W., 1996, The Impact of Technological Change on Open and Distance Learning, Keynote Address, *Open Learning: Your Future Depends on It*, December 4-6, Brisbane, Queensland, Australia, <http://bates.cstudies.ubc.ca/brisbane.html>
- Bates, Tony., 2001, The Continuing Evolution of ICT Capacity : The Implications for Education, in Glen M. Farrell, , (ed), *The Changing Faces of Virtual Education*, The Commonwealth of Learning, Vancouver.
- Berge, Z. L., 1997, Computer Conferencing and the Online Classroom, *International Journal of Educational Telecommunications*, 3(1),3-21.
- Reuters., 2000, Billions at side at Information Highway, Retrieved from Reuters Database on [www.http://www.reuters.com/news](http://www.reuters.com/news) in July.
- Bjamason, S., et.al. 2000, *Summary Report: The Business of Borderles Education: UK Perspectives*, The Committee of Vice Chancellors and Principals of the Universities and the Higher Education Funding Council for England.
- Black, J., 1999, *Information Rich, Information Poor*, BBC Online Network News, [http://news.bbc.co.uk/hi/english/special-report/1999/10/99/information-rich-i ... /](http://news.bbc.co.uk/hi/english/special-report/1999/10/99/information-rich-i.../)
- Burge, Elizabeth, J. Roberts, Judith M., 1998, *Classrooms with a Difference, Facilitating Learning on the Information Highway* (Second Edition), McGaw-Hill Chenelier, Montreal.
- Carr, S., 2000, Army Brmbshell Rocks Distance Education, *The Chronicle of higher Education*, (August 14), Retrieved from <http://chronicle.com>
- Collis, Betly, Dand Moonan, Jeff., 2001, *Flexible Learning in a Digital World:Experiences and Expectations*, Kogan Page Ltd., London.
- Collis, Betty, 1996, *Tele-learning : A Digital World*, International Thompson Computer Press, London.
- Daniel, John., 2000, *Towards the Global E-Universities - Quality or Mediocrity*, Paper presented at the Hong Kong Council for Academic Accreditation, New Millennium Quality and Innovations in Higher Education, Hong Kong.
- Davie, L. and Wells, R., 1991, Empowering the Learner through Computer Mediated Communication, *The American Journal of Distance Education*, 5(1),15-23.
- Dirr, Peter, J., 1999, Distance and Virtual Learning in the US, in Glen Farrell, (ed), *The Development of Virtual Education: A global Perspective*, COL, Vancouver.
- Dirr, Peter, J., 2001, Distance and Virtual Learning in the US in Glen M Farrell (ed), *The Changing Faces of Virtual Education*, The Commonwealth of Learning, Vancouver.
- Ehrmann, Stephen C., 1994, *Responding to the Triple Challenge Facing Post Secondary Education : Access, Quality, Costs*, Report prepared for the OECD, International Conference, December 14-16, Paris.
- Ellin, A., 2000, The battle in Cyberspace *The New York Times*, <http://www.nytimes.com> (quoted in Steven R. Van Hook, 2000, Distance Education : Will Global Learning get Online? Retrieved from <http://www.west.net/wvma/distance.htm> (August, 13).
- Farrell, Glen M., (ed), 1999, *The Development of Virtual Education. A Global Perspective*, Commonwealth of Learning, Vancouver.
- Farrell, Glen, M., 2001, Current International and Domestic Status of Online Delivery in Post Secondary Education, Prepared for Multimedia Learning group, Information Highway Application Branch, *Industry Canada*.
- Forsyth, Ian., 2001, *Teaching and Learning Materials and the Internet*, (3rd ed.), Kogan Page Ltd., London.
- Gates, Bill., 1995, *The Road Ahead*, Viking, London.
- Grimes, A., 2000, A Matter of Degree, *Wall Street Journal*, July 17.

- Harasim, L., 1995, *Learning Networks: A Field Guide to Teaching and Learning Online*, MIT Press, Ma Cambridge.
- Harasim, L., Hiltz, S., Teles, L. and Turoff, M., 1995, *Learning Networks : A Field Guide to Teaching and Learning Online*, MIT Cambridge, Ma Cambridge.
- Hawkins, Brain L. and Battin Patricia, (eds), 1998, *The Mirage of Continuity: Reconfiguring Academic Information Resources for the 21<sup>st</sup> Century*, Council on Library and Information Resources Association of American Universities, Washington DC.
- Hawkrigde, D., Jawoski, J. and McMahon, H., 1990, *Computers in the Third World Schools : Examples, Experiences and Issues*, Macmillan, London.
- Jegede, Ougbemiro, 2001, The Meaning of Online Delivery of Instruction in Open and Distance Learning, retrieved from file://D:\ICDE2001\OUHK-VU.htm, July 2.
- Johnston, D. et.a1., 2001, The E-learning Evolution in Colleges and Universities: A Canadian Challenge, Ottawa: *Industry Canada*, Available at [www.schoolnet/mlg/site/acol-ccael](http://www.schoolnet/mlg/site/acol-ccael)
- Joliffe, Alan, Ritter, Jonathan and Stevens, David, 2001, *The Online Learning Handbook*, Kogan Page Ltd., London.
- Jonasson, D., Davidson, M., Collins, M., Campbell, J., and Heag, B., 1995, Constructivism and Computer Mediated Communication in Distance Education, *American Journal of Distance Education*, 9(2), 7-20.
- Jung, Insung., 1999, The Development of Virtual Institutions in Korea, in Glen M. Farrell, (ed), *The Development of Virtual Education : A Global Perspective*, COL, Vancouver.
- Katz Richard. N. et.a1., 1999, *Dancing with the Devil: Information Technology and the New Competition in Higher Education*, Jossey Bass Inc.
- Keegan, D., 1990, *Foundations of Distance Education*, Second Edition, Routledge, London.
- Kerry, Bob. et.a1., 2000, *The Power of the Internet for Learning, Moving from the Promise to Practice*, Report of the Web Based Education Commission to the President of US. Jessup, MD -. US Dept. of Education. Available at [www.webcommision.org](http://www.webcommision.org)
- Kirkwood, Adrian., 1998, New Media Mania: Can Information and Communication Technologies Enhance the Quality of Open and Distance Learning?, *Distance Education*, 19(2), 228 -241.
- Laurillard, D., 1993, *Rethinking University Teaching*, Routledge, London.
- Lockwood, F. and Gooley A., 2001, *Innovation in Open and Distance Learning, Successful Development of Online and Web Based Learning*, Kogan Page Ltd., London.
- Mackeogh, Kay., 2000, *National Policies on the Cost Effective Use of New Information Technologies in Lifelong Learning*, Paper presented at Council of Europe Workshop on Lifelong Learning for Equity and Social Cohesion: A New Challenge for Higher Education, Catania, April 6-8.
- Mason, Robin., 1999, European Trends in the Virtual Delivery of Education, in Glen M. Farrell (ed.), *The Development of Virtual Education : A Global Perspective*, COL, Vancouver.
- Mason, Robin D., 1998, *Globalising Education : Trends and Applications*, Routledge, London.
- Miller, Gary. E., 2001, Distance Education and the Undergraduate Curriculum, accessed from <http://itesm.cstudies.uk.ca/561g/canada/resources/miller.html>
- Minoli, D., 1996, *Distance Learning Technology and Applications* Artech House Inc., London.
- NTU., 2000, NTU Home, <http://www.ntu.edu/Ac/>
- Oblinger, D. and Rush, Scan. (ed.), 1997, *The Learning Revolution*, Anker Publishing, Bolton, M.A.
- Okuni, A., 2000, Higher Education Through the Internet Expectations, Reality and Challenges of the African Virtual University, *Development and Cooperation*, 2:23, Retrieved from [www.dse.de/zeitschr/de200-4.htm](http://www.dse.de/zeitschr/de200-4.htm) (on January 28).
- Peters, Otto., 1998, *Learning and Teaching in Distance Education Analysis and Interpretations from an International Perspective*, Kogan Page Ltd., London.
- Rice-Lively, Mary, Lynn., 2001, Borderless Education at UT – Austin GSLIS, Retrieved from <http://www.txla.org/pubs/tlj76-2/borderless.html> (July 12).
- Robert Shaw, M., 1999, Virtual Institutions in East and Southeast Asia, in Glen Farrell, (ed), *The Development of Virtual Education, A Global Perspective*, COL, Vancouver.
- Robinson, B., 1995, Research and Pragmatism in Learner Supports, in F. Lockwood, (Ed). *Open and Distance Learning Today*, 221-231, Routledge, London.
- Ryan, Steve, Scott, Bernard, Freeman, Howard, Patel, Daxa., 2000, *The Virtual University*, Kogan Page Ltd., London.
- Ryan, Yoni., 2001, The Provision of Learner Support Services Online in Glen Farrell, (ed), *The Changing Faces of Virtual Education*, COL, Vancouver.
- Shive, Glen and Dirr, Peter J., 2000, Regents College, USA, in V. Venugopal Reddy and Manjulika S. (ed), *The World of Open and Distance Learning*, Viva Books Pvt. Ltd., New, Delhi.
- Simpson, O., 2000, *Supporting Students in Open and Distance Learning*, 4-8, Kogan Page Ltd., London.
- Srivastava, Manjulika., 2000, Learner Support : What, Why and How ? Unit 1, Block 1, *Support Services: Need and Mechanism*, Course ES- 313, Learner Support Services, STRIDE, 7-8, IGNOU, New Delhi.
- Tait, Alan., 2000, Planning Student Support for Open and Distance Learning, *Open Learning*, 15(3),287 - 299.
- Taylor, James., 1996, Perspectives on the Educational Uses of Technology, *Open Praxis*, 2,18-26.
- Taylor, James C., 1998, Flexible Delivery : The Globalisation of Lifelong Learning, *IJOL*, 7(1),55-65.
- Tiffin, J. W. and Rajasingham, L., 1995, *In Search of the Virtual Class: Education for the Information Society*, Routledge, London.
- UNESCO., 1999. Human Development Report, UNESCO, Paris.

