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ICT & The Future of Distance Education

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This paper explores and examines the following:

- Changing demographics
- The spread of ICTs in the world.
- Distance education in 2020.

Changing Demographics

It is noteworthy that in the last 30 years there has been considerable improvement in literacy rates. In 1970, 37% of the world's population was illiterate, as compared to 20.6% in 2000. At the end of 2000AD, Asia being the most populated continent had the highest number of illiterates: 641 million triple the number in Africa: 182 million (Refer Table-I). In 1970 there were barely 48.1 % of literates in the developing countries and 26.8% in the least developed countries, which has now gone up to 73.7% in developing countries and 50.7% in the least developed countries. The literacy levels have crossed more than 50% in sub-Saharan Africa (60.3%), Arab States (61.2) and Southern Asia (54.2%)(2000), the three most illiterate regions of the world, as compared to 1970, when the literacy rates in these regions were extremely low viz.: 32% in Southern Asia, 29.3% in The Arab States and 28.4% in Sub Saharan Africa (Refer Table-2).

Table-I: Illiterate population * of the world (continent-wise)

Continent	1970	1980	1990	2000	Population in 2000
World	37.0%	30.6%	24.8%	20.6%	876 million
Africa	71.6%	61.8%	51.0%	40.3%	182 million
America	14.7%	11.7%	9.0%	7.3%	44 million
Asia	49.1%	39.4%	30.5%	24.9%	641 million
Europe	6.9%	4.2%	2.3%	1.3%	8 million
Oceania	10.7%	7.9%	6.08%	4.6%	1.1 million

***Estimated illiterate population aged 15 years and above**

Source: UNESCO Division of Statistics (2001), Education and Literacy.

http://unesco.stat.unesco.org/statsen/statistics/yearbook/Table_II_S_I_Region.htm

49% of the world's illiterate population lives in Southern Asia, followed by 21% in Eastern Asia and Oceania and 16% in Africa. Southern Asia and Eastern Asia boast of having the two most populated countries of the world namely China (1249.7 million) and India (997.5 million) (1999). China and India together account for 37.6% of the total world population with literacy rates at 82% in China and 62.4% in India in 1999 (The World Bank, 2000/2001). Thus revealing a substantial expansion in the education sector at all levels primary, secondary and tertiary (UNESCO Division of Statistics, 2001).

The substantial widening of primary and secondary sectors has increased the demand for higher education. If we look at the least literate regions of the world, one can notice a significant increase in the enrollments at primary, secondary and consequently tertiary levels. For example, between 1970 and 1990 the primary, secondary and tertiary gross enrollments have increased from 69.8% to 90.3%, 22.8% to 39.8% and 4.1% to 5.7% respectively in Southern Asia. Again between 1990 and 1997 it has further gone up to

95.4% at the primary level, 45.3% at the secondary level and 7.2% at the tertiary level. The same trend can be noticed in sub-Saharan Africa, where the gross enrollments between 1970 and 1997 has gone up substantially from 52.5% to 76.8% at the primary level, 7.1 % to 26.2% at the secondary level and 0.8% to 3.9% at the tertiary level (UNESCO Division of Statistics, 2001).

In terms of real numbers the figures are daunting. In 1990, 29 million were enrolled in higher education in the developing world which has gone up to 43 million in 1997. Similarly enrollments at the secondary level have also substantially increased between 1990 and 1997 from 209 million to 283 million in the developing countries of the world. Since the expansion of the higher education system is not feasible due to the financial crunch, most of the developing countries are looking to open universities as the answer to meet the increased demand for higher education. Hence of the 40 open universities in the world, more than 50% of them have come up in the developing countries of Asia (Reddy and Manjulika, 2000). Some of them have reached the mega university status enrolling _ more than 100 thousand students annually. China Radio, TV university (China) and IGNOU (India) enroll more than _ 300 thousand students each annually. The other mega universities of Asia are in Turkey (Anadoln University), Korea (Korea national open university), Indonesia (Universitat Terbuka), Thailand (Sukhothai Thammathirat Open

University) and Iran (Payame Noor University)(Daniel, 1996).

If we compare the gross enrollments at the tertiary level between 1970 and 1997 in the developed countries, with those of the developing and least developed countries, the enrollments have been increasing in all three categories: from 26.1% in 1970 to 51.6% in 1997 (developed countries), from 2.9% to 10.3% (developing countries) and 1.0% to 3.2% (least developed countries). Presently the enrollment rates in the developed countries is 5 times higher that in developing countries and 16 times that in least developed countries.

Also on a global scale population growth is out pacing the world's capacity to give people access to universities. A sizeable new university would now be needed every week merely to sustain current participation rates in higher education. A crisis of access lies ahead (Daniel, 2000)

Unequal access of ICTs in the world.

For a country to succeed in the ICT arena, one critical element is infrastructure such as telecommunication links. Government has an important role in creating such an infrastructure, especially in developing countries. In very poor countries because of lack of effective demand, market forces may be shy. In many countries the government has to play the role of a catalyst in order to attract the private sector. In some countries there may be barriers against entry along with heavy government involvement. In all such cases only the government can play an important role in ensuring a standard telecommunications network (Quibria and Tschang, 2001). In observing the developments in the international arena, the developed nations have a clear lead. Most developing nations have comparatively weak telecommunications infrastructure, lack the necessary human resources to develop and operate the IT systems and lastly the capital investment necessary is beyond the capacity of most countries to raise (Shariffadeen, 1995).

The growth in the ICT may be characterized by the growth in the number of telephone lines, cellular phones, personal computers and internet hosts and internet users. The data used for analysis is based on the ITU (2000) ITU Telecommunication Indicators.

- **In 2000, Americas (43 countries) and Europe (45 countries) accounted for 69.9% of the total GDP in the world.**

- 6 countries viz., USA, Japan, Germany, UK, France and Italy accounted for 64.3% of the world GDP leaving 35.7% to rest of the 200 countries.
- 47 countries had less than the 1/10th of world's average (\$5258) per capita GDP in 2000. Many of these countries were in Africa (28) and Asia (16). Two countries in Americas namely: Nicaragua (\$459) and Haiti (\$491), Moldova (\$265) in Europe also figures under this category.
- In 2000, 55 countries had higher average per capita as compared to the world's average (\$5258). Many of these countries were in Americas (10 countries), Asia (16 countries), Europe (23 countries) and Oceania (5 countries). Interestingly, Libya and Seychelles have higher than the world average per capita GDP and are in Africa.
- In 1999, 30 countries in the world had less than one main telephone line per 100 inhabitants. Many of these were in Africa (24 countries) and Asia (5 countries). Haiti (Americas) also figures under this category.
- China, Japan, India and Korea Republic in Asia, USA, Brazil and Canada in the Americas, and Germany, France, UK, Russia and Italy in Europe accounted for 71.5% of the total main telephone lines in 1999.
- A number of countries had less than the world's average (\$5258) per capita, however, they had higher than the world's average (16.32) main telephone lines. This is clearly evident in many of the countries of Europe and Americas. For example, Mauritius in Africa, Brazil, Chile, Columbia, Costa Rica, Jamaica, Grenada, etc. in Americas and Ukraine, Yugoslavia, Turkey, Russia, Belarus, Poland, Romania, Latvia, Hungary, Estonia, Croatia, Bulgaria in Europe, etc. fall under this category.
- Contrary to this a few countries like Libya, Mongolia, Oman, Saudi Arabia had more than world's average GDP per capita, however, they have much lower than the world's average main telephone lines.
- Largest numbers of main telephone lines were located in Asia (35.9%) (in absolute numbers). Although Europe and Americas had less share as compared to Asia yet the teledensity (telephone lines per 100) is much higher in Europe (36.15) and Americas (20.70) as compared to Asia (9.79). This is due to high concentration of population (59.9% of the total population) in Asian countries, especially China, India and Pakistan. The share of Africa (5%) was almost negligible with 2.49% of the main telephone lines in the total telephone lines of the world. Africa and Asia had the lowest number of main telephone lines and cellular mobile subscribers per 100 inhabitants compared to other continents.

Variations clearly demonstrate that low GDP per capita countries also had higher number of main telephone lines per 100 inhabitants compared to the world's average. No doubt higher the GDP per capita, higher the main telephone lines across the world except in some of the countries as mentioned above. Various reasons can be cited for this phenomenon such as: countries located in close proximity to developed countries, countries having partnerships with other developed countries and international investments in telecommunications and apart from globalization.

- In 2000, 15 countries in the world were yet to have any cellular mobile

subscribers. 8 countries from Africa (Cameroon, Chad, Comoros, Eritrea, Guinea-Bissau, Liberia, Mayotte, S. Tome and Principe and Somalia), 5 from Asia (Afghanistan, Bhutan, DPR Korea, Iraq and West Bank and Gaza).

- Almost all countries in Europe and South and North Americas and the Caribbean have cellular subscribers in 2000.

- In most of the countries it is noticed that higher the main telephone lines, higher the cellular subscribers, as in Europe, North and South America and Caribbean, Oceania and Asia. However, in Africa it is the other way around in many countries. For example Gabon (3.18 telephones and 9.79 cellular subscribers), Morocco (5.03 and 8.26), Uganda (0.26 and 0.54), South Africa (11.36 and 12.01).

Interestingly, although per capita income is much lower in many of these African nations as compared to many other countries in the world yet they have higher number of cellular subscribers proportionately. For example, Morocco (per capita \$1256) had 5.03 main telephone lines and 8.26 cellular subscribers as compared to Costa Rica's (\$1209 per capita) 24.94 telephones and 5.20 cellular subscribers.

- 88 countries (42 from Africa, 33 from Asia, 6 from Oceania, 5 from Americas and 2 from Europe) had less than one cellular subscriber per 100 inhabitants in 2000.

- Africa (0.25%), Oceania (1.9%) and Asia (6%) had the lowest number of internet hosts compared to Americas (77.8%) and Europe (14.0) in the year 2000. USA alone accounted for 73.9% of the total internet hosts in the world. However, in terms of actual internet users Europe (29.1%) and Asia (27.3%) had a large number after Americas. Although Americas have 77.8% of internet hosts, larger numbers of internet users are from outside Americas (27.3 from Asia, and 29.1 from Europe). Thus giving an impression that many of the countries are utilizing the internet hosts located in USA. Oceania accounts for 1.9% of the total internet hosts yet it had the highest average of users (2246.08 per 10000 inhabitants) as compared to other continents due to its lowest density of population and comparatively higher per capita income.

- Africa (35.14) and Asia (185.48) had the lowest internet users per 10000 inhabitants compared to other continents and the world's average (402.98). In the year 1999 Africa had 1.1%, Oceania 2.8%, Asia 27.3%, Europe 29.1% and America's 39.7% of total internet users.

- Highest number of estimated PCs are located in Americas (43.7%), followed by Europe (30.1 %), and Asia (22.3%). Contrary to this the share of Africa (1.5%) and Oceania (2.4%) is much lower yet Oceania (37.90) has highest PCs per 100 inhabitants in 1999 compared to others. Africa (0.90) followed by Asia (2.53) have lowest PCs and even much below the world's (6.84) average. Interestingly, 36.2% of the total PCs are in USA.

Thus digital divide is obvious. The ICT has brought about a collapse of space, time and borders and is creating a global village, but not everyone can be its members.

ICTs and Higher Education:

The twenty first century presents unique challenges for higher education. Many institutions are responding to the pressures by embracing the new technologies. Higher education must be prepared to embrace the changes and challenges that new ICTs bring. Infact ICTs

are seen as the major driving force of the future economies of countries around the world. They are also seen as both destroyers and creators of jobs. They destroy jobs by replacing labour with machines, and the create jobs in new industries, such as telecommunications, software developments, software applications and in service industries built around the new ICT, such as financial services, entertainment and increasingly education and training (Bates, 1997).

The new ICTs are also expanding the reach and range of educational institutions by making it possible to access any course from anywhere in the world and at anytime. It offers the possibility of drawing students from many countries who are studying the same course together at the same time. Thus online education is suited for those who cannot or do not want to access education through traditional means. What Bates (1997) defines as the 'free market' (i.e. those markets where people are able and prepared to pay the full cost of accessing services) and the 'social market' (i.e. those in need of on demand education and training but who do not have the resources to access or pay for such services, but who for reasons of both social justice and long term national economic development need basic education, upgrading or retraining).

Also the scope of education is being dramatically increased from a specialized activity for young people to a lifetime need for everyone. The wealth of nations will depend increasingly on knowledge based high-tech industries. This means that education and trainings not just in the pre-work years, but throughout lifetime are essential elements of the new information age. Thus ICT offer the promise of not only widening access, but also improving the quality of learning by making it relevant to the skills and knowledge needed in an information society.

What is emerging today is education in three kinds of campus settings:

- Campus based education (conventional universities etc.)
- Off campus educations (open universities and distance education institutions etc.)
- Global electronic campus (virtual universities electronic based consortia/global networks etc.)

There has been a tremendous growth and diversity in the number and types of learners learning outside traditional classrooms and also in the variety of providers from typical single mode and dual mode institutions (open universities/dual mode universities) with the purpose of increasing the access to higher education to the corporate houses using it to upgrade/retrain their workforce.

There are new players joining the higher education marketplace.

Thus distance education is no longer the province of a few. All universities are facing the challenge of serving a clientele from a wider range of geographical areas and life circumstances. There is also the need to meet the demands of lifelong learning and training for professional development and upgrading of skills. This has led to the search for new delivery methods.

By using ICT, the formal universities are transforming into distance learning institutes. They will lecture on and offline to meet the growing pool of part-time students and to open another potentiality.

On the other hand distance learning institutes were aiming to make it possible to teach and learn beyond spatial/time limits. With their adoption of ICT, they are integrating elements which were available only in the formal system. For instance, from a structural point of

view there is no difference between a virtual and a real class or seminar room. A teaching room, no matter what kind of complexion. Virtual seminars as real seminars allow cooperative learning. In other words ICT can personalize the prevailing impersonal studies by making possible dialogue teaching forms, transmitted via data networks, which so far only existed in the real face-to-face meeting. Distance educators are increasingly interested in some of the newer technologies such as the World Wide Web computer conferencing and CD-ROM, as they allow the student to interact directly and flexibly with a teacher or the peer group while also providing a very powerful learning environment.

In the mid 1970s universities began using the internet, mostly in adjunct mode. Since 1984, beginning with the virtual classroom undergraduate project in New Jersey Institute for Technology (Hiltz, 1993) universities and colleges began offering courses entirely online and in mixed mode in the USA. However the first purely virtual university only offering courses online was created in Spain in 1995 - The Universitat Oberta de Catalunya.

Ever since then, many institutions worldwide, but particularly in North America, Australia and New Zealand, the United Kingdom and several other European countries such as Norway, Denmark and the Netherlands have started to invest heavily in online education. Sometimes the courses are entirely at a distance targeted mainly at students who can not access a conventional university or college campus. Others might combine some elements of on-campus teaching with online access to materials and discussion forums (Bartolic-Zlomislic and Bates, 2000),

Americas

Some 710,000 students took online (distributed learning) courses In 1988, and the number is likely to triple by 2002 (2.2 million)(Kerry, et.al, 2000). In the USA of the 1028 accredited two and four year institutions survey 72% offered online courses in 1999, compared with 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 line item for the US Army over the next 6 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 especially distance education has become big business that has attracted commercial interests. Thus new alliances between education and industry have begun to emerge (Dirr, 1999).

All Latin American countries have adopted distance education. Mexico is one of the countries with the greatest experience in the field and has taken the lead in promoting virtual education cross Latin America.

Oceania

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., University of Western Australia (CEDIR), Monash University (CHED), Griffith University (IHE) committee. Further, a number of the former Distance Education centers e.g., University of Southern Queensland, Monash University, University of South Australia, Charles Sturt 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 in Mackay, Gladstones, Emerald and Bundaberg. 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 setup 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).

Europe

The ICT boom has also enveloped Europe. The European Union has been a major driver of 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: UK and Northern Europe (Netherlands, Denmark, Sweden, Finland) are promoters of student - centered constructivist notions while France, Germany and Latin countries still believe in traditional teacher - centered transmissive approaches. The deregulation of tele-communications 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).

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, Taiwan (China) and Hong Kong (China). In these countries where internet infrastructure is reasonably well developed, pressure is increasingly to use 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.

Africa

The development of the internet as a teaching tool in Africa is fairly recent. Unlike many countries of the world Africa continuously struggles to procure infrastructure. Hence international organizations like World Bank have taken the lead by setting up the African Virtual University. Which is offering online courses across the African continent?

Industry is taking the lead in fostering ICT driven education. According to Weissman Morris (2000) 80% of the UK education superhighways initiative is funded by industries such as IBM, INTEL, Microsoft and British Telecom. In 2000, Microsoft is reported to have donated \$344 million worth of software to K-12 school in the US, while INTEL invested \$100 million in providing training to some 400,000 teachers in twenty countries (quoted in Mac Keogh, 2000).

International agencies have also played a key role in promoting ICTs in education. Examples are UNESCO and The World Bank. The African Virtual University initiative has been initiated and funded by The World Bank.

ICT has opened the doors to new competitors. America's investment in lifelong learning amounts to more than \$665 billion in a year - more than what is being spent on national defense. Colleges and universities earn \$ 176 billion a year making them twice as big a business as airlines (Martin, 1998).

Yet another view is offered by Dirr (2001) who sees the process being characterized by two features, one is that technology application decisions have been driven primarily by technology, not by consumers. The other is that applications have been made to a traditional academic paradigm. He points to the widespread use of video conferencing

which has enabled instructors to retain much of the old pedagogical method and has done little to accommodate the learner's need for flexibility. He feels that institutions have failed to employ the full power of newer technologies and have not taken full advantage of the resources available to both learners and instructors.

Tapsall and Ryan (2001) however give it another dimension that flexible delivery modes are being used as much as a solution to on-campus problems as they are to off-campus access. The idea is to provide more education to more students anywhere anytime at less cost. According to them, students in all types of venues are increasingly learning through the use of the same technologies.

Distance education in 2020

The challenge for education about twenty years from now will be the same as it is today. Today the share of the developing countries in the population pool is around 95%. On the other hand, the more developed the country the lower the growth rate and the higher the proportion of the ageing population. According to UNESCO the proportion of the over 65 years of age has been increasing and would go up to 19% of the world population by the first quarter of the 21st century. While in the developing world the numbers of the young (below 15 years) will explode, up to probably 1.2 billion in 2010. .

As on date, one-fifth of the world's population is illiterate, another one-fifth can only read and write but are for all intents and purposes functionally illiterate; a further 700 million may have at most a mid-secondary level education making it difficult for them to aspire for any thing more than low skilled jobs and wages. Two thirds of these groups are made up girls and women (quoted in Dhanarajan, 1996).

Presently all governments in the developing countries are involved in tackling the major problem of illiteracy. As already mentioned remarkable progress has already been made as participation rates at all levels of education have increased. Using present growth trends, it is possible that some 150 billion more post-secondary places will have to be created in the next 20 years in addition to the present 60 million, in order to meet this new demand. Again the demand will come mostly from the developing world. The demand for post secondary level education is further confounded by the problem of providing lifelong education, training, updating/upgrading/supplementing skills and knowledge. Some 80% of today's workforce (about 2 billion people) can be expected to continue working well into the first quarter of the 21st century. Already in some of the developed countries of North America and Europe, part time learners now outnumber full time learners (Dhanarajan, 1996).

Even today majority of the challenges have to be met by the developing world and these would get compounded over the next twenty years. As majority of the world's population would be residing in the developing countries.

The greatest challenge would be for the providers of education whether it is the university or other players who have already entered the education sector. We can envision an enriched educational environment, wherein several alternatives would be available to learners based on the new ICT.

The learning community will move beyond the classroom walls and will not be dictated by the classroom schedule. It will no longer be age based or time based. All boundaries will disappear related to distance, time, location of study, age, language, culture. Individuals/groups who would constitute the learning communities will be able to interact with each other across the globe.

Instruction will be more customized, individualized and life long. Learners would frame their own learning agendas. They would be constructing their own knowledge through interactions with knowledge resources and with their surrounding environments. The students will be in a position of taking a degree and courses from any institution globally,

which need not necessarily be a university or an educational institution. It could be a business/corporate institution, a religious/cultural institution, a public library/museum etc. which would have the degree granting status.

In a nutshell students, families and their prospective employers/employees would be able to shop around and compare programmes and the institutions offering them, in ways that were not possible in the preceding face to face environment. In this context the proximity of the educational institution to a student's home/office would become immaterial. Students would enjoy the freedom to choose a programme/course anywhere in the world.

It took more than a century for distance education to gain acceptance. Today it is open and distance (flexible) learning that suits the post-industrial society. Let us not forget that the post industrial environment is global rather than national. The workforce will be more mobile and contracted. Learning would be lifelong, increasingly part-time and more concerned with enhancing work skills or business performance than with gaining formal qualifications. The demand is for modularized, up-to-date and contextualised programmes, preferably delivered in the workplace.

Every provider of education will need to be available 24 hours a day, 365 days a year via multimedia network technology.

All institutions of higher education including the bastions of higher education like Harvard University, Cambridge University, Oxford University etc. have no option but to adopt flexible methods of delivery in the context of the changed scenario and in order to meet the new demands. It is also predicted that today's universities may become the "relics of tomorrow" as the success of an institution (provider of education) would be determined by its ability to attract students and offer flexibility in the combination of courses and their delivery to diverse groups of learners separated by space; time, prior learning skills and new training requirements. Thus all institutions would have to offer courses that are global in reach interactive in nature and affordable in cost. Globalization of education in the 21st century will automatically result in internationalization of the curriculum, multi-lingual, multi-cultural and multimedia learning environments.

Digital technology will continue its rapid ascent. All institutions would have to adopt ICTs in their teaching, learning process. Thus making accessibility more universal than today. In order to survive in the 21st century institutions would have to use 21st tools - viz. ICTs. Thus the providers of education would be collaborative enterprises. Multiple organizations would become part of the lifelong learning system. The explosive growth of networks will continue to erode the geographical hegemony of universities. Students will more likely select institutions based on offerings, convenience and price than geography. There will be more pooling of resources among the providers of education to meet the demands of personalized/customized education of the next twenty-five years.

Open and distance education as it is being practiced today will not be the same. Just as the traditional university will no longer be traditional. Being flexible as such, open and distance education institutions would lead the way, becoming universities/institution of convergence, fully engaged in networked learning. The transformation has already begun.

Distance education did not challenge or change the structure of higher learning, but was more of a movement to extend the traditional university, a movement to overcome its generic problems of scarcity and exclusivity. ICT is transforming this traditional 'university of convocation' to become the 'university of convergence'. The fact is that distance is becoming less a key descriptor for courses or students. Perhaps flexible learning, distributed learning or networked learning will become more accurate descriptors. According to Hall (1996) "Networked learning describes the grouping availability of aids or alternatives that allow a student to review, speed up or substitute some or all of what normally occurs in a classroom lecture through electronic links. Through applications of

technology, possession, scarcity and exclusivity, the characteristics of convocation are replaced by wide access, multiplicity and replicability of resources. Convergence replaces convocation as the organizing concept of the institution providing education. Thus technology is bringing about a fundamental change in the very structure of higher education.

On the other side, the traditional form of open and distance (based on print, audio and video, telephone, mail etc.) would also continue in countries which have not extended deep into the information superhighway. If we look into the history of media, no medium has ever been totally supplanted by another. Television did not kill the cinema and newspapers (Latchem, 1997). Multiple-media is probably what would prevail all over the world and learners would choose what is best for them. Just as governments, telecommunication providers and industry would share a common vision and understanding of the national and global needs. So what is now will also be then but the proportions would vary.

It would be equally true that tomorrow's citizens will have to be more competent and comfortable in with the technologies of the day. They will be versatile in their readiness and willingness to embrace change and learn new skills. As the adage goes, "If you want to live in the 21st century, live with the 21st century tools." Hence change will be certain in the coming decades. The next twenty five years will be times of major innovation in education at all levels.

UNESCO's International Commission on Education for the Twenty-First Century, identified four pillars of quality education: learning to know, learning to do, learning to be and learning to live together, of these the fourth has been given priority because of the need to develop mutual understanding, peaceful interchange and harmony the things that are most lacking in the world today. Hence they would be the major challenges of tomorrow. The six main tensions that will be central to the problems of the next century are: global and local; universal and individual; tradition and modernity; long term and short term; competition and equality of opportunity; spiritual and material (UNESCO,] 995).

In the next twenty-five years the emphasis will be on: the Market, not Society; the Consumer, not the Citizen; the Want, not the Need; the Quantity, not the Quality; the Price, not the Value; the Globe, not the Nation (Tracey, 1994).

"It is not the strongest of species that survives, not the most intelligent, but the one most responsive to change" (Charles Darwin).

Note: - This paper is abstracted from chapter-1: The changing context of higher education in 21st century in V. Venugopal Reddy and Manjulika S. (Eds) Towards Virtualization, (2002), New Delhi, Kogan Page India Limited.

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