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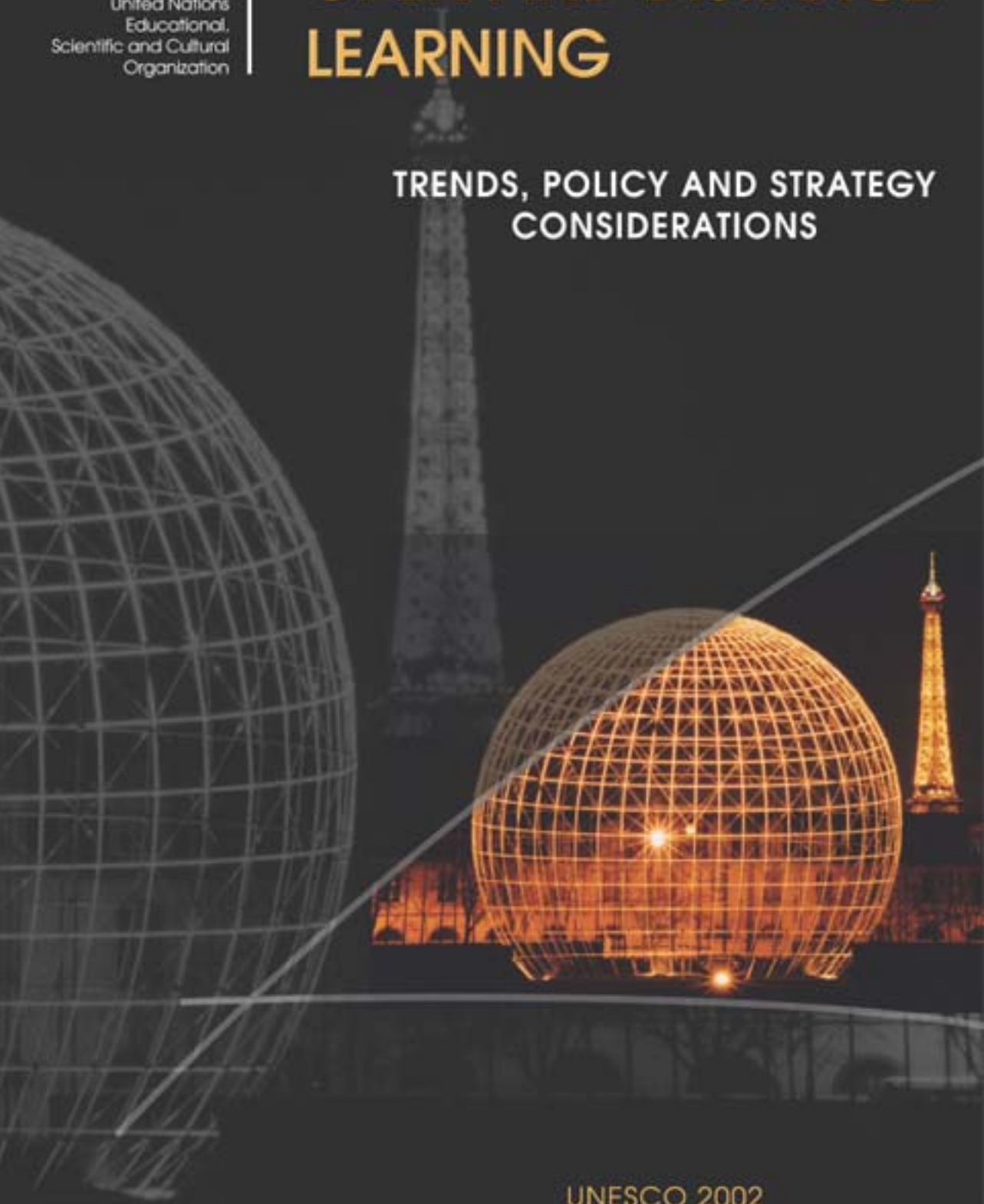
OPEN AND DISTANCE LEARNING

TRENDS, POLICY AND STRATEGY CONSIDERATIONS



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UNESCO, 2002

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FOREWORD

As a *force* contributing to social and economic development, *open and distance learning* is fast becoming an accepted and indispensable part of the mainstream of educational systems in both developed and developing countries, with particular emphasis for the latter. This growth has been stimulated in part by the interest among educators and trainers in the use of new, Internet-based and multimedia technologies, and also by the recognition that traditional ways of organizing education need to be reinforced by innovative methods, if the *fundamental right* of all people *to learning* is to be realized.

The globalization of distance education provides many opportunities for developing countries for the realization of their education system-wide goals. Two main factors have led to an explosion of interest in distance learning: the growing need for continual skills upgrading and retraining; and the technological advances that have made it possible to teach more and more subjects at a distance.

As Member States and their governments become more aware of the potential of open and distance learning, it is essential for their educational planning that the opportunities offered by new technologies be realistically examined within the framework of national development plans in general and educational policies in particular.

Faced with new training demands and new competitive challenges, many institutions need to undertake profound changes in terms of governance, organizational structure and modes of operation. More and more traditional universities are rapidly transforming themselves from single mode to dual mode universities, recognizing the importance of distance education in providing students with the best and most up-to-date educational resources available in addition to the traditional teaching methods that they receive. The increasing number of open universities being established across the world is highly indicative of this trend.

The Division of Higher Education is proposing an updated version of its document, *Open and Distance Learning: Prospects and Policy Considerations*, published in 1997. The present paper aims to review open and distance learning in the context of present challenges and opportunities, describe relevant

concepts and contributions, outline some significant current global and regional trends, suggest policy and strategy considerations and identify UNESCO's initiatives in this area, including its role in capacity building and international co-operation. While the paper is not intended to impose any particular policy or model, it is hoped that it will assist Member States, especially the developing countries, in defining appropriate policies and strategies helping them make the best use of available distance learning technologies corresponding to different cultural contexts and stages of development.

This paper is also a contribution to the collective efforts aimed at achieving the EFA goals, adopted at the World Education Forum (Dakar, Senegal, April 2000) by ensuring that the learning needs of all young people and adults are met through equitable access to appropriate learning and life-skills programmes and through harnessing new information and communication technologies to help attain those goals.

John Daniel
Assistant Director-General for Education

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EXECUTIVE SUMMARY

The terms *open learning* and *distance education* represent approaches that focus on opening access to education and training provision, freeing learners from the constraints of time and place, and offering flexible learning opportunities to individuals and groups of learners. Open and distance learning is one of the most rapidly growing fields of education, and its potential impact on all education delivery systems has been greatly accentuated through the development of Internet-based information technologies, and in particular the World Wide Web.

The objective of this paper is to review open and distance learning in the context of present challenges and opportunities, examine relevant concepts and contributions, outline current global and regional trends, suggest policy and strategy considerations, and identify UNESCO's initiatives in open and distance learning, including its role in capacity-building and international co-operation. It is addressed to a wide range of potential partners, governments, intergovernmental and non-governmental organizations, specialized institutions, associations, industrial corporations, telecommunication companies, and others interested in this field, to seek their co-operation in meeting today's urgent education and training needs, through open and distance learning.

Challenges and opportunities

Major changes have occurred in the world economy, in particular with regard to the information-bearing technologies. These demand the attention of governments for education and for human resource development. While the last two decades have seen considerable growth in education and training, the world still suffers from intolerable inequalities at the international level and sometimes within nations. Many countries are struggling with limited access to education and training for children and young people, and at the same time have to address the basic needs of an older generation. Low quality and insufficient relevance are other concerns. At the root is often the problem of financing adequate provision, and of outdated structures for education and training.

The rapid development of information and communication technologies (ICTs) and the move towards more knowledge-intensive, interdependent and internationalized societies create new challenges and opportunities for the design and delivery of education. ICTs open up new horizons for progress and the exchange of creativity and intercultural dialogue. Nevertheless the growing digital divide is actually leading to greater inequalities in development. This is giving rise to paradoxical situations where those who have the greatest need of them – disadvantaged groups, rural communities, illiterate populations or even entire countries – do not have access to the tools which would enable them to become full-fledged members of the knowledge society.

For the student/learner open and distance learning means increased access and flexibility as well as the combination of work and education. It may also mean a more learner-centred approach, enrichment, higher quality and new ways of interaction. *For employers* it offers high quality and usually cost-effective professional development in the workplace. It allows upgrading of skills, increased productivity and development of a new learning culture. In addition, it means sharing of costs, of training time, and increased portability of training.

For governments the main potential is to increase the capacity and cost-effectiveness of education and training systems, to reach target groups with limited access to conventional education and training, to support and enhance the quality and relevance of existing educational structures, to ensure the connection of educational institutions and curricula to the emerging networks and information resources, and to promote innovation and opportunities for lifelong learning.

Concept and contributions

The term *open and distance learning* reflects both the fact that all or most of the teaching is conducted by someone removed in time and space from the learner, and that the mission aims to include greater dimensions of openness and flexibility, whether in terms of access, curriculum or other elements of structure. The historical evolution of distance learning systems has been in four main phases. Open and distance learning systems can usually be described as made up of a range of components such as: the mission or goal of a particular system, programmes and curricula, teaching/learning strategies and techniques, learning material and resources, communication and interaction, support and delivery systems, students, tutors, staff and other experts, management, housing and equipment, and evaluation.

Sometimes open and distance learning is used for school-age children and youth that are unable to attend ordinary schools, or to support teaching in schools, both at primary and secondary level. However, most courses and programmes are targeted at the adult population. In developing countries in particular distance education for school equivalency is an important way of expanding educational opportunities to the adult population. Open schools that use a variety of media are of particular interest to high-population countries.

Teacher training is an important area where open and distance learning has made a major contribution. This includes initial training for formal qualifications, in-service supplementary training for formal upgrading, and continuing in-service training in particular subjects and topics. Many examples, particularly from developing countries, show that teacher training at a distance may reach large groups of teachers and have profound impact on the development of national education systems. The use of open and distance learning for teacher education is therefore a crucial strategy when expansion or quality improvement is needed in the public education system.

A common need in many countries is to upgrade teachers' knowledge and competence in using new ICTs, in particular the rich instructional and information resources available on the Web. In such cases it is also very appropriate to use the new technologies in the training programme for teachers.

Both private and public providers have made important contributions to the development of industry and trade through programmes for technical and vocational education. Core purposes include the ability to respond flexibly to the need for working adults to obtain training, and to provide opportunities for those most disadvantaged by existing provision. The capacity of open and distance learning to support large-scale campaigns, e.g. in the field of HIV/AIDS education, is significant in the context of continuing education and training.

Non-formal education and community development represent other sectors where open and distance learning is increasingly used. Programmes at a distance often reach substantial numbers of women, in societies where women lack equal opportunities for participation in conventional forms of education and training. Open and distance learning approaches lend themselves to the teaching of many of the complex issues of the modern world, in which input from a variety of disciplines is necessary.

Distance education at the tertiary level shows a two-fold development pattern. On the one hand, numerous single mode open universities have

emerged to absorb large numbers of new learners, while, on the other hand, increasing numbers of traditional universities have begun to offer their programmes also through distance education. The development of new ICTs has reinforced this trend.

Open and distance learning has the potential to generate new patterns of teaching and learning. Strongly linked with developments in information and communication technologies, it is close to the development of new learning needs and new patterns of information access and application and learning. There is evidence that it can lead to innovation in mainstream education, and may even have effects beyond the realm of education itself. Open and distance learning therefore plays an especially decisive role in the creation of the global knowledge-based society.

Present trends in open and distance learning

It is more than ever clear that open and distance learning will be an important element of future education and training systems. It is approaching acceptance within mainstream education and training in such a way that it will make up part of the repertoire of most educational institutions in the future. The emergence of new forms of distance learning based on new information and communication technologies, in particular those supported by the Internet and using the World Wide Web, has significant pedagogical, economic and organizational implications. Furthermore, there is a significant trend towards intensifying globalization. Institutional and inter-governmental co-operation is increasing, and the 'global classroom' has been realized in quite a number of projects, particularly in connection with emerging global communications networks. Governmental leadership concerning network development and access will be essential in this sphere.

The regional overview shows great differences between all regions of the world, although there are also a number of similarities. Open and distance learning has existed for about one hundred years in the more developed regions and for one or two generations in the developing regions. In the high-population countries of the developing world, open and distance learning has been seen to offer very significant opportunities for education and training. Lack of infrastructure and professional competence in open and distance learning remain important barriers. Nevertheless, these forms of educational delivery have come to stay, and many countries are looking at open and distance learning as a major strategy for expanding access, raising quality and ensuring cost-effectiveness.

In industrialized countries present trends are linked both to structural problems of education in modern society, and to technological development. The need to extend learning opportunities over the whole life span and the changing demands concerning mass education and the need for new skills represent challenges that are not easily met by conventional structures and institutions. Governments, industry and educational institutions are eager to develop effective applications of new technologies and at the same time meet the needs of learners. However, conventional ways of teaching continue to thrive, and the field shows a great variety of approaches to the implementation of new strategies, with varying success.

Internet and Web-based education

The emergence of the Internet and related networks such as the World Wide Web has had and will increasingly have radical effect on the transformation of education and training in all sectors. The impact is already significant in all developed countries, and the great majority of developing countries are despite difficulties and fears seeking to take part in the emerging global educational community.

The Web offers a worldwide forum in which to teach courses that can be dynamically updated in ways never before possible. Each student has an enormous range of resources available, free from limitations of time and space. There remains considerable work to be done concerning searching and sifting techniques within these resources for learners and teachers alike. These resources are reconfiguring the ways in which students learn, and new approaches to networked learning are evolving.

The trans-cultural nature of the Web also creates problems of legislative and public control, with fears that local culture can be threatened by the international culture of developed countries. While the use of the Internet and the World Wide Web in open and distance learning is predominantly represented within higher education, it is also beginning to be used in schools.

Economics of open and distance learning

The cost structures in open and distance learning are quite different from cost structures in conventional types of education. Capital investments usually substitute for high recurrent costs, making economies of scale a decisive factor. Large distance-learning programmes may produce graduates at con-

siderably lower costs than conventional institutions. This depends, however, on a number of other factors. The costs of open and distance learning vary a great deal according to the use of learning materials, media and technologies, and types and organization of student support services. In order to evaluate costs it is also necessary to consider the rate of completion of studies.

Factors affecting the cost-efficiency of open and distance learning systems include: the number of learners enrolled; the size of the curriculum; the number of years over which courses are offered without change; containment of course development costs; sharing course development costs; technology choice; the level of student support; and a range of working, labour market and structural practices. There is little evidence about the cost structures of Web-delivered education at this stage.

There is a need for cost studies of open and distance learning to be increased in both scope and number. Most previous studies compare the costs of single mode distance-learning systems with that of conventional systems, while cost studies of open and distance learning used by conventional or dual mode institutions are scarce. The introduction of open and distance learning technologies should lead to reallocation of other resources, to avoid increased costs. Simple cost-efficiency studies do not take into account broader qualitative and social aspects. Open and distance learning systems are often targeted towards other groups, without easy access to conventional institutions. There are other benefits that are not easily quantified and calculated. Opportunity costs and productivity effects of upgrading the workforce through in-service training should also be taken into account.

Funding of open and distance learning institutions is often different from that of conventional institutions, and there are many arguments in favour of this. On the other hand, if open and distance learning is to be used increasingly by conventional institutions, funding for programmes of this type needs some harmonization with funding mechanisms for conventional programmes. It is widely assumed that students in open and distance learning, who are often working adults, should pay a higher proportion of the costs than conventional students. However, this assumption should be modified according to the mission of programmes, target groups and local circumstances. The balance of funding from government, employers and individual students should be carefully considered, in the knowledge of the fact that underfunding may have negative qualitative and social effects. Care should be taken to remedy any unjustified economic discrimination between students in open and distance learning and other students.

UNESCO's initiatives in open and distance learning

UNESCO's initiatives in open and distance learning are based on its overall priority to ensure the right to education for all. While the use of distance education was given early support by the Organization, new developments in information and communication technologies, in particular the Internet and the World Wide Web have radically increased the demand for lifelong education but also provided new means to meet the demand. Facing the educational challenges of the 21st century, UNESCO continues, through its support of open and distance learning, to contribute to the construction of knowledge societies in a lifelong learning context.

Within its overall priority, UNESCO focuses on fostering basic education for all to meet the commitments of the Dakar World Education Forum, encouraging and supporting action in its Member States with special emphasis on co-operative efforts to develop open and distance learning systems and programmes to the benefit of those deprived of basic learning skills.

Great attention is given to open and distance learning to meet the educational needs of the adult population, with a view to providing new and alternative learning opportunities for those who were initially deprived of them, or who, for one reason or another, did not make use of them.

UNESCO continues to strengthen the role of open and distance learning in the diversification of educational delivery systems, notably, for technical and vocational education, encouraging co-operation and partnership between enterprises, professional bodies and distance teaching institutions. Support is also given to open and distance learning to meet the special needs of the disabled, migrants, cultural and linguistic minorities, refugees, populations in crisis situations, who cannot be efficiently reached by traditional delivery systems.

Great importance is attached to open and distance learning in teacher education, notably, for in-service teacher training but also for the training of teacher educators. National and sub-regional initiatives are encouraged and supported also through UNITWIN/UNESCO Chairs and inter-university co-operation.

The potential contribution of open and distance learning to the development of higher education is fully recognized and supported by UNESCO. In their efforts to make wider use of distance education to expand access to advanced learning and improve its efficiency, Member States are assisted,

among other things, by providing them with support in the initiation and development of open university schemes and other higher education programmes making use of distance education.

In its efforts to support its Member States to make wider use of open and distance learning, UNESCO gives priority to national capacity-building, including activities to enhance policies, planning, administration, financing, personnel, production, technologies, and other capacities essential to the establishment and management of efficient open and distance learning systems. Bridging the digital divide between developing and developed countries and within countries is a prime strategic challenge throughout UNESCO's activities.

In line with its mission to serve its Member States, UNESCO gives great importance to international, interregional and regional co-operation for the promotion of open and distance learning. Co-operation is pursued with intergovernmental organizations such as other UN system agencies, the Commonwealth of Learning, the World Bank, the Commission of the European Union, the Organization for Economic Co-operation and Development, regional development banks, private and public sector partners, non-governmental organizations, notably with the International Council for Open and Distance Education (ICDE) – which are competent to act in this field.

I.

INTRODUCTION

As a force contributing to social and economic development, open and distance learning is today one of the most rapidly growing fields of education and training. It is fast becoming an accepted and indispensable part of the mainstream of educational systems in both developed and developing countries, with particular importance for the latter. This growth has been stimulated in part by interest among educators and trainers in the use of new, Internet-based information technologies, but also by recognition that traditional ways of organizing education need to be reinforced by innovative methods if the fundamental right of all people to a life of learning is to be realized (UNESCO, 2000a). One innovation in particular, that is the expansion of the World Wide Web, coupled with a continued fall in the cost of processing, storing and transmitting information, has contributed to significant shifts in how distance education is perceived by educators and how it is designed, delivered and administered.

As Member States and their governments become more aware of the potential of open and distance learning, it is essential for their educational planning that the opportunities offered be realistically examined within the framework of national development plans in general and educational policies in particular. In undertaking such reviews it is essential to keep in mind both the optimism but also the caution about technology that prefaces the *Report on Distance Education in the E-9 countries*: "It is widely acknowledged that the past ten years have seen … intense development of distance education experiences. They gave birth to a surprising change of vision and rhetoric to express the hopes and promises attached to concepts of modern technologies. Oddly enough buzzwords and catchy ideas were adopted and replaced well-known definitions of distance learning. … too many experts or gurus jumped on the idea, without considering the hard facts such as the costs and uses of modern technologies in traditional societies. Later, and thanks to the accumulation of experiences, a differentiated and pragmatic understanding was developed" (UNESCO, 2001a, p.5).

The aim of the present paper is to contribute to the discussion of when, for what purposes and in what ways distance education in its range of forms is appropriate, and to facilitate decision-making in this respect. The paper also aims to reflect UNESCO's major initiatives in this field, as expressed in the Resolutions of its General Conference and Executive Board, the Medium-Term Strategy for 2002-2007, and recommendations of major international conferences. Reference is made, in particular to the *Final Report* of the Dakar World Education Forum (UNESCO, 2000c), the Analytical Survey: *Distance Education for the Information Society: Policies, Pedagogy and Professional Development* (UNESCO, 2000b) and the *Report on Distance Education in the E-9 countries* (UNESCO, 2001a).

The paper aims to review open and distance learning in the context of present challenges and opportunities, describe relevant concepts and contributions, outline some significant current global and regional trends, suggest policy and strategy considerations, and identify UNESCO's initiatives in this area, including its role in capacity-building and international co-operation. The paper is addressed, as an open invitation, to a wide range of potential partners, governments, inter-governmental and non-governmental organizations, specialized institutions, public and private sector partners interested in this field, to examine how open and distance learning can effectively help meet today's urgent education and training needs and how this can be accomplished through the international co-operation to which UNESCO is committed.

II.

CHALLENGES AND OPPORTUNITIES

Global changes, and challenges to education

Education has to be considered in its relation to global economic, social and cultural development. There is now little doubt that major changes are occurring in the world economy, mainly due to the expansion of new information-bearing technologies. In what has already become known as a knowledge-based society, economic advantage will accrue to countries in which the population acquires competence in processing information into knowledge and applying it in work and everyday life. The importance of knowledge as an essential component of the economy has influenced the increasing interest of governments in human knowledge resource development.

The tendency has been evident in developing as well as developed countries, although the circumstances, priorities and challenges are different. In developing countries, human knowledge resource development through initial and continuing education is not only seen as crucial for economic growth and competitiveness, but also has far-reaching social impact, for example in influencing the birth rate, increasing the independence of women, and improving standards of health and the rural environment.

The resources available for the development of knowledge are far from evenly distributed. In spite of a considerable quantitative growth in recent years, there are still intolerable inequalities both between and within nations. There are about 880 million illiterate adults in the world and some 113 million children between 6 and 11 deprived of any schooling at all. In higher education also, inequality in opportunities is expected to continue, especially in view of projected population growth (UNESCO, 2000c). Besides the insufficiency of opportunity, the low quality of education and its frequently

observed irrelevance are also of major concern. Rapid changes in the workforce, unemployment and uncertainty now demand fast-changing, "just in time", continuing and lifelong education.

Linked to most of these problems is the problem of financing. Lack of resources in developing countries is obvious, and becomes more acute as demographic trends increase the need to expand educational provision. The 'knowledge divide' is, however, compounded by serious situations in certain regions, and particularly in Sub-Saharan Africa. In this region, the achievement of education systems is often threatened by a series of other problems. In the next few years the most serious of these is likely to be the effect of the HIV/AIDS pandemic, followed by the effects of military conflicts (UNESCO, 2001b).

Under such conditions, it is unrealistic to expect traditional educational structures to provide an adequate basis for knowledge development. A developing country has to find new methods that will dramatically improve both its children's schooling and its continuing education system. New methods will need new organizational forms, which in turn require re-thinking of education and training policies. Strategies that have been recommended include the diversification of the resource base by privatizing some educational functions, the use of donations from private sources, and the recovery of costs from users and participants.

Another strategy is to focus on increasing efficiency within the system. Future policy will probably involve structural reform and the limitation of expenditure in the public sector. It is therefore relevant to look not only at new technologies but also alternative systemic approaches in pursuit of increasing access, improving cost-effectiveness and quality, as well as learning outcomes.

The development of a more knowledge-based and service-oriented economy leads to important changes in the organization of work and the structure of skills needed. New jobs tend to demand new and higher levels of skills, customer-oriented communication, problem solving and entrepreneurial skills. The emergence of more flexible work organizations is clearly linked to the development of technology. One of the new challenges for education is that high-level skills are needed not only by an elite, but by the population in general.

Political, economic and technological developments make up a strong movement towards internationalization. Increasing integration and interde-

pendence of national economies are followed by attempts towards economic integration at regional levels, e.g. in Europe, South East Asia, North and South America, and East and Southern Africa. International and regional co-operation in education and training is often included in such efforts. Internationalization is enhanced by the development of information and communication technologies. Thus, international and regional markets for education and training are emerging. This leads not only to increased international awareness and orientation in curricula, but also facilitates the exchange and sharing of expertise and human resources.

Major obstacles to internationalization are found in the barriers to, and limited recognition of, diplomas and qualifications across national borders. There are also cultural aspects connected with internationalization. Increased communication underlines the needs for mutual information and understanding of cultural and social contexts. Sometimes cultural and ethnic forces oppose internationalization, leading to an increase in national, ethnic and regional consciousness and in the extreme to polarization and fragmentation. The challenge to education is to prepare citizens for a truly international community, without neglecting the richness and the value of cultural variation.

The potential of open and distance learning

As in every other walk of modern life, the answer to the challenge of education for development will include the use of information and communication technologies, provided the necessary organizational and policy changes can be implemented to make the technologies effective. A range of technological devices is now widely available and relatively cheap (e.g. CD-ROM, various Internet services). They are accepted and often available for domestic use as well as in the workplace. Governments are concerned that educational institutions become connected to the emerging networks, that curricula include the knowledge of and acquaintance with new technologies, and that teachers are prepared and trained to use these new resources.

Among the benefits expected from new information and communication technologies, besides that of outreach, are efficiencies derived from economies of scale and qualitative improvements such as greater individualization of learning, easier access to information, and more use of simulation techniques. In addition, the use of new forms of technology will have an impact on the cognitive functions of children and youth.

In efforts to meet the new and changing demands for education and training, open and distance learning may be seen as an approach that is at least complementary and under certain circumstances an appropriate substitute for the face-to-face methods that still dominate most educational systems. While its benefits can be evaluated by technical, social and economic criteria, distance learning methods also have their own pedagogical merit, leading to different ways of conceiving knowledge generation and acquisition.

To the learner, open and distance learning means more freedom of access, and thereby a wider range of opportunities for learning and qualification. The barriers that may be overcome by distance learning include not only geographical distance, but also other confining circumstances, such as personal constraints, cultural and social barriers and lack of educational infrastructure. For the student it is often a cheaper alternative to pursuing a course through conventional methods. Since many people cannot afford to leave their work in order to study, it is important that distance education and training may be combined with work. Distance and open learning may also mean a more learner-centred approach, allowing greater flexibility and choice of content as well as more personal organization of the learning programme.

For employers, open and distance learning offers the possibility of organizing learning and professional development in the workplace itself, which is often more flexible and saves costs of travel, subsistence etc. The use of distance learning often puts both the firm and employees in a position of co-investment (of money and time) in the pursuit of common goals, based on shared values and culture. It increases productivity and supports the development of communication and other work-related skills. With sufficient numbers of employees being trained, open and distance learning is usually cost-effective. Other advantages for the employer include the increased availability of the employee during the course of the training programme, and the portability of training programmes and processes.

These advantages to learners and employers are also important features from the perspective of governments. Traditionally, governments have introduced distance education provision in order to:

- increase access to learning and training opportunity;
- provide increased opportunities for updating, retraining and personal enrichment;
- improve cost-effectiveness of educational resources;
- support the quality and variety of existing educational structures;
- enhance and consolidate capacity.

In the light of the experiences of the past twenty or more years, there is today recognition of other, related, benefits. Some of these are:

- balancing inequalities between age groups;
- extending geographical access to education;
- delivering educational campaigns and other education for large audiences;
- providing speedy and efficient training for key target groups;
- expanding the capacity for education in new and multidisciplinary subject areas;
- offering the combination of education with work and family life;
- developing multiple competencies through recurrent and continuing education;
- enhancing the international dimension of educational experience;
- improving the quality of existing educational services.

III.

THE CONCEPT OF OPEN AND DISTANCE LEARNING

Introduction

The term *open and distance learning* is used throughout this paper in recognition that this is a familiar term that has entered every-day usage in many parts of the world (though not in all). Since the discussion is not limited to learning alone, but also includes activities aimed at guiding and supporting learning – normally referred to by terms such as teaching, training, facilitating, etc. – the term *distance learning* is used as a synonym for the more comprehensive and precise term *distance education*. The rationale for distance education from its earliest days has been to open opportunity for learners to study regardless of geographic, socio-economic or other constraints. The use of the term *open* is intended to highlight this key feature of the theory and practice of distance education.

Distance education is any educational process in which all or most of the teaching is conducted by someone removed in space and/or time from the learner, with the effect that all or most of the communication between teachers and learners is through an artificial medium, either electronic or print. By definition, in distance education the normal or principal means of communication is through technology. Obviously teachers in conventional classrooms may use technology as a supplement to their teaching, but since it is not their principal means of communication the classroom is not considered to be distance education. Another way of discriminating between distance and other forms of education is to ask where the principal educational decisions are made. Who is deciding what is to be learned? When and how is it to be learned? When has learning been satisfactorily completed? If such decisions are made in the classroom, this is not distance education. If they are made elsewhere and communicated by a technology the programme is defined as distance education.

The 'open' nature of education that is mediated by electronic or printed technologies might be formally institutionalized in such policies as open admissions, freedom of selection of what, when and where to learn. Distance education organizations may indeed limit the extent of their openness, but traditionally they have shown a strong bias towards supporting the freedom of individual learners to exercise choice over one or more of the main processes of their learning. Typically this involves helping learners take responsibility for aspects such as what they learn, how they learn, where they learn, how quickly they learn, who to turn to for help and whether, when and where to have their learning assessed. The openness of distance education is also seen in relatively flexible organizational structures, delivery and communication patterns, and the use of various technologies in support of learning.

Open and distance learning is usually contrasted with 'conventional' or 'face-to-face' education, which may be described as the form of education which takes place in a classroom or an auditorium. However, both 'distance' and 'face-to-face' education are labels covering a wide range of variations and methods. Face-to-face education may vary along a continuum from one-to-one tutorials, group activities, seminars and classroom teaching to lectures for large audiences. In each case different educational philosophies may be applied and different methods may be used. Face-to-face education may be supported by a range of media, and may be combined with periods of independent study. In a similar way, distance education has a variety of forms, according to the underlying educational philosophy, organizational approach and choice of technology, and distance educators may incorporate into their programmes an element of face-to-face teaching.

The historical evolution of distance education has been in four main phases, each with its own organizational form derived from the main form of communication.

Correspondence systems originated at the end of the nineteenth century, and are still the most widely used form of distance education in less developed countries. Based around a study guide in printed text and often accompanied by audio and video components such as records and slides, interaction in the correspondence method is by letters and other written or printed documents sent through postal systems.

Educational television and radio systems use various delivery technologies – terrestrial, satellite, and cable television and radio – to deliver live or recorded lectures to both individual home-based learners and groups of learners in remote classrooms where some face-to-face support might be provided. Some

systems offered limited audio or video-conferencing links back to the lecturer or a moderator at a central point.

Multimedia systems encompass text, audio, video, and computer-based materials, and usually some face-to-face learner support delivered to both individuals and groups. In this approach, which is that used by the open universities, instruction is no longer an individual's work, but the work of teams of specialists, — media specialists, information specialists, instructional design specialists, and learning specialists. Programmes are prepared for distribution over large numbers of learners, usually located across a whole country.

Internet-based systems in which multimedia (text, audio, video and computer-based) materials in electronic format are delivered to individuals through computers, along with access to databases and electronic libraries, and which enable teacher-student and student-student, one-to-one, one-to-many, and many-to-many interactions, synchronously or asynchronously, through e-mail, computer conferences, bulletin boards, etc.

Just as each previous generation of technology, i.e. correspondence, broadcast and narrowcast audio and video, and multimedia systems, produced its particular form of distance learning organization, so the spread of broadband Internet communication is stimulating new types of educational organizations and also stimulating re-thinking about the effectiveness of the older ones. Thus the new technologies are being taken up with equal enthusiasm by open universities, correspondence schools, established "dual mode" institutions and by those now converting to dual mode status, as well as by newly emerging "single mode", purely electronic universities.

"Single mode" institutions are those in which distance education is the sole mission, to which teachers and administrative staff are exclusively dedicated. Course development, instruction, evaluation and other educational processes are tailored to the distant learner. In *"dual mode" institutions* there may be an administrative staff whose sole responsibilities are distance education, but usually it is the teachers of the parent body who provide the teaching. There is some allowance for distance teaching methods in course design, instruction and evaluation and teachers may have some special training. The most common distance learning design process is the "author-editor" model; each course is based on a study guide prepared by a single course writer. Where the Internet is available the study guide may be accessed online rather than in hard copy.

Distance learning consortia consist of two or more distance learning institutions who share in either the design or delivery of programmes, or both.

Increasingly in many countries teachers in conventional institutions are required to teach at a distance as a responsibility added to their normal duties. Teachers have little training in distance methods. Such programmes may not have their own administrative or learner support services and there are relatively low levels of tailoring of course design, instruction and evaluation to the distant learner.

Non-traditional providers, including private profit-oriented new companies are entering the global market, selling educational services online, especially to adult learners in the labour force. For-profit universities are able to raise money in stock offerings tied to their distance education programmes. Some for-profit online programmes are growing twice as fast as the dual mode institution's face-to-face programmes, attracting students from more than a score of different countries. Some traditional education institutions are responding to such competition by establishing their own for-profit affiliates, while corporations have established their own in-house systems to meet their own needs for 'just-in-time' and 'just-enough' education.

The perspective on distance education chosen in this paper is an eclectic one where all organizational forms with a significant distance learning element are included. At times it will be helpful to recognize where an issue will apply specifically to one type of organization rather than others. This is not the place to consider the different structures of different systems, but it is important to be aware of the main components common to the majority of all systems.

Components of all distance learning systems

It is the *mission* of a distance learning system that defines its role within the context of national policy. The mission may be directed towards particular purposes, target groups, regions, sectors or levels of education and training, and driven by particular values and philosophies of learning and education. The mission statement of a public institution will be part of a national policy, while the mission of private organizations may fulfil subsidiary functions in relation to the public institutions. On the other hand, private organizations must respond to the needs of particular market segments, especially of the labour market, both quickly and efficiently.

Courses and curricula define the profile of a system or institution. They should be related to the mission and to defined needs or markets. Many distance education systems provide courses in preparation for examinations and

degrees which are equivalent or similar to those offered by conventional institutions, and subject to similar regulations as regards content, admission and assessment.

Teaching strategies and techniques depend partly on the type of programme and the needs they are designed to meet, but they also depend on the educational philosophy and values of the particular system, and the educational characteristics and potential of the technologies used. There may be a connection between teaching strategies, economy and the choice of technology.

Learning materials and resources are essential components in all distance learning systems. Comprehensive, well designed materials may stimulate self-directed learning and thus influence the quality of the system as a whole. Design, development and production of materials are often considered as a sub-system in distance teaching organizations. Previously produced, existing materials, text-books, software etc. may be used but in most cases each programme benefits from having specifically designed learning materials.

Communication between teachers and learners is a necessary component in distance education, as in all other forms of education. Communication technologies distribute messages in text, still and moving images, and sound. Knowledge-generating messages may be communicated to large numbers of learners, either synchronously or asynchronously, "pushed" by broadcasting or accessed on demand through audio/video players or Internet. As these devices change, so the quality and nature of the messages will change.

Thus, new Internet devices will make it possible on the one hand for larger numbers of people to share a common learning experience, in real time, or on the other, to enable an individual learner to have a unique personal interaction with a teacher or with another learner, no matter where located. More importantly these experiences, since they do not depend on physical access, can be of much higher quality than were possible before. They will increasingly be available on a common platform, as bandwidth limitations become less significant than at present.

Communication serves two purposes. One is the distribution of information. This delivery system may comprise both distribution of pre-packaged material and transmission of synchronous or broadcast programmes, lectures etc. The second role of communication is the crucial component of all education which is the *interaction between teachers and learners*, and, where possible, *between learners* also. In some forms of distance education this learner-learner interaction is practically non-existent, but in most cases it is consid-

ered important and may be provided in different ways. Often students meet together physically in groups, some times connected with other forms of local support. New technologies allow the organization of 'virtual groups', and in countries where access to the Internet is common, this is the fastest growing approach to distance teaching.

Support delivered locally is a common component in most single mode institutions. A letter, a telephone call or an e-mail message is of course delivered locally and is more likely to be the means of learner support in dual mode institutions. What is meant here is, however, support in a form that allows some kind of direct (face-to-face) interaction between the learner and a teacher or a mentor/facilitator. This component may be organized completely as face-to-face events, or in combination with communication at a distance (teleconferences etc.). Local support is usually given in a study centre or resource centre. The centre may also offer access to other learning resources, equipment etc.

The *student and staff management* sub-system is often distinguished from the course materials sub-system. From an administrative perspective the student and staff management sub-system comprises admission, allocation to courses and student services, administering the learning and teaching procedures, assignments and assessment, monitoring drop-out and completion, and examinations. Staff may be contracted on a part-time basis or may be in the core faculty in the case of a dual mode institution, but in either case they have to be recruited, trained and monitored. A range of other experts with different qualifications is also needed, either as full-time staff or as external consultants: planners, instructional designers, developers and producers, researchers, media experts, marketing experts and administrative staff.

Effective *management and administration* needs not only competent staff, but also well designed, efficient administrative systems and routines, planning and monitoring systems, budgetary and accounting systems etc. Many of these will be quite different from the corresponding systems needed in the management of other forms of education.

The requirements of *housing and equipment* may also be very different from conventional education institutions. A single mode distance learning system has no residential students, and thus there is little need for classrooms, lecture theatres etc. at the central location. Such facilities may be needed locally, and are often provided in co-operation with local institutions. At the central location there will be need for production facilities and storage capacity, although some decentralized production is also possible. In a dual mode institution

these distance education facilities have to be accommodated alongside the space dedicated to the institution's primary mission.

Finally, *evaluation* should be a component, in order to provide information relevant to the adjustment of the roles and operation of system components, and in order to secure their optimal contribution and development. The success of any distance education institution, dual or single mode, is highly dependent on the efficiency and effectiveness of the monitoring and evaluation system, without which it may be impossible for administrators to be aware of problems in the system until the system itself breaks down. It is not possible to rely upon the kind of informal, unstructured feedback that may be sufficient in the conventional classroom.

Major contributions of open and distance learning

Open and distance learning is used for a wide range of purposes. This section will summarize some of the main areas and sectors where open and distance learning has made major contributions. The scope of the paper limits the number of particular cases and examples that can be cited.

General education

Distance education can be used at primary and secondary education levels to provide both in-school and out-of-school programmes.

In-school distance education programmes are used to support teaching in schools when learning materials are lacking, or where enrichment is thought to be desirable. They may also be used where teachers do not have formal qualifications, or to support subjects where the number of pupils is too small to be able to organize conventional teaching. A variety of approaches are used, including Interactive Radio Instruction (IRI), schools radio, educational television through terrestrial and satellite networks, multimedia schemes delivered through satellite, and Web-based delivery of multimedia schemes. The materials may be designed for young children or for adolescents and adults.

Distance education is used in out-of school programmes both at primary and secondary level to educate school-age children and youth who are unable to attend ordinary schools, including those who are disabled, suffering from long-term illness, or living in remote areas or living outside their own countries. These programmes generally use correspondence methods. Some pro-

grammes are designed to provide lessons that parents can use to teach their own children. Other programmes are designed to be supported by teachers, with parents providing direct supervision. Such programmes may, for example, combine correspondence education with two-way radio contact.

As well as focusing on isolated individuals, out-of-school programmes can also be directed at nomadic and itinerant groups. They may also be directed at youths and adults who dropped out of initial formal education, and for whom distance education represents a convenient opportunity at a later stage of their life. Open schools, which use a variety of approaches (print, broadcast, face-to-face and other media), are of particular interest to high population countries. Those aimed at children offer the same curriculum as normal state schools: equivalency of standards and of qualifications offered is important to their legitimacy.

Out of school programmes for adults tend to provide basic education through a range of models. Both radio schools and open schools targeting adults tend to provide a complementary – often vocational or socially-directed – curriculum, as opposed to the state-controlled curricula of the primary school.

Teacher education

Teacher education is an important area where distance education has been used extensively to provide pre-service teacher preparation, upgrading of academic qualifications, and in-service continuing professional development in particular subjects, content areas and instructional methods. Many examples, particularly from both developing and developed countries, show that teacher training at a distance may reach large groups of teachers and may have profound impact on the development of national education systems. Examples include distance learning initiatives in countries such as Burkina Faso, Chile, China, India, Mongolia, Nigeria, and South Africa to prepare new teachers or upgrade skills of the existing teaching force. The use of open and distance learning for teacher education is therefore a crucial strategy when expansion or quality improvement is needed in the public education system.

Distance education may play an increasingly important role during this decade in helping address the growing shortage of teachers, educational administrators and other educational professionals experienced in both developing and developed countries. Developed countries are using the

Internet as the principal or supplementary means of providing both pre-service and in-service teacher education. There is a growing number of high quality Web-based professional development resources available for educators globally. In addition, the number of universities in North America and Europe that are offering online degree programmes and courses for educators across the globe has grown exponentially in recent years.

The current and emerging communication and information technologies provide unique opportunities to continue the professional development of teachers and other educators. The Web provides teachers with incredibly rich instructional and information resources to enhance their instruction and professional skills and the possibility of on-demand, just-in-time professional development without leaving their classrooms. The Web also provides opportunities for online mentoring and support of novice teachers during their first year of teaching and to develop online communities of practice. Virtual Web-based environments for teachers now enable them to seek help from other teachers, locally, nationally, or globally in solving classroom problems, sharing lesson plans and materials, interacting with experts in particular fields, and in planning collaborative curriculum development projects. The latter may be particularly important in nations in which educational expertise in specific knowledge domains or instructional practices is scarce and distributed.

Distance education may also play a major role in upgrading the knowledge and skills of teacher educators both in higher education and educational agencies. Web-based resources and tutorials may assist teaching faculty and teacher educators in upgrading their knowledge and skills in areas such as the new technology tools for learning in order that they may infuse and model the use of technology in the courses they offer to future teachers.

A particular advantage of distance education is that it is makes teacher preparation and professional development programmes accessible to indigenous peoples and others located in remote, rural areas who do not have convenient access to higher education institutions and where there is often a shortage of well-prepared teachers and other educational professionals. Often, when individuals must leave their communities to attend higher education institutions in urban areas, they do not return upon completion of their education. In contrast, distance education may help develop qualified teachers and other educational professionals among members of the local community who are also best able to adapt or develop curriculum resources that meet national standards but also reflect and integrate local culture and indigenous knowledge. Such educators are best able to make the learning process more relevant to their students. By developing local educators, dis-

tance education may also play a significant role in contributing to the economic development of the community.

It is recognized that in many developing countries access to the Web in local schools is not possible. However, the Web may provide an important resource for teacher education institutions and agencies and centres that provide professional development to teachers in the country. In countries with limited access to technology infrastructure, radio, television and print-based materials are used to address teacher education needs. The China Television Teacher's College, a part of the China Central Radio and Television University, uses television-based distance education to prepare new teachers and provide a range of distance education professional development programmes to primary and secondary teachers, principals and administrators.

Brazil's national distance education system, PROFORMAÇÃO, is used to provide initial training to unqualified preschool and primary education teachers and combines self-study and bi-weekly workshops using print-based and video materials. Other countries with limited technology facilities also rely heavily on print-based materials as well as radio and other media options. India, for example, uses print-based materials, audio and video cassettes, coupled with optional face-to-face tutorials in local study centres, to provide a comprehensive child development certification programme for teachers. Mongolia uses radio and print-based materials as part of the strategy to help primary teachers transform the teaching-learning process. South Africa is using interactive radio to support teachers of English as a second language. The above examples illustrate some of the ways the technology resources available within each country may be used to provide pre-service and in-service teacher education.

Finally, distance education and the new tools for learning may serve as a catalyst for changing teaching practices, the roles of teachers and students as part of an overall strategy for systemic change of the educational system to reflect current knowledge on human learning and to help the educational system be more responsive to local and national needs as well as global trends.

Vocational and continuing education

Technical and vocational education have in recent years played important roles, not only in contributing to the improvement of productivity of a national labour market, but also in assisting individuals to improve their employment prospects in rapidly changing socio-economic conditions. In this

regard, the role of open and distance learning in the field of technical and vocational education is significant. It has two main functions:

- to respond effectively to the growing demand of working adults or any others who have difficulties in getting training in conventional education because of lack of flexibility in the timing and location of courses;

- to provide an opportunity for the empowerment of those most disadvantaged by existing provision – the unemployed, the disabled, women and ethnic minorities.

Open and distance learning in the field of technical and vocational education makes up a mixed and complex picture. It may include experimental work and hands-on training as an integral element. It has often been developed by private institutions and enterprises, and makes an important contribution to human development. It is often necessary to supplement distance learning with intensive experimental work and hands-on training through residential schools, home experiment kits, etc. Examples could also be mentioned from within the public sector. Electronically supported open and distance learning programmes using the World Wide Web are now substantially employed in technical, vocational and professional education. Many countries have developed vocational, polytechnic and other types of short-cycle colleges, sometimes spanning both secondary and post-secondary levels. In this sector there are many examples of open and distance learning programmes (the Australian TAFE colleges and the US Community Colleges being just two examples). In addition to management, business studies and technician training, one may also mention training for agriculture and for public administration and health services as important areas.

Continuing education and training is an expanding field in which open and distance learning is used to a great extent. The need for recurrent and continuous updating of knowledge and skills is recognized as a fundamental demand in society today, and open and distance learning with its decentralized and flexible delivery and its modular structure of courses and curricula has become an obvious way of meeting this need. Open and distance learning institutions offer their courses and programmes for this purpose, and they are developing particular courses for particular needs.

Co-operation and partnerships between enterprises, professional bodies and distance teaching institutions are growing, and consortia and special training institutions have been established in order to serve particular trades and professions with continuing education courses. The National Technolog-

ical University in USA offers one example, providing continuing education for engineers through satellite broadcasts from about 50 universities. The medical profession is another example of a profession which often uses distance education for continuing education purposes. Many large corporations also provide in-service training at a distance for their employees. The capacity for open and distance learning to support large-scale campaigns, e.g. in the field of HIV/AIDS education, is significant in the context of continuing education and training also.

Non-formal education

Although distance education has been used to considerable effect in the non-formal and community development sectors of education, it is probably true to say that its potential has never been fully realized.

Enthusiasm for basic adult education grew in the 1960s and 1970s just as technology began to be used more widely in education. Mass communication methods, often linked with some kind of group meetings and face-to-face support, were seen as one way of delivering a wide range of educational and skills programmes in support of agriculture, health and nutrition, political education (in the emergent democracies of the post-colonial period), and development- and employment-related projects, to large numbers of adults.

An early and influential prototype – the Canadian Farm Forums of the 1940s – suggested a way forward through the motto 'Read, listen, discuss, act'. This approach was later used in India and Ghana. Radio campaigns were another early and influential model. The idea was to deliver short, highly intensive campaigns to support major development ends. Botswana, for example, used the approach in 1976 to raise awareness on a new policy for cattle on tribally owned land, and there was another project run by the co-operative movement in Zambia in 1982.

Research suggested, however, that audiences were often unresponsive, projects often inappropriate, and the lack of resources to follow up the campaigns meant that information can not be turned into action – with the result that campaigns of this kind were not repeated. However, there is much anecdotal evidence of the effectiveness of small-scale non-formal education projects using radio – for example, to support health care in Sudan and rural women in Mongolia. Latterly radio and television dramas have been used in countries such as Gambia and Nigeria as a means of educating people about

health issues such as family planning and HIV/AIDS. Indeed, radio in particular has a powerful role to play in non-formal education.

Some of the early projects were designed to break free of those parts of the school syllabus that are irrelevant to adults, and instead offer a curriculum of more practical use to their audiences, but this thrust was not developed as much as it might have been in the face of economic findings that suggested that the case for investment in non-formal education was not as strong as that for investing in projects delivering the formal curriculum. As a result the rapid development of non-formal education projects was curbed as enthusiasm for the idea that mass communication systems should be mobilized for development, and the financial resources that followed, began to wane.

Nevertheless, the anecdotal evidence suggests that there are many successful but largely unreported and often formally unevaluated projects run by the extension services of ministries of health, agriculture, and labour, and by NGOs. One relatively well reported project is the African Institute for Economic and Social Development (INADES), which is headquartered in the Côte d'Ivoire, and operates as semi-autonomous efforts across eight francophone and two anglophone countries. It has done much to provide education aimed at farmers, agricultural extension agents, and women, using various approaches, including distance education (largely correspondence lessons and assignments). Participants are predominantly male though special efforts are made to reach out to women farmers, and indeed most of the non-literate participants are women. INADES works with governments yet remains independent of them.

Elsewhere, in Pakistan, the Allama Iqbal Open University provides non-formal education through its Functional Education Project in Rural Areas. Audiocassettes and flipcharts form a centrally produced resource for group leaders to use in discussion and study groups. Evaluation has suggested that this is a viable and effective approach – yet the total number of learners has never topped more than about 1,500 a year. Other university-based extension projects include the University of Namibia's action research pilot project on the use of affordable media for farmer education, which delivers information on best cattle husbandry practices to small-scale cattle farmers in the north of the country; and the Yashwantrao Chavan Maharashtra Open University extension, community education and non-qualification programmes in India. This delivers programmes on agriculture, marital relations, personality development, ageing, child care, nutrition, first aid, vocational skills, and entrepreneurial development, to illiterate adults, new literates, less educated adults, leprosy patients, unemployed youths, etc.

Projects are delivered through a vast range of organizational structures involving public community development services, popular movements and organizations, churches and religious organizations, charitable foundations and organizations, private institutions and government-funded schools, colleges and universities – but all in essence develop centrally produced materials that can then be used in distributed sites to deliver non-formal education locally to adults. The most common approaches involve print sometimes combined with correspondence teaching, some form of broadcasts or recorded media – often radio/audio, coupled with some form of face-to-face support – even extending as in the Gobi Desert Women's Project to home visits by tutors to learners. The learners often come from the more marginalized sectors of society, and as a result have low levels of previous formal education or none at all.

In this connection it is worth noting that programmes aimed at illiterates and new literates have to be designed carefully to ensure that such learners can benefit from the programme. This requires a cadre of support workers. Generally learners enrol to achieve a particular learning objective, and wish to progress quickly. These characteristics determine the curricula, which are usually focused on specific issues to do with social and community education, health and family, and economic and earnings-related education, including agriculture. Moreover, projects can support equity goals – though this can be undermined by policies that require learners to pay for materials and services.

The evidence suggests that projects can be delivered cost-efficiently, and that they can be effective, particularly where 'bottom up community dialogue' leads to the successful integration of such programmes into the wider development needs of a society.

Higher education

There are more distance learning courses offered at the tertiary level than at any other. This has been the case since the invention of the distance education method near the end of the nineteenth century when the use of new technology (i.e. national rail systems that supported national postal systems) made it possible to deliver higher education beyond the boundaries of the campus, especially in such "new" and large nations as the United States, Canada, Australia, South Africa, and Russia. In turn these countries led the way in the use of radio for university level teaching, then television, and today the Internet. In these nations the preferred organizational form was, and remains, the dual mode university.

The development of the Open University in the United Kingdom provided the model for the integrated multimedia systems approach to the delivery of higher education by a single mode university, a model that has been emulated in more than a score of other countries. Open universities have their own degrees and curricula, though these are usually similar to the curricula and degrees of a conventional university. The similarity of curricula and degree structures may be seen as a demonstration of equal quality, and makes the recognition of distance education at the tertiary level easier. Many of the open universities have developed into 'mega-universities' with more than 100,000 students.

The Internet has attracted the attention of university academics to the idea of distance teaching in a way that no previous technology managed to do. Together with the pressure from new competitors for student enrollment, this enthusiasm for technology explains the growing number of traditional universities that are converting to dual mode status. Such universities usually teach the same curricula for distance students as for their residential students and subject the students (but not always) to the same entrance requirements and examinations.

The success and expansion of single mode open universities on the one hand, and the transformation of traditional universities to dual mode universities on the other, are important contributions to the diversification and development of higher education systems.

The role of open and distance learning in educational innovation

Open and distance learning has a major impact on thinking and practice throughout the whole educational system, regarding such critical matters as how students learn, how they can best be taught, and how educational resources might more efficiently be organized to deliver the instruction that is needed. Open and distance learning is closely linked to innovation in information and communication technologies, to the identification of new learning needs and new ideas about how information may be accessed and applied in the information society. In particular open and distance learning has the potential to enhance a more student-centred and consumer-oriented approach to education, leading in turn to more extensive contact between educational institutions on the one hand and community-based organizations, business and industry on the other.

Innovation in how resources are organized is essential, and open and distance learning has demonstrated how the labour (i.e. teacher) to capital (i.e. technology) ratio can be improved to lead to greater efficiency. Unlike open and distance learning, conventional schools and universities are still organized on the assumption that learning is dependent on a single informed person imparting information by word of mouth to a small group of listeners in a classroom. A multitude of solitary individuals are responsible for the organization and control of information, are designers of their courses, manage the instructional process, are testers, motivators, counsellors and evaluators for a handful of learners. Teaching, in other words, remains organized as a craft not a system. With open and distance learning there is greater specialization of labour and investment in capital to replace certain human activities. It is this different form of structure that makes the technology effective and leads to lowering costs while increasing access.

To bring about this increased efficiency, new national policies and reforms in regulatory frameworks may be needed. Many countries have already engaged in reform of their telecommunications policies, particularly regarding Internet backbone development, and relaxation of the monopolies of publicly owned telecommunications companies. New international partnerships are emerging, not only of telecommunications providers, but also of universities and training institutions, equipment providers, content producers and publishers, software developers, assessment services, credit banks, and library services.

However, the organizational frameworks in which technology is used in education have not been treated to the same radical policy reviews as has the telecommunications infrastructure itself. Other work has to be done to establish policies concerning international trade in educational services and such related matters as institutional accreditation and assessment, certification of learning, intellectual property rights, and incentive structures (tax breaks, subsidies, promotion of public/private sector collaboration, etc.).

While information technology has potential to deliver high quality content more cost-effectively it cannot, nor should it be expected to replace the appropriate use and availability of human helpers in the learning process. As teachers become less information communicators and more knowledge processers, experts in learning rather than content, so technology can help them do their jobs more efficiently provided they are organized into better integrated systems.

Because the economies of large-scale production enable distance education systems to invest larger sums in the design and development of learning materials than smaller, conventional teaching institutions, the quality of such materials is usually higher, and this in turn makes for a raising of standards throughout the educational system. This may have a particularly important influence when teachers and professors of conventional institutions become involved in the development or use of these materials, for instance on contract with a distance teaching institution.

The introduction of a distance programme at a conventional university may also lead to curriculum reform and new learning materials for resident students in the same subjects. In some projects distance learning is used systematically to support conventional systems at basic and secondary levels (UNESCO 2001a). The potential of distance learning to increase innovation and creativity in conventional education depends on the degree of interaction between distance learning systems and conventional systems. Ideally, there ought to be formal links between such institutions and the conventional system, in order that they may serve as national resource centres.

Organizational innovation does not mean setting up new institutions. A new organizational model is that of a network of institutions and individuals that together provide the kind of services delivered by single mode institutions, but on a more flexible and open basis through a process of commissioning. A small management team is one of two essential requirements for a network; and the other is a significant funding resource that allows the management team to obtain the quality resources needed from wherever they are located. What this approach promises is a very flexible, versatile, responsive system that produces high quality without commitment to ongoing institutional costs, and delivers efficiently by employing the comparative advantage of each institution in a country or region.

A second innovative model is the Independent Study model, which gives learners control of their own learning programmes through use of new technology. This calls for a different type of organization than was useful when information was stored centrally in a location to which students could travel, or in a distance teaching centre from which they it could be "distributed". Such an organization could make instructors anywhere available to students anywhere, and could make courses prepared by any institution available to students anywhere.

A student's teachers need no longer be limited to those who assemble in any one place, any more than a teacher's students would have to assemble in one place. Students could learn wherever they are located from instructional resources wherever they are located. No student would need to take instruction from exactly the same teacher as any other; students could have access to teachers from any state or country at any time and in any combination; they could have access to information resources from any state or country at any time and in any combination. Students also could have universal access to advice and guidance.

IV.

PRESENT TRENDS IN OPEN AND DISTANCE LEARNING

Global trends

Most of the discernible present trends in open and distance learning are linked to the general background described in Chapter II of this paper. Considering the challenges of education and development, both in developing and developed countries, it is not surprising that open and distance learning is often seen as an important new approach and strategy which could make a significant contribution towards resolving problems of access, quality and equity. When conventional systems and approaches cannot meet the needs, it is necessary to look for new strategies. Confidence seems to be growing that open and distance learning is such a strategy.

Examples of this growing confidence can be found in many countries. For example, it has been recommended that distance education efforts in the nine high-population countries (Bangladesh, Brazil, China, Egypt, India, Indonesia, Mexico, Nigeria and Pakistan, referred to as the E-9 countries), focus on "expanding work for school equivalence, for teacher education, and for non-formal education, especially in relation to health…. Strategies for all these areas have been developed that could usefully be applied in most if not all of the E-9 countries. Low-tech and broadcasting strategies figure strongly but there are also a growing range of projects which make innovative use of the new information technologies" (UNESCO, 2001a, p.61).

The European Union has in recent years consistently increased distance education components of its educational programmes, and has included open and distance learning explicitly in its Maastricht Treaty. In Central and Eastern Europe, distance education is seen as an important means of supporting the transformation process towards democratic and market-oriented soci-

eties. Similar initiatives and statements are forthcoming from a wide range of individual countries as well as from regional and international organizations and agencies.

This does not mean that distance teaching institutions escape all financial constraints and cutbacks. In developing countries the general lack of resources in the economy often prevents distance education programmes from being sustained, developed and extended. In addition to the general objective of increased productivity, and usually reluctant to take money away from established educational interests, governments want to have an increasing proportion of expenditure for open and distance learning to be paid by the students through fees.

At the same time, in increasingly market-oriented educational systems, conventional institutions are to a greater extent using some form of open and distance learning as a means of extending their markets. Strategic alliances are being formed between educational and private sector institutions of various kinds. This means that the traditional distinctions between various types of providers (distance – conventional, public – private) are being blurred, particularly within vocational and continuing education and training.

Technological development allows for new paradigms of access and new delivery systems, linked to new types of demand. Continuous miniaturization of equipment, reduced costs, increased user flexibility, portability and integration offer a whole range of new opportunities. These changes can either lead to more effective centralized systems of development, and the distribution of educational services and software. They can also support a more open "networked society" with greater variation and more equitable access to educational resources through a network infrastructure.

The direction of this development will be strongly influenced by the willingness of governments to provide leadership and co-ordination concerning network development and access (network here referring not only to technological networks, but networks of educational providers whose services are delivered via the technology). New technology also means that distance learners are not as highly reliant on the quality of pre-produced packages of course materials or programmes as they were. Technology permits more learner-instructor and learner-learner communication and dialogue and thus a high degree of individualization of learning and learner construction of knowledge.

Nevertheless the quality of the learning programme will depend on well designed instructional materials as well as the ability of the instructor to facil-

itate such knowledge construction. This puts a high premium on teachers being adequately grounded and trained in distance education methods.

Finally, the trend towards internationalization is clear. In addition to the political and economic driving forces, the internationalization of distance education is enhanced by its links to information and communication technologies (ICTs). For instance, educational software is often international, and satellites and electronic networks allow transmission and communication across national borders. The "global classroom" is no longer a concept only of our imagination or of the future. There are of course limitations of access for a range of reasons, but international projects and programmes are already quite common.

Regional trends

Africa

Sub-Saharan Africa is one of the regions where the "knowledge gap" between North and South takes on its most dramatic character. Here, open and distance learning has been mainly used to widen access to basic education and to maintain and improve quality in the conventional education system, particularly through in-service training of teachers. For example, UNESCO was involved in the in-service training of all of Botswana's unqualified teachers in the late 1960s and 1970s. Open and distance learning has also been used in non-formal education and community development by national and international organizations. One early example is the pan-African INADES-Formation (African Institute for Economic and Social Development), established in 1962 in the Côte d'Ivoire, with national offices in 10 countries (UNESCO, 1991).

Correspondence education has been the main medium of instruction in the region, with radio also widely used. Radio transmitters reach over 60 percent of the population whereas television coverage is usually confined to major towns. Interactive technologies have been of limited value in a region in which the availability of telephone lines is about five times lower than the average low-income country and where the telephones are concentrated in urban, relatively privileged, areas. Recent estimates for the number of personal computers in Africa put the average at about 3 per 1000 people in 1996. Some of the wealthier countries such as Botswana, Mauritius and South Africa have higher levels of penetration, at least 5 per 1000. Internet access has grown rapidly, and while only 11 countries had local access in 1996, by April 1999, only

the Republic of Congo (Brazzaville), Eritrea and Somalia were still without local Internet service (Economic Commission for Africa, 2002).

In the past it seems that open and distance learning has had a relatively low impact on education in the region. The main reasons concern not only lack of infrastructure, but also include underfunding, lack of training of those involved, as well as the fragmented institutional base which results in both duplication of programmes and insufficient concentration of the limited resources on any one.

The situation seems to have improved over the past five years, with evidence of growing commitment by African governments to the development of ICTs along with interest in the application of those technologies for distance education.

Notable events in this regard were the 1996 Information Society and Development Conference, held in South Africa, and the Economic Commission for Africa's African Information Society Initiative (AISI). Other important initiatives in recent years include a task force on an African Distance Learning Programme (ADLP) convened for the Economic Commission for Africa's First African Development Forum; a UNESCO International Institute for Capacity Building in Africa (IICBA), inaugurated in Addis Ababa, Ethiopia in May 1999, with distance education as one of its priority areas; the UNESCO International Institute for Educational Planning's (IIEP's) transformation of its existing training courses into distance learning format – including a course on "The Planning and Management of Distance Education"; and the International Institute for Communication and Development's facilitation of "ICT Roundtables" in a number of countries, including Burkina Faso, Ghana, Tanzania and Zambia.

Thus there are strong indicators that open and distance learning is becoming more central to the education policy of many countries. Among examples from particular countries can be cited South Africa's Technology Enhanced Learning Programme and its Telematics for African Development Consortium. Also in South Africa, projects such as the Shoma teacher development programme (using satellite TV and Internet technology to support in-service training for underqualified teachers) demonstrate the potential of partnerships between private companies and national and provincial Departments of Education.

A remarkable phenomenon in South Africa in the early years of the new decade is the shift on the part of learners from single mode to dual mode

institutions. According to South Africa's Council on Higher Education, enrollment in the long-established single mode institutions (University of South Africa and Technikon SA) dropped by 41,000 students, or 21 percent, from 1995 to 1999 as a result of the growth of new dual mode institutions. These drew 31,000 new distance students, an increase of 111 percent, according to the Council. The six campuses with the largest distance education programmes have about 65,000 students on open and distance learning courses. Most of those students are school teachers trying to upgrade their qualifications in pursuit of promotion and salary increases.

At the University of Pretoria there are now 30,000 distance learners, with about 25,000 studying for a further diploma in education management, taught through open and distance learning. About 3,500 postgraduate distance learners receive study material electronically, via e-mail, World Wide Web sites, and television. With 27,000 full-time residential students, the University of Pretoria, not long ago a fully residential university, now has fewer residential than distance students.

A similar pattern has emerged at the University of Port Elizabeth where some 13,800 students have enrolled in distance programmes offering undergraduate diplomas, further diplomas, and master's degrees, more than double the 6,000 students registered for conventional classes. The majority of distance students are unqualified or underqualified teachers upgrading their training.

Rand Afrikaans University has more than 7,000 students registered for distance courses and about 13,000 students in traditional instruction. 82 per cent of the distance students are registered for a further diploma in education, and their average age is 36.

Looking beyond the Republic of South Africa, still the leader in African distance education, the following illustrative cases can also be cited.

In Botswana, the major distance education provider is the Botswana College of Distance and Open Learning (BOCODOL). BOCODOL currently offers distance education courses for the Junior Certificate which is the end of basic education, and which constitutes the first ten years of formal schooling. BOCODOL also offers distance education courses for the General Certificate in Secondary Education (GCSE). BOCODOL is being given a brief to continue offering school equivalence programmes and additional vocational and non-formal courses for both adults and youth. It uses printed materials, which are distributed in the post and regional offices as study centres for stu-

dents to meet tutors. Some counselling and advice services are available and a weekly 30-minute slot on Radio Botswana is dedicated to supporting its learners.

Malawi has two dedicated distance education providers, one a private school and the other a department of the Ministry of Education, Sports and Culture. The University of Malawi has been exploring possibilities for offering distance education programmes, and the Domasi College of Education has taken the initiative to adopt distance learning as an approach to the training of teachers. The College has collaborated with the Commonwealth of Learning and is developing modules for this purpose. MIITEP, an in-service programme run by the Teacher Development Unit to train untrained and underqualified teachers, employs open and distance learning methods for delivery of the programme. In addition, the newly established Mzuzu University is also planning to offer teacher education courses through distance education. International providers, such as the Rapid Results College, also operate in Malawi.

Distance education in Tanzania is organized through the Distance Education Association of Tanzania (DEATA), a national association established in December 1992. Its membership is currently made up of the Ministry of Education and Culture, the Open University of Tanzania, the University of Dar es Salaam, the Vocational Education and Training Authority, the Muhimbili University College for Health Sciences, the Southern African Extension Unit, the Institute of Adult Education, and the Cooperative College Moshi. These organizations enrol over 18,000 students between them. In addition to more traditionally expected roles for open and distance learning (such as higher education or providing schooling to adults), there are various innovative applications of distance education. These include educating Burundian refugees, training local counsellors, and offering civic education.

In Zimbabwe, the Centre for Distance Education was established by the University of Zimbabwe in 1993 and in 1996 became the University College of Distance Education. The college received its university charter in 1999, and was transformed into a fully-fledged university known as the Zimbabwe Open University. Among other things, the university's mission is to adapt, develop, and implement new courses and programmes to meet the needs of a changing knowledge base, employment sector, and socio-economic, political, and international environment. The University offers programmes leading to Bachelors degrees in Education, BA in English and Communication Studies, BSc in Agriculture and an Undergraduate Diploma in Classroom Text and Discourse (DCTD).

In Africa, there is much to be gained from enhanced regional collaboration – on policy issues, development of delivery systems and sharing of materials. There are now many initiatives to establish networking through national and regional associations in order to strengthen and improve capacities for open and distance learning in the region. Among projects that exemplify this collaborative approach are:

- Training of Upper Primary and Junior Secondary Science, Technology and Mathematics Teachers in Africa by Distance. This programme is supported by the Commonwealth of Learning and countries included are Botswana, Malawi, Mozambique, Namibia, South Africa, Tanzania, Zambia and Zimbabwe;

- Training for primary school principals, using print materials and Internet, coordinated by CIFFAD, the International Francophone Consortium of Distance and Open Learning Institutions. CIFFAD also has a project in Senegal, Guinea and the Côte d'Ivoire to improve the teaching of French at the secondary level.

Some lessons acquired from the studies of open and distance learning in the African context have been summarized by the South African Institute for Distance Education (1999).

Arab States

Open and distance education in the Arab states is generally more recent and less extensive than in some other regions of the world. There is, however, growing interest in the potential of distance education to solve some of the educational challenges facing the region. Distance education has great potential to meet mass demand for education, but although Egypt reports using communication technologies in school and both radio and video-conferencing for teacher education, the level of usage of distance education is lower than in other E-9 countries. In Algeria, the Centre National d'Enseignement Generalisé offers general and technical education to Baccalaureate level, education in preparation for certificates and diplomas of different levels, and specialist professional training. Courses are offered through print, newspapers, audio- and video-cassettes, radio, telephone and group study. Some 100,000 students are enrolled.

The Sudan Open Learning Organisation (SOLO) has operated since 1984 to provide a number of educational programmes including basic education to

adult refugees in Ethiopia, Somalia and Sudan. At the basic level it offers a literacy programme, a primary health care programme, income generating and small business skills for women, and a teacher assistance course aimed at training basic level teachers employed within the refugee schools.

At the higher education level, the Palestinian Al-Quds Open University began teaching in 1991, using an integrated multimedia approach. Set up to meet the needs of Palestinian students in Gaza and the West Bank, the University initially operating out of Amman, moved its headquarters to Jerusalem in 1993. More recently, the Arab Open University project has been formally established with its headquarters in Kuwait. Plans are afoot to launch programmes in a number of Arab countries (Bahrain, Egypt, Jordan, Kuwait, Lebanon and Saudi Arabia), with others to follow. Meanwhile, the level of frustrated demand for entry to higher education has attracted foreign providers to the region: a recent study indicated that in Bahrain, for example, no fewer than 36 foreign providers were offering distance education programmes.

Asia and the Pacific

Australia

Australia's open and distance learning dates back to the first decade of the nineteenth century, giving the system long experience from which significant lessons have been drawn by later open and distance learning initiatives (e.g., the UK Open University). Dual mode institutions characterize open and distance learning in Australia, providing similar curriculum for on- and off-campus students. This promotes student choice and flexibility combining courses in a variety of modes in accordance with student needs. In 2000, 94,000 students (14% of all university students in Australia) were enrolled in open and distance learning programmes, while a significant number simultaneously enrolled both on- and off-campus.

Australia's open and distance learning provision aims to improve access and outcomes for disadvantaged and disenfranchised populations, including the aboriginal peoples and Torres Strait Islanders. However, current threats from competitive global markets, especially with growing virtual/online learning, are demanding the adoption of more flexible and commercial approaches.

Australia's open and distance learning providers are well-equipped with high level technologies. Asynchronous rather than synchronous forms of learning have been adopted in order to promote flexibility for the learner.

Bangladesh
In 1957 the Education Reform Commission recommended the establishment of a correspondence school. This led to the establishment of the East Pakistan Audiovisual Education Center (AVEC) in 1962 and the School Broadcasting Programme (SBP) in 1980. AVEC and SBP merged into the National Institute of Educational Media and Technology (NIEMT) that later became the Bangladesh Institute of Distance Education (BIDE). Successes with BIDE provided the impetus for the establishment of the Bangladesh Open University (BOU). BOU has more than 200,000 students enrolled across the country, and offers diploma and degree level certificates and non-formal and informal education programmes.

BOU's curriculum covers secondary and higher secondary certificate, agriculture and livestock science, teacher training, humanities, languages, business management, science and technology, non-formal and informal programmes. Schools in BOU have full responsibility to initiate, develop, design, and evaluate academic programmes.

With the goal to use limited computer- and Internet-based communication in the near future, BOU's core instructional delivery media remain printed materials, radio and television broadcast, occasional face-to-face, and limited teleconferencing.

China
Open and distance learning in China has significantly contributed to broadening access and opportunities especially to higher education and to socio-economic development more generally. China's open and distance learning focuses on secondary and tertiary education, although programmes for in-service adult education and training are also offered. Generally the media include correspondence, television and radio broadcasts, and State Examination Self-Study (SESS).

With the establishment of the Radio and TV University system (RTVU) in 1960, China became the first country to use radio and television to provide single mode distance higher education with unified planning. Today its single mode distance RTVUs makes up one of the 11 world mega-universities. The structure of the RTVUs corresponds to the five level government administrative structure with its headquarters in Beijing, provincial offices, prefecture level branch schools, county level work stations and grass roots classes. The largest portion of funding comes from the government (51.6%), followed by work units (40%), students and their families (5.1%) and others (3.35%).

Hong Kong

Being a commercial centre and travel hub Hong Kong is viewed as a cultural bridge between east and west. It has eight traditional universities, which have not been sufficient to provide an adequate workforce to drive its economy. The country has only one distance education university, the Open University of Hong Kong (OUHK), but the provision of open and distance learning also comes from other countries. Thus there are two categories of open and distance learning programmes, local and off-shore. The off-shore programmes are provided from different countries including: Britain (288 courses or 57% of the programmes), Australia (157 courses or 31%), US (7%), and mainland China (4%). Canada, Macau and Ireland provide the rest. Partnerships with local institutions have been sought, although local partners contribute little to the content of the programmes. Government and charitable organizations provide some grants to open and distance learning programmes but open and distance learning financing is generated mainly through student fees.

India

Open and distance learning in India dates back to the 1960s. By the 1980s there were 34 universities offering correspondence education through departments designed for that purpose. The first single mode Open University was established in Andhra Pradesh in 1982, followed by the Indira Gandhi National Open University (IGNOU), and subsequently in Bihar, Rajasthan, and Maharashtra, Madhya Pradesh, Gujarat, Karnataka, West Bengal, and Uttar Pradesh (established throughout the 1980s and 1990s). The establishment of these single mode distance education universities was stimulated by the government's intention to democratize education and make it lifelong. The initiative did not discourage the expansion at the same time of correspondence programmes in dual mode universities. The year 1995 witnessed the enrollment of 200,000 students in open and distance learning, accounting for 3% of total higher education enrollment.

Most open and distance learning universities in India follow the model of the UK Open University. They co-ordinate communication and collaboration through the Distance Education Council (DEC), founded in 1992. DEC is responsible for the promotion, co-ordination, and the maintenance of quality and standards.

A range of factors including emerging ICTs, liberalization, privatization and globalization have amplified the demand for open and distance learning. While the government is responsible for more than 90% of open and distance learning funding, plans are underway to involve the private sector more closely, especially through permitting the increase of fees.

Indonesia
Open and distance learning in Indonesia had its beginnings in 1955 with the establishment of correspondence diploma programmes. In 1981 open and distance learning programmes became widespread with the introduction of a crash teacher-training programme. The University of Terbuka (UT), the Indonesian Open Learning University, was established in 1984 and remains the only single mode distance education university in the country. UT aims at providing flexible inexpensive education, reaching people unable to attend face-to-face education, increasing access to higher education, providing training in areas demanded by economic and cultural development, and upgrading the qualifications of primary and secondary school teachers.

The credibility of distance education in Indonesia is reflected in the increasing numbers of enrollments (350,000 in 700 courses) at UT, the establishment of distance education programmes in other institutions, and the establishment of the Indonesian Distance Learning Network (IDLN) by 13 institutions to share training, research and information.

With its headquarters in Jakarta, supported by 13 regional offices, UT uses both centralized and decentralized management approaches and collaborates with external institutions such as the national postal services, Bank Rakyat Indonesia, and provincial governments. Print materials developed by course teams remain the main medium of instruction while conventional examinations, self-tests, course practicums and micro-teaching make up the basis of student assessment.

Japan
Japan has recently witnessed the rapid increase of open and distance learning institutions and programmes. Until 1985 there were only a few private correspondence colleges and the University of the Air (UA). By 2000 there were 19 four-year open and distance learning private universities and 10 junior colleges with an enrollment of over 254,000 students. Four of the open and distance learning universities, including UA, are planning to initiate postgraduate programmes soon.

Enrollment to open and distance learning programmes in universities is determined by entry examination. Despite the fact that 99% of higher institutions are "wired", only 10% fully utilize ICTs for delivery of open and distance learning (with the use of correspondence, audio and video still dominant). Barriers to the use of ICTs include high installation and maintenance costs, the lack of organizational support, and experience and human resource issues.

Malaysia

Universiti Sain Malaysia (USM) began open and distance learning programmes in 1971. However, the challenges of the 1990s, and in particular the need to cope with economic and technological change, led Malaysia to move substantially into open and distance learning. The country's economic downturn in the 1990s made it more difficult for many Malaysians to afford education, especially in foreign institutions where many had previously enrolled. Open and distance learning, which is regarded as more flexible and cost-effective, has increasingly been acknowledged as a desirable alternative. Open and distance learning has not only been valuable for the local population but also for attracting foreign students whose fees boost the economy. Open and distance learning also provides the basis of hope that the country can achieve its goal of democratizing higher education, making it accessible to the majority of the people.

Currently all except two of the eleven Malaysian universities offer open and distance learning programmes. The government as well as enhancing institutional autonomy encourages the universities to adapt corporate-style management practices, deeming both important for dynamic operation and quality. The open and distance learning delivery mode in Malaysia remains mostly printed lectures supplemented by face-to-face, audio, and videocassettes. Institutions with open and distance learning programmes enroll students from all the 14 states of Malaysia and a good number from other countries including: Indonesia, Thailand, Singapore, China, and Korea. Funding for open and distance learning comes from the universities where they are based, although open and distance learning programmes are moving towards self-financing status.

Philippines

Open and distance learning in the Philippines was initiated by the US-based International Correspondence Schools (ICS) programmes in 1940. Due to the existence of many traditional tertiary institutions and the view that open and distance learning was inferior, its popularity remained low until the 1990s when the growing use of ICTs improved the image and prospects of open and distance learning worldwide. By 1995 several institutions were offering open and distance learning programmes, including the government-owned consortium (Continuing Science Education for Teachers), the Philippine Women's University (PWU), University of Mindanao (UM), University of the Philippines Los Baños (UPLB), the Polytechnic University of the Philippines (PUP), and the Visayas State College of Agriculture (ViSCA). PUP and ViSCA were transformed into fully-fledged open universities in 1990 and 1997 respectively.

Current prospects for open and distance learning, including the possibility of government funding, have attracted more colleges and universities to initiate open and distance learning programmes. However, the lack of open and distance learning experience has led to haphazardly managed and delivered open and distance learning programmes. This has led to the promulgation of new policies and guidelines in order to eliminate abuse of the system and to enhance quality in all open and distance learning institutions.

More people and institutions are becoming connected to the Internet, raising the prospects for Internet-based education. Currently, however, printed material, radio, television and occasional face-to-face remain dominant. Open and distance learning in the Philippines does not face a great challenge from foreign delivered online education, whose costs are unaffordable for most people.

Thailand

Open and distance learning began in Thailand in 1933 with the establishment of the University of Moral and Political Science. By the year 2000 more open and distance learning institutions have emerged including Ramkhamhaeng University (RU), Sukhothai Thammathirat Open University (STOU), the Department of Non-Formal Education (DNFE), Klai Kangwon Royal Satellite Project (KKRSP), the Borderless Education Project (BEP) and Suranaree University of Technology (SUT). In collaboration with international agencies all open and distance learning programmes are provided nation-wide, are self-funded (except SUT) and, depending on the institution and programme pursued, one may study at home, on campus or a mixture of the two.

Given Thailand's comprehensive communications infrastructure, its open and distance learning utilizes current technologies for instructional delivery. Most open and distance learning institutions have a multimedia instructional delivery system and the existence of Internet systems has made it possible for institutions like SUT to use on-screen interactive and Web-based Internet media as core instructional delivery systems supplemented by print, audio-visual media and telecommunications. Most open and distance learning programmes are in the area of social sciences, except for those offered at STOU and the planned technology-based programmes offered at BEP beginning in 2002.

Recognizing open and distance learning's potential for cost-effectiveness, mass enrollment, and the provision of education and training without demanding the movement of employees, Thailand currently considers open and distance learning as a most economical and effective way to educate and

train. Priority is currently given to open and distance learning systems design, the performance of instructors and learners, effective assessment procedures, and ICTs.

South Pacific

The South Pacific region consists of island nations west of Hawaii, east of the Philippines and north of New Zealand. Open and distance learning in these island nations is offered at several institutions including the University of the South Pacific (USP), the University of Papua New Guinea (UPNG), the University of Technology in Papua New Guinea, Fiji School of Medicine, Fiji School of Nursing, the Solomon Islands College of Higher Education, Pacific Adventist College in Papua New Guinea, the Pacific Theological College of Fiji, the Fiji College of Advanced Education and Tonga Teachers College and the Community Training Center in Tonga.

Established in 1968 as a regional university the University of the South Pacific (USP) developed into a dual mode institution in 1970, with a main campus in Fiji and smaller campuses at Vanuatu and Samoa. The university maintains a centre in all 12 member countries. Currently about 5,000 students in the region are enrolled in open and distance learning provision, with the target to increase that enrollment by 10% per year. Courses offered are equivalent to those on campus and follow the same semester system. English remains the language of instruction. Constrained by communication and geographical barriers, open and distance learning in the region has relied on correspondence programmes and occasional face-to-face tutorials.

Europe

In Europe open and distance learning is a well-established form of education, although the status and tradition varies considerably within the region. In Western Europe there is a strong private sector serving the adult population, mainly through general education programmes at the secondary level, through various forms of vocational and professional training and through non-formal education. A number of countries have implemented particular legislative measures to ensure quality control of private provision. Some countries have also established major government-funded institutions (France, Spain, and Sweden). Some of these operate mainly at the secondary level, others also have tertiary level programmes.

The UK Open University has set the standards for a particular type of university institution, the open universities. Flagship institutions have been established in other European countries including most notably Spain with the Universidad Nacional de Educación a Distancia (UNED) and the Universitat Oberta de Catalunya (UoC), Germany with the Fernuniversität, as well as the Open Universiteit of the Netherlands and the Universidade Aberta of Portugal. In other countries the dual mode type of universities represent the dominant model, and in recent years various consortia models have been introduced, including virtual and distributed universities. European distance education is currently at a stage of major strategic development, where national provision is being extended across borders.

In Central and Eastern Europe and the former USSR the political and economic transformations have had important implications for education, and have already led to fundamental reforms and restructuring of national education systems. In most of the countries, distance education based on correspondence studies combined with face-to-face 'consultations' was developed and served large populations. However, student numbers decreased very much after the political transformation, partly due to lack of support from employers. The model is now often met with some reserve regarding both status and quality. Open and distance learning is still a priority for most of the governments in this sub-region, but it is in need of fundamental reform and upgrading, as is the education system as a whole. Undoubtedly, distance education and training has an important role to play in the modernization and expansion of access to education in Central and Eastern Europe and the former USSR. The development of new structures will need support in forms of funding and regional collaboration in order to be effective, such as the PHARE and TACIT Programmes of the European Commission.

Cultural diversity, the range of languages in use, and differences in educational tradition have made educational provision a matter for the individual country, and there are still few examples in Europe of successful international provision of distance education. However, efforts towards economic and political integration are changing this picture. Distance Teaching Universities, above all the UK Open University, are now enrolling considerable numbers of students, particularly within business education, from all over Europe including the former USSR.

The European Union has for many years been promoting distance education, particularly with a European dimension and in co-operation between institutions in the member states. Open and distance learning features strongly in policy documents from the Commission of the European Com-

munities, and was mentioned particularly in the 1992 Maastricht Treaty. Support for distance education is also given within the framework of programmes of economic assistance to Central and Eastern Europe and the former USSR. This continuous interest of the European Union has probably influenced national governments in their revision of policy concerning open and distance learning. Several regional networks have been formed since the second half of the 1980s, among them the European Distance Education Network (EDEN), and the European Association of Distance Teaching Universities (EADTU). They are active in promoting and implementing collaborative projects in various sectors and at different levels.

The role of users in the *de facto* acceptance of open and distance learning should not be underestimated: the examples of many British professional bodies and of the German car industry provide evidence of its importance. The trend that has definitively changed the level of legitimization and respectability of open and distance learning in the last five years has been the integration of open and distance learning segments and modules derived from open and distance learning into conventional education and training, and into work-based learning. This evolution is quite different in nature because it does not only concern specialized open and distance learning providers or specialized consortia (although composed for the most part of conventional educational institutions), but is bringing open and distance learning into the core business of education and training bodies. It involves cohorts of hitherto passive or hostile teachers and trainers to open and distance learning, and is bringing the experience of open and distance learning to normal and privileged users of full time education and training.

Substantial progress in the quality of supply of multimedia products and services for education and training has taken place over the recent period. The explosion of Internet use and the significant growth of the CD-ROM market represent the two basic conditions for this development on the technology infrastructure side. The quality of multimedia products has improved substantially, moving from an unsatisfactory level which justified negative attitudes developed in the past by users and intermediaries (teachers, trainers, managers etc.). New forms of user-based review are emerging in some countries.

High growth has taken place in the diffusion of ICTs in all European countries, and the trend is expected to continue vigorously, especially in those countries that are less advanced. Education and training is responsible for about one third of multimedia development. A sort of virtuous circle is created, in which users familiarize themselves with multimedia tools in the context of entertainment activities, and then become able and willing to use mul-

timedia products and services either for education or for training purposes. An aspect which should not be underestimated is the fact that while the diffusion of ICTs is involving a growing proportion of the European population, it is not involving all of it.

Public authorities in the main European countries have understood the significance of educational multimedia and the number of initiatives at local, national and European levels has multiplied. They are taking shape through the setting up of financial support funds, and incentives to develop infrastructures and programmes, and through lowering the costs of equipment for schools. A potentially significant new fact is the emergence of multi-country projects directly supported by national Ministries of Education, which have among their objectives to involve private partnerships in a systematic way.

Diversity and fragmentation in Europe goes beyond the structure and traditions of the education system. Severe obstacles for development include lack of standardization, varying and insufficient copyright legislation and weaknesses in the European software industry. Proper regulatory frameworks, tariff structures and the seamless interconnection of networks, as well as the development of services and applications, are crucial for further utilization of new technologies. The European Union has carried out actions in this area, including open and distance learning, based on recommendations from a group chaired by Commissioner Martin Bangemann (Bangemann, 1994; Commission of the European Communities, 1991a; Commission of the European Communities, 1991b). This has been extended most recently with the eLearning Action Plan (Commission of the European Communities, 2001), and the extension of opportunities to develop open and distance learning activities for Central and Eastern European countries using the European Commission Framework Programmes.

Some of the emerging issues in European distance education may be summarized as follows:

- The problem of matching open and distance learning provision to the needs of human resource development at national and sub-regional levels, and of integrating future development with human resource and education policies and strategies;

- The challenge of mobilizing conventional institutions of education in the implementation of open and distance learning strategies, and at the same time capitalizing on the experience and resources of the many specialized distance teaching institutions;

- The need for innovation by both conventional and distance teaching institutions concerning the effective use of new information and communication technologies for education and training purposes, based on sound educational strategies and research and on the accessibility of the necessary ICT infrastructure and connectivity at affordable cost;

- The continuing importance of the recognition of awards deriving from study using open and distance learning methods;

- The significance of competition in the education and training field from providers from outside the European region;

- The importance of developing quality standards for e-learning systems in both the private and public sectors;

- The need for appropriate balance and synergy between national and European development concerning policies, infrastructure, quality standards and equivalence, joint development projects and delivery and support systems;

- The challenge of assisting the development of open and distance learning programmes and infrastructure in sub-regions where it is not sufficiently developed.

Latin America and the Caribbean

There is a rich and varied tradition of distance education in Latin America. Early provision of distance education in Latin America dates from 1946 and the establishment of Radio Sutatenza by Acción Communitaria Popular. This programme, which presaged the development of the Latin American radiophonic school model, delivered correspondence and radio-based education to adults. Radio schools, generally supported by government and the Roman Catholic Church, were set up in almost all the countries of the region, but notably in Argentina, Brazil, Colombia, Costa Rica, Guatemala and Mexico. They played an important role in rural community education and development, and in the provision of school-equivalency programmes.

One particularly successful project was Acción Cultural Popular (ACPO), which operated from 1974 to 1998, and which used educational radio supported by books, pamphlets and charts to provide Colombian peasants and their children with basic literacy and numeracy skills, as well as community

development, health education, child care and agricultural skills. It provided cost-efficient basic adult education and primary school equivalency programmes. At its height it served some 150,000 students in 22,000 radio schools. Monitors led the groups and guided discussion. ACPO died after 40 years when church and government support was withdrawn. However, other radio schools continue to carry out valuable work.

In Bolivia Radio San Gabriel offers a range of basic education programmes to adult Aymarans, with a view to helping these people integrate themselves more fully into Bolivian life. In Brazil, the Centro de Ensino Tecnológico de Brasilia offers basic education. The Centros APEC de Enseñanza a Distancia in the Dominican Republic, with some 22,000 students each year, offer upper primary and lower secondary level courses, as well as vocational and skills courses in such topics as Small Business Management and Home Electrical Installation. Project ACESSO in Brazil is a comparatively rare example of a vocationally-oriented project that offers basic education components to its target group – the workers of PETROBRAS, the Brazilian state-owned oil company. In Chile the Instituto Nacional de Capacitación Profesional established a distance education programme in 1975 to offer further education and vocational courses, basic occupational training, and technological training at a distance.

The second phase of Latin American distance education was dominated by educational television, designed to deliver mass education. In-school ETV systems developed in the 1960s and were applied in Brazil, Colombia, El Salvador, and Mexico. They were invariably aimed at children. In some cases, as in El Salvador and Mexico, they demonstrated the ability to improve the quality of the educational process and outcome, but they were generally too costly to sustain and by the mid-1980s many of the schemes had been wound up. The Mexican Telesecundaria is an exception. Well integrated into national provision, it provides middle school opportunities to people in rural communities, attracting the poorer and more remote students. In 2000/2001 it had over 963,000 students in some 50,000 groups spread over 16,000 schools, had 23,000 students enrolled in Costa Rica, the Dominican Republic, El Salvador, Guatemala, Honduras, and Panama, and was due to start operating in the Andean region.

At primary level, Edusat (Educational Satellite Television Network), which was launched in 1995, reaches over 10,000 schools throughout Mexico to provide basic education to remote, outlying regions. Brazil's Telecurso has been running since the 1960s and recently launched a new programme of

basic education for young adults (Telecurso 2000), which now reaches 200,000 students. A further 200,000 students attend classes in regular schools that rely on Telecurso programmes.

Schools radio broadcasting and Interactive Radio Instruction (IRI) are concerned with improving the quality of learning and teaching within the classroom. IRI was first used in Nicaragua from 1974 to 1979 in the Radio Mathematics project. Although IRI projects have had mixed results in terms of national implementation and long-term sustainability, there are examples of interesting projects in mathematics in Bolivia and Venezuela, and IRI has also been applied in the Dominican Republic to provide the first four years of primary school outside formal schools. IRI has also been used for non-formal education.

The IRI-based Preventive Health programme (PARI) in Bolivia has achieved significant gains in children's knowledge, attitudes and behaviours. Broadcasts reach approximately 125,000 students in 69 schools. TV Escola is a Brazilian schools television service of the Secretary of Distance Education of the Ministry of Education. Some of the air-time is used for the in-service training of teachers and principals; the rest is used for programmes to support classroom teaching. Each programme lasts three hours and is re-transmitted 4 times per day. Started in September 1995, the project now reaches all Brazilian states. Any school with more than 100 elementary students is eligible to apply for resources from the National Fund for the Development of Education (FNDE) to buy the "technological kit" needed to download and record the programmes delivered through the Brasilsat satellite, and by 1999 38,846 had received support.

By the 1970s, universities in the region were beginning to set up distance education departments to reach out to marginalized populations. The Universidad de La Sabana in Colombia, for example, began offering distance courses in 1975. Some of these programmes are designed to prepare students for university. The Pre-University Programme run by the Institute of Distance and Continuing Education of the University of Guyana offers remedial programs in English and mathematics. Others are designed to offer university-level qualifications at a distance. The predominant pattern is the dual mode university, with very many universities offering distance education programmes. The Universidad de La Habana in Cuba, for example, began its distance teaching programme in 1979 and currently offers a range of degrees to some 7,000 students, while the Universidade Federal do Rio Grande do Sul in Brazil has some 15,000 distance students.

Many of the programmes are quite small – for example, the Universidad Nacional de Tucumán in Argentina has about 250 distance students. In Jamaica, the University of the West Indies Distance Teaching Experiment began regular programmes in 1983/1984, using telephone-based systems to enable courses to be taught through a combination of correspondence techniques and teleconferences, with occasional audio- and video-tapes and face-to-face sessions. In 1992 the University officially became a dual mode institution and began to offer a number of certificate and degree programmes at a distance. It provides distance education opportunities across the 14 countries served by the University. In 1989 the Monterrey Institute of Technology and Higher Education (ITESM), Mexico, launched a virtual university to provide both within and outside Mexico a comprehensive postgraduate teaching-learning system using advanced telecommunications technologies and electronic networks.

In 1977 Latin America's first two distance teaching universities were founded – the Universidad Estatal a Distancia in Costa Rica, and the Universidad Nacional Abierta in Venezuela, to respond to strong demands for higher education, and to provide avenues by which adults could re-enter the education system. Further distance teaching universities followed, in Colombia (Universidad Nacional de Educación a Distancia), Mexico (Sistema de Universidad Abierta), and Chile (Universidad Gran Mariscal Sucre).

Teacher education projects are common. The Instituto de Radiodifusão Educativa da Bahia in Brazil offers a primary school teacher-training programme (as well as a secondary programme for adults). Logos II in-service teacher education project in Brazil addressed the needs of unqualified and unlicensed primary-school teachers, particularly in rural areas, through distance education. Students were provided with correspondence materials and encouraged to attend occasional monitor-led face-to-face sessions. Students could take examinations that were equivalent to those used in the regular systems.

Also in Brazil, the PROFORMAÇÃO project provides initial training to unqualified teachers already teaching pre-school literacy, and the first four years of basic (primary) education in the state and municipal education systems in all 19 states of the North, Northeast and Midwest regions of Brazil. The teachers have completed their basic or middle-level education but have no teaching certification. In total the project is training 27,372 teachers distributed in 1107 municipalities, covering about 21,000 schools. Ninety-five per cent of these teachers are teaching in rural schools. Training, which takes place over 3200 hours, consists of a distance education system combining self-study course materials and school-based practice, linked to bi-weekly work-

shops. The project is of key importance given the fact that from the end of 2001 it has been illegal under Brazil's National Education Law for states or municipalities to have individuals employed as classroom teachers if they have not been certified as qualified to teach.

Although the region's distance education projects continue to suffer from vicarious political support and chronic ill-funding, there is reason to be optimistic about the future of open and distance learning in Latin America. There is considerable local experience, and a commitment to make it work. The challenge remains to use it more systematically as part of each country's formal educational provision, as well as supporting and at times regulating the standards of the private sector.

North America

The history of distance education goes back more than one hundred years in North America, and is now firmly rooted in the education systems of both Canada and the USA. There is a rich variety of programmes and institutions in a range of areas, and there are examples of the use of almost every conceivable technology. Distance education is used for outreach to remote population groups, support of school education, provision of education and training opportunities for adults, vocational courses, corporate and military training, higher and continuing education, life enrichment courses, etc. Modalities in frequent use are Web-based instruction, computer-mediated communication, video teleconferencing, satellite transmission, television and video courses, and correspondence education often supplemented by the use of CD-ROMs and videotapes.

Both in Canada and the USA, education is under the responsibility of individual states/provinces. There is variation in the extent to which states/provinces provide resources and infrastructure to support access to instructional opportunities and resources at a distance. A number of states and provinces have major initiatives to help schools acquire videoconferencing systems to share courses and to provide Internet access in the classroom. These efforts in the USA have received support through the national E-Rate programme that provides substantial discounts to schools for telecommunications and technology access. During the first year of the programme, for example, Internet access was provided to over 500,000 classrooms.

Another USA national initiative is targeted on training teachers to use technology. The Preparing Tomorrow's Teachers to Use Technology pro-

gramme has helped hundreds of colleges of education across the USA prepare teachers to use the new technologies for learning. The importance of addressing the needs of underserved indigenous peoples has been recognized in the USA, and a national initiative now provides access to the Internet in classrooms of all federally-supported Native American schools.

In both Canada and the USA, there has been explosive growth in the number of undergraduate and graduate courses offered via the World Wide Web. In addition to offerings by "bricks and mortar" universities, a number of for-profit online university companies such as Capella University, Jones International University and others have arisen, been accredited and are now offering Web-based degree programmes. This trend is expected to continue in the future as we enter a new era of digital competition in higher education in North America and globally. The use of traditional educational television services and videoconferencing services is continuing but is increasingly coupled with Web-based resources and collaboration.

Among the prominent providers of distance education in the USA one may mention several conventional universities, private distance teaching institutions, military training institutions, broadcasting services, some private corporations, and lately, a range of various consortia. One of them is the National Technological University (NTU). In Canada, there are some strong provincial institutions at the secondary as well as university level, and also educational television services. There are, for instance, specialized distance teaching universities in Quebec, Alberta and British Columbia. Consortia models have also been developed in many provinces.

North America has more extensive experience than most other parts of the world in the application of advanced telecommunication technologies in distance education. A significant trend is that of blended distance learning programmes and systems that represent a mix of technologies such as educational television, videoconferencing, Web-based communication and collaboration, and CD-ROM instructional resources. Access to the Internet is available to a majority of the population at home, school, or at work, and governments see a future in expanding capacity and access through the Web. Although considerable capital investments in technological infrastructure have been made within North American colleges and universities to provide ubiquitous access to the Internet and university resources, increasing high bandwidth educational applications available through Internet 2 will require continued public investment in the technology infrastructure.

Miller (1993) identified four long-term trends in American higher distance education that have been prophetic of the changes observed in distance education within North America and globally. These include:

- the simultaneous diversification and convergence of technologies, with consequences for course design, curriculum planning, organization of resource investment policies, etc.;

- changing relationships with students with more weight on group and student-student interaction, shift of control over time, place and pace of study;

- changing relationships between institutions, with the development of consortia for sharing resources, provision of national degrees and programmes, and even specialized national universities or university programmes;

- the emerging mainstream, meaning that distance education is a symptom of broader changes in the educational paradigm, where educational institutions are adapting to currents of social change, new technological infrastructures and shifts in basic teaching-learning relationships.

North American institutions are often driving forces in the emergence of international and global co-operation. The agreement on economic co-operation between North American countries in NAFTA includes increased cooperation in distance education between Canada, USA and Mexico. The new information and communication technologies have served as a catalyst for forging new partnerships between higher education institutions. An example is the Virtual Alliance between Stanford, Yale, Princeton, and Oxford universities whose goal is to develop and offer collaboratively high quality Web-based courses. Such collaborations will increase at the same time as competition in online degree programmes in North America and globally.

V.

INTERNET USAGE AND WEB-BASED EDUCATION

Setting the global context

The use of technology to aid in the processing and communication of information is not new; it is at least as old as writing. However, over the last 50 years, the development of a range of technologies has accelerated exponentially, mainly due to the invention of digital electronics.

A vital recent development has been the convergence of technology concerned mainly with the processing of information with that which deals mainly with its communication. This is clearly seen in the emergence of the Internet, whereby the processing power in each office and school can easily be connected, and can communicate with corresponding systems anywhere else in the world. The greater extent to which this integration is realized, the more blurred such distinctions become. We can reach the point where the user does not know whether the information resource being accessed is held on the local machine – and more significantly does not care where it comes from.

The importance of the use of the resources and technologies of the Internet in education is obvious today. It has been shown that the use of the Internet in the sphere of organization and management of education leads to the increase of education accessibility on a global scale, and may lead to the growth of economic efficiency of an educational institution's activity. All developed countries of the world have more or less extensive programmes of Internet development in the sphere of education. The overwhelming majority of developing countries, despite difficulties, problems and fears, seek as far as possible to take part in the formation of the global educational community. In doing so, the systematization and analysis of the experience of Internet

usage in education becomes an urgent issue for each country and the global community as a whole.

Taking the huge scale of the Internet into account, the creation of mechanisms designed for effective navigation of the Internet, and the collection, analysis, exchange and distribution of information for the specific use of education acquires great importance. However, despite the outstanding progress made in some countries in the creation of universal information retrieval systems and specialized information systems for education, neither set of systems taken separately can provide a complete service. It has usually been found that only 2 or 3 out of 20 current Internet-applications are used in most educational institutions. Further, this situation arises from a lack of information rather than a lack of finance.

A powerful tool for the solution of the resultant problems can however be provided on the basis of the co-operation between such systems. The specialized information system "Education via the Internet" within the framework of UNESCO programme activity may become one of a group of permanent international tools of co-operation (UNESCO, 2000d).

The application of the Internet in education is understood as the use of various Internet-technologies for the solution of various educational tasks, namely, teaching, learning and management of the educational process. The systematic analysis of experiences as they have hitherto been identified and defined in using the Internet in education provides an opportunity for comparison and generalization.

Web-based learning

The Web potentially offers a worldwide forum in which to teach courses. One can assume, for example, that each student at any time has an excellent encyclopedia at his or her disposal. Course material can be dynamically updated. Course text, examples and exercises can be interactive in the sense of immediately illustrating equations with graphs, changing parameters and seeing the results, linking to other web-sites according to the interests of the student. The Web-based learning model is essentially free from limitations of space and time while it reaches students around the world with great ease.

In addition, the Web-based learning model offers students a wealth of information that was never possible in the classical model. For example, the student who suddenly becomes interested in what kind of music was com-

posed during Newton's lifetime could link to that information, even though the instructor may not know how to answer such a query. The possibility of linking to information worldwide in a multitude of formats creates a remarkably rich medium for learning. Web-based courseware is not merely an electronic duplicate of the original course material. It represents a new type of educational materials which takes full advantage of the emerging Web and multimedia technologies in order to achieve an effective yet enjoyable learning process. Thus, complex concepts are introduced in innovative ways. Full linking to vast resources available worldwide introduces new levels of value to the courseware. A Web-based course is envisioned as a dynamically-evolving resource that will prove beneficial to both students and instructors alike.

In the light of these foregoing remarks, it is evident that the design of a Web-based course is a multifaceted process that closely resembles that of movie making in cinema productions. That is, a Web-based course is developed through the efforts of a team of professionals with a complementary range of skills, as opposed to classical course design, which is typically developed by faculty alone.

The richness of modern Web and multimedia technologies allow for unlimited creativity when it comes to electronic courseware development. Such richness offers educators new opportunities to develop very interesting course material while it also poses a substantial challenge in that it requires faculty to rethink their own course offerings in the light of the new technologies.

Creating a new educational platform

One of the first areas that requires change is higher education's perception of technology as it relates to its mission. For the past decade, most attempts to use technology in higher education have been very haphazard: systems have been designed only to automate existing processes, computers have been thought of as strictly computational devices, and desktop workstations have not accomplished much more than replacing the typewriter and the adding machine.

Today, however, technology is creating a new educational platform and is reconfiguring the way a student learns. Networked learning – accessing libraries, scholars, networks, and information worldwide – is evolving. In the light of this, one important question needs to be considered – what is the mission of higher education? It can be said that education is a discovery process,

and its mission is to provide the widest repertoire of possibilities for a student entering a learning situation. Technology can realize this ambition, and because of it a student's educational experience can be immeasurably richer.

Various typologies of Internet Applications in Education (IAE) have been proposed in the literature in recent years. Two main approaches to the segmentation of this project-domain have been revealed through the analysis of recent experience. The technology-oriented approach is the most widespread. For example, statistical research on the use of the electronic communication in open and distance learning, conducted by UNESCO in 1995 (Euler and Berg, 1998), has identified the following types of applied telecommunication media in educational programmes:

- telephone;
- fax;
- audio-conference;
- video-conference;
- electronic mail;
- access to databases.

Ellsworth (1994) proposes the classification of Internet tools in accordance with the types of interaction between the participants in the educational process as follows:

- interaction between the students and professors in the educational process;
- interaction between the students and professors while searching for information on the Net;
- joint activities of professors and the administration;
- students' joint research projects.

Individualized learning and teaching

We should not underestimate the prevalence and importance of "person-to-person" type of communications on the Net. For a long time electronic mail has remained the only Internet application in education. Data submitted in the above-mentioned UNESCO survey reveals that electronic mail is still the most frequently used computer technology in open and distance learning (Euler and Berg, 1998).

A relatively new phenomenon in educational communications is the newly established practice of learners speaking directly to experts in one or another field (which can already be considered as a consequence of the

increase in the level of communication skills among learners actively using the Internet). On the Net, there are a number of centres such as Yahoo! Yahooligans! School Bell; Homework Answers; and Ask a Scientist. By addressing enquiries to these centres learners can receive, via e-mail, answers to their questions on a particular theme.

Group learning and teaching via the Internet

An online lecture or presentation of teaching material published on the Net becomes accessible to many learners. At the first stage of IAE implementation, the most common technology for this "communications paradigm" was the electronic bulletin board (BBS) and electronic mail discussion lists (listservs), where course notes were given with "read-only" access for students. Since the extensive implementation of interactive WWW technologies in the distribution of educational information, various forms of courses on the WWW have become common. WWW technologies have made it possible for materials on the Net to be published with ease. Other learners can thus become the source of information for the learner.

Collaborative activities

The advantages provided by the Internet in the organization of co-operation are suggested by its very nature. As is well known, the WWW was created as an environment specifically designed for collaborative work on documents by groups of researchers remote from each other. The further development of Internet technologies has provided the opportunity for joint use and the editing of textual materials, and also of audio- and video-sequences.

Problems of legislative and public control over Internet contents are a part of a general problem, which can be identified as the trans-cultural nature of the Net. It can offer a considerable challenge for the cultural identity of the nations of the world. As was mentioned at the Second UNESCO-ACEID Conference, organized by UNESCO-ACEID in co-operation with the Ministry of Education of Thailand in Bangkok, 1996, new technologies pose in particular questions of their influence on the culture. In some countries, governments have a negative view of Internet access since "it can break the culture". The limited capacity of data delivery channels creates technical restrictions for enquiries to data and knowledge bases, especially those of a multimedia nature.

The institutional impact of Internet-technologies

The application of Internet-technologies to educational systems at different levels has a significant impact on the development of open and distance learning-related forms of teaching. Traditional methods of delivery of educational materials and organization of feedback to learners – such as mail and telephone – are increasingly being replaced by electronic mail and the WWW.

Educational institutions of different types and educational levels now provide greater or lesser elements of their teaching through the WWW. An example of the use of Internet-technologies in higher education is represented by those specialized distance education institutions delivering a considerable part of educational materials through the WWW. Further, many traditional higher education establishments have introduced separate distance courses (for example, the course on fundamentals of protein structures in Birkbeck College in the University of London) (Birkbeck College, 2001).

Although open and distance learning at the current time is predominantly represented in higher education, it is gradually also beginning to be used in high schools. Owston (1997) singles out three areas of secondary education where this has taken place. Firstly, in home education: as a result of the availability of WWW resources, children suffer to a lesser extent from shortage of educational materials and a lack of dialogue with classmates – two main disadvantages of home education. Secondly, alternative education arising in the context of freedom of choice of school is sometimes remote from the place of residence of a pupil. Thirdly, it is possible to offer extra courses to pupils in conventional schools, in particular in preparation for entry to higher education institutions.

VI.

ECONOMICS OF OPEN AND DISTANCE LEARNING

It is often said that open and distance learning is more cost-efficient than other forms of education. Among the factors said to contribute to this are the use of media enabling relatively few teachers to reach very large numbers of students, the fact that distance education systems do not need classrooms, and the very different cost structure of distance education arising from the substitution of capital in the form of teaching materials for labour in the form of teaching.

The cost-efficiency of open and distance learning

Comparison of the average cost per student in open and distance learning institutions with that in broadly comparable traditional institutions operating in the same jurisdiction shows that the former is not always the most cost-efficient option. Table 1, for example, shows the efficiency ratio (defined as the average cost per student in a distance teaching institution divided by the average cost per student in a conventional system) for a number of projects (Rumble, 1997). An efficiency ratio of less than 1.0 means that the distance system is cheaper than the comparator tradition system; an efficiency ratio of more than 1.0 means that the average cost per student in the distance system is higher than that in a traditional system.

As Table 1 shows, open and distance learning is not necessarily the most cost-efficient approach – but then there is no reason why it necessarily should be. Distance education methods may be the only way to reach some target audiences, in which case lowering the cost of education will not necessarily be an objective. Generally, however, the fact that open and distance learning may lower the costs of education is seen as one of its advantages, and the expectation that this will be the case has been a specific policy objective in a number of instances.

Table 1. Comparative costs of selected distance and traditional education projects

Project	Comparator institution	Year	Efficiency ratio
Instituto de Radiodifusão Educativa da Bahia (IRDEB), Brazil	Conventional school	1977	4.36
Malawi Correspondence College	Conventional day school	1977/1978	0.62
	Boarding school	1977/1978	0.23
Telesecundaria, Mexico	State day secondary school	1975	0.76
		1981	1.09
		1988	1.32
Centros APEC de Enseñanza a Distancia, Dominican Republic	Secondary level day school	1988	0.46
Tanzania Teacher Training at a distance	Face-to-face two-year trained teacher	1993	0.23
Universitas Terbuka teaching diploma programme, Indonesia	Traditional teacher training	1988	0.60
Allama Iqbal Open University, Pakistan	Traditional university	1988	0.22
University of the Air, Japan – recurrent costs, liberal arts programme	National universities	1986	0.47
	Public universities	1986	0.55
	Private universities day programme	1986	0.82
	Correspondence programme	1986	7.64
Abbey National, UK – training costs per trainee	Abbey National, traditional training costs	1990	0.42
Delco Electronics, UK – training costs per trainee	Delco Electronics traditional training costs	1990	1.08

Table 1 also shows that while a particular form of open and distance learning may be cheaper than some options, it may actually be more expensive than other options (as with the University of the Air of Japan, where annual revenue cost of correspondence university education was found to be much cheaper than that of the UAJ). Finally, Table 1 shows that the comparative cost of different systems may change over time. For example, the average cost per student per year actually rose in the Mexican Telesecundaria between 1975

and 1988, notwithstanding that over this period the number of students in the system rose from 34,000 to over 400,000. Intuitively, in open and distance learning one would expect the cost per student to fall as economies of scale are achieved – yet in this particular case it rose. This was because the Telesecundaria was steadily reaching out to more and more disadvantaged communities, to set up schools with smaller and smaller class populations. As a result its unit costs per student increased.

When comparing the costs of open and distance learning with those of more traditional face-to-face approaches, one needs to bear in mind that there are a range of factors that can affect the costs of traditional education, including staff:student ratios, the balance of 'big' group to 'little' group teaching, and the balance between time spent in class and in independent study and resource-based learning approaches. At the higher education level, efficiencies in class-sizes, coupled with increased use of independent and resource-based learning strategies, have transformed the economics of the campus to support the view that mass higher education systems have a quite different economy from that of élite systems.

Much of the increased productivity of education within the campus has derived from the conscious or unconscious adoption of methods used within open and distance learning in the campus setting. The remarkable growth in the number of 'dual-mode institutions' offering, in addition to face-to-face classes, 'flexible learning' (an approach largely based on the same kind of combination of resource-based and independent learning that characterizes distance education), while by no means confined to the recent past, is part of this phenomenon. There are those who believe that the marginal costs of adding a flexible learning capability to traditional higher education is not only a cheaper option than setting up a new distance learning system, but delivers a wider curriculum choice.

More recently, however, traditional campus-based institutions, along with distance teaching institutions, have begun to use the Internet to provide online courses. This has resulted in yet further changes in the costs and cost structure of educational provision, which are still being investigated. However, the indications are that many of the cost factors involved in online learning have been underestimated (Rumble, 2001).

As the figures in Table 1 suggest, a very great deal will depend upon the actual circumstances, and on the nature of the comparator institutions. Although distance education approaches often enable planners and managers to achieve greater efficiencies, there is a range of factors in play that will

influence this outcome one way or the other. These are explored in the next section. Overall, the studies we have show a mixed picture indicating that there is no simple answer to the question, 'Is distance education a cheap alternative?' (Perraton, 1993).

Finally, not all cost studies take account of the cost of completion, but in general, because the level of drop-out tends to be higher in open and distance learning systems than in comparable face-to-face situations, the former tends to be less cost-efficient when measured by the average cost per graduate measure than is the case when it is measured by the average cost per student measure.

Factors affecting the cost of open and distance learning

A range of factors may affect the cost-efficiency of particular distance learning systems. These include:

The number of learners enrolled. The greater the enrolment, the more the fixed administrative costs of the system, and the resources invested in developing the curriculum and learning materials, will be spread across the student population, thus bringing down the unit cost of per student. However, the nature of the cost structure is such that most of the economies of scale are reaped at an early stage. As student numbers rise, so the gain in efficiency falls (see Table 2). Moreover, scale may bring its own complexities with the result that costs per student may actually begin to rise.

Table 2. Economies of scale at the Indira Gandhi National Open University, India

Number of students (in thous.)	10	20	30	40	50	60	70	80	90	100
Average cost per student (Rs)	6251	3424	2482	2010	1750	1604	1499	1420	1359	1310
Efficiency gain per student (Rs)	–	2827	942	472	260	146	105	79	61	49

The size of the curriculum. The broader the curriculum on offer, the more courses will need to be offered, and the greater the volume of course materials that will need to be developed. The cost per student will therefore rise unless the increase in the number of courses is compensated for by an increase in the number of students (see Table 3, where projections were made on the basis of three cost elements: the direct cost per student times the num-

ber of students; the direct cost of keeping a 'standard course' in the curriculum times the curriculum load, and the cost of institutional overheads, which were deemed to be fixed).

Table 3. Projected unit costs per student in UK £s at the UK Open University, 1976 (Rumble, 1997)

	Course load (planned) in 'full course equivalents'						
Student numbers	58	62.66	73.14	77	82	84	87
55,000	488	499	520	528	536	542	548
60,000	468	478	498	504	512	517	523
65,000	451	461	478	485	492	497	502

The number of years over which courses are offered without change. One of the advantages of capturing knowledge in text, audio, video or computerized formats is that the material then exists as a more or less permanent record, and can be used again and again to teach successive cohorts of students. It makes economic sense to reuse the materials from year to year, so that the cost of developing the materials can be spread over more and more years (and more and more students). However, this can prove to be a drawback if the format does not allow for easy changes to be made to the materials, and if once the course is launched it becomes clear that poor initial design leads to the need to revise the course materials. To avoid this possibility, materials may be developmentally tested before they are produced in bulk. This is obviously a sensible strategy where it is intended that materials will last several years, or where materials are being used in a mass educational campaign.

A further problem is that the more years the materials are used, the greater the danger that they will become outdated. This is likely to be more serious in some subjects (e.g. computing, social sciences, education) than in others (basic maths, history). The extent to which this is a serious problem or not is to some extent affected by the approach taken to the design of the courses, and the ease with which changes can be made to materials. Modularization of the materials' format, and the use of electronic formats, can make revision that much easier. Indeed, one of the advantages of online course formats is that development is no longer seen as a pre-presentation stage in the lifecycle of a course, but as something that happens continuously.

Containment of course development costs. The range of materials to be developed can be reduced by using existing textbooks in conjunction with 'wrap-

around' materials – materials that act as a commentary on a commercially produced textbook. This will reduce the costs of developing and producing course materials. This is certainly an option where the target population is capable of learning independently, but it may work less well with less experienced learners, who tend to benefit from more structured and integrated materials.

Sharing course development costs. Another approach is to try to share the costs of developing course materials. One way is to design the materials so that they can be published in book form. This approach, often undertaken in partnership with a commercial publisher, generates income from sales that can then be used to offset the cost of developing and producing the materials. However, the income from royalties on sales to the public is usually relatively small. Another approach is to enter an agreement with another institution to share the development effort. In theory collaborative course development is an excellent way of reducing costs; in practice such collaboration can often be very difficult to get off the ground. Finally it may be possible to buy in materials that have been produced by another distance teaching institution. Again, while in theory an attractive proposition, the rights charged for use of such materials can be significant, and there is some evidence that unless the number of copies required is relatively low, it can be cheaper to develop courses in house. The free courseware initiative could help here. However, bought-in materials may also raise curriculum and cultural issues, and may need to be adapted and/or translated. The costs of adaptation and translation should not be underestimated.

Technology choice. Since distance education methods first emerged in the 1840s, the range of media and technology employed has widened. Each technology has its own cost structure, so the choice of technology has an impact on the costs of the system. The cost of a given technology will depend on the equipment used (and the extent to which that equipment has to be sourced from abroad), the running costs of the technology, and the labour costs involved in the development, production and delivery of materials carried by the technology. For example, it generally takes a teacher more time to write a text that will occupy a student for one hour, than it takes to develop a one-hour lecture; and it generally takes longer to write an e-mail response to a student query, than it takes to respond to a student orally.

More complex technologies may also require teams of technicians and specialist producers to support the teacher. Also, a given media (text, audio, video) may be produced and delivered in a variety of formats – with implications for the costs of the materials. There is evidence that the costs of devel-

oping and producing materials in any given media varies enormously for all kinds of reasons, and so it is very difficult to make any categorical statements about the relative cost of media. Generally print, audio-cassettes, and pre-recorded Instructional Television (i.e. video-taped lectures) are the only media that are relatively low cost for courses with populations of from under 250 students a year to over 1,000 students a year.

In addition, radio is also likely to be low cost on courses with populations of 1,000 or more students. Of the various other media, audio-cassettes and radio have low fixed and low variable costs; good quality broadcast television has high fixed costs but zero variable costs; and pre-programmed computer-based learning and multimedia have high fixed and high variable costs (Bates, 1995). At the time of writing there are no convincing cost-effectiveness studies about the utilization of technologies in which computers are a key input (Orivel, 2000).

Generally the move towards online education has provided an opportunity for course designers to shift away from the preparation of prepared materials towards less structured course formats in which much of the content is 'developed' through student dialogue. This has radical implications for course costs, and for distance education it represents a shift away from capital in the form of learning materials back towards a more labour-intensive form of teaching unless it is accompanied by increased learner autonomy.

Education economists expect new information and communication technologies to have an impact on the productivity of educational services, but the costs of hardware, software and consumables are linked to the price structures of the supplier country, and not to local price structures. While the largely supplier-determined cost per learning hour using a computer may be less than the cost per learning hour with a teacher in developed countries, it is more expensive than the comparable cost in countries where labour costs are low, and where as a consequence the per hour/per pupil cost of teacher-based education is low (Orivel, 2000). And even in developed countries, there are indications that the costs of online education are more expensive than other forms of distance education (Rumble, 2001).

The level of student support. All the evidence indicates that successful distance education systems require three elements: excellent teaching materials, efficient logistical systems, and responsive and where appropriate individualized student support systems. The difficulty with this is that the cost of student support tends to be driven by the number of students in the system, so that the absolute cost of providing student services increases rapidly with

increases in student numbers. Moreover, student services are a direct student cost, so that the more that one spends on this, the less likely it is that the distance education option will prove to be cheaper than traditional education. As a direct result the amount of face-to-face support and correspondence tuition tends to be limited.

Also every effort needs to be made to ensure that general student services are focused on the students who need that support, and that they are provided in the most efficient manner possible, using approaches drawn from service management. A particular problem with the costs of online education is that there is increasing evidence that it takes more time to support students studying online than it does to provide face-to-face teaching.

Working practices. Working practices can affect costs significantly. Courses that take students many hours to study tend to require more materials, and the range of materials on such courses is often such that several people will be required to develop the materials. Course teams, in which overall responsibility for content and teaching strategy is vested in a team rather than the individuals, have proved to be an effective but costly approach to course design. Reducing the transaction costs of team working by having a series of quasi-independent authors working under the direction of an academic editor will reduce costs. So too will reducing the size of the course modules so that just one or two people can produce them.

Many distance teaching systems, faced with the need to support many hundreds or thousands of students studying course materials developed by a small team of academics, have divided the academic task between those who develop the materials, and those who support the students' learning. Further divisions of labour may occur where different individuals are appointed to mark examination scripts, and to provide general advice and educational guidance to the students. Such specialization of tasks requires very considerable planning and management if it is to work effectively.

In the student support area, the use of telephone call centres staffed with less expensive help-desk operatives can also reduce costs. Generally distance education has proven fertile ground for the division of labour, and reduction in worker's autonomy. Many teachers, who see the resulting division of labour and loss of overall control as disempowering, oppose these practices. One of the reasons why many individuals have welcomed the emergence of online forms of distance education is that this is seen as once again integrating the job of the teacher, enabling him or her both to develop the Web-based materials and conduct the online class discussions. But there is some evidence

that the number of online students that can be handled by one teacher is much the same as (or even less than) the number that is handled in a face-to-face class, while the volume of messaging and the time it takes to moderate classes online has increased workloads, necessitating the employment of teaching assistants and graduate students to do some of this work.

Student support may be focused on the student in the home, but in many cases a network of learning or study centres is maintained, where students can come together to meet each other and advisors, to use facilities such as a library and computing and audio-visual equipment, and to take part in face-to-face tutorials. Setting up and maintaining such centres can be costly, most particularly where equipment such as computers is provided at sufficient levels to enable students to access resources easily.

Labour market practices. The 'Fordist' practices discussed above can reduce costs significantly, particularly where they are combined with the employment of staff on short-term contracts where payment is on a per student, per hour, or per script basis. Many course developers, editors, producers, designers, and above all tutors are hired on this basis. Carried to the extreme, this can result in some open and distance learning institutions having almost no core academic staff.

Structural practices. Open and distance learning systems require a range of activities to be accomplished if they are to succeed, including the development, production and distribution of materials, the administration, teaching and examination of students, and the management of the organization. While many institutions are organized around an integrated structure, others rely on external suppliers to fulfil some of these tasks. Thus it is not uncommon for open and distance learning institutions to work alongside media production agencies, printers, colleges and schools, etc to provide services and facilities. Recent proposals, for example, for the UK's E-university consortium, have suggested that services might be disaggregated even further, with individual courses being provided by a range of supplier universities, access to electronic libraries and to tuition being provided through a series of commercial operators (PricewaterhouseCoopers, 2000). The globalization of the sourcing of production and services has enabled open and distance learning institutions, in common with other enterprises, to locate production and service provision (such as help-desk facilities) in one country, to serve the delivery of teaching services to students in a number of countries. Open and distance learning institutions may also operate through partnership organizations to deliver teaching services in a range of countries.

Who pays?

The very different cost structures of distance and traditional forms of education argue for the application of different funding mechanisms to support open and distance learning, compared with traditional approaches. The much lower variable cost per student achievable in correspondence education and educational broadcast-based approaches, and the relatively high 'fixed' investment costs in the development of learning materials, means that there is a strong argument in favour of a funding mechanism that reflects not just the number of students in the system, but the number of courses being developed and maintained. The application of traditional per capita funding models to distance tends to underfund such institutions in the start-up phase, when large sums are required to develop the infrastructure and curriculum, and overfund them when they reach 'mega-institutional' size (say, 100,000+ students), because 'standard' per capita funding exceeds the actual level of variable costs per student in distance education.

On the other hand, the use of more refined funding models can provide funding agencies with an opportunity to make savings by delaying investment in course renewal, particularly in systems where development staff are hired on short-term contracts. This can seriously damage the quality and hence the reputation of an institution.

There is a case for students in distance education, many of who are working adults, to pay a higher proportion of the costs of their studies than conventional students. However, this assumption needs to be adjusted in the light of the institutional mission. There is plenty of evidence that where fee levels are disproportionately high, relative to the discretionary income of the target population, people are stopped from applying, or from progressing through a system as quickly as they might. Against this, some students will be supported by employers. The balance of funding from government, individuals, and employers, needs careful consideration given the adverse effect of underfunding on institutional quality, and of high fees on recruitment and progress. There is a strong case for mechanisms to provide assistance to those who would otherwise be denied the opportunity to study for financial reasons.

Apart from fees, education generally imposes some costs on students and their families, whether it is in terms of consumables (pencils, paper), supplies (books), travel, and equipment (computers), and open and distance learning is no exception. Apart from the need to travel to study centres for face-to-face meetings, and to meet the stationery and postage costs, students may have to

buy books, and equip themselves to be able to make use of the technologies used by the providers. This last may require students to own or at least have access to radios, televisions, cassette players, computers, printers, telecommunication facilities, ISP providers, etc. Most mass systems do not have the resources to provide every student with reception equipment, or even to provide sufficient facilities in study centres to enable students to use the facilities easily. The impact of technology choices on student access is an important issue – particularly in developing countries. The current push towards e-education has made the issue of access to technology even more important.

Finally, although there are many responsible commercial providers whose standards are assured through trade organizations, there are also unscrupulous operators who maximize income by collecting non-refundable fees upfront, and minimize costs by providing minimal support to students. The practice of relying on 'drop-out money' to generate a commercial profit not only reinforces the sense of failure of weak students, but continues to give distance education a bad name, and underlines the continuing need to protect consumers against the activities of disreputable 'diploma mills'.

Qualitative considerations

In the past most studies comparing the costs of distance and conventional approaches assumed that the quality of the educational experience and the quality of the graduates produced are the same. Recently distance educators have come to recognize that there are very considerable differences in the nature and hence in the quality of the experience provided by interactive e-education systems, compared with earlier forms of distance education.

On the whole the qualitative benefits of open and distance learning are a contentious area of debate. On the plus side, distance education students may have access to the 'best' teaching materials, and the 'greatest' lecturers – including international 'gurus'. Student support services can also be designed to provide high quality advice and support. On the minus side, the learning materials can be seen to be pre-selected and overpackaged, and so fail to give students the chance of browsing through a library (something that access to an e-library will help to get round).

But the major drawback in earlier forms of distance education was the lack of opportunities for dialogue and argument between teachers and students, and among students. Assuming that interactivity has been designed into the programme, it is the ability of electronic conferencing systems (e-mail, com-

puter conferencing, and computer-based video conferencing) to get round this, and to enable students to search out materials and thus assume more responsibility for their own learning, that above anything else makes e-education attractive to distance educators, and there is some evidence that students studying online perform beyond expectations.

There is much less dispute about some of the social benefits of distance education, particularly with regards to questions of flexibility and access. In general distance education liberates individuals from the tyranny of fixed-location, fixed-time education (though some elements of provision may require attendance at a study centre, or 'attendance' at a particular time – e.g. participating in a synchronous electronic conference). Moreover, by virtue of its use of standardized learning materials, procedures, and processes, open and distance learning systems can easily teach very large numbers of students. It can increase the supply of places at primary, secondary, and tertiary levels of formal education, in non-formal settings, and for training (both pre- and in-service), thus easing frustrated demand for entry to education. In this connection, its contribution to the provision of educational places worldwide is growing steadily. Furthermore, it can provide opportunities to people who cannot make use of traditional educational services, by meeting the needs of those in remote communities, peripatetic individuals who need to study wherever they are, those whose jobs prevent them from attending regular classes, those who are tied to the home, and the institutionalized.

The extent to which students benefit financially from their studies is a little researched area. The question is, are the lifetime earnings of distance students the same, more, or less than their counterparts graduating from traditional institutions? On the plus side, distance education students can earn as they study (though many 'conventional' students do this too); they can return to study without interrupting their careers; and they can update their knowledge, thus keeping themselves in the forefront of their fields, and so maintaining their earning power. On the minus side, they may start their education later in life, when most career patterns are fixed, and when they have fewer years to earn at a higher level. Also, the 'credentialling power' of distance teaching institutions (the extent to which the reputation of their institution will enable them to gain higher paid jobs) has been questioned. What studies exist, however, suggest that distance students do benefit financially from their studies.

More studied have been the benefits that employers reap from using flexible distance training methods. These include the avoidance of the costs of employee travel to and accommodation at training venues, and the fact that

much of the training can take place in the employee's time rather than in the firm's time, thus enhancing productivity by effectively passing the time cost of training to the employee. However, this in itself raises questions about the extent to which it is right that a higher proportion of the opportunity costs of training should be placed on the employee – particularly if this results in a deterioration in the individual's quality of life.

VII.

UNESCO'S INITIATIVES IN OPEN AND DISTANCE LEARNING

Setting the international context: open and distance education from the lifelong learning perspective

The last ten years have seen an increase in the use of open and distance learning particularly in developing countries and in countries in post-conflict situations, prompting UNESCO to renew its strategy, mobilize greater resources, and reinforce international co-operation in this field.

The transition to knowledge societies, largely driven by information and communication technologies (ICTs), holds the promise that the right to the free flow of, and equitable access to, knowledge, information, data and best practices across all sectors and disciplines is basically ensured. Knowledge societies offer both significant opportunities and real risks. They require fundamental changes in learning and teaching habits, a new organization of content and structure of learning provision and a new appreciation of learners' intellectual, emotional and social needs. The skill levels required in the labour market are high and all societies face the challenge of raising their educational performance.

In this context, lifelong learning is a high priority for all. Based on the four pillars of **learning to know**, **learning to do**, **learning to be** and **learning to live** together, it provides the enhanced opportunities that are essential for full citizenship in the knowledge society. The Cologne lifelong learning charter (1999) recognizes the challenge every country faces to become a learning society and to ensure that its citizens are equipped with the knowledge, skills and

qualifications they will need in the 21st century. The rapid progress of ICTs in recent years such as satellite communications, large capacity optical fiber communications and the Internet have greatly expanded the power of distance learning as a tool for lifelong learning and international understanding (G8 Education Ministers' Meeting, 2000).

In pursuance of this right, UNESCO encourages and assists its Member States to make greater use of open and distance learning for expanding access to education and enhancing its effectiveness in all forms, types and levels of education, including the potential for alternative systems of educational delivery using modern information and communication technologies.

Questions such as *relevance*, *quality*, *equity* and *viability* are challenges facing distance education in the new century. These challenges present opportunities as well as risks. Despite the powerful dynamics of globalization, the situation facing distance education is not the same everywhere. If equitable, inclusive knowledge societies are ever to take proper root, the huge potential of ICTs should be harnessed to fight exclusion and to bring new digital opportunities for all (UNESCO, 2001g).

In support of these initiatives, a UNESCO Institute for Information Technologies in Education (IITE) was set up in Moscow in 1997, with capacity relating to policy advice, research on new ICT applications in education, training of educational personnel, and continuous monitoring of the use of information technologies in all aspects and levels of education, including in open and distance education.

Basic education for all

UNESCO's overriding priority is ensuring the right to *education for all* through the realization of the six objectives of Education for All (EFA), adopted by the World Education Forum in Dakar, Senegal, 26-28 April 2000. Harnessing new information and communication technologies (ICTs) to help achieve EFA goals and thus overcome the digital divide is one of the strategies to be implemented. These technologies have great potential for knowledge dissemination, effective learning and the development of more efficient education services. To be effective, especially in developing countries, ICTs should be combined with more traditional technologies such as books and radios, and to be more extensively applied to the training of teachers (UNESCO, 2000a).

While notable progress has been made in improving the quality and scope of education for many children since the World Conference for Education for All (Jomtien, Thailand, 1990), only marginal progress has been made towards extending education to millions of excluded children, "reaching the unreached". Another significant thrust on open and distance learning for basic education was the 'joint initiative on distance education' launched in 1993, with the support of UNESCO, UNICEF and UNFPA, by the nine most populous nations (the so-called E-9: Bangladesh, Brazil, China, Egypt, India, Indonesia, Mexico, Nigeria and Pakistan), in the context of the Education for All summit meeting (12-16 December 1993, New Delhi, India).

This was reasserted in documentation associated with the Dakar World Education Forum in 2000, where the E-9 countries in a preliminary meeting in Recife set themselves the goal of 'increasing technology and distance learning in all aspects of EFA '(UNESCO, 2000a). The report on developments of distance education in the E-9 countries indicated priorities for expansion of work in school equivalence, teacher education, and non-formal education in particular with relation to health. In all three areas special attention to the participation of girls and women is required. The document also notes the absence of reports on work relating to HIV/AIDS.

A recent study of the application of new technology systems in basic education concludes that while there is no alternative for primary school, there may be an important role for junior secondary audiences. The importance of communications technologies for the development of intermediaries – teachers and extension agents- is noted as being cost-effective in comparison with conventional ways of supporting these groups, and in particular as being able to mitigate the isolation of remote and rural teachers (UNESCO, 2001e)

In line with the above commitment to basic education, UNESCO encourages and supports action at national and provincial levels with special emphasis on co-operative efforts to develop open and distance learning systems, and programmes, to the benefit of those deprived of basic learning skills, making use of untapped information sources and media channels, written press, community radio, television, libraries, multimedia channels and others to increase the outreach of basic education programmes.

Adult education

Within the framework of its policies for lifelong education for all, UNESCO continues to give an important priority to adult education through open and

distance learning. The great potential of information and communication technologies to reach large numbers of new adult learners is recognized as an important source towards lifelong learning. To this effect, the 4th UNESCO World Conference on Adult Education (Paris, 1985) stressed the responsibility of colleges 'to allow adults access to higher education, by extending distance learning to include distance courses, radio programmes and others' (UNESCO, 1985).

Similarly, the International Commission on Education for the 21st Century called for greater use of new information and communication technologies in adult education (UNESCO, 1996b). Reports from the E-9 countries note a range of projects with adults including school equivalence, the participation of marginalized communities and in health fields (UNESCO, 2001a).

Within the framework of its activities to meet the educational needs of the adult population, UNESCO encourages and promotes the establishment of open and distance learning institutes and, programmes, including those of open universities, with a view to giving new opportunities for further studies for adults who were initially deprived of them, or who, for one reason or another, did not make use of them.

Renewing and diversifying education systems

In UNESCO's Medium-Term Strategy (2002-2007), the third thrust of the overall priority for education for all focuses on promoting experimentation, innovation and the diffusion and sharing of information and best practices as well as policy dialogue in education. The objective of harnessing information and communication technologies (ICTs) for education has the expected outcome of promoting international debate and reflection on the development of internationally compatible descriptors and standards for distance and e-learning courseware, and for e-learning institutions (UNESCO, 2001b)

UNESCO promotes the role of open and distance learning in the diversification of delivery systems for extending and complementing conventional forms of education. In technical and vocational education, attention is given to alternative delivery systems, including programmes using new information and communication technologies, media channels and multimedia modules, to facilitate learning at the workplace, at home and elsewhere.

Co-operation and partnership between enterprises, professional bodies and distance teaching institutions are encouraged and promoted. Support is

also given to the use of open and distance learning to meet the special needs of the disabled, migrants, cultural and linguistic minorities and others who cannot be efficiently reached by traditional delivery systems. The importance of an educational response on a mass scale to the HIV/AIDS pandemic is also given emphasis in the Medium-Term Strategy 2002-2007 (UNESCO, 2001b).

Teacher training

Great importance is given to open and distance learning in teacher training. UNESCO's Medium-Term Strategy 1996-2001 stressed the need to train, upgrade and motivate teachers and other education agents, using innovative approaches, including open and distance education (UNESCO, 1996a). The International Commission on Education for the 21st Century called for the use of distance education techniques especially in in-service training (UNESCO, 1996b).

UNESCO's Second International Congress on Education and Informatics (Moscow, 1996) encouraged the dissemination of programmes that assist teachers in the proficient use of distance education (UNESCO, 1996c). These lines of development are taken forward in the current UNESCO Medium-Term Strategy (2002-2007), where the contribution of ICTs to networking of teachers and teacher-training institutions is emphasized (UNESCO, 2001b).

In order to strengthen teacher education, notably in-service teacher training, but also the training of trainers, UNESCO encourages and assists its Member States to make wider use of open and distance learning techniques including new technologies such CD-ROM, interactive multimedia systems, television and radio satellite broadcasting, computer networks and others.

Case studies on teacher education through distance learning have been published, deriving from studies in Brazil, Burkina Faso, Chile, China, India, Nigeria, Mongolia, South Africa and the United Kingdom. The case studies focus in particular on technology, curriculum, evaluation and cost (UNESCO, 2001d). UNESCO gives support to the use of open and distance learning in teacher education also through UNESCO Chairs and inter-university co-operation.

Higher education

The provision of higher education through open and distance learning is recognized as an effective step towards the democratization of education. It is

also an important contribution to the development of higher education, notably in its modernization and diversification, encouraging the search for alternative delivery systems, including ways of updating knowledge and of providing advanced training so that institutions of higher education may serve as centres of lifelong learning permanently accessible to all.

UNESCO's 'Policy Paper for Change and Development in Higher Education' urges higher education institutions to make greater use of the advantages offered by the advancement of communication technologies, noting further that 'the distinction between distance and traditional education is becoming blurred as alternative delivering systems are an increasingly viable element in a forward-looking blueprint for higher education' (UNESCO, 1995). This view was further enhanced by the International Commission on Education for the 21st Century, which noted that 'each university should become an 'open' university, offering possibilities for distance learning and learning at various points in time' (UNESCO, 1996b).

The *World Declaration on Higher Education for the Twenty-first Century: Vision and Action* stresses that "higher education institutions should lead in drawing upon the advantages and potential of new information and communication technologies, ensuring quality and maintaining high standards for education practices and outcomes … by creating new learning environments ranging from distance education facilities to complete virtual higher education institutions and systems, capable of bridging distances and developing high-quality systems of education, thus serving social and economic advancement and democratization as well as other priorities of society" (UNESCO, 1998).

Since lifelong education for all will be one of the essential keys in the building of knowledge societies, and having regard to the new possibilities open to distance education, the universities need to redefine their role, missions, profile and functioning in the 21st century (UNESCO, 2002a).

UNESCO encourages and assists its Member States in their efforts, through the above open and distance learning delivery systems, to expand the access to advanced learning and to improve its efficiency by providing support in the initiation and development of open university schemes, and by giving assistance to traditional universities wishing to deliver their programmes through distance education. Support is also given through the UNITWIN/UNESCO Chairs programme as a principal modality for inter-university co-operation.

Capacity-building for open and distance learning

In its efforts to assist Member States in the field of open and distance learning, UNESCO gives priority to various forms of capacity-building, especially in developing countries. Reference is here made to the Director-General's statement that "one of the three major strategic thrusts of our new Medium-Term Strategy (2002-2007) is that of 'promoting empowerment and participation in the emerging knowledge society through equitable access, capacity building and sharing of knowledge'"(UNESCO, 2002b). The 31st session of the General Conference (2001) drew attention to capacity-building in open and distance learning, urging to carry out cross-cutting projects promoting accessible quality distance education tools reflecting regional, social and economic needs.

The establishment of the UNESCO Institute for Information Technologies in Education (IITE) will in general support such capacity building in distance education, as can be seen in its report on 'Distance Education for the Information Society: Policies, Pedagogy and Professional Development' (UNESCO, 2000b).

Within the framework of its policies, priorities and programmes UNESCO contributes to the development of capacity building in open and distance learning among other things by generating public interest in its use, sensitizing policy and decision-makers to its potential, assisting in drafting respective policies supporting the establishment of delivery systems, institutes and programmes, improving their management administration and student support systems material and course production and the training of personnel.

It also advises in the choice of information and communication technologies, supporting the establishment of regional and national distance education associations, facilitating the collaboration with international regional and sub-regional networks, and enhancing their partnership with information, communication, industrial and other related sectors, serving as an international clearing house, monitoring present and future open and distance learning activities, collecting, processing and disseminating relevant information and experience, and mobilizing internal and external resources to support capacity-building activities.

International co-operation

UNESCO's role in international co-operation for open and distance learning, which is part of its overall policy to face the challenges of the knowledge soci-

ety, consists of both intellectual co-operation and technical assistance. Great importance is given to international interregional and regional co-operation for the promotion of open and distance learning, such as awareness, confidence and capacity building, mapping of relevant experience, success and failures, networking between key players in distance education and educational technology, piloting and adapting educational technologies in different settings, shared development of learning systems programmes, and learning materials involving inter-country and industry-country exchanges and joint ventures, technology assessment, examining the actual costs and impact of alternative delivery systems, and support for the development of system-wide policy and planning on new technology in education.

Co-operation is pursued with intergovernmental organizations such as other UN system agencies, the Commonwealth of Learning, the World Bank, the Commission of the European Union, the Organization for Economic Co-operation and Development, regional development banks, private and public sector partners, non-governmental organizations, notably with the International Council for Open and Distance Education (ICDE) – which are competent to act in this field.

BIBLIOGRAPHY

Bang J, Baumeister H-P and Wilson K (1999): Virtual Seminars in European Studies, A Model for Collaborative Learning, in *Proceedings for the ICDE Conference in Vienna*, CD-ROM, 12 pp, Oslo, International Council for Distance and Open Education

Bang J, Baumeister H-P, and Wilson K. (1999): Collaboration as a Challenge, New Learning Environments embedded in old Traditions, in *Proceedings from EUNIS '99, Information Technology Shaping European Universities*, Helsinki

Bangemann, M et al. (1994): *Europe and the Global Information Society*. Recommendations to the European Council. Brussels: The European Council

Bates A.W. (1995): *Technology, Open Learning and Distance Education*, London: Routledge

Birkbeck College (2001): *The Principles of Protein Structure*, School of Crystallography, Birkbeck College, University of London, www.public-1.cryst.bbk.ac.uk/PPS, December

Bosch, A. (1997): Interactive Radio for Instruction: Twenty-Three Years of Improving Educational Quality, *Educational Training Technology Notes Series 2*, Washington, D.C., World Bank

Bradley J and Yates C (Eds.) (2000): *Basic Education at a Distance*, World Review of Distance Education and Learning, London: RoutledgeFalmer

Commission of the European Communities (1991a): *Memorandum on higher education in the European Community* (COM (91) 349 final)

Commission of the European Communities (1991b): *Open distance learning in the European Community* (COM (91) 388 final & SEC (91) 897 final)

Commission of the European Communities (2001): *The e-Learning Action Plan, Designing Tomorrow's Education*, COM (2001) 172 final, Brussels: Commission of the European Communities

Daniel, J. S. (1997): Mega-universities and Knowledge Media, Technology Strategies for Higher Education, London: Kogan Page

Ding, Xingfu (1994): Economic Analysis of the Radio and Television Universities in China. *Open Praxis, vol. 2*

Dock, A. and Helwig, J. (Eds.) (1999): Interactive Radio Instruction: Impact, Sustainability and Future Directions, *Educational Training Technology Notes Series 4*, Washington D.C., USAID/World Bank

Economic Commission for Africa (2002): *National Information and Communication Indicators (NICI) Country Profiles*, at www.bellanet.org/partners/aisi/nici/nici20%indicators.htm, January

Ellsworth, J.H. (1994): *Education on the Internet*, Indianapolis: Sams Publishing

Euler M and Von Berg D (1998): *The Use of Electronic Media in Open Learning and Distance Education*, Paris: UNESCO

Evans, T and Nation, D (1993): Education within and without classrooms: Sustaining quality through technological change. In Tait, A (Ed.): *Quality assurance in open and distance learning*' European and International Perspectives. Cambridge: The Open University

Floor P (Ed.) (1998): Beyond HUMANITIES, Long-term Strategy for ODL in University Environments and Virtual Mobility, Brussels, Coimbra Group

Floor P (2000): Networked Services for Quality Distance Learning, in *ODL Networking for Quality Learning,* in Proceedings of Lisbon 2000 Conference of the European ODL Liaison Committee, Lisbon

G8 Education Ministers' Meeting (2000): *Report*, Tokyo, April, at http://www.monbu.go.jp/g8/eng/eh1.htm

Hülsmann T (2000): *The Costs of Open Learning, A Handbook*, Bibliotek und Information System der Carl von Ossietsky Universität, Oldenburg, Germany

Miller, G (1993): *Distance education encounters new technologies*. American Independent Study Newsletter, Fall 1993

Mills, R. and Tait, A. (Eds.) (1996): *Supporting the Learner in Open and Distance Learning,* London, Pitman

Oblinger D (2001) Will e-Business Shape the Future of Open and Distance Learining?, in *Open Learning 16(1)*

Orivel, F. (2000): Finance, Costs and Economics, in Yates C and Bradley J (Eds.) *Basic Education at a Distance*, London, RoutledgeFalmer

Owston, R.D. (1997): The World Wide Web, A Technology to Enhance Teaching and Learning? In *Educational Researcher, 26*

Perraton, H (Ed.) (1993): *Distance Education for Teacher Training*. London and New York: Routledge

Perraton, H. (2000): Open and Distance Learning in the Developing World, London, Routledge

PricewaterhouseCoopers (2000): *Business Model for the e-University*. Main Report, available through www.hefce.ac.uk/pubs/HEFCE/2000/00_44.htm

Rumble, G. (1997): *The Costs and Economics of Open and Distance Learning*, London: Kogan Page

Rumble, G. (1999): Cost Analysis of Distance Learning, in *Performance Improvement Quarterly,* 12(2)

Rumble, G. (2001): The Costs and Costing of Networked Learning, *Journal of Asynchronous Learning Networks,* Vol. 5, Issue 2, September

South African Institute for Distance Education (1999): *Distance Education and Technology Choices in Southern Africa*, www.saide.org.za, April

Tait, A. (1997): *Quality Assurance in Distance Education: International Case Studies*, Vancouver: The Commonwealth of Learning

Tait, A. (2000): Planning Student Support in Open and Distance Learning, in *Open Learning*, 15 (3), 287-300

UNESCO (1985): Final Report: The 4th World Conference on Adult Education, Paris: UNESCO

UNESCO (1991): *Africa: A survey of distance education 1991*. New papers on higher education: Studies and research, No 4, Paris: UNESCO

UNESCO (l995): *Policy Paper for Change and Development in Higher Education*, Paris: UNESCO

UNESCO (1996a): *Medium-Term Strategy 1996-2001*, 28 C/4, Paris:UNESCO

UNESCO (1996b): *Learning: the Treasure Within.* Report to UNESCO of the International Commission on Education for the Twenty-first Century, Paris: UNESCO

UNESCO (1996c): Recommendations of the Second International Congress on Education and Informatics, UNESCO Institute for Information Technologies in Education, Moscow: UNESCO/IITE

UNESCO (1998): *Final Report*, World Conference on Higher Education, Paris: UNESCO

UNESCO (2000a): *The Dakar Framework for Action, Education for All: Meeting Our Collective Commitments*, adopted by the World Education Forum Dakar, Senegal, 26-28 April 2000, Paris: UNESCO

UNESCO (2000b): Analytical survey, *Distance Education for the Information Society, Policies, Pedagogy and Professional Development*, UNESCO Institute for Information Technologies in Education, Moscow: UNESCO/IITE

UNESCO (2000c): *Final Report*, World Education Forum (Dakar, Senegal), Paris: UNESCO

UNESCO (2000d) *The Experience of Internet Usage in Education, an Analytical Survey*, UNESCO Institute for Information Technologies in Education (IITE), Moscow: UNESCO/IITE

UNESCO (2001a): *Distance Education in the E-9 Countries, The Development and Future of Distance Education Programmes in the Nine High-Population Countries*, Paris: UNESCO

UNESCO (2001b): *Medium-Term Strategy 2002-2007* Contributing to Peace and Human Development in an Era of Globalization through Education, the Sciences, Culture and Communication (31C/4), Paris: UNESCO

UNESCO (2001c): *UNITE:* UNESCO's New Information and Communication Technologies and Education Programme, UNESCO Education Sector, Paris: UNESCO

UNESCO (2001d): *Teacher Education through Distance Learning, Technology – Curriculum – Evaluation – Cost*, Paris: UNESCO

UNESCO (2001e) *Applying New Technologies and Cost-Effective Delivery Systems in Basic Education*, Thematic Study for the International Consultative Forum for Education for All (Dakar, Senegal, April 2000), Paris: UNESCO

UNESCO (2001f) The New Information and Comunication Technologies For the Development of Education, Science and Culture, 161 EX/INF.12, Paris: UNESCO

UNESCO (2001g): *Some reflections on the challenges facing distance education*. Address by Mr. Koïchiro Matsuura, Director-General of UNESCO, at the Indira Gandhi National Open University, New Delhi, 24 July

UNESCO (2002a): *Building Knowledge Societies*, 164EX/INF.6, 25 April, Paris: UNESCO

UNESCO (2002b): Address by Mr. Koïchiro Matsuura, Director-General of UNESCO, on the occasion of the opening of the First Session of the Intergovernmental Council for the Information for All Programme, 15 April, Paris: UNESCO

Van den Branden J and Bang J (1998): ODL, ICT and the HUMANITIES Model, in Floor P (Ed.) *Beyond HUMANITIES, Long-term Strategy for ODL in University Environments and Virtual Mobility*, Brussels, Coimbra Group

The present paper aims to review open and distance learning in the context of present challenges and opportunities, describe relevant concepts and contributions, outline some significant current global and regional trends, suggest policy and strategy considerations and identify UNESCO's initiatives in this area, including its role in capacity building and international co-operation.

While the paper is not intended to impose any particular policy or model, it is hoped that it will assist Member States, especially the developing countries, in defining appropriate policies and strategies helping them make the best use of available distance learning technologies corresponding to different cultural contexts and stages of development.