



UNESCO at the World Summit on the Information Society

Education and Knowledge Societies

ROUND TABLE DISCUSSION

Geneva, Switzerland
11 December 2003



UNESCO Institute
for Information Technologies in Education

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TITLE	EDUCATION AND KNOWLEDGE SOCIETIES
TYPE	ROUND TABLE DISCUSSION
DATE	11 December 2003
TIME	9.30 a.m. – 1.00 p.m.
PLACE	Geneva Palexpo, Room C
ORGANIZER	UNESCO Institute for Information Technologies in Education (UNESCO IITE)
PARTNERS	The Club of Rome (CoR); the International Federation for Information Processing (IFIP); the International Council for Open and Distance Education (ICDE); the International Association of Universities (IAU); University of Mauritius, Virtual Centre for Innovative Learning Technologies (VCILT) and Lifelong Learning Cluster (LLC); the Food and Agriculture Organization of the United Nations (FAO); the NGO-UNESCO Liaison Committee

TABLE OF CONTENTS

Agenda

Welcome address / DANIEL, John

Introduction: Education for Evolving Societies / KINELEV, Vladimir

Preamble to the Round Table discussion / CORNU, Bernard

SESSION I: Education for Knowledge Societies: Trends, Challenges and Policies

Preamble to the Session I / CORNU, Bernard

Education and Knowledge Societies / ADAMKUS, Valdas

Knowledge Sharing and International Cooperation in Science Education / WEI, Yu

ICTs as an Innovator for Sustainable Development / WEILER, Raoul

SESSION II: Education in Knowledge Societies: Strategies, Tools, Teaching and Learning

Preamble to the Session II / MOREL, Raymond

_____ / FARRUK, M. Osman

Education for Knowledge Societies: Learning to Work with Insecure Information & Communication Technologies / BRUNNSTEIN, Klaus

Teacher's Training: Central Challenge for Knowledge Societies / LOING, Bernard

Lifelong Learning in the Knowledge Society: Is There a Role for Higher Education? / van WEERT, Tom J.

Facilitating Lifelong Learning in Universities: the Role of ICTs / LANGLOIS, Claudine

Technology-enhanced Education, Open Educational Resources and Non-formal Approaches to Lifelong Learning for Sustainable Development / SENTENI, Alain

Open Educational Resources / JOHNSTONE, Sally M.

SESSION III: UNESCO as a Key Actor in the Development of Education for and in Knowledge Societies

Preamble to the Session III / BOLLERSLEV, Peter

The Challenges for Education and Knowledge in the Information Society / SENDOV, Blagovest

FAO-UNESCO Partnership on E-learning for Information and Knowledge Management / RUDGARD, Stephen; MANGSTL, Anton

PARTICIPATING ORGANIZATIONS

UNESCO Institute for Information Technologies in Education (IITE)

The Club of Rome (CoR)

The International Federation for Information Processing (IFIP)

The International Council for Open and Distance Education (ICDE)

The International Association of Universities (IAU)

University of Mauritius, Virtual Centre for Innovative Learning Technologies (VCILT) and
Lifelong Learning Cluster (LLC)

The Food and Agriculture Organization of the United Nations (FAO)

The NGO-UNESCO Liaison Committee

LIST OF PARTICIPANTS

AGENDA

9:30

OPENING OF THE ROUND TABLE “EDUCATION AND KNOWLEDGE SOCIETIES”

Mr John Daniel, UNESCO
ADG/ED;

Mr Vladimir Kinelev, Director,
UNESCO IITE

SESSION I

Session I

“Education for Knowledge Societies: Trends, Challenges and Policies”

Chair and moderator:

Prof. Bernard Cornu (France),
Director, La Villa Media – the
European Residence for
Educational Multimedia; Vice-
Chairman of the IITE Governing
Board

Paper 1

General introduction

*Education and Knowledge
Societies*

Prof. Bernard Cornu

Mr Valdas Adamkus (Lithuania),
UNESCO Goodwill Ambassador for
the Construction of Knowledge
Societies; Former President of the
Republic of Lithuania

Paper 2

*Knowledge Sharing and
International Cooperation in
Science Education*

Dr Yu Wei (China), Director,
Research Center of Learning
Sciences, Southeast University; Vice
President of China Association of
Science and Technology; Former
Vice President of All China Women's
Federation; Former Vice-Minister of
Education of the People's Republic of
China

Paper 3

*ICTs as an Innovator for
Sustainable Development*

Prof. Raoul Weiler (Belgium),
Professor, University of Leuven;
Member of the Executive Committee
(International) of the Club of Rome
(CoR)

Debate

Audience

10:35

Session II

“Education in Knowledge Societies: Strategies, Tools, Teaching and Learning”

(During the session: video link
with the International Conference
on Open and Online Learning
organized under UNESCO's
sponsorship in Mauritius)

Chair: Prof. Bernard Cornu

Moderator: Prof. Raymond Morel
(Switzerland), Director, Geneva
Educational Technology Centre
(CPTIC)

SESSION II

Paper 1

General introduction

Prof. Raymond Morel

Dr M. Osman Farruk (Bangladesh),
Minister of Education of the People's
Republic of Bangladesh

SESSION II

Presentations on Lifelong Learning

Paper 2

Education for Knowledge Societies: Learning to Work with Insecure Information & Communication Technologies

Prof. Klaus Brunnstein (Germany), President of the International Federation for Information Processing (IFIP)

Paper 3

Teacher's Training: Central Challenge for Knowledge Societies

Prof. Bernard Loing (France), Intergovernmental Liaison Officer and General Delegate of the International Council for Open and Distance Education (ICDE) at UNESCO

Lifelong Learning in the Knowledge Society: Is There a Role for Higher Education?

Drs. Tom van Weert (the Netherlands), Chair "ICT and Higher Education", Professional University of Utrecht

Facilitating Lifelong Learning in Universities: the Role of ICTs

Dr Claudine Langlois, Director, International Association of Universities (IAU)/UNESCO Information Centre on Higher Education

Technology-enhanced Education, Open Educational Resources and Non-formal Approaches to Lifelong Learning for Sustainable Development

Prof. Alain Senteni (Mauritius), Director, Virtual Centre for Innovative Learning Technologies (VCILT), University of Mauritius (via video link)

Open Educational Resources

Dr Sally M. Johnstone (USA), Executive Director, Western Cooperative for Educational Telecommunications (WCET), Western Interstate Commission for Higher Education (WICHE) (via video link)

Debate

Audience

11:50

Session III

"UNESCO as a Key Actor in the Development of Education for and in Knowledge Societies"

Chair: **Prof. Bernard Cornu**

Moderator: **Prof. Peter Bollerslev** (Denmark), Director and Editor in Chief at SAXO Publishers

SESSION III

Paper 1

General Introduction

Prof. Peter Bollerslev

The Challenges for Education and Knowledge in the Information Society

Academician Blagovest Sendov (Bulgaria), Bulgarian Ambassador in Japan; Former President of Parliament of the Republic of Bulgaria

SESSION III

Paper 2 *FAO-UNESCO Partnership on E-learning for Information and Knowledge Management*

Dr Anton Mangstl, Director, Library and Documentation Systems Division, Food and Agriculture Organization of the United Nations (FAO);

Dr Stephen Rudgard, Chief, WAICENT Outreach, Library and Documentation Systems Division, FAO

Paper 3 *ICTs in Knowledge Societies: a Tool for Access, Equity and Quality*

Mrs Monique Fouilhoux, President of the NGO-UNESCO Liaison Committee, President of the International NGOs Conference

Debate

Audience

Discussion and adoption of the final document of the Round Table

Prof. Bernard Cornu

Closure of the Round Table

Mr John Daniel,

Mr Vladimir Kinelev

13:00 End of the Round Table discussion

BRUNNSTEIN, Klaus

Professor for Application of Informatics, University of Hamburg (1973-Present)

President of the International Federation for Information Processing (IFIP) (2002-Present)

Field: Social implications of computing, esp. Ethics

Professional Career:

1969-1973: Secretary, commission for the foundation of Institute for Informatics at Hamburg university, working group on "Informatics aspects of Computer-supported Learning"

1965-1973: Computer Center, coordinator of system and networks for High Energy experiments, German Electron Accelerator (DESY), Hamburg

1962-1965: University of Hamburg, Institute for Shipbuilding, doctoral work on theoretical hydrodynamics of ship propulsion

Educational Background:

1967: Doctoral degree (Dr. rer. nat. in Theoretical Physics/Applied Mathematics)

1962: Diploma in Theoretical Physics

Born: 1937

Education for Knowledge Societies: Learning to Work with Insecure Information and Communication Technologies

Only now, 60 years after the advent of first computers in universities and enterprises, modern Information and Communication Technologies (ICTs) have invaded many areas of education, enterprises, organisations and government, as well as individual and social life, at least in the developed spheres. At the same time, modern computer and communication devices have contributed significantly to reshape structures, tasks and requirements in all kinds of institutions with the benefits for new fields of production and service but with the losses of traditional jobs and enterprises. There is no doubt that the next generation of computing and communication devices will keep invading many – if not all – areas, and their application will continue to change contemporary structures and tasks further.

With special focus upon the development of interoperable and distributed applications, traditional ways of computing will be modified in favour of innovative infrastructures where computing devices are a commodity deeply embedded and hardly distinguishable from devices, services and functions. Consequently, such systems will become even more complex, difficult to understand and control. As this development will take place on a global scale, its pace and direction can hardly be controlled by local or regional mechanisms such as laws and regulations.

It is well known that today Information and Communication Technologies are so complicated that even experts have difficulties to understand their work, and especially to recognize why and when such systems misbehave. Every computer user knows that contemporary ICT systems rather often fail to work properly and even crash, and that these systems tend to misbehave, especially in instances least suited for a user (well known as "Murphy's laws"). While many regard the Internet as an infrastructure to support human hopes for more democracy and self-

determination, most – if not all – users have experienced the invasion of malicious software - viruses, worms, Trojan horses - and other malign content – spamming, spyware, unwished marketing – in their local systems. It is also broadly known that most of these problems are based on the insufficient quality of software, and that some are deeply inherent in design faults, e.g. of the Internet Protocol, which permits address spoofing, content sniffing and many forms on attacks on useful e-services.

With further increase of system and software complexity, weaknesses of contemporary technologies– aka¹ “InSecurity” – will unavoidably grow in the same way. It implies that the first affect of growing complexity will make impossible to understand the details of how devices and functions, systems and software actually work. Moreover, the second consequence is that the unwished side effects – incidents or attacks – will be a part of future work with the ICTs. In principle, complexity and insecurity may be reduced by proper design, implementation and usage, but the contemporary methods used to develop next generation systems are not adequate to help containing these technological risks.

Unavoidable, mounting complexity will lead to an equally growing dependence of all kinds of institutions and individuals on ICTs. Meanwhile, increasing faults of systems and software will lead to likewise growing vulnerability of institutions and individuals. This raises the question how users can learn to use the overly complex and insecure technologies for the best of their institutions and themselves.

Very often the answer is: “adequate” education with significant change in focus though.

The 1st lesson to learn (and to implement in curricula) is: contemporary ICTs are a major part of everybody’s life. Therefore, ICT literacy (which is significantly more than contemporary computer and media literacy!) is a MUST for everybody. Moreover, this applies also to pre-school education. Consequently, usage of ICTs must become an object of education as early as in families and kindergarten to be continued in school.

Being well-known and accepted, the 2nd lesson is less understood: as ICTs are so complex, there is NO HOPE that users can EVER understand what is going on in deep layers of these devices, network layers and systems. Consequently, education must essentially help make users be aware how best to control whether their devices and services do what they are expected to do. It means: rather than teaching how to program, schools must concentrate on the tools and methods with which information is processed, stored and transmitted.

The 3rd lesson is that the usage of modern ICTs will be accompanied by unwished – if not malevolent and sometimes criminal-intended – side effects. Consequently, education must help children be always aware that the results of their ICT-based work may not be what they expect or should get. Consequently, education must help children and students develop attitudes of due care and plausibility control.

Proper education will be important to enable individuals to take advantage of the benefits of these technologies, as well as they must become aware of the risks and shortcomings. Similarly important will be the fact that the related technologies – even if overly complex and insecure – will be developed and used with respect for individual and social needs. Consequently, ethics of ICT and its usage must also be a major subject in education.

¹ aka - also known as

Remark: this paper reflects the personal view of the speaker, based on his background as a specialist in ICT security with the focus on risk analysis/risk management, analysis of ICT incidents and attacks, and as a teacher and expert in Forensic Informatics. It does not reproduce the views of IFIP community as represented by IFIP Technical Committee TC-3 "Education".

BOLLERSLEV, Peter

Director and Editor in Chief at SAXO Publishers (2003 – Present)

Field: Mathematics and informatics in teacher education

Professional Career:

2000-2003: Chief Consultant in Gyldendal Education (Publishing House)

1998-2001: President of International Federation for Information Processing (IFIP)

1970-1993: Her Majesty's Inspector for Teacher Education, Ministry of Education, Denmark

1962-1999: Professor in colleges of education

Educational Background:

1959: Mathematics, University of Copenhagen, Denmark

Born: 1936

Preamble to the session III. UNESCO as a Key Actor in the Development of Education for and in Knowledge Societies

Three speakers at this session will contribute the ideas on how in the future UNESCO can best engage in and stimulate the development of education for and in the new kind of society we are building.

With the experience from the past as a background they will present the opinions about how Information Society can respect and at the same time overcome such obstacles as cultural diversity, linguistic diversity, digital divide, gender disparities, illiteracy, different economic opportunities etc.

With their visions of the future in mind the speakers will recommend certain important items to be included in a strategic plan of action for mutual development toward the realization of Knowledge Society as a society where citizens are prepared for life through education, where the conditions are at their optimum.

The power of ICTs in the process will be defined and described as well as how ICTs can benefit the world and, particularly, be used to improve the quality of life for the majority of peoples who live in LDCs, despite the digital divide between the rich and the poor, urban and rural societies, men and women, and different generations.

In this session they will consider and comment on a number of specific themes, which are the suggestions that UNESCO should undertake a specific role and responsibility for action within its field of competence:

1. UNESCO should establish an information bank where experiences in the use of ICTs in education are collected and grouped according to comparable environments and circumstances.

As a part of this approach a "Handbook of Good Practices and Success Stories" could be developed and launched, based on compilation of contributions from all stakeholders, in a compelling format. The handbook could be re-issued periodically and turned into a permanent experience-sharing exercise.

2. In collaboration with other international agencies UNESCO should set up models of in-service training and professional development of teachers who make effective use of the approaches, facilities and opportunities provided by ICTs.
This is in line with the spirit of the "Education for All" action plan.
It will help define, which education is needed in Information Society and, what is learning and teaching in Knowledge Society.
3. UNESCO should develop strategies to establish an infrastructure for ICTs in LDCs, which would help in fighting illiteracy through Life Long Learning projects.
UNESCO should advice governments on comprehensive and forward-looking strategies to be developed in response to new human needs, including the creation of an environment that supports information and ICT literacy, Lifelong Learning for public at large. Everyone should be offered an opportunity to acquire the necessary skills in order to understand, participate actively in, and benefit fully from Information Society and the knowledge economy. This is a matter of "Capacity Building for All".
4. UNESCO should develop strategies to use ICTs in education in order to overcome gender disparities, especially in LDCs.
The Information Society should be subject to universally held cultural and ethical values such as truth, justice, solidarity, tolerance, human dignity, shared responsibility, transparency and accountability. The use of ICTs can facilitate social integration of excluded segments of societies.
The use of ICTs for education and human resource development, in both formal and informal learning environments, should be promoted, with a special reference to the requirements of disadvantaged groups, and to the specific needs of girls and women.
UNESCO should, therefore, advice governments how to design, develop and adapt ICT infrastructure, tools and applications that are responsive to the needs of the poor, including women.

The speakers have also been invited to consider the action items in WSIS Draft Action. Most of them relate to the above-mentioned themes and, in general, to the involvement of UNESCO in the process of using ICTs to let the Information Society encompass LDCs.

The speakers have been requested to end their presentation with some principles and recommendations.

A final discussion should then lead to a short list of well-built principles and recommendations from session 3.

ADAMKUS, Valdas

UNESCO Goodwill Ambassador for the Construction of Knowledge Societies Former President of the Republic of Lithuania

Field: Environment protection, ICTs and policy-making

Professional Career:

- 1998 – 2003: President of the Republic of Lithuania
- 1983: Chairman of the Organizing Committee of the World Lithuanian Games
- 1972 – 1997: Administrator at the U.S. Environment Protection Agency (EPA)
- 1970 – 1972: Deputy Administrator at the U.S. Environment Protection Agency (EPA) Region 5 (Great Lakes Region)
- 1967: Chairman of the SANTARA-SVIESA (Accord-Light), Association of Lithuanian students in the USA
- 1961-1964: Member of the Board of the American-Lithuanian Community (LC), Vice-Chairman of the Board, member of the American-Lithuanian Council (ALC)
- 1958 – 1965: Vice-Chairman of the SANTARA-SVIESA (Accord-Light)
- 1957 – 1958: Chair of the Board of the Santara (Accord)
- 1949 – 1996: Secretary General and Chairman of the Physical Education and Sports Committee
- 1946 – 1948: World YMCA organization

Educational Background:

- 1960: Master's degree (Engineering), Illinois Institute of Technology, USA
- Undergraduate degree (Natural Science), Munich University

Born: 1926

Education and Knowledge Societies

Education and knowledge societies are linked with each other on a fundamental basis. Knowledge societies may be neither built nor developed without education. Education is a keystone of building the knowledge society as well as of its existence.

Developed knowledge societies first of all mean a quality education accessible to everyone. They build on well-educated people, able to use their knowledge independently. Also knowledge societies focus on life-long learning that makes the knowledge society work. In the era of rapid changes, where up-to-date information so quickly becomes out-of-date information, it is impossible to learn things "once and forever". Only continuous learning makes us feel safe in the fast changing world of information. Hence, it follows that the knowledge society is a learning society by definition.

The Lisbon European Council's conclusion that "the move towards life-long learning must accompany a successful transition to a knowledge-based economy and society" is applicable to all countries, which have chosen to build a knowledge society.

Transition towards the knowledge societies is inseparable from the essential education reforms. Therefore, continuous learning and lifelong learning should become a paradigm of renewed education.

What are these particular changes that would help people to establish themselves and then successfully integrate into the knowledge societies? In many countries this question is a matter

of theoretical discussions as well as an issue of practical implementation of the education policy. The actions taken toward building the knowledge society are two-folded.

On the one hand, practical actions can be oriented toward education reform and modernization of the education system marked by transition from closed educational of industrial society, to open and flexible forms of education of information society. The existing forms of formal, non-formal or informal learning are gradually merging into integral space of overall education.

Such open education space would provide best conditions for people to choose desirable forms, timing and location for studying. Distance learning and diverse forms of training at work would gain momentum in this case. Formation and development of modern business enterprises acknowledging the value of continuous learning is not of the least importance either. Transition to credit-based and "accumulative" learning depends on the establishment of a flexible system of evaluation of knowledge, skills and qualifications and acknowledgement of the results. An adequate fiscal policy designed to stimulate both corporate and private investment into lifelong learning, should accompany the modernization of the education system.

On the other hand, in order to meet the demands of the knowledge society, the content and methods of teaching must be essentially renewed. The knowledge society requires adequate cultural and social competence of a person as well as new skills and abilities. Speaking of skills: skills to learn continuously, ability to find, choose and make critical assessments of information, analyze and to use information to accrue personal and public benefit. The age of information poses a great danger both for an individual and a society threatening to undermine their independence and identity, if they are not culturally consolidated and have not developed adequate skills.

The knowledge society changes the role of a teacher and a school dramatically. Today it is not enough for teachers to be just knowledge transmitters - they shall assume new roles: those of moderators, learning partners, mediators between students and the information environment.

These are just very rough and general guidelines for education reforms. However, in the meantime we have more questions than answers related to the modernization of education and its adaptation to the needs of the knowledge societies. It is therefore critical to learn from the best experiences and to exchange information with other countries. And furthermore, neither modern education reform nor successful building of knowledge societies is possible without close cooperation among governments, NGOs, business and public communities, without joint discussions, joint decisions and joint actions.

WEILER, Raoul

Member of the Executive Committee (International) of the Club of Rome
President of the Brussels-EU Chapter of the Club of Rome
Vice President of the European Academy of Sciences and Arts, Salzburg, Austria
Professor of the University of Leuven, Faculty of Agricultural and Applied Biological Sciences, Center for Ethics on Agriculture, Life Sciences and Environment (1997 – Present)
Consultant in ICT and management

Field: Study of and teaching on the relation between society and technology

Professional Career:

1970-1996: Chemical Industry as researcher, engineering and ICT manager
1966-1969: Post doctoral Fellow at the University of North Carolina at Chapel Hill, USA;
The Catholic University of America, Washington DC, USA; Université Paris V, France

Educational Background:

1966: Doctoral degree (Applied Biological Sciences), University of Leuven, Belgium
1962: Master's degree (Bio-Engineering, Chemistry), University of Leuven, Belgium

Born: 1938

ICT as an Innovator for Sustainable Development

1. Introduction

The contributions of ICT to sustainable development are manifold, and all sectors of the daily life will be affected. Futurologist **Ray Kurzweil** pictures a 'time line' till the end of this century in his book *The Age of the Spiritual Machines*, Viking (1999). In about twenty years a computer device of about \$1,000 will have the computational ability approximately of human brain. Computers will be largely invisible and embedded everywhere, paper books and documents will be rarely used, and most learning will be conducted through intelligent, simulated software-based teachers, etc. (page 278). Even when these forecasts have a prophetic character, nobody doubts that ICT is at the edge of revolutionizing our society profoundly, therefore, frequently designated as a paradigm shift.

Does this technology possess the potentiality to become a major innovator for sustainable development and for reaching a sustainable world society? This is, in fact, a major question in the light of this World Summit. Sustainability is an overarching issue for the mankind and cannot be put aside during the summit.

Reaching a sustainable global society implies that fundamental aspirations, expressing the desire to share a decent living of all people on earth, have to be fulfilled. This means *in concreto*: fast alleviation of extreme poverty, sufficient food supply and shelter, improved basic health care, reduction of adult as well young illiteracy, correct use of the ecological system, including its resources, by industrial societies. This world '*problématique*' has amplified with almost doubled world population during this century.

ICT has the potential to cope with these situations as well as intrinsic power to bring about 'quantum jump' solutions: ICT is a part of the '*résolutique*' for these global problems.

Sustainable societies will be attained only when the alleviation of poverty is made convincingly apparent. Several international conferences have stated that education of people is the best way, if not the only one, to realize its eradication. ICT is a new tool for 'leapfrogging' to this objective as well as it is the key to bring developing countries in the information and knowledge age. Information and, successively, knowledge are the instruments for local innovation and local entrepreneurship embedded in the local traditions, habits and cultures.

2. Perspective of the Club of Rome

From the very beginning the Club of Rome has paid considerable attention to the problem of education. As early as 1979 the report to Club of Rome *No Limits to Learning. Bridging the Human Gap* (1979, 1998) by **James W. Botkin et al.** was published.

In 1997, the United Nations University commenced its new International Leadership Academy with an ambitious program hosted by the Government of Jordan and held in Amman, on the campus of the University of Jordan. Our Honorary Member **Harlan Cleveland** held a series of lectures *Leadership and the Information Revolution*. In the lecture *The Global Fairness Revolution* he writes: 'As information - abundant, shareable, and instantly accessible - now becomes the world's dominant resource, what does that mean for the prospect of fairness? Surely it means that people who get educated to convert information into knowledge and wisdom, who hone their intuitive powers, who learn to achieve access to information and (even more important) how to select what they need from the information overload, will likely be better off and more fairly treated than those that don't.' (p. 30).

The activity of 'education' is of all times, from the very first moments of the appearance of man on earth. In his book and report to the Club of Rome *Global Population Blow-up and After* (to be published, 2003), our colleague **Sergey Kapitza**, advances a non-linear mathematical formalism of the growth of mankind. The formalism presents a time constant to which the author gives the following interpretation: 'the time constant of 45 years for the multiplication of humanity is not set by a rate of procreation, but by an information based process of educating the next generation, and that is what limits the growth rate. In other words, in the population blow-up we have hit a systemic crisis of time for bringing up, educating and training the next generation.' (p.144).

3. Education for Knowledge Sharing and Capacity Building for Sustainable Development

The 'digital divide' is but one element of a broad gap that separates the rich from the poor. Development of appropriate ICT has the potential to narrow the gap. However, the broadening of participation in and responsible engagements with the information society must also focus on education and in a later phase on entrepreneurship. The efforts must also go far beyond simple provision of access to infrastructure, affordable terminals and services. Education and innovation are linked to the creation of knowledge and its dissemination in communities.

Education for ICT. People need skills and knowledge in order to handle the information flows they will be confronted with. Education for ICT is necessary to promote the use of local knowledge with new technologies. To allow the emergence of "multiple modernities", indigenous knowledge has to be fully integrated into the new social reality. Cultural and linguistic diversity is to be fostered as an element of global cohesion.

ICT for Education. As education is necessary in order to develop information and knowledge societies, ICT has to be used to develop education systems. It empowers society to develop new learning methods, to promote distance learning, to create virtual libraries and universities, to assist with innovation and training. In the domain of social innovations in education and health-care, ICT allows greater peer support among pupils and teachers, at the local and community level. All world universities and higher schools have to be connected in the same sort of high-speed network for research, education and collaborative development as is available in Europe and the US.

ICT for Capacity Building. Equity and social cohesion are prerequisites for attaining sustainable communities and societies. Capacity building is people-centred development deeply embedded in this social, economic and political environment. Capacity building has to be designed to promote change, to reduce vulnerabilities and to motivate local populations, and implies a long-term investment in people. ICT offers new possibilities to accelerate learning processes for basic education as well as for enhanced skills training in many domains.

Successful 'Bridging the Digital Divide' requires a simultaneous development of infrastructure of ICT networks mostly accompanied by decentralized electrical power to be installed, and training of future teachers. Governments insist too frequently on their efforts to shape an infrastructure and overlook the problem of teachers' training and conditions for acceptance. In the absence of a simultaneous implementation of the human, technical as well as financial investments, the risk is real that they will miss the objectives and expectations ICT can offer for further development.

4. Resource Use and Cultural Diversity as Part of Sustainable Development

Information systems play an essential role in reaching environmental targets for sustainable development. At WSSD in Johannesburg, the Plan of Implementation lists numerous actions on environmental preservation and climate change, which cannot be realized without the support of ICT. These technologies can enable systematic and comprehensive monitoring to protect and conserve Earth's ecosystem: the protection of forests against uncontrolled exploitation, the protection of oceans and coastal areas against large-scale pollution, and of the marine environment against land-based activities. We also need a monitoring system to mitigate the effects of desertification, drought and floods, to measure climate change, to monitor land and natural resource use, and to manage rescue efforts after large-scale disasters. There will be sustainability when resource use is in relation with its availability, this means equitable use for the present generation and the ones to come.

The accumulation of very large amounts of data about the eco-system as well as about their use in industrial production processes, their effective use and archiving for the far future requires a global structure and management facilities. The third *Conference on the Digital Earth* in BRNO, 2003, Czech Republic, has taken a step in the right direction. The availability and use of data about the Earth's co-evolution with mankind will allow the modeling of future scenarios, and will provide national and world leaders with the necessary tools to make decisions.

We must develop culturally diverse, tolerant and vibrant societies in which individuals have the opportunity to pursue actively and fulfil their primary need of a sense of identity and a sense of belonging. The elaboration of an overarching vision of a world with "multiple modernities", with communities rather than ideologies in which different cultures peacefully coexist, a world of "learning communities" in which no culture imposes its values on others,

and where “indigenising modernity” and “learning from each other” are values in themselves has the highest priority, especially, in the frame of this world summit.

5. Technology Transfer and Innovation for Sustainable Development

Many developing countries recognise the unique potential of the knowledge resources of their own people and culture. Indigenous knowledge holds great promise in providing the means of eliminating the alienation many people feel from science and technology and ICT, especially. Several original knowledge projects have already shown a rich potential for better development, as well as for new technological innovation. Technology transfer and the adoption of technologies is a human-centred process, and it has to be ensured that as many as possible people master modern technologies, especially ICT, and integrate them in their social activities, including education, delivery of services and economic activity.

Far more attention should be paid to the receptor capacity for technology transfer in the developing world. A policy for sustainable development should shift from the notion of technology transfer to a far broader concept of “technology and knowledge partnerships”. Partnerships between local communities and suppliers have to be based on mutual respect and recognition and are prerequisite for any further development. Technology transfer has to be a shared process between partners, allowing the receptors to pursue, in later stages, the development with local research institutions, universities or business partners. Governments of developing countries need to invest in R&D, as well as the private sector needs to have incentives to do the same. However, in the economic structure of many developing countries this process is made more difficult when large global corporations, that earn significant revenue from developing countries, fail to do research and development in these countries. There should be an obligation for proper R&D investment tied in some meaningful way to the revenues earned by these companies, especially when the countries themselves are investing in R&D.

Sustainable development will not be achieved unless there is a redirection of the efforts to develop the full potential of people through education, which includes mastery of modern technologies. The emerging networked knowledge society has to integrate the richness of indigenous knowledge as well as to assimilate eco-centric and anthropocentric visions of a sustainable world society. ICT allows worldwide communication among populations and has the innovative potential in the coming decades to enhance a multilateral understanding. At the world level a new global ethics of human solidarity is needed.

WEI, Yu

**Director of Research Center of Learning Sciences, Southeast University, Nanjing, China
(2002 – Present)**

Vice President of China Association for Science and Technology

Vice President of All China Women's Federation (1988 - 2003)

Academician of Chinese Academy of Engineering

Field: EE, Biomedical Engineering, Learning Science

Professional Career:

1993 – 2002: Vice-Minister of Education, China

1986 – 1993: President of Southeast University, Nanjing, China

1966 – 1993: Assistant Lecturer, Association Professor, Professor and Dean of BME, Southeast University, Nanjing, China

Educational Background:

1981: Doctoral degree (Electrical Engineering), TH Aachen, Germany

1965: Master's degree (Electronics), Nanjing Institute of Technology (now Southeast University), China

1961: Undergraduate degree (Electronics), Nanjing Institute of Technology (now Southeast University), China

Born: 1940

Knowledge Sharing and International Cooperation in Science Education

Rapid development of science and technology as well as the globalization of economy are driving the world from the knowledge - based economy towards the knowledge - based society. This tendency poses serious challenges to education sector, that is, how to offer more people the opportunity to join this development and benefit from it. A top priority is to provide the chance to every citizen, especially our children, to leap onto the platform of the Internet or the Internet alike, and link to the information society pushed by the information waves.

China is a vast developing country with great diversities between cities and countryside. In order to narrow the digital division among areas, the Chinese Ministry of Education has set up a network infrastructure popularly known as “heaven and earth combined” IT-based distance education system covering cities and remote areas as well. Using this infrastructure, two projects “The Project of Training Female Teachers for Tomorrow” and “The Project of Modern Distance Education in Primary and Secondary Schools in Western China” have been successfully carried out in cooperation with LI Ka Shing Foundation in Hong Kong. 10,000 sites have been put into operation. Its supporting system, including universities, local authorities and institutes of distance education, has been developed. In the next five years, the Chinese government has planned to popularize this infrastructure in more areas. It is proven that, if we can take teachers into serious consideration and offer concrete help to them, teachers in the countryside, including women teachers, can meet the demands of IT technology and join the development of the information society.

The changes of education in the knowledge - based society indicate not only the building of new hardware infrastructure, but the changes in the learning methods, even the living styles. A joint effort in science education, called ‘Hands on Inquiry-Based Learning’, initiated by the

international scientific society has spread from the U.S.A. to France, and now to many developing countries like China, Brazil, Malaysia, etc. This education innovation is expected not only to improve the knowledge acquisition, though it is important, but also guide our children to a better way to learn and a correct way to learn.

Building infrastructure, innovating learning philosophy and process, as well as knowledge sharing require joint efforts of governments, international organizations, NGOs and private sectors. UNESCO can take its leading and important role in accomplishing the goal of quality education for all with equality and equity.

Preamble to the session 2. Education IN Knowledge Societies: Strategies, Tools, Teaching and Learning

Moderator : Prof. Raymond Morel

Four speakers at this session will address the question of Education in Knowledge Society. In such a society, education takes a specific dimension and particular forms. For instance, OECD has published a study about the school of the future, with six possible scenarios for the place and role of schools in future societies. How can UNESCO and other national and international bodies in the future promote and facilitate the development of education for and in such new type of a dynamic society.

According to the discussion of the first session and taking in account some main priorities of UNESCO for 2004-2005 (as decided two months ago, i.e. education for all, ethics in sciences and technologies, cultural diversity and access to information and to the knowledge), four speakers with their experience will present their opinions about some urgent questions such as:

- What is learning in a knowledge society? Are there specific new forms of learning?
- What means teaching in a knowledge society? What are the place and role of a teacher in a knowledge society and how to facilitate this evolution?
- How can ICTs help teaching and learning in a knowledge society?
- Which new tools and resources should be available for teaching and learning in a knowledge society?
- What should be the specificities of educational policies in the ICTs context and in a knowledge society?

The session will regard the "Youth Declaration" adopted at IFIP WCC in Montreal (2002), as well as the output of WITFOR 2003 Conference.

In this session the speakers will consider a number of specific themes coming from their fields of competence:

- From a ministerial point of view what is a national educational policy in a knowledge society and how can it contribute to new forms of teaching and learning? How to formulate core principles of educational policies in knowledge societies and to suggest possible actions?
- How can international cooperation and international organizations contribute to develop education in knowledge societies? How to promote research, development, pedagogy, cooperation, etc? How to formulate core principles of international cooperation in knowledge societies and to suggest possible actions?
- On the new forms and tools for Education in knowledge societies, particularly Open and Distance Education: What are the new needs, new trends, and new questions? How to formulate core principles of new educational resources and tools in knowledge societies and to suggest possible actions?
- On the issue of Life Long Learning, which is its place in knowledge societies? What are the tools and resources needed? How to formulate core principles for Life Long Learning in knowledge societies and to suggest possible actions?

The speakers have been invited to consider the action items in WSIS Draft Action. Most of them relate to the abovementioned themes and, in general, to the involvement of UNESCO and other

bodies in the process of integrating ICTs to enrich innovation process for Information Society, thus, to contribute to the emerging Knowledge Society.

The speakers have been requested to end their presentation with some principles and recommendations.

A final discussion should then lead to a short list of strong principles and recommendations from session 2.

Preamble to the Round Table discussion

Information and Communication Technologies (ICTs) have brought profound changes in society and education. They are so huge that new concepts of the society appeared: information society, communication society and knowledge society. The changes are not only technological: they address the fundamental values and concepts of societies and raise new essential questions. The aim of the Round Table is to consider these questions and try to formulate some core principles and concrete recommendations for Education in Knowledge Society.

This must be done taking into account the reflections already led at the international level, particularly, by UNESCO. Speaking about the society we need to state and agree on core values, the values of humanism, peace, equal dignity of human beings, the values of solidarity – these values our countries share and want to promote. We could take as a basis for our deliberation some main principles and documents.

Education for All: Access and Quality

First, the affirmation of “Education for All” is to be studied. UNESCO and its Member States committed themselves to the promotion and development of “Education for All”, considering that education is a major need for humanity, a major investment to prepare the future of humanity, that all human beings have the right to receive education, and that all countries have the duty to provide education for all. Of course, a strong and efficient international cooperation is needed in this respect. “Education for All” includes two main aspects: access (make education accessible for all) and quality (provide a quality education for all). Access and quality must be aimed at simultaneously; it would be a mistake to decrease quality in order to improve access.

“Four Pillars”

There may be difficult debates about what education is. Is it just the transfer of certain knowledge? Is it more linked to the development of human beings? We can take as a basis the Report to UNESCO by the International Commission on Education for the Twenty-first Century, chaired by Jacques Delors (“Learning, the Treasure within”, UNESCO, 1996). It describes the “four pillars” of education: *“If it is to succeed in its tasks, education must be organised around four fundamental types of learning which, through a person’s life, will in a way be the pillars of knowledge: learning to know, that is acquiring the instruments of understanding; learning to do, so as to be able to act creatively on one’s environment; learning to live together, so as to participate and cooperate with other people in all human activities; and learning to be, an essential progression which proceeds from the previous three. Of course, these four paths of knowledge all form a whole, because there are many points of contact, intersection and exchange among them”*.

The Dakar Framework for Action

The “Dakar Framework for Action”, adopted during the World Education Forum, in Dakar, Senegal, April 2000 stated some principles in order to enhance “Education for All”: *“... we hereby collectively commit ourselves to the attainment of the following goals: [...] ensuring that by 2015 all children, particularly girls, children in difficult circumstances and those belonging to ethnic minorities, have access to and complete free and compulsory primary education of good quality.”*

And the framework gives some hints for strategies, taking into account ICTs :

“Harness new information and communication technologies to help achieve Education For All goals:

- *ICT must be harnessed to support EFA goals at an affordable cost. These technologies have great potential for knowledge dissemination, effective learning and the development of more efficient education services. This potential will not be realised unless the new technologies serve rather than drive the implementation of education strategies. To be effective, especially in developing countries, ICTs should be combined with more traditional technologies such as books and radios, and be more extensively applied to the training of teachers.*
- *The swiftness of ICT developments, their increasing spread and availability, the nature of their content and their declining prices are having major implications for learning. They may tend to increase disparities, weaken social bonds and threaten cultural cohesion. Governments will therefore need to establish clearer policies in regard to science and technology, and undertake critical assessments of ICT experiences and options. These should include their resource implications in relation to the provision of basic education, emphasising choices that bridge the "digital divide", increase access and quality, and reduce inequity.*
- *There is a need to tap the potential of ICT to enhance data collection and analysis, and to strengthen management systems, from central ministries through sub-national levels to school; to improve access to education by remote and disadvantaged communities; to support initial and continuing professional development of teachers; and to provide opportunities to communicate across classrooms and cultures.*
- *News media should also be engaged to create and strengthen partnerships with education systems, through the promotion of local newspapers, informed coverage of education issues and continuing education programmes via public service broadcasting."*

IFIP Montreal Youth Declaration and Vilnius Declaration

More recently, two major texts provided key principles and stated recommendations:

- The participants in IFIP World Computer Congress, Montreal, Canada, 2002 adopted "Youth Declaration". It highlights the importance to sensitize authorities and the society about the necessity to include the development of ICT infrastructures and ICT skills for young people as a high priority in policies and agendas. It affirms the commitment to ensure a youth-oriented digital inclusion. A set of concrete recommendations is then provided.
- The participants in First World Information Technology Forum (WITFOR), in Vilnius, Lithuania, 2003 adopted "Vilnius Declaration" inviting national governments to give priorities to national socio-economic development plans to create ICT infrastructures, urging national governments to guarantee the application of the principles of freedom of expression and privacy, ensuring a continuous process of education on the rights of citizens as a fundamental element of poverty alleviation, facilitating knowledge and information sharing, encouraging international cooperation, empowering all communities through programmes aimed at developing literacy, including ICT literacy, etc.

World Summit on Information Society

Ministerial Round Table on "Towards Knowledge Societies", Paris, October 2003 adopted a communiqué, reminding of some fundamental principles for the development of equitable knowledge societies: freedom of expression; universal access to information and knowledge; respect for human dignity and cultural and linguistic diversity; quality education for all; investment in science and technology; understanding and inclusion of indigenous knowledge systems. This communiqué must be considered an essential input to the work of the World Summit on Information Society (WSIS).

Finally, two documents gather a set of principles and recommendations, to be addressed during WSIS: "Draft Declaration of Principles", and "Draft Plan of Action". The declaration of principles recognizes, that education, knowledge, information and communication are at the core

of human progress, endeavour and well-being. A vision of Information Society for all is presented, and access to knowledge is quoted as a key principle. The plan of action gives concrete recommendations: several address access to knowledge and capacity building: *"Everyone should have the necessary skills to benefit fully from the Information Society. ICTs can contribute to achieving universal education worldwide, through delivery of education and training of teachers, and offering improved conditions for lifelong learning, encompassing people that are outside the formal education process, and improving professional skills."* The plan recommends to *"develop national policies to ensure that ICTs are fully integrated in education at all levels, including in curriculum development, teacher training, institutional administration and management, and in support of the concept of lifelong learning."*

From Information Society to Knowledge Society

Some years ago, we were talking about computers and informatics, and their influence on learning, teaching, and education. The new technological tools brought new resources for the teacher, and were considered a supplementary aid for teaching, like other technologies had been before. Information technologies then developed processing digitalized information. At the same time, communication technologies transporting digitalized information, developed as well; both merged leading to new tools known as information and communication technologies. The concept of Information Society appeared: information has become a valuable good, that one can buy and sell, and information has acquired a major place in economic and social matters. The organization of societies evolves being based more and more on information and access to information. Information is very easily accessible, in any place, at any time. But new questions appeared: how to sort and categorize information, which is abundant and untidy? How to evaluate and assess information, how to distinguish between accurate and wrong information? New ethical questions about information, access to information, and distribution of information were raised. Information is like raw materials: it must be processed before used.

Information is not knowledge. Information, even if it is digitalized, interactive, dynamic, has no human dimension. The next step, the major step, is now to move toward Knowledge Society. Information Society is based on technology; Knowledge Society is based on human beings.

Knowledge is a good that can be stored, circulated, exchanged. But it is an evolving good, continuously changing and enriching. Knowledge has a human dimension; it is linked with what human beings do and think; knowledge is created and developed in and by human beings. Knowledge is both an individual and collective matter. Knowledge is linked to culture and technology; there exists not one knowledge society, but, certainly, many knowledge societies. Some have a lot of knowledge and can produce knowledge; others are poorer; there are conflicts about knowledge, territories, and borders. In knowledge societies, our geographical and political borders are no longer accurate, new borders are appearing, as well as new territories, new powers, and new conflicts.

Knowledge societies must not be reduced to knowledge economy: it is not only a matter of buying and selling knowledge, but, more fundamentally, to analyse the social changes due to the advent of knowledge societies.

We are used to describe knowledge in terms of subjects, disciplines: mathematics, history, literature, languages, etc. But knowledge is getting more and more composite; the questions addressed in society, that knowledge must keep answering, are more and more transverse and complex. Edgar Morin has shown that the necessary knowledge cannot be listed in the terms of disciplines, and he has suggested "Seven complex lessons in education for the future": detecting

error and illusion, principles of pertinent knowledge, teaching the human condition, earth identity, confronting uncertainties, understanding each other, and ethics for the human genre.

Knowledge and Education

So, new challenges are raised for Education in the knowledge societies: transforming information into knowledge, identifying accurate knowledge, transmitting knowledge ...

Accessing knowledge takes new forms. Knowledge is no longer accessible only in books and in the teacher's head! Knowledge is now available in many different places, and attainable from any place, at any time. Education has a new role in terms of making knowledge accessible for pupils, and guiding pupils in getting knowledge. However, it is not enough to access knowledge; knowledge must be actually acquired. Since there are profound changes in the knowledge, there are changes in learning and acquiring knowledge. These changes we must try to identify.

There is, of course, a strong link between knowledge and education. Education is the main process dealing with knowledge. So, in a knowledge society, education takes a central role and is a major stake for future and evolutions. Education takes the characteristics of an economical activity in such a society. But it is a political and social responsibility of decision-makers to ensure that everyone can access and acquire knowledge. The question of education as a public service is raised in a new form, in a context where knowledge is a good and education – an economic activity.

Education for and in Knowledge Societies

At the Round Table, we will address two main aspects of education and knowledge societies: education FOR knowledge societies, and education IN knowledge societies.

Education for knowledge societies, because knowledge societies expand progressively, and we must educate pupils and students for this kind of society: preparing the knowledge societies, preparing citizens of knowledge societies, preparing people to understand knowledge societies and to act and behave in such societies. Education must take into account the main trends in the changes toward knowledge societies, identify the main challenges to overcome; educational policies must be designed in the context and framework of knowledge societies. Education and educational policies must follow the changes and evolutions, as well as anticipate and, therefore, help decision-makers and the civil society impact the evolutions to master them.

Education in knowledge societies, because in such societies, knowledge has changed, access to knowledge is different; learning in knowledge societies, and teaching in knowledge societies, include new components, new concepts, new pedagogical approaches, and need new resources and new tools.

Networks

Knowledge societies are networked societies. We are used to hierarchical structures, to pyramidal or tree-type organizations. Knowledge societies are structured by networks. A network is very different from a pyramid or a tree: there are edges and nodes, the edges linking the nodes; from one node to another one, there are several possible paths. There may be lots of sub-networks. There is no natural hierarchy, but new types of hierarchies may appear. The Internet is the clearest example of such a network. One can circulate in a network, but this needs to be mastered, tools and rules are necessary. Accessing information is, mainly, made through networks now. The network structure of such societies will, certainly, have huge consequences

on the organizations. A school, an educational system, cannot stay organized as hierarchical and pyramidal structures in a society where knowledge and people are networked. This can lead to profound and unexpected changes in our societies.

Competencies

Knowledge societies need new types of competencies. We have already mentioned that the educational needs of societies can be considered through the four “pillars” of education: learning to know, learning to do, learning to live together, learning to be. In knowledge societies, knowledge is not static, it evolves and it is permanently enriching. Education cannot be reduced to the transmission or acquisition of a set of definite knowledge; it would be soon obsolete. Learning to learn is a necessary ability that education must provide. It is the content as well as the processes that education must transmit. The ability to evolve, to adapt, is essential in knowledge societies; education must take it into account. Knowledge societies are lifelong learning societies, and education must prepare to lifelong learning.

Collective intelligence

Knowledge societies need virtual communities and collective intelligence. We were used to educational systems aimed at acquisition of individual knowledge and development of individual intelligence. But more and more, society needs collective kinds of competencies. In knowledge societies, knowledge and processes are mainly collective. This requires collaborative work, teams and communities. The concepts of virtual communities and collective intelligence are essential in knowledge societies. Virtual communities are communities of real human beings made possible and activated through information and communication technology tools; ICT implement new kinds of communities, enable to overcome usual barriers and borders, create new communities who can communicate, work together, act together. Collective intelligence is not a mere sum of individual ones: there is an “added value”, a kind of intelligence, which is communal, which no one could have alone.

School in Knowledge Societies

When we speak about knowledge societies, we mean that we do not want to reduce them to technology societies or information societies. The role of schools and education is essential in knowledge societies. Of course, education must focus mainly on knowledge, not on technology. Every educational policy must address knowledge, not only technology and communication. The role of school in knowledge societies raises new questions: schools for the knowledge society, schools in the knowledge society. However, information and communication technologies change the status, mission, role, and action field of schools. What will education be, and what will the school be in future, in knowledge societies? OECD has published a very interesting study about the school of the future, imagining six different scenarios. Such scenarios are not the guessing what the future will be, it makes us aware that there is no fatality in the future: we must decide where we want to go and act within the appropriate parameters in order to master our future, the future of schools. The scenarios are of three types:

1. Attempting to maintain the status quo:
 - Bureaucratic school systems continue.
 - Teacher exodus; the “meltdown” scenario.
2. Re-schooling:
 - Schools as core social centers.
 - Schools as focused learning organizations.
3. De-schooling:

- Learning networks and the network society.
- Extending the market model.

Such scenarios can help policy-makers and decision-makers design appropriate policies for the future. They can help anticipate, not only follow!

The question of anticipation is a crucial one. Technology evolves very quickly, and changes are so fast that most of the time we just try to catch up with our delay, to adapt our old strategies and habits to the new tools and technologies. It is not enough, and may even be wrong. There is a need to re-think the main paradigms of education in knowledge societies. Innovation must not only follow the evolutions of technology and the evolutions of society; it must anticipate, be proactive.

Pupils and Learning in Knowledge Societies

The pupil and the student are at the centre of education in knowledge societies. The pupil is the learner, but cannot be reduced to the one who acquires knowledge. The pupil is a citizen in the knowledge society, and the pupil must be prepared and educated as a citizen of the knowledge society. We have to reflect on this new “knowledge citizen”, so that the fundamental values of the knowledge society can be described and respected: equity in access to knowledge, solidarity, equal dignity of human beings, etc. The relationship between individuals and society has new characteristics in the knowledge society, particularly because of virtual communities, of collective intelligence. We have to invent a citizenship for knowledge societies.

Lifelong learning is an important component of Knowledge Society. Since knowledge is at the core of such a society, learning is an essential process, and it must go on all life long. Knowledge societies are lifelong learning societies.

Knowledge societies and ICT make possible and need new learning methods. ICT enables to take into account space and time in education differently; we are not bound to the “same place – same time” aspect of school classes; it becomes possible to have school activities at different times and different places. Distance education does not address only the ones who are in particular situations; it becomes a component of Education for All; we have to invent a good articulation and a good balance between class and distance education activities, in order to improve education and learning.

Teachers in Knowledge Societies

Being a teacher in the knowledge society is a new challenge. Of course, there are new teaching methods, new pedagogies, new tools, and new resources available for a teacher. However, the role of a teacher is changing, and the expectations of society toward teachers are evolving and increasing. The role of a teacher in the learning process is essential. Whatever the technology can do, the teacher remains the only one able to be the necessary human mediator between the pupil and the knowledge. The teaching profession is evolving, because access to knowledge is changing; the teaching profession is evolving in its everyday activities, in the way teachers work with others. Although the core role of a teacher remains, being the one who makes the pupil acquire knowledge, and preparing future citizens.

The role of a teacher is essential; in societies changing quickly toward knowledge societies, the teacher is the main actor, the main agent of the evolution of education. Teacher education is, therefore, fundamental, and a key issue in every educational policy. In the projects, action plans, reforms of education, teacher training is a central issue. It is clear that in order to help countries

overcome the digital divide teachers' education is one of the most important tools. Teachers' education has become a major stake in national policies and at the international, worldwide level.

In 1966, the UNESCO Special Intergovernmental Conference on the status of Teachers adopted "Recommendation Concerning the Status of Teachers". This set of precise and concrete recommendations for action is still very vital, and most of them have not been completed yet. It would be useful to check these recommendations and evaluate to which extent they have been put in action, and to update them, taking into account the new kind of society we live in, and the integration of information and communication technologies. Recommendations concerning the status of teachers in the knowledge society are very useful nowadays!

Need of Policies

So, our Round Table has a lot of questions to address. Our main issue is Knowledge Society: what is it, what are the new trends in such societies; what are the place and the role of education in knowledge societies, how central education is realized in such societies. Education for knowledge societies and education in knowledge societies will be our main topics. We will see that there is a need of strong and concrete policies in order to develop education for and in knowledge societies. It is not a matter of unavoidable evolutions; political choices and decisions must make us master the evolutions and the future. Principles and recommendations for educational policies in knowledge societies will be the main outputs of our Round Table.

We are in the context of globalization. This may have negative aspects, possible risks, and this leads to essential ethical questions about the digital divide, our local cultures, risk of merchandization of knowledge and education. But let us look at it from the positive side: an opportunity to develop a real international dimension in education, a real cooperation between our countries. The knowledge society does not have the same borders our geographical and political countries have; let us take this as a new chance to reinforce international cooperation in a way that respects and enhances cultures and identities.

Knowledge societies need education, and education has a much more important role in such societies. Let us use the opportunity of the knowledge societies to promote and enhance Education for All, give access to education for everyone in the world, in particular, to quality education for everyone.

Bernard CORNU

in TEHSUS

Session 2: Education IN knowledge societies: strategies, tools, teaching and learning.

The four speakers in this session will address the question of Education **in** a knowledge society. In such a society, education takes a specific dimension and particular forms. For instance, OECD has published a study about the school of the future, with six possible scenarios for the place and role of schools in future societies. How can UNESCO and other national and international bodies in the future promote and facilitate the development of education for and in such a new type of dynamic society.

According to the discussion in the first session and taking in account some main priorities of UNESCO for 2004-2005 (as decided two months ago i.e. education for all, ethics in sciences and technologies, cultural diversity and access to information and to the knowledge), the four speakers with their experience will present their opinions about some urgent questions such as:

- What is learning in a knowledge society? Are there specific new forms of learning?
- What means teaching in a knowledge society? What is the place and role of a Teacher in a knowledge society and how to facilitate this evolution?
- How can ICTs help teaching and learning in a knowledge society?
- Which new tools and resources should be available for teaching and learning in a knowledge society?
- What should be the specificities of educational policies in the ICTs context and in a knowledge society?

The session will take into account the “Youth Declaration” adopted at the IFIP WCC in Montreal (2002), as well as the output of the WITFOR 2003 Conference.

In this session the speakers will also consider a number of specific themes coming from their fields of competence:

- From a Ministerial point of view; what is a national educational policy in a knowledge society and how can it contribute to new forms of teaching and learning? How to formulate core principles for educational policies in knowledge societies and to suggest possible actions?
- How can international cooperation and international organizations contribute to develop education in knowledge societies? How to promote research, development, pedagogy, cooperation, etc? How to formulate core principles for international cooperation in knowledge societies and to suggest possible actions?
- About the new forms and new tools for Education in knowledge societies, particularly Open and Distance Education: What are the new needs, the new trends, the new questions ? How to formulate core principles for new educational resources and tools in knowledge societies and to suggest possible actions?
- On issue of Life Long Learning, which is its place in knowledge societies? What are the tools and resources needed? How to formulate core principles for Life Long Learning in knowledge societies and to suggest possible actions?

The speakers have also been invited to consider the action items in the WSIS Draft Action. Most of them relate to the above mentioned themes and in general to the involvement of UNESCO and other bodies in the process of integrating ICTs to enrich innovation process for the Information Society and thus to contribute to the emerging of the Knowledge Society.

The speakers have been invited to end their presentation with some principles and recommendations.

A final discussion should then lead to a short list of strong principles and recommendations from session 2.

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À : Bernard Cornu <bernard.cornu@lavillamedia.org>, <peter@bollerslev.com>
Cc : "Irina V. Smirnova" <Irina.Smirnova@iite.ru>
Date : lundi 3 novembre 2003 1:36
Objet : Re: Round-Table - Sessions presentations

le 31/10/03 9:20, Bernard Cornu à bernard.cornu@lavillamedia.org a écrit :

> Dear Peter, dear Raymond,
> I remind you that I need from you a presentation of your session at
> our WSIS Round-Table. It does not need to be long (1 or 2 pages), but
> please send it to me before the end of the week-end...

Hello Friends
is the week-end over ? (not just in time ?)
is it what you are waiting for ?
is it relevant for your purpose ?

Sorry, three time sorry but I'm in a bad period (overloaded professional
and private)

Keep in touch
Best regards
Raymond

> Thanks,
> Yours,
> Bernard

Session 3: UNESCO's role in the development of education for and in Knowledge Societies.

The three speakers in this session will contribute with ideas about how UNESCO in the future can best engage in and stimulate the development of education for and in the new kind of society we are building.

With their experience from the past as a background they will present their opinions about how the Information Society can at the same time respect and overcome obstacles such as cultural diversity, linguistic diversity, digital divide, gender disparities, illiteracy, different economic opportunities etc.

The speakers will with their visions about the future in mind recommend certain important items to be included in a strategic plan of action for mutual development towards the realization of the vision of the Knowledge Society as a society where citizens are being prepared for life through education where conditions are at their optimum.

The power of ICTs in the process will be defined and described. A description of how ICTs can benefit the whole world and particularly be used to improve the quality of life for the majority of the peoples of the world who live in LDCs, despite the digital divide between rich and poor in the world; urban and rural societies; men and women; and different generations.

In this session the speakers will also consider a number of specific themes and comment on them. They are all suggestions to UNESCO to undertake a specific role and responsibility for action within its field of competence:

1. UNESCO should establish an information bank where experiences in the use of ICTs in education are collected and grouped according to comparable environments and circumstances.
As a part of this approach a "Handbook of good practices and success stories" could be developed and launched, based on compilation of contributions from all stakeholders, in a compelling format. The handbook could be re-issued periodically and turned into a permanent experience-sharing exercise.
2. UNESCO should in collaboration with other international agencies set up models of in-service training and professional development of teachers which make effective use of the approaches, facilities and opportunities provided by ICTs.
This is in line with the spirit of the "Education for All" action plan.
It will help defining which education is needed in the Information Society and what is learning and teaching in the Knowledge Society.
3. UNESCO should develop strategies for establishing an infrastructure for ICTs in LDCs which would help in fighting illiteracy through LifeLongLearning projects.
UNESCO should advice governments to develop comprehensive and forward-looking strategies to respond to the new human capacity needs, including the creation of an environment that supports information literacy, ICTs literacy and LifeLongLearning for the general public. Everyone should be offered the opportunity to acquire the necessary skills in order to understand, participate actively in, and benefit fully from, the Information Society and the knowledge economy. This is a matter of "Capacity Building for All".
4. UNESCO should develop strategies for the use of ICTs in education in order to overcome the gender disparities, especially in LDCs.

The Information Society should be subject to universally held cultural and ethical values such as truth, justice, solidarity, tolerance, human dignity, shared responsibility, transparency and accountability. The use of ICTs can facilitate the social integration of excluded segments of societies.

The use of ICTs for education and human resource development, in both formal and informal learning environments, should be promoted, with a special reference to the requirements of disadvantaged groups, and to the specific needs of girls and women. UNESCO should therefore advise governments to design, develop and adapt ICT infrastructure, tools and applications that are responsive to the needs of the poor, including women.

The speakers have also been invited to consider the action items in the WSIS Draft Action. Most of them relate to the above mentioned themes and in general to the involvement of UNESCO in the process of using ICTs to let the Information Society encompass LDCs.

The speakers have been invited to end their presentation with some principles and recommendations.

A final discussion should then lead to a short list of strong principles and recommendations from session 3.

Session 2: Education IN knowledge societies: strategies, tools, teaching and learning.

The four speakers in this session will address the question of Education **in** a knowledge society. In such a society, education takes a specific dimension and particular forms. For instance, OECD has published a study about the school of the future, with six possible scenarios for the place and role of schools in future societies. How can UNESCO and other national and international bodies in the future promote and facilitate the development of education for and in such a new type of dynamic society.

According to the discussion in the first session and taking in account some main priorities of UNESCO for 2004-2005 (as decided two months ago i.e. education for all, ethics in sciences and technologies, cultural diversity and access to information and to the knowledge), the four speakers with their experience will present their opinions about some urgent questions such as:

- What is learning in a knowledge society? Are there specific new forms of learning?
- What means teaching in a knowledge society? What is the place and role of a Teacher in a knowledge society and how to facilitate this evolution?
- How can ICTs help teaching and learning in a knowledge society?
- Which new tools and resources should be available for teaching and learning in a knowledge society?
- What should be the specificities of educational policies in the ICTs context and in a knowledge society?

The session will take into account the “Youth Declaration” adopted at the IFIP WCC in Montreal (2002), as well as the output of the WITFOR 2003 Conference.

In this session the speakers will also consider a number of specific themes coming from their fields of competence:

- From a Ministerial point of view; what is a national educational policy in a knowledge society and how can it contribute to new forms of teaching and learning? How to formulate core principles for educational policies in knowledge societies and to suggest possible actions?
- How can international cooperation and international organizations contribute to develop education in knowledge societies? How to promote research, development, pedagogy, cooperation, etc? How to formulate core principles for international cooperation in knowledge societies and to suggest possible actions?
- About the new forms and new tools for Education in knowledge societies, particularly Open and Distance Education: What are the new needs, the new trends, the new questions ? How to formulate core principles for new educational resources and tools in knowledge societies and to suggest possible actions?
- On issue of Life Long Learning, which is its place in knowledge societies? What are the tools and resources needed? How to formulate core principles for Life Long Learning in knowledge societies and to suggest possible actions?

The speakers have also been invited to consider the action items in the WSIS Draft Action. Most of them relate to the above mentioned themes and in general to the involvement of UNESCO and other bodies in the process of integrating ICTs to enrich innovation process for the Information Society and thus to contribute to the emerging of the Knowledge Society.

The speakers have been invited to end their presentation with some principles and recommendations.

A final discussion should then lead to a short list of strong principles and recommendations from session 2.

UNESCO - IFIP - IITE – References

Developing and Using Indicators of ICT Use in Education (2003)

<http://www.unescobkk.org/ips/ebooks/documents/ICTedu/ictedu.pdf>

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Information and communication technologies in education

(A Curriculum for Schools and Programme of Teacher Development) (2002)

<http://unesdoc.unesco.org/images/0012/001295/129538e.pdf>

Recommendations "Informatics for Primary Education"(2000)

<http://www.iite.ru/iite/publications/publications?id=19>

High Level Seminar and Workshop for Decision-Makers and Policy-Makers from Asia and the Pacific "Towards Policies for Integrating Information and Communication Technologies into Education"(2003)

<http://www.policy-seminar-bkk.iite.ru/>

Informatics Curriculum Framework 2000 for higher education (2000)

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Session 3: Education IN knowledge societies: strategies, tools, teaching and learning.

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- What is learning in a knowledge society? Are there specific new forms of learning?
- What means teaching in a knowledge society? What is the place and role of a Teacher in a knowledge society and how to facilitate this evolution?
- How can ICTs help teaching and learning in a knowledge society?
- Which new tools and resources should be available for teaching and learning in a knowledge society?
- What should be the specificities of educational policies in the ICTs context and in a knowledge society?

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Vilnius Declaration

Education Commission Report

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Abstract

The purpose of education is to improve the individuals place in the world and their relationship with it. Educational organization, objectives and methodologies should promote the development of an inclusive knowledge society.

Information and Communication Technology (ICT) facilitates and stimulates educational diffusion and dissemination to and through communities. It offers educational empowerments and supports active, lifelong learning. It should be used to address issues of educational inequality and create educational resources that reflect diversity of language and culture.

At all stages of education ICT literacy and competence must be developed so that individuals can join, contribute and benefit from our emerging knowledge society. ICT capability building and infrastructure development must be accompanied by a vision of the ICT skills and competences that students should acquire and the professional development of teachers related to ICT.

Introduction

This text was initially produced by an electronic list group of people representing around forty countries. This group was asked to send some information on the difficulties and developments of the use of ICT in their home country. After collecting the information, a first version of the text was produced and discussed in the list. It was revised during the WITFOR 2003 in Vilnius, which was attended by people from 68 countries, and again discussed and revised via an

electronic list. This version represents the agreement of the people that have contributed to the Vilnius Declaration in the Education Commission.

1.1 Education in the Context of a Global Society Driven by Knowledge and ICT

Economic, social and technological forces are placing unprecedented demands on educational institutions at all levels and calling for increasingly flexible and diverse systems to cater to an ever-growing range of learning needs.

Largely driven by the ICT revolution, globalisation is placing an ever-higher premium on knowledge as a vector of wealth. In our emerging knowledge-intensive societies, low education levels often result in marginalisation and exclusion.

The nature of education is to improve person's relations to the world. In this sense, educational processes, organization, methods and structures has to change to adapt to the emerging knowledge society. This does not mean to change education nature, but to adapt its methods in order to maintain this nature.

1.2 ICT and Technology to Enhance Learning and Skills

New technologies are a major factor in shaping the new global economy and producing rapid changes in society. Many countries are now focused on building a knowledge society. Within the past decade, new ICT tools have fundamentally changed the way people communicate and do business. They have produced significant transformations in industry, agriculture, medicine, business, engineering and many other fields.

They also have the potential to transform the methods of education—where and how learning takes place (ways of exploring information and building knowledge) and the roles of students and teachers in the learning process. These new possibilities largely exist due to the synergy of two converging forces. Firstly the quantity of information available in the world—much of it relevant to survival and basic well being—is exponentially greater than that available only a few years ago, and the rate of its growth is accelerating.

Secondly, there is a new capacity to communicate among people of the world. The opportunity exists to harness this force and use it, consciously, positively and judiciously to contribute to meet defined learning needs.

Preparing People for Knowledge Society

Like other sectors of society, education will need to come to terms with the new technologies. This will require substantial public and private sector investments in pre and in-service teacher education, software research and development, purchase of hardware, provision of infrastructure, and refurbishment of schools.

It will be difficult for national policy makers to find the necessary resources, whichever are their sensibilities for expenditure on education. Without international cooperation and assistance the poorest countries will fall still further behind. Parents and the public at large, in the industrial countries at least, are unlikely to accept for too long the notion that education should be less well equipped with the new technologies than other areas of social and economic activity (UNESCO World Report, 1998, p. 20).

In developing countries a wider diversity of problems and solutions can be found. Some regions still lack electricity or reasonable telephonic lines. Other regions in developing countries concentrate wealth, but often are surrounded by very poor communities. People that are marginalized have not yet been awaked for the possibilities of ICT in their lives. They should be given the opportunity of knowing the benefits of it.

1.3 Cooperation

International cooperation should be promoted so that good practices and learnt lessons can be shared. Every country has to decide on its local policies regarding ICT for education development, but as resources are limited, sharing international experiences can help governments to optimize their expenditures based on past experiences of other countries.

Even inside each country, cooperation should be pursued. Especially large countries, with heterogeneous educational systems, have to promote internal cooperation and exchange of experiences in order to optimize the investment in ICT for educational purposes.

There are good examples of international cooperation, especially in the context of the European Union. Similar models should be thought and implemented in other regions of the world.

1.4 Knowledge-Based Society

There is growing awareness among policy-makers, business leaders and educators that the educational system designed to prepare learners for an agrarian or industrially-based economy will not provide students with the knowledge and skills they will need to thrive in the 21st century's knowledge-based economy and society. The new knowledge-based global society is one where:

- a) The world's knowledge base doubles every 2 –3 years.
- b) 7,000 scientific and technical articles are published each day.
- c) Satellites orbiting the earth transmit enough data to fill 19 million books every two weeks.
- d) Graduates of secondary schools in industrialized nations have been exposed to more information than their grandparents were in a lifetime.
- e) There will be as much change in the next three decades as there was in the last three centuries.
- f) Many children have grown up in ICT rich environments.

This new order can be approached not as a deepening on the difference between rich and poor, but as an opportunity to remove, at least part of this difference. Few years ago, schools and universities with fewer resources could not provide good libraries and good research materials for students and teachers. Today, with the easy of access to information provided by the Internet, every school, with relatively little investment can have access to huge amounts of educational materials and general information, at least in a broad sense.

1.5 Preparing for a Technology Based Economy

The technology-based global economy also poses challenges to countries as national economies become more internationalised, with the increasing flow of information, technology, products, capital, and people between nations. This new economic environment is creating an era of global competition for goods, services, and expertise. All of these changes are producing dramatic shifts in the political, economic and social structures of many countries around the world.

In industrialized nations, the economic base is shifting from industry to information. In emergent nations the transition may be even more pronounced as they seek to capitalise on the new employment possibilities afforded by ICT. This shift demands new knowledge and skills in the work force. ICT has changed the nature of work and the types of skills required in most fields and professions. While it has, on one hand, created a wide array of new jobs, many of which did not even exist ten years ago, it has also replaced the need for many types of unskilled or low-skilled workers.

These trends pose new challenges to educational systems to prepare students with the knowledge and skills needed to thrive in a new and dynamic environment of continuous technological change and accelerating growth in knowledge production. New workers need to be adaptable, and to recognize their need for lifelong learning.

Multiple roles of ICT in Education

Computer literacy should be ensured by schools in the same way that common literacy is. However, this is currently happening more at universities than at secondary schools. The focus in schools should be on achieving development, not only on efficiently carrying out the traditional work.

ICT in education, at schools and at universities plays a multiple role. It can be considered as:

- a) An object of learning, to develop ICT awareness, competence and skills.
This is what every citizen needs: a basic broad knowledge of ICT to be able to cope with ICT in daily life.

- b) As an object of study, to develop knowledge about ICT as a subject. In the same way that basic physics and biology are taught in schools, basic ICT principles should be addressed, so that every people can be aware of part of the structure of the world of the knowledge society.
- c) As a multifaceted aid for learning which allows improvement of the learning process, and as a tool which helps manage and organize the work of teachers and school organization.

1.6 Teaching ICT Skills

To teach ICT skills, teachers need a curriculum describing what skills and competences should be developed and how to evaluate these. One example of this is the UNESCO curriculum for secondary schools. These curricula and syllabuses should be adapted for local conditions.

Hardware and software for learning ICT skills for educational purposes should be available. To make the process of using ICT of value to the students, ICT facilities and resources should be available at educational institutes.

There are wide differences between availability of facilities in different countries. However, resources are limited in every case. Poor and rich countries shall have strategic plans on investments in order to make the best use of resources and targeting especially the more marginalized people in order to reduce the difference (digital divide).

In most places where ICT is introduced in schools, the technology is the focal point, and not the students needs. Then, is still necessary to study ways to stimulate the educational use of ICT in everyday life, and the ways to introduce this technology in the educational process by allowing people to comprehend its meaning.

ICT skills are becoming necessary for everyday life. Many relevant questions that create problems to the people can be solved by a single search on the Internet. However, many people are still unaware of this potential. Learning the basic skills on this technology should be provided to every citizen, in order to improve the way they gather information and knowledge.

ICT skills are fundamental in today's formal education. But a significant number of people are still outside of regular education. This means that, if the gap is to be crossed, the society has to incentive the creation of non-formal courses on ICT skills, and regular, good-quality, public service should be provided for the community, in the same way as water, electricity and communications are provided. This kind of ICT infrastructure should be affordable for people.

1.7 ICT as a Subject

Teaching ICT skills (computer literacy) is not enough. Schools at all levels should start introducing ICT concepts in everyday activities. This means that instead of only using ICT as a learning or organization tool, students should learn something about their underlying principles. This does not mean that ICT should be addressed as a topic necessarily, but that it can be introduced together with other subject matters.

However, at secondary schools, ICT should be integrated in the school curricula as a learning subject. Their underlying principles should be understood at least in broad generic way.

Teaching ICT as a subject is of vital importance, as society needs people with a thorough knowledge of ICT. People involved in ICT research and development should contribute to training teachers and others. This should happen at all stages of education in universities, in vocational education and at the upper level of high school.

A large number of ICT/Computer Science courses in developing countries are aimed at enabling students to find jobs in companies in developed countries. The education system must do more than that as this causes a brain drain in most developing countries. Despite international experience and cooperation is important, developing countries cannot afford losing well skilled ICT professionals to other countries. Governments should provide incentives for students to stay in their home country after concluding their studies. If unemployment and lack of job opportunities is a problem, then incubators for new ICT companies, and international cooperation would be good initiatives to stop the brain drain.

1.8 As a Tool for Learning and Management in Schools

It is proposed that lecturers and teachers should integrate ICT in the teaching process. But teachers invest much time in learning to install equipment and software, less time in understanding it, and no time in understanding the underpinning theoretical principles. Many times, they are skilled and trained to use a product and do not want to change this skill.

It is an important task to train teachers to use ICT in all aspects of teaching and learning. Teachers should be enabled at university level to appreciate the power of informatics, not only in using it, but also in knowing what is going on behind. Teachers should be given concessions to buy computers. Personal ownership is considered fundamental to increase teachers' confidence and competence in ICT.

Governments should pay more attention to teacher training in ICT by financing it (or making arrangements to reduce costs) and facilitating certification (making it free if possible).

In most countries there is a language problem, because most software that could be used in education is not available in many languages. Evidently, open-source software (not necessarily free) would help a lot the contextualization task.

ICT tools will be successful in education when they become practical solutions to everyday educational problems and needs. Then it has to be used not only in special classrooms, but also in every classroom and in most activities of the school other than learning only.

ICT can provide improvement also for school managers. In the long range, investment in ICT can reduce costs and improve the quality of the services provided by schools. Managerial people should also receive special attention in ICT education in order to realize the possibilities of using ICT in their institutions. There are many good experiences and reports on this kind of systems.

Challenges and Goals

Education is at the confluence of powerful and rapidly shifting social, technological and political forces that will shape the structure of educational systems across the globe for the remainder of this century. Many countries are engaged in a variety of initiatives to effect changes in the teaching/learning process to prepare students for an information and technology-based society. The new technologies challenge traditional conceptions of both teaching and learning and, by reconfiguring how teachers and learners access information and knowledge, have the potential to transform teaching and learning processes. ICT provides an array of powerful tools that may help in transforming the present isolated, teacher-centred and text-bound classrooms into rich, student-focused, interactive knowledge environments.

In most places, current ICT use makes little impact on learning. It has been used mainly to facilitate access to data/information. Unfortunately, in most places there is still not enough opportunity to really exploit the potential of ICT. Only a few courses have been developed which are more than mere notes and activities repositories. State-of-the-art methods for e-learning are seldom used. Perhaps this happens because, in some places, technicians, not educators, control the process of development and application of ICT. Commission members reported that:

- a) Pupils spent a lot of time playing with technology - not using it in purposeful activity.
- b) There was a concern that pupils with no computer resources at home were disadvantaged.
- c) The uses of ICT were inconsistent and generally new technology has little proven impact on attainment and learning.

There is widespread concern that the educational experiences currently provided in many schools will not prepare students well for the future. Many educators and business and government leaders believe that creating a paradigm shift in views of the learning process, coupled with application and integration of the new information technologies, will play an important role in

bringing educational systems into alignment with the emergent knowledge-based, information-rich society.

To meet these challenges, schools must judiciously embrace the new technologies and the new ICT tools for learning. They must also move to transform the traditional paradigm of learning.

To accomplish these goals it is necessary both to change the traditional view of the learning process and to better understand how the new digital technologies can create enhanced learning environments in which students are engaged learners, able to take greater responsibility for their own learning and constructing their own knowledge.

1.9 Teacher Education

Any educational system reform should start with teacher in-service and pre-service education. Teachers should be encouraged to acquire and use ICT equipment and skills.

Moreover, teachers, students and institutions should receive incentive not only to consume information and educational material, but also to become producers of this kind of resource whenever it is possible, and to share their production with other schools, teachers and students.

1.10 Digital Heritage

Extensive cooperation should exist between governments and corporations to improve access and storage/preservation conditions of digital heritage with open or free source software. The MIT, for instance, has opened its educational resources. Especially for the poorest countries, free educational software can be an important resource for learning.

Many institutions and teachers worldwide are developing educational material with no commercial purposes. The current problem is how to access, organize and use all this free software that could be available. National or international policies and standards for developing that material would be of great help.

1.11 Heterogeneity

It has to be taken into account that some communities have special needs regarding ICT equipment: for example, people living in deserts, rain forest, far from communication facilities, etc. Any project or policy has to take into consideration that different communities would have different needs in terms of equipment and personnel.

1.12 Digital Divide

The challenge to reach everyone is a matter of social justice and economic development. In 2000, at the World Education Forum in Dakar, over 160 nations committed to ensuring that by 2015, all children would complete a full course of good quality primary education, learning opportunities for youth and adults would be significantly expanded, illiteracy levels would be halved and gender disparities at all levels of education eliminated. The UN's Millennium Development Goals, endorsed by 189 nations in 2000, set forth an ambitious agenda to reduce global poverty, notably by universalising primary education and eliminating gender disparities. Leaders also pledged "in co-operation with the private sector, to make available the benefits of new technologies, especially information and communications."

As noted in the UNESCO World Education Report, *Teachers and Teaching in a Changing World* (UNESCO, 1998), the young generation is entering a world that is changing in all spheres: scientific and technological, political, economic, social, and cultural. The emergence of the "knowledge-based" society is changing the global economy, the status of education, and the type of education this new world order requires.

The challenge of expanding access to education remains sizeable: despite progress, the global education map is marked by extreme inequalities. There are over 113 million children out of school – a majority living in Sub-Saharan Africa and Southern Asia - and 862 million illiterates, two thirds of who are women. Other historically underserved groups include out-of-work youth, minorities, physically disabled people, long-term unemployed, refugees and recent immigrants. Tertiary enrolment stands at three percent in the least

developed countries, compared with 50 percent in North America, Western Europe and parts of Asia.

It was reported that women are less likely to use computers than men in all broad range categories. There is also a decline in use of the Internet with age. Computer ownership is still strongly influenced by age and gender. However, the greatest gap can be observed between people with high and low income. A significant number of people still believe that access to the Internet will not make any difference to their lives.

1.13 Distance Education

Many obstacles frustrate the implementation of distance education in some countries:

- a) Lack of unified credit system.
- b) No special finances for distance education.
- c) Weak teacher motivation.
- d) Poor technical base infrastructure at the universities.
- e) Lack of ICT infrastructure.

With its capacity to reach learners in any place at any time, ICT has the potential to promote a new educational paradigm, one that involves a far-reaching review of teaching and learning methods. The issue goes beyond promoting computer literacy, although this is critical. It is about how to tap the power of technology so that education becomes accessible, relevant and responsive to all. In this analysis, technology must also be viewed along a continuum (radio, TV, video, PC, Internet) catering to different educational needs and objectives – one single medium seldom provides the optimal solution.

1.14 Lifelong Learning

The advent of ICT has brought a new perspective to the lifelong learning concern. Lifelong learning concerns not only knowledge with employability purposes but also for personal, civic and social purposes.

Lifelong learning can provide people formal degrees and informal education, as they get interest. It can be provided even for pre-school children and retired people.

As the divide between learning and work narrows, education is conceived along a continuum, with lifelong learning opportunities as a key to helping individuals adapt their knowledge and skills to economic and societal changes.

Proposals for Actions

Considering the discussion above, a number of actions can be proposed to start providing solutions to some of the observed problems and opportunities. This set is not intended to be complete or definitive, but to call into attention some initiatives that the commission believes important to be considered by governs, companies, educational institutions and the society in general.

- a) Educational institutions should seek that every student is computer literate.
- b) Educational institutions and educational policy makers should discuss the ways to adapt the educational processes, organization, methods and structures in order to preserve the nature of education in the era of knowledge society.
- c) Governments and educational institutions should invest substantially in pre and in service teacher education for using ICT for educational purposes.
- d) Companies should consider developing open source educational software systems that can be easier to adapt to different local conditions.
- e) Governments and educational institutions should invest in ICT infrastructure, including hardware, refurbishment and personnel.
- f) Governments and society should create programs of social inclusion were disadvantaged people are given the awareness of ICT potential to improve their relation to the world.

- g) Governments and educational institutions should promote national and international cooperation in order to share experiences about the implementation of ICT programs in education.
- h) Educational institutions have to promote lifelong learning for former students and others in order to maintain their qualification on this rapid changing knowledge society.
- i) Policy makers and educational institutions should provide teachers with good quality ICT curricula and syllabuses.
- j) Governments should provide incentives (e.g. incubators or international cooperation) to stop brain drain from developing countries.
- k) Governments, companies and educational institutions should give teachers the incentives to own ICT equipment.
- l) Schools and teachers must consider the use of ICT tools not only in special laboratories but in everyday school activities.
- m) Teachers must consider not only consuming information but producing it with their students, and sharing it with other groups.
- n) Governments should allocate a separate and realistic budget for investment on the development of the knowledge society related to education.
- o) Governments should implement computer literacy among civil servants, especially those that serve in educational institutions.
- p) Governments should establish national education portals.
- q) Governments should stimulate an e-learning industry.
- r) Governments and educational institutions should elaborate international agreements on common principles of: (1) quality assurance as well as quality assessment for virtual education; (2) recognition of virtual education achievements.

We recommend that leading educational institutions design special institutional policies and practices for adopting e-learning in each country.

All policies should provide training opportunities, especially for women, unemployed and disadvantaged groups, and provision on ubiquitous Internet access should be a priority.

Projects

Some international projects can be proposed immediately:

- a) Defining standards and building an international multi-lingual repository of learning objects.
- b) Establishing a virtual education cooperation center as a distributed university - a consortium of universities and companies to enhance collaborative, creative and reflexive practices (to focus research and dissemination ideas).
- c) Building a catalogue of e-learning platforms appropriate to different regional needs.
- d) Building international open academic libraries with full-text documents databases.

THINK AGAIN

Hindsight, Insight and Foresight on
ICT and schooling

David Wood

THINK AGAIN

Initiated as part of EUN ValNet programme

Developing further within EUN ERNIST project

Main Foci

- Political and economic climate
- Impact and value for money
- Training and CPD
- Quality of content, tools, environments
- ‘Spiraling’ out beyond the school
- Landscapes, scenarios and meta-scenarios

Value for money and impacts on learning

- Views on the existing evidence base
- Future developments in assessment and the roles of ICT
- Knowledge creation under the different scenarios
- Need for a more system-based approach to evaluating costs and benefits.

SCENARIO 1

ICT strengthens the centralised regulation of schooling

SCENARIO 2

- **ICT supports the creation of schools as learning organisations**

SCENARIO 3

- **Citizenship at the centre: ICT supports the emergence of schools as core nodes in their communities**

SCENARIO 4

- **ICT fails to deliver: Technology meltdown**

Impacts on Learning -past

- Economist report
- IMPACT-2 and
 - 'main effect analyses'
- OECD case studies
 - Multiple, hypothesis-driven case studies

Impacts on learning - future?

- Clarification of claims for ICT
- Clarification of categories and architectures of ICT
- Classification of types and qualities of different types of evidence
- More focused R and D in schools and science

Impacts on learning - future?

- Current examination practices fail to assess the benefits for learners promised by innovative uses of ICT
- Hence, need to envisage innovations in summative, formative and communicative impacts of ICT under different scenarios

Future assessment under different scenarios

- Scenario 1 - extends value added analysis to national level
- Scenarios 2/3 -
 - extend and develop scenario/portraits
 - develop new school-based assessments
 - Integrate school R and D with external research processes

CPD for whom?

- “Training teachers in ICT pedagogical literacy is not a sufficient condition for the enhancement of learning”
- CPD for school managers and leaders
- CPD for the inspectorate
- Multiple constraint alignment

Alignment of constraints

- Learner and ICT
- Teacher (Learner and ICT)
- School (Teacher, Learner and ICT)
- Community (School, Teacher, Learner and ICT)
- Policy and policy agencies (Community, School, Teacher, Learner and ICT)

Scenario Development & Uses

- Netherlands - school portraits
- Switzerland - teacher scenarios
- France - co-ordination and scenario development
- UK - scenario development for school leaders
- OECD - scenarios for policy formulation

Designing a new balance sheet?

- If ICT becomes mission critical, impacts on the system as a whole -spiralling out
- Look for models?
 - Economist and IBM?

Partners in the process

- Partners in case studies
 - **Denmark**
 - **France**
 - **Netherlands**
 - **Portugal**
 - **Sweden**
 - **UK** and add
 - **Switzerland**
 - **Hungary**

Memorandum of Understanding

*The Technical Committee 3 (ICT and Education) of IFIP
(hereinafter referred to as 'TC3')*

and

*UNESCO Institute for Information Technologies in Education
(hereinafter referred to as 'IITE')*

Seeking to promote the achievements of the Aims and Scopes laid down by TC3 of IFIP (International Federation of Information Processing) and the Status of IITE, and to act in close cooperation and coordination on matters of mutual interest within the scope of their respective objectives and functions;

Considering that one of the main objectives assigned to TC3 by its Aims and Scopes is to consolidate understanding among peoples and promote cooperation among its Member States in the fields of education, ICT, culture, social impacts, lifelong learning and communication, as well as the development of ethical and conscious uses of ICT;

Considering that IITE contributes among other objectives, to the design and implementation of programmes in regard to application of information and communication technologies in education;

Bearing in mind their fields of competence and the responsibilities conferred upon them in those fields;

With a view to developing harmonious and continuous collaboration between them;

Have agreed to the following:

Article 1

TC3 and IITE undertake to grant each other, as far as possible, all facilities conducive to the accomplishment of their tasks.

Article 2

The two parties shall exchange invitations to attend conferences and meetings on activities of common interest.

Article 3

The two parties shall cooperate in holding conferences, symposia, workshops and training sessions in the field of application of Information and Communication Technologies in Education.

Article 4

The two parties shall cooperate in the preparation, printing, translation and publication of studies and references dealing with application of Information and Communication Technologies in Education.

Article 5

The two parties shall cooperate in implementing projects for promoting the application of Information and Communication Technologies in Education.

Article 6

The two parties shall grant each other broad facilities for access to all data, documents, studies and statistics produced by one and likely to interest the other, and for the acquisition and exploitation thereof where appropriate. Procedures shall be jointly agreed upon to safeguard the confidential or restricted nature of information so exchanged.

Article 7

In order to maintain constant relations between TC3 and IITE, the two parties agree to convene periodically joint meetings between them to promote and activate the mutual cooperation.

Article 8

The two parties may agree upon such complementary arrangements as they may find suitable in the light of experience in order to improve or develop a particular aspect of their cooperation. They may also introduce any such modification or amendment as they deem necessary to the provisions of this *Memorandum of Understanding*.

Article 9

This *Memorandum of Understanding* is concluded for an unspecified period of time. Nevertheless, either the two parties may terminate it, subject to a six-month prior notice. In that event, TC3 and IITE shall agree on the action to be taken concerning cooperation work in progress.

Article 10

This *Memorandum of Understanding* shall take effects as of the date of its signature.

In witness thereof, this *Memorandum of Understanding* has been signed in 2 original copies, both of them being equally authentic.

For TC3
The Chairman

Prof. Jan Wibe
IFIP Technical Committee 3
(ICT and Education)

Date :

For IITE
The Director

Prof. Vladimir Kinelev
UNESCO Institute for
Information Technologies in
Education

Date :

Memorandum of Understanding

*The Islamic Educational, Scientific and Cultural Organization
(hereinafter referred to as 'ISESCO')*

and

*UNESCO Institute for Information Technologies in Education
(hereinafter referred to as 'IITE')*

Seeking to promote the achievements of the objectives laid down by the Chapter of ISESCO and the Status of IITE, and to act in close cooperation and coordination on matters of mutual interest within the scope of their respective objectives and functions;

Considering that one of the main objectives assigned to ISESCO by its Chapter is to consolidate understanding among peoples and promote cooperation among its Member States in the fields of education, science, culture and communication, as well as the development of applied sciences;

Considering that IITE contributes among other objectives, to the design and implementation of programmes in regard to application of information and communication technologies in education;

Bearing in mind their fields of competence and the responsibilities conferred upon them in those fields;

With a view to developing harmonious and continuous collaboration between them;

Have agreed to the following:

Article 1

ISESCO and IITE undertake to grant each other, as far as possible, all facilities conducive to the accomplishment of their tasks.

Article 2

The two parties shall exchange invitations to attend conferences and meetings on activities of common interest.

Article 3

The two parties shall cooperate in holding conferences, symposia, workshops and training sessions in the field of application of Information and Communication Technologies in Education.

Article 4

The two parties shall cooperate in the preparation, printing, translation and publication of studies and references dealing with application of Information and Communication Technologies in Education.

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The two parties shall cooperate in implementing projects for promoting the application of Information and Communication Technologies in Education.

Article 6

The two parties shall grant each other broad facilities for access to all data, documents, studies and statistics produced by one and likely to interest the other, and for the acquisition and exploitation thereof where appropriate. Procedures shall be jointly agreed upon to safeguard the confidential or restricted nature of information so exchanged.

Article 7

In order to maintain constant relations between ISESCO and IITE, the two parties agree to convene periodically joint meetings between them to promote and activate the mutual cooperation.

Article 8

The two parties may agree upon such complementary arrangements as they may find suitable in the light of experience in order to improve or develop a particular aspect of their cooperation. They may also introduce any such modification or amendment as they deem necessary to the provisions of this *Memorandum of Understanding*.

Article 9

This *Memorandum of Understanding* is concluded for an unspecified period of time. Nevertheless, either the two parties may terminate it, subject to a six-month prior notice. In that event, ISESCO and IITE shall agree on the action to be taken concerning cooperation work in progress.

Article 10

This *Memorandum of Understanding* shall take effects as of the date of its signature.

In witness thereof, this *Memorandum of Understanding* has been signed in 2 original copies, both of them being equally authentic.

For ISESCO
The Director General

Dr Abdulaziz Othman Altwaijri
Islamic Educational, Scientific

For IITE
The Director

Prof. Vladimir Kinelev
UNESCO Institute for

and Cultural Organization

**Information Technologies in
Education**