

CHAPTER IV

THE ON-LINE EDUCATION PARADIGM

How Can the Net be Used in the Education Context in the Developing Countries?

4.1 Social Progress

The social or human development of a nation is a process of widening the possibilities of choice for the people that can be obtained through the widening of human capacities. At every level of development the three essential categories for the improvement of the human condition may be categorised as: *Living a Long and Healthy Life, Being Educated, and having Access to the Necessary Resources for a Decent Standard of Living*. The income is of course one of the main means to broaden the choices and the welfare of the people, but it is not possible for everyone to have an income sufficient to satisfy their needs, especially the primary and the vital ones.

Ever since 1990 the *United Nations Development Program* (UNDP) has been preparing every year a '*Report on the Human Development*' addressing various topics relating to human development. One of the topics addressed in a recent report was, for instance, '*The Unequal Consumptions*', which was the subject of 1998 Report. Ever since its first appearance, the report has tried to measure social progress through some indexes represented in TABLE 12 and TABLE 13 in the Appendix [UNDP 98].

From the 1998 Report, one can draw some important information relating to the state of progress of human development in the Developing Countries: they are useful to understand the present social situation of these countries and how it has evolved in the last few years. From the

evaluations on the hope of living, today a child in a Developing Country could live 16 years longer than a child who was born 35 years ago. In fact owing to recent progress in the new advancements in medicine and food technology, the Developing Countries have made more progress in the process of human development in the last 30 years than the Industrialised Countries did in more than a century.

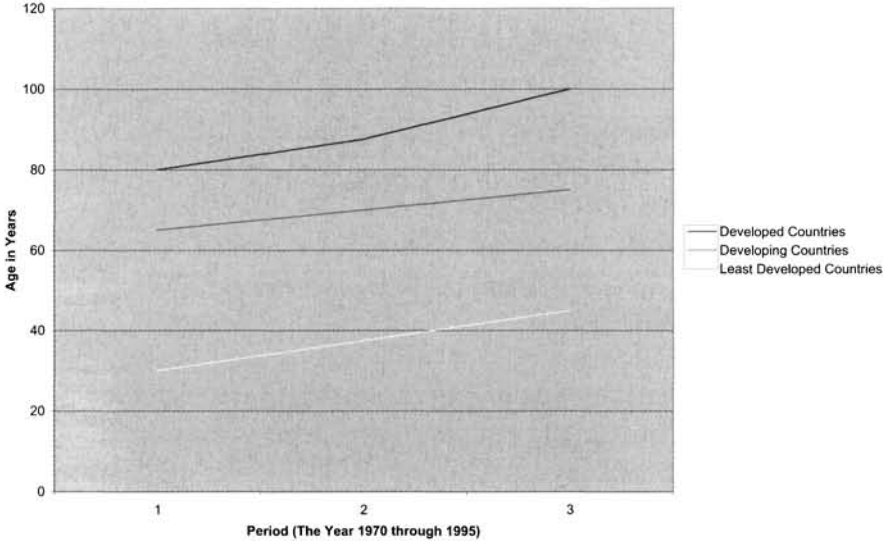


FIGURE 4-1: Hope of Living in the Various Countries - UNDP, 1998.

Infant mortality rate in the Developing Countries has halved since 1960. The lives of more than 3 million children have been saved every year thanks to the improvement of the basic immunisation system and to the easier access to the information media. The infant malnutrition rates have decreased by 25%. The rate of enrolments to the primary and secondary school is more than redoubled and the percentage of rural families with the access to the drinkable water has increased a lot, changing from 10% to 60%.

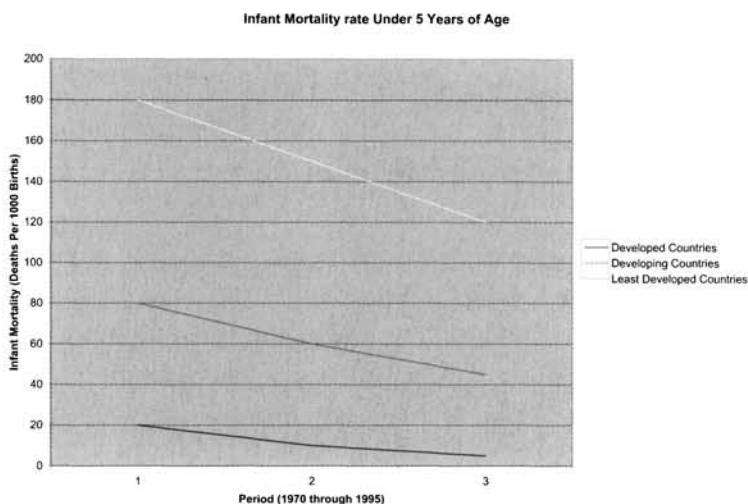


FIGURE 4-2: Infant Mortality Rate under 5 Years of Age - UNDP, 1998.

The **Index of Human Development (IHD)** for the 1998 UNDP was calculated over 174 countries, comprising both industrialised and developing countries, which have data that can be compared in order to measure the global progress of a nation according to the three dimensions of the human development: **Education, Health, and Decent Standard of Living**. In the 1998 report, the UNDP recorded the indexes surveyed in 1995. These indexes are reported in TABLES 12 and 13 in the Appendix.

From these data we can notice that the Industrialised Countries, such as Canada, France, Norway and USA are high up the list. There are a number of Developing Countries, such as Cyprus and Barbados, which are in a good position, with an index of human development of 0.913 and 0.909 respectively. Other Developing Countries are a little way down the IHD league. Among the 174 countries, 98 have reached a higher level of the IHD than corresponding levels in the per-capita GNP. *This shows that they have actually succeeded in transforming the economic welfare into human resources.* This fact is significant, particularly for the countries with low income, such as Lesotho, Madagascar, Tanzania and Vietnam. The contrary has happened for 73 countries that were not able to improve the standard of living of their populations; this concern cuts across both the richer Developing Countries, such as Kuwait, Mauritius, Brunei Darusalaam and Qatar; and the poorer Developing Countries, such as Angola, Iraq, Laos, Senegal, and Uganda.

The progress of human development measured through these indexes can be further clarified through an analysis of two of its essential dimensions, namely, Education and Health.

4.1.1 The Internet and Education

In an information society everyone needs **Learning** in general and as a result a *basic culture* and a *technical preparation* to be able to use at best the new technologies and to take from them the maximum advantage. All this requires a high instruction level for anyone who wants to have a quality job. The only way to reach this aim is to provide adequate education for everyone: not only to children, but also to adults, as the instruction has to be constantly revised. Furthermore, none has to be left behind when learning new knowledge, as there has not to be a society where some people have the means to have access to information at the expense of the others. *In other words, it is necessary to fight to reduce the digital divide among the individuals.*

The **Adult Literacy Rates** in the Developing Countries during the period between 1970 to 1995 increased by about one half, passing from 48% to 70%, with maximum points of 90% reached in the South-East of Asia and the Pacific, in Latin America and Caribbean and of 51% in the South of Asia. The **Female Literacy Rate** increased by more than 67% over 20 years while in the in the Arab states the rate more than doubled, passing from 20% in 1970 to 44% in 1995 [UNDP 98]. This progress in the Literacy Rate can be attributed to the remarkable improvements in the School Enrolments Rates: between 1960 and 1991 the **School Enrolments Rate**, according to UNDP, increased from 48% to 77%, while the Secondary School Enrolments Rate increased from 35% to 47%. In South Asia the increases were in the primary and secondary school, while in the East of Asia, in Latin America and in the Caribbean the increases were at the secondary school and tertiary college enrolment levels. These data are reported in TABLE 14 of the Appendix.

4.2 The Use of the Internet in Education

The Internet brings the means for learning and for amusement, by providing information, including on-line texts written by some of the best experts in order to help both the teachers reach the students through the courses and those people who need more detailed information. Some experts think that the Internet and the new Information and

Communications Technologies (ICTs) cannot solve the problem of illiteracy in the Developing Countries. For instance, Steve Jobs, Co-founder of Apple Computer, in an interview quoted in the report by *Panos Institute* [Panp 98b] declares: *'I've probably spearheaded giving away more computer equipment to schools than anybody else on the planet. But I've had to come to the inevitable conclusion that the problem is not one that technology can hope to solve. What's wrong with education cannot be fixed with technology'*.

On the contrary, in many Developing Countries the potentialities of the Net in the area of Education have already been discovered and have made it possible to put into practice some education projects that previously we could only think of. Philemon Kotsokoane, Headmaster of the Secondary School *Micha-Kgasi*, which is in a rural area of South Africa, is enthusiastic about the connection to the Net for the deployment of e-mail. The school has a *Pentium* 100 PC, a deskjet printer and a data/ fax for a mobile telephone; all these have made it possible for *Micha-Kgasi* to send messages all over the world and are used to:

- ☐ Communicate with St. Hildas for the donation of computer equipment;
- ☐ Put into practice a water project in collaboration with an NGO in New Jersey;
- ☐ Make searches for a project about violence;
- ☐ Search for reports on the use of mobile telephones;
- ☐ Write the quarterly forms for every class;
- ☐ Develop a project called *'Where on the globe is Roger?'*;
- ☐ Put into practice a project on the comparison of various prices;
- ☐ Send and receive e-mail;
- ☐ Take part in conferences in Hungary and Spain.

Only some of the schools of the rural villages of South Africa have such facilities and just some of the headmasters of these schools have the chance to take part in an international conference. *Micha-Kgasi* school was the main focus of a six-month project by the *International Development Research Centre* (IDRC). The aim of the project was to underline usefulness of the mobile telephones for the connection of two schools in two rural villages of South Africa, 50 km away from Pretoria: they both wanted to enter *PreNet - Pretoria Education Network*, an

association of schools founding their education on the use of the e-mail and of Internet [IDRC 97].

4.2.1 Some Experiences in Argentina

In **Argentina** the use of the Internet is difficult to be interpreted: on the one hand the Government has declared that access to the Net constitutes a really relevant matter and has planned its deployment for the development of education, culture and medicine; on the other hand, connection to the Net is not possible in all rural areas of the country. Furthermore, in the State schools teachers seem to be worried more about obtaining higher salaries from the Government than about teaching, say, Net-surfing.

The lack of resources and the predominance of various obstacles, however, have not prevented experimenting on the Internet in various schools. In Buenos Aires in the State elementary school *Ricardo Rojas* the first Website was built in July 1996: it cost about 1,000 US\$ and was sponsored by the students' parents. The students were really fascinated by the new technology and worked really well with the support of their computer studies teacher Paula Rapado. Unfortunately, the first problems rose when the children did some research through the Internet on sea monsters: as they could not find anything in Spanish, they had to work with the support of an English teacher. Then the parents started complaining that their children did not study, but they looked for irrelevant and dangerous things on the Net. The last straw was reached when the students tried to publish on their Website two articles they had written about drugs and police violence. At this point the school authorities put a stop to the publishing effort and closed the project. The headmaster, Mrs Dora de Sao Caledonio, explained that *'once the ten to twelve year-old children's opinions did not go out of the schools, now they can circulate with the name of the school through the Internet. This is not right, the students cannot be totally free as they do not know enough, they have to be controlled by adults.'* [Pano 98c].

In Argentina, however, there are other projects that seem to be working really well. For instance, 210 schools in Buenos Aires are working for a multimedia newspaper called *'La Nave, Tripulantes del Caos'*, meaning *'The Ship, the Crew of Chaos'*, which is supported by the State authorities and an ISP. The students of the participating schools built a home page where they publish poems, drawings, articles about the subjects they have

studied, about their school and extra-school activities, and about information on Argentina; all is in Spanish and not in English [Pano 98c]. In the town of Monte Grande, 25 km away from Buenos Aires, a secondary school has begun to communicate with the rest of the world through e-mail, while in Mendoza nearly 93 secondary schools are connected to the Internet. The home pages are built not only for the schools and by the students, but there are also sites created by teachers, such as, for instance, *Nueva Alejandra*, an educational Website in Spanish created by independent teachers; in its directory there are the addresses of 159 schools all over Latin America that have a Website or e-mail. The Scientific Communication Centre of the University of Buenos Aires has created a mailing list that serves about 200 teachers and institutions, while the Ministry for Culture and Education has created a Website where the teachers can find information of any kind and can also receive news about the latest national editorial publications [Pano 98c].

4.2.2 Some Experiences in the Middle East and the Arab Countries

On-line learning is spreading not only in South America, but also other Developing Countries are experimenting with the Net in this sector. In Dubai (**Saudi Arabia**), for instance, in 1998 the first *Arabic Educational Website Development Contest* was opened to promote the style of learning through the Internet all over the world, by offering awards to the best teams of the region. The competition was launched by the magazine '*Internet Al Alam Al Arabi*' (IAW), one of the issues of *Dabbagh Information Technology Group* (DIT). The Director of IAW, Abdel-Kader Al Kamil, declared: '*Learning through the Net is an exciting and interactive kind of education, which is already used in the schools of USA and Europe. This competition will encourage Arab students to use constantly the Internet as a source of information enriching language and culture.*'

In the competition, the participants must make teams of 2-3 students and create their own Websites based on one or two of the subjects suggested (the categories are: art, literature, science, maths, history and geography). The official language must be Arabic, but English can be used as the second language. Every team will have its own password for access to the DIT server. At the end, the completed Website projects are judged by a panel of experts and the best project is announced. The winning prize for the 1999 contest was awarded at the *COMDEX Egypt 99* Exhibition in El

Cairo. Every member of the winning team received hardware and software products of the supporting companies: *Microsoft Corporation Middle East, Compaq Computer MAMEA, IBM, and Sun Microsystems* [DIDN 98a].

4.3 Distance Learning

In a private secondary school inside the University of Ankara in Turkey the students are sitting in classrooms equipped with TV sets and satellite connection, through which a teacher of the Kaplan school, which is in New York, prepares them to pass the SAT test: this is an examination that helps the students qualify for the first University Courses in America (US Undergraduate University courses). This is a great example of the way technology makes it possible for students to receive adequate learning by spending less than traditionally buying books and paying skilled teachers in Turkey.

The foregoing is just an example of how distance learning can, to date, be promoted through the Net. The Developing Countries have *now new opportunities for having access to knowledge and for enriching their own human capital*. Technology has greatly contributed to the transformation of distance learning, not only as a result of the potentialities of the radio and the television technologies, but now as a result of deployment of the Internet and of the satellite communications technology. The new information and communications technologies have transformed the world into an arena for education. As we have seen, however, many developing countries have limited access to these new technologies, especially because of the lack of the telecommunications infrastructure and of the requisite information systems.

Distance Learning is used in many different ways: universities use it to increase the number of their students; firms use it to teach their employees, to specialise them and to bring themselves constantly up to date about the new production processes and the new technologies; people use it to improve their job performances and to increase their opportunities to gain advancement; finally, Governments use it to bring their employees and teachers up to date, to improve the quality of the secondary schools and to provide education in the rural areas of the country, which could not be supplied in any other way.

The universities providing exclusively distance learning are called **Open**

Universities. There are, however, other universities, which offer both distance and traditional learning. The mega-universities are big Open Universities with over 100,000 students a year. The first and most famous Open University is the United Kingdom's Open University [POTC 98].

There are a number of **Conventional Universities** that are providing distance learning for a certain period of time or are trying it out: this is mostly due to the fact that they are not able to meet completely and efficiently the great demand for learning. There are even *élite Universities* that had never taken into consideration the idea of distance learning until a few time ago. To date such universities are offering courses at various levels including Masters programmes. One example is *Johns Hopkins University*, USA, which offers health management courses by using digital video technologies, as part of their Business of Medicine Certificate Program, while *Duke University* offers a Global Executive Masters in Business Administration (MBA) to students of Europe, Latin America and Asia, by using technologies that make it possible for them to communicate and to implement the course.

Furthermore, completely new structures have been built to increase the advantages provided by the Internet and the new technologies; these are called **Virtual Universities**: these comprise universities with no headquarters. They use the Internet and satellite technology to send their courses all over the world. In 1989 the first Virtual University of *Monterrey Institute of Technology* was launched in Mexico; it was a joint effort realised by an association of universities, among which 13 were not Mexican. It counts about 9,000 graduates and 35,000 enrolments a year coming from Mexico and from the countries of Latin America. The courses are provided through a combination of written tests, videotapes or live lessons between the faculty and the students. Every course is given a teacher, full-time working, for every 50 students enrolled for the same course. The *World Bank* has created the first **Virtual University in Africa**. This project has been implemented at really low costs in order to provide for the lack of learning material and the low level of interaction in the African universities.

Virtual teaching using the Internet is used not only by the universities, but also by firms in order to increase the professional knowledge of their own employees. An example is provided by *Hewlett-Packard* which through high-technology teaching equipment, broadcasts TV programmes for its employees in about 100 firms in Europe and in the USA. Other

companies, on the contrary, turn to external organisations, such as the *US-Based Technological University*, to promote the professional development of their own employees.

The use of distance learning is significant both from the standpoint of bringing teachers up to date, especially in the Developing Countries where teachers are generally disadvantaged from the viewpoint of lack of continuing professional development that is necessary for the improvement of teaching quality in the secondary schools of the rural villages. For instance, in Mexico the programme *Mexico's Telesecundaria* teaches through the TV about 700,000 students living in small and distant areas of the country. In Africa, Latin America and Asia at the beginning of the Seventies one-way radios were implemented, mainly as a result of the predominance of the low cost of the radio service suitable for spreading education in the rural areas. The *Interactive Radio Instruction* (IRI), as this service was named, uses one-way radios to send the basic activities that the students have to do during the lesson and to communicate the lessons and complete the reading with various activities through a '*radio teacher*': they have to answer some questions, make some drawings, sing and do their homework. The IRI programme is used, in general, as a support for those schools with a low level of instructional capacity or with limited resources for making their work.

4.3.1 Costs and Advantages of Distance Learning

Many studies have been made to measure the advantages of **Distance Learning**, even if none of these has been made on Internet-based training. More than 70 years of research on print-based correspondence courses have been constantly reported to make a comparison with the traditional courses. Many reports on radio learning show that the advantages for students increase with the use of this kind of learning. Other researches show that the pre-packaged computer-based training for adults make it possible to learn better, in some cases even more rapidly and with low costs, rather than the traditional courses taught in classrooms by teachers [CAPP 90].

Distance Learning Programmes, however, are considered to be more expensive than the traditional ones; some studies show that this is true only if the enrolment is at a sufficiently high level of expenditure and taxes. In particular, a study on the actual costs of the mega-universities has stated that the cost per student varies between 5% and 50% more than

the traditional universities [Dani 96]. The main mega-universities, taken into consideration in the study, are illustrated below [TABLE 5], in terms of foundation year; number of students enrolled and of graduates; and budget in US\$ (million). In some of the countries, the percentage of the budget coming from the taxes paid by the students corresponds to more than 50%, starting from a minimum of 0% in *China TV University System*, to a maximum of 87% at *Iran Payame Noor University*. The actual costs of Distance Learning become evident in a comparison of the number of enrolments and the cost for each student in these Universities with the American traditional Universities: a total of 3,500 colleges and universities in the USA serve 14 million students with an average annual cost of about 12,500 US\$ per student. A total of 11 mega-Universities, instead, serve 2.8 million students with an average annual cost equal to just 350 US\$ per student [Dani 96]. The taxes on the courses at the mega-Universities are lower than the taxes on the traditional Universities, and the annual cost per student is much higher than 350 US\$, as evaluated by J S Daniels [POTC 98]. *This is due to two factors: the number of enrolments and the supporting services provided to the students. There is a direct proportional relationship between the two: the cost of the services rises with the increase of the enrolments. Again, the providing of a limited number of courses keeps the costs low, but when their number increases, the costs of the distance courses become more expensive than the traditional ones.*

Country	Name of Institution	Year Founded	Number of Graduates	Number of Subscriptions	Building Infrastructure US\$(million)	% Tuition Fees	% Governments	Unit Cost
China	China TV University	1979	530,000	101, 000	1.2	0	75	40
France	Centre National D'Enseignement a Distance	1939	184,614	28,000	56	60	30	50
India	Indira Gandhi National Open University	1985	242,000	9,250	10	42	58	35
Indonesia	Univrstas Terbuka	1984	353,000	28,000	21	70	30	15
Iran	Payame Noor University	1987	117,000	7,583	13.3	87	13	25
Korea	Korea National Open University	1982	210,578	11,000	79	64	36	5
South Africa	University of South Africa	1873	130,000	10,000	128	39	60	50
Spain	Universidad Nacional de Education a Distancia	1972	110,000	2,753	129	60	40	40
Thailand	Sukhothai Thammathirirat Open University	1978	216,800	12,583	46	73.5	26.5	30
Turkey	Anadolu University	1982	577,804	26,321	30	76	6	10
United Kingdom	Open University	1969	157,450	18,359	300	31	60	50

TABLE 5: Mega -University - J S Daniels, 1996.

For instance, an Open University spends more than 3 years for the organisation of a new course and it invests more than a million pounds, in particular to implement the technologies. The *printed materials*, the *audiocassettes*, and the *TV lessons* use low-cost technologies for a small number of students (less than 250), while the *radio broadcasting* needs at least 1,000 students to maintain the unit cost at a minimum. Lectures via *computers* have low costs and make it possible for interactions between the teacher and the students, but *live interactive broadcasts* and the *video conferencing* deploy advanced technologies which are generally expensive, particularly with the rise in the number of enrolments.

In TABLE 6 the average cost per students' groups (from 50 to 1,250) are underlined for every technology used in the process of Distance Learning.

Technologies	Cost/50 Students (US\$)	Cost/125 Students (US\$)	Cost/250 Students (US\$)	Cost/625 Students (US\$)	Cost/1250 Students (US\$)
UNI-DIRECTIONAL					
Printing	-	2.61	-	0.63	0.37
Videotape	-	3.51	-	1.30	1.02
TV Course:					
- 25 courses	7.71	3.09	1.54	0.61	0.31
- 10 courses	7.95	3.18	1.59	0.63	0.31
- 1 course	18.76	7.50	3.39	1.50	0.75
Radio	-				
TV Education	-				
Learning on Computer					
- Low Level	59.25	18.75	11.25	6.75	4.50
- High Level	322.50	130.50	66.75	28.50	15.75
BI-DIRECTIONAL					
Audio Conferences	-	7.12	-		
Interactive Lessons On Air	-	67.24	50.14	4.11	3.67
Videoconference at 340Kb/s	56.74	22.17	16.78	34.36	29.00
Dual-mode Conference On Computer					
- Institutions	1.45	1.12	1.09	0.99	0.93
- Students	0.69	0.69	0.69	0.69	0.69
- Combine	2.55	1.81	1.80	1.69	1.68

TABLE 6: Average Costs Per Number of Students of Every Technology Used in Distance Learning – J S Daniel, 1996

Trends and changes in Distance Learning are spreading more and more in all countries, having been imbued with renewed vigour enhanced by the help of the Internet. The main role in this process of transformation is played by the *World Bank*, which has decided to enlarge its distance learning programmes and its training activities and to help the members create their own abilities in this sector. With this aim the organisation has created a new Website for distance education called *Educationnet* (EdNet), in order to provide the politicians, the education experts and the people who make investments with information service of high-level quality. It is organising a series of regional workshops about distance learning in the countries and it is launching projects to improve the learning capacities of these countries. Furthermore, the Bank is launching its global programme of teaching in order to spread knowledge all over the world through its offices in the various nations and a large network of infrastructure.

Donor organisations, such as the *World Bank*, and other institutions invest in the Internet in order to spread education in the Developing Countries, but the education systems of these countries often lack access to the necessary information needed to make it possible to put the projects into practice. The Web can play a more relevant role in making this gap decrease and can also provide the necessary information to increase the population's knowledge. The Internet provides not only education through courses for students, teachers or employees, but also makes it possible to transfer the cultural inheritance of the world and to share it amongst individuals, communities and nations. In Egypt, for instance, a Website has been devoted to the Egyptian Museum (<http://www.idsc.gov.eg/culture/egy-mus.htm>): here one can find information on the thousands of years of civilisation that prevailed in Ancient Egypt.

The diffusion of the Internet worldwide has literally changed the traditional structure of the school and, as it can be noticed from the previous examples, it is doing it in many different ways that are more and more interesting. It must not be forgotten, of course, that parents keep on worrying about the fact their children's opinions are circulating all over the world and that this could mean danger and repression for them; psychologists frequently remind users and non-users alike of the problem of the images of pornography and violence on the children that can be found on the Net. These anxieties, however, cannot erase the advantages coming from the introduction of this new technology into the educational area.