



# INFORMATION AND COMMUNICATION FOR CAPACITY-BUILDING:

Critical Success Factors

PROCEEDINGS  
OF THE WORLD  
CONFERENCE

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UNESCO,  
Paris, France

Harnessing the Potential of ICTs to Build Inclusive Knowledge Societies

**Editors:**  
Raoul Weiler  
Abdul Waheed Khan  
Roland A. Burger  
Thomas Schauer

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Mr. Wijayanand Jayaweera, Director of Communication, UNESCO

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# FOREWORD

The purpose of the World Conference on ICT for Capacity-Building was to contribute to the second phase of the World Summit on the Information Society (WSIS) in Tunis in November 2005. The fast development of the information and communication technologies (ICTs) within the last decades led to the necessity of a world summit in order to reflect and debate on the manifold of new issues coming forth from these overarching technological breakthroughs.

ICTs penetrate almost all domains of society and human behavior, resulting in an overall transformation of society with new concerns and challenges. In the present World Conference the focus was on non-formal education for development, in particular, it addresses one of the major issues of development, namely the use of ICTs for capacity-building.

Indeed, the new technologies offer tools, unknown before, for learning and accessing information and knowledge without physical borders anymore. However, the materialization of these potentialities into concrete action plans can be realized neither without appropriate means nor within short periods of time of months or a few years.

The Conference brought together experts and grass root people. During the three day conference, with the help of Global Development Learning Network (GDLN) of the World Bank Institute using the video-conferencing facilities, the organizers succeeded to include many regions of the world and have the precious inputs and testimonies from remote places.

The focus was put on critical success factors for the introduction and implementation of ICTs for capacity-building. To extract from the many projects and trials, criteria and guidelines for further development was a major challenge.

The day has come to install large scale

infrastructure and equipment for daily use everywhere. But this is not enough, the content and applications for capacity-building and learning in general, should be made available and embedded in the local habits and languages, enabling a successful and sustainable implementation.

The availability of trainers and teachers is a frequently underestimated challenge. It is imperative for success to respond appropriately this objectives of ICT for capacity building and learning.

Technically several complimentary tools have been considered at the Conference for informing, communicating, capacity-building and learning. For example, the following tools have been discussed: satellite radio broadcasting, wireless telephone, devices like PCs and laptops for schools and easier access to the Internet and to relevant applications and content. They all address, in a different way, the needs and desires of the populations, and contribute to bridge the gaps for acquiring more information and sharing knowledge, for participating in new ways of learning processes.

However, the successful acceleration of development requires solutions low-cost, solutions, warranting an equitable dissemination among the population groups: the young, the active and the women, the individuals and the communities. The real quantum jump for development by ICT will only be possible if hardware, software, access and applications are affordable for the majority of the population. This includes end-user equipment and wireless networks on the ground, satellite ground equipment on the ground and access of as well as low-cost satellite infrastructure and operation.

With respect to the financial means, the World Conference addressed, besides the low-cost dimension of required investments, the structural aspects of financing in particular micro-credit and micro-

finance. They are widely used practices known for about two decades and are now available in most parts of the world. Micro-credits have helped millions of peoples and families to get out of the vicious circle of poverty and extreme poverty.

Meanwhile, these instruments are applied today for the provision of ICT infrastructure, for example for phone- and tele-centers. The World Conference underlined that the application of micro-credit and micro-finance is a most valuable means for capacity-building and for starting and supporting micro-enterprises at the local level.

Last but not least the reference to the Millennium Development Goals (MDGs) was permanently present in the discourses of the contributors. Perspectives of technological breakthroughs and progress open the future to communities and individuals to catch up with main stream development, overcoming ignorance and poverty, as well as getting in integrated in a larger community and regaining human dignity. Without doubt, ICTs are powerful instruments, though not exclusive ones, which support and enhance further steps towards the achievement of the MDGs and the objectives of WSIS.

■

# ACKNOWLEDGEMENTS

To the success of the conference is indebted to a very large group of people, several in remote places for the preparation of their participation longtime in advance. The use of video-conferencing facilities allowed the conference to have an original and unique profile about the use of ICTs for capacity-building: grass roots testimonies, expertise from different approaches, building of partnerships, richness in diversity of applications and the like.

Special attention and particular thanks are due to the direction of UNESCO for hosting the conference, without their support and leadership, this initiative would neither have had the dimension it became nor the quality of the content of the messages it produced. Special thanks go to the manifold of collaborators who faced the challenge to integrate new techniques in a conference context.

Special thanks go to the technical staff who managed so well the technical and organizational challenges of the three day conference, inclusive the “live” web broadcasting. They are addressed explicitly to the colleagues of the World Bank Institute in Paris and in other places for their assistance, wise advice and technical expertise in the set up of the GDLN events.

Without the involvement of the enthusiastic groups of people in rural, urban and remote places, the conference could not have reached the intensity it succeeded to get. They made the preparatory process function properly and expressed their needs and expectations for a better future. Sincere thanks go to all of them; indeed they share the success of the initiative.

The special thanks are addressed to all the speakers, chairs, moderators and panelists who steered the conference process of a high loaded program. Their contributions have set the tone for strategic and useable content, prepared for the delivering additional input the second phase of the World Summit on the Information Society.

Last but not least special thanks go to the patrons of the conference, their support was indispensable for moving ahead with the ambitious initiative. Grateful appreciations are addressed to the sponsors who contributed financially as well as to the content.

The list below gives an overview of the persons who worked unceasingly for the success of the conference. We apologize for having overseen possibly some colleagues.



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## CO-CHAIRS

**Mr. Abdul Waheed Khan,**

Assistant Director-General for Communication and Information, UNESCO

**Mr. Raoul Weiler,**

President of the Brussels-EU Chapter, the Club of Rome;

Member of the Executive Committee of the Club of Rome



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The patronage of the World Conference comprises leaders and decision makers from governments, international organizations, industry and civil society, including:

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**Mr. Bruno Lanvin**,  
 Senior Advisor in E--Strategies, World Bank, US  
**Ms. Christine Leurquin**,  
 European Programs Senior Manager, SES ASTRA, Belgium

## Acknowledgements

**Mr. Bernard Loing,**

Rector, International Council for open and Distance Education, France

**Mr. Sergio Lub,**

Director, Friendly Favors, US

**Mr. Yefim M. Malitikov,**

Interstate Committee on Knowledge Promotion and Adult Education of Commonwealth of Independent States, Russia

**Mr. Franz Josef Radermacher,**

Director of the Research Institute for Applied Knowledge Processing; The Club of Rome, Germany

**Mr. Alan J. Rossi,**

Chief Executive Officer of Development Gateway Foundation

**Mr. Daniel Schaubacher,**

Consultant, Brussels EU Chapter of the Club of Rome, Belgium

**Ms. Michelle Selinger,**

Education Strategy Manager for Europe, Middle East and Africa, Cisco Systems

**Ms. Elizabeth Stacey,**

Vice Chair of Distance Learning, International Federation for Information Processing, Australia

**Mr. Tim Unwin,**

Professor, ICT41) Collective, Royal Holloway, University of London, UK

**Ms. Ingrid Volkmer,**

Department of Communication Studies, University Otago, New Zealand

**Ms. Verena Wiedemann,**

Director of ARD Liaison Office, Brussels EU Chapter of the Club of Rome, Belgium

**Mr. Anders Wijkman,**

Member European Parliament; The Club of Rome, Sweden

**Mr. Jim Wynn,**

Schools Developments and Strategy Manager for Europe, Middle East and Africa, Microsoft

---

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**Ms. Joy Tang,**

Founder and Ambassador, Onevillage Foundation, US

**Mr. Jeff Buderer,**

Ecoliving Consultant, Onevillage Foundation, US

**Mr. Michael Bosse,**

Project Director, Equal Access, US

**Mr. Heitor Gurgulino de Souza,**

Vice-President, International Association of University Presidents; The Club of Rome, Brazil

**Ms. Susan Chacon,**

Professor, Mexican Association of the Club of Rome, Mexico

**Mr. Ricardo Toledo,**

Engineer, Mexican Association of the Club of Rome, Mexico

**Mr. Magdy S. El-Hussainy,**

Engineer, ReDSOFT, Kuwait

---

### GDLN INTERACTIVE PARTICIPATIONS

#### LATIN AMERICA

Brazil: Eda C. Barbosa; Heitor Gurgulino de Souza; Filipe Rizzo Oliveira

Mexico: Terence Karran

Argentina: Angélica Abdallah

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**ARAB STATES** Kuwait: Hameed El-Qaheri; Magdy El-Hussainy  
Jordan: Andreas Cox; Majied Qasem  
Egypt: Sohair F. Wastawy

---

**AFRICA** Tanzania: Titus Tossy  
Senegal: Jean-Pierre Guingané  
South Africa: Marc Van der Merve

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**ASIA** Afghanistan: Mustafa Babak; Abdullah Faim  
India: Ashish Sen  
China: Zeng Yichum

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Society, Division of Information Mr. Jean-Claude Dauphin, Computer Systems Analyst  
Society Ms. Armelle Arrou, Program Specialist  
Mr. Igor Nuk, Web Master  
Ms. Misako Ito, Assistant Program Specialist  
Ms. Natalia Denissova, Web Assistant  
Ms. Frédérique Schaeffer, Assistant  
Ms. Tiina Gregglina-Jouini, Assistant

---

**The Club of Rome** Mr. Raoul Weiler, President of the Brussels-EU Chapter  
Mr. Roland A. Burger, think tank 30  
Mr. Thomas Schauer, European Support Centre

---

### TECHNICAL COORDINATORS

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Mr. Nicolas Meyer, Learning Officer

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**UNESCO** Mr. Jean Pierre Juchereau, Chief of Telecommunications Unit  
Mr. Gyula Bogнар, Chief of Networks Unit  
Mr. Frank Williams, Networks Support Technician  
Mr. Richard Cadiou, Web Editor  
Mr. Claudio Bruno Monteiro, Video Technician  
Mr. Alain Perry, Conference Clerk

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# WELCOME ADDRESSES INTRODUCTORY REMARKS

## **ABDUL WAHEED KHAN**

Co-Chair of the World  
Conference  
Assistant Director-General  
for Communication and Information

Votre Excellence Monsieur Adamkus, Président de la Lituanie Votre Excellence, Monsieur Karklins, Président du Comité préparatoire du Sommet Mondial sur la Société de l'information Monsieur Weiler, représentant du Club de Rome Monsieur le Directeur général de l'UNESCO, Excellences, Mesdames et Messieurs C'est pour moi un grand plaisir de vous souhaiter ce matin la bienvenue à la conférence sur «Les technologies de l'information et de la communication pour la formation au service du développement : les facteurs clés de succès». Nous sommes heureux de vous accueillir ici au siège de l'UNESCO. Je salue tout particulièrement tous ceux qui nous joindront au cours de trois prochains jours de partout dans le monde par les moyens de vidéoconférence. Permettez moi de rendre hommage aux personnalités qui ont bien voulu accepter d'octroyer leur patronage à notre conférence, comme leurs Excellences Messieurs Adamkus et Karklins, le Prince El Hassan bin Talal, Président du Club de Rome ; Mme Begum Khaleda Zia, Premier Ministre du Bangladesh; Mme Lidia Brito, ancien Ministre de l'Education du Mozambique; M. Yoshio Utsumi, Secrétaire général de l'Union Internationale des Télécommunications; M. James D. Wolfensohn, ancien Président de la Banque Mondiale; Mme Viviane Reding, Membre de la Commission

Européenne ; M. Roberto D. Peccei, Vice-Chancelier à la recherche de l'université de Californie, et M. Frank De Winne, Astronaute de l'Agence Spatiale Européenne et Ambassadeur de bonne volonté de l'UNICEF. Ladies and Gentlemen, The event, to which we have the pleasure to welcome you today, is an official "Thematic Meeting" of the World Summit on the Information Society, and is organized in cooperation with the Club of Rome. It comes in a series of four meetings, which set UNESCO's frame for operationalizing its concept of Knowledge Societies and for implementing the Summit's Plan of Action. In the coming days, we will address the challenge on how to accelerate progress on achieving Millennium Development Goals and poverty alleviation, with particular focus on the use of ICT in non-formal education and learning. The conference is structured into four substantial sessions addressing the issues of "Policy making and critical success factors", "Technology partnerships for lifelong learning in developing countries", "Sustainable solutions for capacity building" and "Low cost technology solutions for capacity building". It will conclude with a session synthesizing your debates for the World Summit on the Information Society. Thank you



# WELCOME ADDRESS TO THE CLUB OF ROME AND UNESCO WORLD CONFERENCE

## **RAOUL WEILER**

Co-Chair of the World  
Conference  
President of the Brussels-  
EU Chapter The Club of Rome

In the name of the Club of Rome I am pleased and honored to welcome you to this World Conference, co-organized with UNESCO, and dealing with the non-formal education and capacity-building processes for development. The overall objectives, as literacy and learning, human dignity, local entrepreneurship, cultural diversity, and many others are related and positioned within the frame of the World Summit on the Information Society in Geneva and Tunis.

The Club of Rome is well known for the famous report *The Limits to Growth* published in 1972 and actualized very recently in 2004. The report basically dealt with availability of planetary resources, a topic which has retained the attention of the political world leadership since 30 years and will do for the next decades.

However, the attention of the Club of Rome to education and learning has been manifest from the very beginning of its existence. In 1978 appeared the report *No limits to learning. Bridging the human gap* and has been re-edited in 1998. In this report it is stated that: "without the eradication of poverty and ignorance, there can be little doubt that the same or greater proportion of our future children will be condemned to continue as in this fate."

It has become overwhelmingly clear that sustainable societies cannot emerge as long as large scale poverty -2/3 of humankind- remains a dominant parameter in these societies on our planet. For the Club of Rome the simplified equation of the World Sustainability 'problématique' sounds:

*education = fighting large scale poverty =  
reaching sustainable societies*

For these reasons the organizers -Club of Rome and UNESCO- have taken the challenge to set up this World Conference in order to contribute -in a substantive way- to the endeavors, especially to the future Plan of Action, of the 2nd phase WSIS in Tunis.

The fast development of new technologies of information and communication - including satellites - are creating another epoch, modify profoundly human behavior and changing societies globally. Envisioning the emergence of information and knowledge societies belongs to the near future.

The developing world has to be integrated in this global process. If this integration process would not succeed, our planet will not end up only with poor countries but with poor and ignorant countries. This would be the climax of irresponsibility for many of us all. No political leadership can afford such an evolution.

Additionally we have to keep in mind that by 2050 the total world population will have attained about 8-9 billion people, meaning that the today's problems will increase dramatically if no appropriate actions are taken and Ways and Means are made available.

The Club of Rome is very grateful to welcome such a large participation from all parts of the world. It is particularly grateful to UNESCO for hosting this conference as well as for its dedicated personnel for the organization of the event. Indeed, UNESCO as the center of excellence of education and sciences has anticipated, since many years, the emerging information and knowledge society.

## Welcome address

The Club of Rome is particularly grateful to the Patrons of this event and to all who contributed to its content, especially to the people in remote places whose participation as been made possible via the GDLN network of the World Bank Institute.

The World Conference is the beginning of a large dissemination process through the Internet web-casting “live” and continued thereafter, Satellite and Radio Broadcasting

and in printed and electronic form. The culminating point will be to present the results as input to the WSIS in Tunis in November 2005.

Finally I wish to thank explicitly the sponsors and maecenas from Europe and the US as well as the NGOs and Foundations in Africa, Asia, Latin America and the Middle-East, who all made this event possible.

■

# EXECUTIVE SUMMARY

## 1. FRAME AND KEY CONCEPTS

The context of the World Conference was placed in the frame of the World Summit on the Information Society (WSIS), which resulted in a "call to action" by the world leaders to use ICTs for development, in its the first phase in Geneva 2003.

ICT for Capacity-Building covers a range of topics and the Conference addresses especially the part of the non-formal education. The main objective was to compile and to learn the critical success factors, in view of improving of future actions and initiatives. In fact it is contribution to reduce the "digital divide", which can also be characterized as the "knowledge divide" between those who have access to information and learning tools of the 21st century and those who do not.

The conference was structured around four strategic topics: policy-making and critical success factors in Chapters I & II, technology partnerships for Life-Long learning in developing countries in Chapter III, Sustainable solutions for capacity-building and Low-cost technology solutions for capacity-building in Chapter IV. In order to complete the debates on the strategic topics, testimonies and experiences from all around the world were incorporated in the Conference with the use of the Global Development Network (GDLN) of the World Bank Institute, with their resumes in Chapter V.

Key concepts for capacity-building were put in the large context of the emergence of new technologies and applications. For non-formal education as well as for education in general, the main challenge frequently advanced was the need of sufficient numbers of trainers of all sorts and teachers at all levels. Additionally, with the introduction of these technologies, substantial shifts to new pedagogical paradigms as well as to new forms of knowledge will take place. The integration of local languages and local practices and

habits is required for grass root training activities but as well as for development of applications. An extraordinary opportunity emerges for embedding the local languages with immense diversity. New literacies resulting from the new technical environment, about information access and media emerge, as well as increased assimilation of knowledge through non-formal channels.

## 2. SUCCESS FACTORS FOR THE IMPLEMENTATION OF ICT FOR DEVELOPMENT

### 2.1. Societal and Pedagogical Factors

The main objective of the implementation of technology and infrastructure has to be oriented towards human needs and uses. The focus lies on helping people to acquire new skills for improving their daily living conditions of poverty or extreme poverty.

To embed ICT initiatives in local communities, contributing and leading to local ownership and participation. Telecenters, telephone, e-health centers, etc. in communities and urban areas are essential for ownership attitudes. The attraction of the young, the integration of the women and the involvement of the local authorities and NGOs, all form the larger multi-stakeholder base for success.

The Government, national and regional, has to play a decisive role in creating indispensable conditions for deploying infrastructure requirements: like bandwidth, involving schools, electric power etc.

To initiate new perceptions and understandings for the importance of the use of networks in local communities, for mutual helping, for local farming conditions and food supply, medial assistance, in the schools and many other occasions and places.

Special attention in projects and initiatives should be paid to transfer information and

know how to the young, eager to learn and to assimilate new techniques. They have to be seen as the continuity for further development. Their training, over longer periods of time, warrants success in the continuity of ICT implementation.

Presently there are a lot of initiatives using information technology for capacity-building. There are successful ones and some that fail. Success and failure depend for example on the degree of integration of projects in local networks on all levels. This starts from user networks, includes local content providers and includes also the governmental structures on different levels. If co-operation one of these levels does not work properly, it may be possible to create a project and to maintain it for a while, but after some time, usually when the external financial support ends, it will disappear.

### 2.2. Infrastructure and Tools

At a first view, different technologies compete with each other and it is not yet visible, which one will finally be the best solution for a specific application. But a close look shows already that they will occupy different segments of the market and may finally be used in parallel.

There is the hope that developing countries need not to go through a "copper-age" but that they will directly start with wireless and satellite based applications.

Satellite radio exists for many years and is easy in use and accessible anywhere. Information and education programs are provided in the local languages and contribute significantly to the development of people. Satellite radio offers huge opportunities in the future.

Wireless mobile phones are meanwhile easily available, the advantage that its use is nowadays widespread and can be used by anyone. They play an important role in the developing world in the areas of small and local enterprises.

A recent innovative education project consists in providing young pupils a laptop: One Laptop Per Child (OLPC), elaborated at MIT and carried by the concept of the US\$ 100 laptop. This new device, belonging in a formal education context, will in the future, due to its wide dissemination and contribution to the pedagogical paradigm shifts, contribute significantly to reduce the 'digital divide'. Satellite access is part of the concept and equipment on the ground for interactive communication will become available at acceptable costs. Part of the OLPC concept is use of open software, tailored for minimum resources use, contributing to lower the costs and to facilitate its operation and maintenance. The availability of electrical power is an additional requirement in regions without grids. It is critical for implementing ICT that adapted power sources are included.

Large scale applicability of the above mentioned technologies depends on the costs of acquisition and operation. Their availability is a critical factor for successful penetration of ICT for development.

### 2.3 Open Systems Are Needed

Development requires the possibility for the developing countries to learn from the industrialized ones and to use the knowledge to adapt technology to their local needs and to follow subsequently their own development path. This learning and adapting is only possible if the knowledge is actually accessible and can be further processed. The software problematique was therefore discussed at the conference also from the viewpoint of users from developing countries. There were claims for open software because this is the prerequisite to enable people from developing countries to learn how the systems work and to develop them further according to their needs. This contributes to the creation of specific knowledge in developing countries and increases their competitiveness.



#### 2.4. New Financing methods

Financing the reduction of the digital divide remains a major challenge and is part of the Plan of Action of the WSIS. Of course technology providers are interested in huge future markets. Partnerships are concluded for further development. Official Development Aid (ODA) of the rich countries supports projects as well as do Intergovernmental Financial Institutions.

Attention was given to micro-credit and micro-financing for ICT implementation. Several examples in many parts of the world have proven that such methods are applicable with success. Local and collective financing of ICT projects, show large advantages in terms of ownership, initiatives, etc. Micro-credit exists since some years and it can have a significant contribution to successful implementation of ICT for development.

### 3. PERSPECTIVES

The World Conference on ICT for capacity-building has given a wide overview of success factors from the human and technological perspectives. Their simultaneous implementation looks to be an absolute requirement to be sustainable and successful.

In view of WSIS, an estimation of the amount of investment and ownership is made possible by businesses and experts. The perspectives of the announced low-costs equipment increase significantly the number of people to be trained and educated. The time frame in which considerable progress can be made for large scale ICT implementation remains difficult.

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# **Chapter I.** Setting the Frame

# ON THE OCCASION OF THE WORLD CONFERENCE ICT FOR CAPACITY-BUILDING: CRITICAL SUCCESS FACTORS

**KOICHIRO MATSUURA**  
Director General, UNESCO

Mr. Adamkus, President of the Republic of Lithuania,  
Mr. Karklins, President of the Preparatory Committee of the World Summit on the Information Society,  
Mr. Weiler, President of the Brussels-EU Chapter of the Club of Rome,  
Excellencies,  
Ladies and Gentlemen,

It is a great pleasure for me to open this World Summit Thematic Meeting on "ICT for Capacity Building: Critical Success Factors". I would like to welcome all of you to what promises to be a most interesting event.

This Conference is one of many ways that UNESCO is engaging in the ongoing process of the World Summit on the Information Society (WSIS). I am delighted that UNESCO, through technology, is bringing together such a range of international stakeholders and experts to help UNESCO and its partners in our combined efforts to translate the vision of the World Summit into action. We share a very strong resolve, illustrated by the Declaration from the first phase of the WSIS in Geneva in December 2003, where it says in Principle 14: "We are resolute to empower the poor, particularly those living in remote, rural and marginalized urban areas, to access information and to use ICT (Information and Communication Technology) as a tool to support their efforts to lift themselves out of poverty"

This is a very special event, reflecting the spirit of the World Summit in that it is truly multi stakeholder. In organizing this conference, UNESCO has partnered with the Club of Rome, and I wish to acknowledge and thank it for its efforts. In keeping with the recognition by the United Nations and the Summit of the need for new forms of solidarity, partnership and cooperation to

address the digital divide, a wide range of experts from civil society worldwide will be involved in this Conference. This includes NGOs, academia, industry and colleagues from other international agencies, all of whom are working on policies, partnerships and technology solutions to build human capacity and accelerate development through the use of ICT.

Over the next three days, we will share ideas, experiences and know how with a global and diverse audience through a unique feature of this event, namely, the live discussion platform. Four regional interactive sessions are scheduled to collect live testimonies from 12 locations in Latin America, the Arab States, Africa and Asia. UNESCO greatly appreciates the support of the World Bank Institute which has made available the satellite facilities of the GDLN (Global Development Learning Network) for this Conference.

Our objective with this global dialogue is to address the key challenge of how to develop the human capacities necessary for building inclusive knowledge societies. Over the past decade, ICT has triggered a revolution, affecting education, culture, society and many other spheres of our lives, and this revolution is only just beginning. Access to information and knowledge facilitated by ICT is increasingly determining patterns of learning, cultural expression and social participation. It also provides opportunities for development, more effective poverty reduction and the preservation of peace. Indeed, knowledge is playing, and will continue to play, a pivotal role as a principal force of social transformation.

Knowledge societies depend on the capacity of people to use and apply ICT to facilitate access to knowledge acquisition, transfer and learning. Knowledge societies are soci-

eties in which new paradigms of learning are emerging and exceptional investment, both intellectual and financial, in new learning will be needed. Knowledge societies are necessarily societies with strong learning imperatives and quality education for all is one of the building blocks of knowledge societies.

To put it very simply, we are striving for a world of social inclusion without the daily grind of poverty. We know that knowledge, through education and learning, is the key to improving prosperity and human security. This was one of the core messages that UNESCO took to the World Summit on the Information Society in Geneva 2003. For some years now, there has been enormous global investment in the use of ICT as a means of addressing critical development needs. This reflects what was acknowledged globally through the World Summit, that the appropriate use of technology can greatly accelerate social and economic development.

The Declaration of Principles from the Summit places great emphasis on capacity building and in particular makes the link between sustainable development and the potential of using ICT in all stages of education, training, and human resource development. Now, through the Summit Plan of Action, all stakeholders are being called upon to focus and accelerate their efforts to build the necessary capacities to bridge the digital divide and to ensure everyone can benefit fully from the Information Society.

This brings us to the key question of this Conference. How effective and sustainable is the strategy of using ICT for capacity building? What needs to happen to ensure that the growing investment in ICT to support learning can play its part in realizing the aims of the Millennium Development Goals (MDGs) and fulfill the responsibilities under the World Summit Plan of Action?

Over the next three days, therefore, this Conference will draw on experiences and

expertise from around the world on how ICT is being used to develop human capacities. To complement UNESCO's other efforts on education for sustainable development, we have decided to reflect the emphasis of civil society at the World Summit and to pay particular attention to the marginalized and vulnerable, and those not easily reached by classical education methods.

As a process of progressive change from ignorance to knowledge, from inability to competence, and from indifference to understanding, learning has never been so crucial. The need for lifelong learning and for education that is accessible, affordable and of high quality presents a huge challenge. As this learning process becomes increasingly complex and non linear, going far beyond the acquisition of basic literacy skills, old methods of learning are becoming insufficient and conventional methods of limiting the learning process to the four walls of a classroom and a one-time learning experience become less relevant and efficient.

New ways of teaching and learning may now be envisaged where ICT makes it possible for creating learning communities across age, class and status, language, skill, gender and spatial boundaries. ICT can change the modes of learning as it provides open and flexible solutions and can be highly cost effective and efficient in terms of reach and impact. This, let me add, does not mean that we can do without schools. But we need to combine traditional and new methods.

In focusing on non formal education and on the use of ICT for learning, we need to understand the critical success factors of the projects and policies designed to build human capacities. Our challenge is to identify what works and what does not. Given the complexity of learning environments and of applying ICT for development policies, programs and projects, this is not a simple task. However, if we are serious about being action oriented, and about fulfilling the various targets set by the MDGs

and the World Summit, we must focus on the difficult questions of effectiveness and sustainability.

To understand what are the essential elements for successful implementation and the key lessons to be learned, we need to address a number of basic questions. What makes a project sustainable and cost effective? How do we define, monitor and evaluate its impact, particularly its educational and social impacts? How do we ensure the availability of human resources, local champions, and relevant content in local languages? What partnering models are most suitable? How do we satisfy infrastructure needs? How can we ensure that technology solutions are appropriate to the local conditions? And, what of the need to ensure an integrated approach, including the weighting and interdependency of all of these factors? This conference is a unique opportunity to explore these issues by drawing on those with first hand experience from around the world.

Finally, let me conclude by extending my deep appreciation to the Club of Rome, whose President His Royal Highness Prince El Hassan bin Talal is a good and long standing friend of UNESCO. I am very pleased that Mr. Raoul Weiler, President of the Brussels/European Union Chapter of the

Club of Rome, is with us here today. I would also like to express my particular thanks to the World Bank Institute for making the GDLN available, as well as all the partners who have supported the Conference: ReDSOFT; SES Global; Intel Corporation; NEWTEC; European Space Agency; Hewlett Packard; Alcatel Space; MCI; and Microsoft.

This support is a vivid demonstration of civil society's strong engagement in this area and of our collective will to take up the challenge of the World Summit. Your ideas and conclusions will be carried forward to become an input to the second phase of the Summit in Tunis this November. Most importantly, your deliberations will inform us and guide us on how, collectively, we can become more effective in our action agenda to build human capacities through ICT.

I wish you every success in addressing this challenging agenda over the next three days of the Conference. To guide the deliberations to come, we are particularly fortunate to have with us today Mr. Valdas Adamkus, President of the Republic of Lithuania and, I am honored to add, UNESCO Goodwill Ambassador for the Construction of Knowledge Societies; and Mr. Janis Karklins, President of the Preparatory Committee of the World Summit on the Information Society.

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## UNESCO AND THE CLUB OF ROME WORLD CONFERENCE

**H.E. VALDAS ADAMKUS**

President of the  
Republic of Lithuania

Ladies and Gentlemen,

I am pleased and honored to speak at this World Conference, organized by UNESCO and the Club of Rome.

It is emblematic that these two organizations hold a meeting devoted to the second phase of the World Summit on the Information Society, which will take place in Tunis later this year.

Today, the term “Information Society” is omnipresent. Communication is indispensable for successful development of all areas of our public life. Yet UNESCO and members of international community stress that our ultimate goal must be the creation of a global “Knowledge Society”.

Information is not yet knowledge, and the increase in the amount of information does not guarantee a harmonious development of the individual and society as a whole.

Information technology does not automatically create an information society, let alone a knowledge society. Without education, which is a guarantee of real access to information, cultural diversity and freedom of expression, Knowledge Society is impossible. That is why this Summit deals with content and applications, and not pure technology.

In spite of deep respect for new technologies, we must have in mind that a lot of people are using such traditional media as TV and radio. Community radio and the volume of information we are receiving through them is still very important for civil society and knowledge. Looking at the development of new technologies let's not forget traditions which are still alive in our societies – both in the cities and villages.

Ladies and Gentleman,

A lot is said about the digital divide between the developed and the developing countries. But even in industrial countries there exists

a digital divide between the urban and rural areas, between the affluent and the poor. I know it first hand from the experience of my own country – Lithuania, which has numerous small towns and villages.

The gravitation of the cities and their economies denies the village equal access to the information highways. Not only does it deprive rural population of active participation in society, but it also aggravates urban problems.

Cities grow out of all proportions with inevitable traffic jams, pollution and other problems, all because they still have the monopoly on the most attractive jobs. Many of these problems can be solved by connecting villages to the information highways, injecting new partnerships and policies between the state and the business to compensate for this digital divide.

Most of us have to admit that caught up in short-term tasks and urgent problems we do not take time to design well thought strategies and to reflect on their implications.

As a result, and as a rule, we build airports that are too small, roads that are too narrow and information highways that are too slow.

Without a vision, we cannot hope to build the best possible future for our children by simply adjusting and adapting to the requirements of today. The change of requirements is too fast for policy-makers who cannot follow all the zigzags of IT development.

That is why it is so important right now to unite the efforts of UNESCO and The Club of Rome. This coupling of their efforts can give a fresh impetus to the second phase of the World Summit on the Information Society.

Ladies and Gentleman,

The key issue is that of freedom of expression and attempts to limit it in cyberspace. Very often, proposed restrictions are por-

trayed as protection against terrorism. However, by limiting freedom of expression, we play into the hands of terrorists for that it is precisely what they try to achieve.

It is very important that UNESCO has taken a clear stand on this issue. Let me quote Koichiro Matsuura, Director-General of UNESCO, who said at a conference on freedom of expression in cyberspace last February:

“UNESCO stands firmly behind the principle of freedom of expression in this matter. The debate must not be locked into a discussion about “good” or “bad” information. The discussion must focus on the core issue at stake – the universal human right of freedom of expression”.

This meeting must make its contribution to the ongoing debate by clearly identifying the challenges before the international community as it progresses on the road towards the Knowledge Society based upon the universal principle of freedom of expression. Furthermore, we must make sure that the conclusions of this meeting are presented and heard at the Tunis Summit

Civil society was far from satisfied with the preparations for the first phase of the Summit in Geneva, for it had limited possibilities to contribute to the debate.

The Club of Rome can help to correct this deficiency by bringing together those who are convinced that the future of humankind is not determined once and for all and that each human being can contribute to our society.

Ladies and Gentleman,

At this conference, UNESCO and the Club of Rome will address the key challenge of developing human capacities necessary for building inclusive knowledge societies that empower people. Education and a rational use of new technologies can help us reduce the existing inequalities and prevent many conflicts.

As Herbert George Wells used to say, civilization is “a race between education and catastrophe”.

Interactive technologies are opening new possibilities for communication between students and teachers, both real and virtual, but they can hardly change the essence of education.

Replacing education by training may well satisfy short-term industry needs, but it will not fulfill the task of transmitting to the young people the real scale of human values. Education is more than a simple transfer of information.

The statement that new technologies allow the developing countries to leapfrog in their development is only true on one condition: you must have an educated society first. This is difficult to accomplish in developing countries, where rural poverty and general illiteracy are not diminishing, but growing.

We must, however, reverse the current trend whereby two information worlds are being created -- the first of them is well-off, educated and technically equipped, able to receive the latest information quickly and at low costs; and the second is poor, deprived of access to basic infrastructure, doomed to be outdated, and paying a high price for information.

Clearly, this second world has no chance of catching up with the first one, if we are not ready to table and implement effective policies.

Ladies and Gentleman,

Talking about great opportunities that new communication technologies open up, we must not close our eyes to dangers, associated with this process.

Our children read less than we did at their age. Since the days of Ancient Egypt, the written word was at the basis of human education. It must be honestly admitted that

so far, the hopes vested in new technologies with regard to education have only partly come true.

Another dangerous trend is to review the concept of scientific knowledge as public good. The best example in this respect was the attempt to patent the human genome code.

So, there is no simple answer to the question of whether the information revolution is good or bad. It may be both. On the one hand, it gives unlimited possibilities for information exchange. On the other, it may bring the danger of a new global “iron curtain”, where the developing countries may once again be the big losers.

Ladies and Gentleman,

Our times are complex and full of uncertainties. To borrow a quote from the French poet and thinker Paul Valéry: “The trouble with our times is that the future is not what it used to be”.

It is clear, however, that the technological revolution alone will not lead us to a harmonious global knowledge society.

We need participation, we need genuine international solidarity and we need investment in human skills. But above all, we need responsible political decisions, which would ensure conditions for putting technological achievements at the service of every man.





# WSIS THEMATIC CONFERENCE ICT FOR CAPACITY-BUILDING

## JANIS KARKLINS

President Preparatory Committee  
World Summit on the Information  
Society, Tunis 2005

Excellencies, Ladies and Gentlemen:

I would like to thank the Club of Rome and UNESCO for inviting me to the WSIS thematic conference to focus on human capacity building, so necessary for building inclusive information and knowledge societies. In my talk, I will first describe the World Summit for the Information Society (WSIS) process, including the outcome of the Geneva phase and where we stand today in the Tunis phase of WSIS. I will then outline the role of thematic meetings in the process.

Mr. Chairperson,

The digital era started not so long ago - three or four decades back. Since then, technology has impacted all facets of life. However, development of this new type of society and life has not been even in different parts of the world.

While the issues of information society have been addressed in various forums, the World Summit on the Information Society focuses comprehensively on the information society and bridging digital divide with the participation of governments, international organizations, civil society and industry representatives.

Addressing these issues is critical for reaching the goals set out in the Millennium Declaration. If we succeed in harnessing the immense potential offered by information and communication technologies, and make these technologies accessible to as many people as possible, then we will be in a much better position to achieve the overarching goals that have been enshrined in the Millennium Declaration, such as the eradication of extreme poverty and hunger, the containment of disease, the protection of the environment and the attainment of a more peaceful, just and prosperous world.

Looking closely at country's development trajectories, the fundamentals for sustainable growth and development are no longer simply the traditional factors of production - labor, capital and technology - as we know them. Knowledge has increasingly become a very significant factor in the development process. For a country to seize development opportunities in the 21st century, its economy must move progressively and vigorously towards emerging as a knowledge-based economy. Developing countries can benefit from the knowledge revolution and make effective use of knowledge in all sectors of their economies. However, if the digital divide is not addressed, we risk creating a knowledge divide whose impact may be even larger.

ICTs should be regarded as tools and not as an end in themselves. Under favorable conditions, these technologies can be a powerful instrument, increasing productivity, generating economic growth, job creation and employability and improving the quality of life of all. They can also promote dialogue among people, nations and civilizations.

## THE WSIS PROCESS

The UN World Summit of the Information Society, or WSIS, is focused on promoting the Information Society at the national, regional and international levels. The overall goal of the WSIS process is to advance the achievement of the internationally-agreed development goals, including those in the Millennium Declaration, the Monterrey Consensus, the Johannesburg Declaration and Plan of Implementation and the Spirit of Sao Paulo (UNCTAD XI) by promoting the use of ICT-based products, networks, services and applications, and to help countries overcome the digital divide. The WSIS process provides an opportunity to address ICT issues in all

societies, developed and developing alike. Civil society and the private sector have key roles to play and both must stay fully involved in the process along with government. This is critical for a successful outcome of the WSIS process.

The unique nature of WSIS, structured in two phases, provides an opportunity for enhanced dialogue and partnership, enabling the international community to address questions about the information society in a comprehensive and inclusive manner. Phase I of WSIS culminated with the Summit in Geneva in December of 2003, in which a Declaration of Principles and a Plan of Action were finalized.

The Second Phase of WSIS, which will take place in Tunis, will build on the Geneva agreements, which outline important information society issues and require implementation on national, regional and international levels. The Tunis Phase has three main areas of focus; implementation of the Plan of Action developed in Geneva, streamlining of financial mechanisms for bridging the digital divide and discussing questions of Internet governance.

The Tunis Summit must go one step further and move from principles to actions. The outcome of the Tunis Summit should be to translate the decisions made in Geneva into concrete actions and policy decisions. The Tunis Summit should foster existing, and create new, partnerships between governments, the private sector and civil society. A sound implementation process of WSIS decisions is crucial to avoid a common outcome of many international gatherings in which no follow up action is taken.

In February 2005, we successfully concluded the second preparatory meeting of the Tunis summit. Based on the report of the Task Force on Financial Mechanisms, member states examined in depth existing financial facilities to bridge the digital divide and analyzed their efficiency. They also reached an agreement on the establishment in Geneva of a

voluntary digital solidarity fund, an issue on which we were not able to agree during the Geneva phase. This fund will complement existing financial mechanisms but will focus on exploring new sources of funding and will concentrate on pressing needs on local level.

In September, the third PrepCom will examine the Report of the UN SG Working Group on Internet Governance and continue discussions on the implementation of the Geneva decisions as well as negotiate the Political Chapeau of the Tunis Document.

Thematic meetings, such as this one, provide intellectual laboratories in which new and practical measures can be discussed and innovative solutions developed. Last week's consultations on implementation, which took place in the framework of ITU activities, clearly demonstrated the importance member states attach to implementation of WSIS decisions. I'll not be original by saying that implementation first and foremost should be organized in national countries by national governments and that process should be supported by regional and international cooperation. Thousands and millions of individuals stand behind the governments. We have to reach each of them. We have to make their lives better by providing education, health and social services. ICTs provide us with unprecedented tools and we should make the most of these opportunities. I believe that this conference is exactly about these issues - how to empower a woman in Sub-Saharan Africa, a young man in the highlands of Bolivia or a girl in the Philippines, to benefit from the use of ICTs and how to make it possible.

I hope that the outcome of this meeting will provide guidance and practical proposals to policy makers regarding ways to most efficiently provide access to education by use of ICTs in order to ensure growth and economic development for all populations. The recommendations from this conference will feed into the negotiation process and will provide a valuable source of ideas in the WSIS deliberations.

The outcome of this meeting will be placed on the WSIS website and the organizers will be given the floor during the third PrepCom to present the findings and conclusions of the conference.

There is no disagreement about the existence of a digital divide. And there is a consensus that, if urgent steps are not taken, the divide will widen. More than lip service is needed. It will require a concerted effort by governments, international organizations,

companies and civil society, working together to provide an improved environment for the Information Society in both developing and developed countries around the world as well as within and between populations of people.

I wish you all a very successful and productive conference and look forward to hearing the report with the conclusions of the meeting.

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# **Chapter II.** Policy-Making

# INSERTION AND CAPACITY-BUILDING THROUGH ICT, AN OPPORTUNITY FOR DEVELOPMENT CHARACTERIZED BY SOLIDARITY, EQUITABILITY AND CO-RESPONSIBILITY

## CATHERINE TRAUTMANN

Former Minister,  
European Parliamentarian

First of all, I would like to thank the organizers inviting me to participate at this conference. I propose to express myself not only as a European Parliamentarian in charge of the report on WSIS, but as well from my personal experience at the local and national levels. In this way I contributed at the elaboration of French governmental plan for the information society which looked for the development of the use of ICTs in all the domains of, creation, industrial production and services, administration and education & research.

In this way, I observed that such an ambitious and global ICTs development plan, intended to fill our gaps at the national level, is slow down in its effects by insufficiency of training and available content.

I drew the simple conclusion: it is in the training, initial as well as continuous, that resides the key for success for creating access to ICTs for all.

### I. THE ROLE OF ICTS IN THE INSERTION AND TRAINING FOR ALL

In my region, a very interesting experience has been set up, with the support of the local elected representatives, in the beginning of the nineties. This experience, which idea has been used again in the development of the cyber centers and in the elaboration of the French national plan with the implementation of the “cultural-multimedia spaces”, illustrates very well the role of ICTs in the insertion and training for all.

It concerned the return to employment of the population hurt by the industrial re-conversion of shoe manufacturing. The bet consisted in the resort to ICTs for the training of the unemployed. It should be mentioned that besides the traditional industrial manufacturing existed also the artisan man-

ufacturing of moccasins, braid in an Indian manner, home-made, an activity which became unfortunately obsolete, as a result of competition. It was chosen to consider ICTs at the same time as a tool and an object of training. The objective consisted in the creation of conditions for professional re-insertion and valorization of new acquired competencies, specifically for the orientation to tele-working.

It was observed that this training has created a stimulating effect the personal level, due to the acquisition of new usable knowledge, but also for a personal and social usage of ICTs. The re-adaptation to the world of employment has been favored through the opening of new forms of communication, allowing to these persons to be in sync, even at the edge, with the technological evolution of our society. Several among them expressed their desire to continue for higher qualification.

In this way, ICTs can be suitable for everyone, at condition of applying an adapted training, enabling a potential professional as well as a personal and private use by the persons to be re-inserted, allowing them to be considered again as “performing” individuals. Even more, this experience has allowed observing that ICTs stimulate a re-mobilization of intellectual capacities and a desire for additional training.

This experience has also shown that success factors reside in the “group effect”. It has not only to do with bringing an individual in contact with a technique, but to surpass the barrier of ICTs training of many, for ICTs are also a tool for communication, which the acronym tends to oversee. Communication in itself is part of the training process and plays an essential role in it. Training through ICTs creates a link, as testifies the mutation of tele-learning, which

evolved basically from an individual use with audio-cassettes, than to interactive CD Rom and now to downloadable programs from the Internet.

ICTs are also a means for combating scholar failure or absence of initial training. This is what I observed in the work of teachers using multi-media for the re-designing apprenticeships, through the use of images or other forms of languages, and through the appeal to game behavior. ICTs can as well be outreaches as real pedagogical resources for combating scholar failures or gaps in the training processes.

## II. THE EDUCATION COMMUNITY OR THE MOBILIZATION OF A COMMUNICATION NETWORK. RENEWING EXISTING APPROACHES?

The training of ICTs through ICTs represents an advantage, namely the one of thinking in terms of communication networks, beyond courses and methods. It is possible to draw a parallel with the learning of writing and the utilization of characters and words. The learning of ICTs refers in fact to intelligence, to reasoning and memorization, to curiosity, but above all it opens to a multiplicity of possibilities of contacts with others. It is astonishing to see how many heavy physically handicapped persons learn easily ICTs, escaping their isolation.

ICTs change the approach to writing and allow a conquest of autonomy much faster than with classical methods. Therefore is it not possible to renew the methods of teaching? The same question of adaptation arises for teachers and trainers.

At this stage, I would like to add a personal reflection and draw your on the importance of cultural and linguistic diversity in ICTs. The communication through the Internet is branded by a poor writing and the supremacy of one language. These two elements can contribute

to supplementary difficulties to persons in situation of failures or illiteracy. The learning of an additional language to the mother language should not be compulsory, very oft selective and dissuasive, for persons who desire to be trained using ICTs. These individuals should be accepted in their own language and use it to undertake their training allowing the building of a relationship of confidence and trust with the trainer.

The question is thus to adapt the content of the training programs as well as the competence and the number of the trainers for the concerned peoples, and not to suppose that, since it concerns technologies, it would be sufficient in a certain way, to deliver a user manual. Being convinced about the necessity to warrant, in the frame of the WSIS, a universal service of access and its gratuity, this does not imply imposing uniform contents. I believe on the contrary that it is essential to warrant plurality of approaches and favoring international cooperation of networks among researchers and trainers.

I want to take the practical example of the introduction in the schools of electronic notebooks and schoolbags, of pedagogic material which supposes not only a perfect mastering by the teachers but an initiation of the parents as well. There, where the relation between pupils, parents and teachers has been taken into account, the operation has been more successful compared to the situation where the teachers did not benefit an accompanying and sufficient training or where the parents have not been involved enough. This example shows that an adequate training of the teachers and trainers is required for an optimal use of the tools and similarly that the setting up of educational community in the form of a communication network results in an enhanced success.

The information society has to be considered as a communication society and the training programs as a means to get acquainted without being alienated to it.

### III. ICT AS INSTRUMENT AND RESOURCE FOR DEVELOPMENT.

Concerning the developing countries, another question has to be taken into account: the one of the cultural and social references which are the basis of their culture. As an example I may mention, fairy tales, which are frequently related to the education of the young, or evoke the place and respect of the elderly. It is suitable to do the same for ICTs in searching for adequate training in accordance with the expectations of the young public, of men and women in age of being active, the elderly as well as for people being in an insertion process. **All people must have the possibility to get acquainted with the available content.**

This refers to the **socialization of education, mirror of the degree of consideration a Government allocates to the education of its population.** In Western countries, the model is more focused on the family nucleus than on the enlarged collectivity or the enlarged family. In this frame, it is suitable to make a difference between what are the initial acquisitions and what belongs to and is transmitted through the collectivity.

This question is prior to the implementation of the plan of action of the WSIS. Indeed, the development has not to be understood as the only improvement of competitiveness, even as the adaptability to the mutations of the economic world, but as a **development of the person**, of the individual aptitude, depending on the different social and age categories. From this point of view, the training serves a societal project as it contributes to a project of development, favorable to the creation of new enterprises and activities.

Willing to reduce the digital divide requires strategic choices about **individual and group training, and not only about the accessibility of services.** Some are satisfied by advocating the sole training of the ICTs as technology. According to me, one has to think in a similar way as it was done for the

school system, with a global vision about training and education, shared by the actors of the educational network, the citizens and the decision makers.

**In the perspective of sustainable development, ICTs may not be considered as simple tools but as real instruments and resources.** Instruments for knowledge and production; resources with a strong cultural value as well as economical, which exploitation requires imperatively the availability of energy and infrastructure. As in the past, the roads and railways and now ICTs design and make entire regions viable. Their role is **polyvalent and the organizer of personal life, social and political as well as.** Any training of ICTs must be thought by taking into account the sense and the **social place that ICTs can take.** If the dematerialization of the contents can be considered as a loss, ICTs allow to keep a relation with others, with life. **The content of the training must be respectful of cultures and local know-how.** ICTs represent a real engine for growth (a quarter of the growth of the GDP of the European Union, and 40% of the productivity), their role cannot only be macro-economic by facilitating the access to the international market by less advanced economies, but must favor the emergence of projects adapted to the populations and the territories.

After having known the historical phase of the Internet users forming a collective avant-garde, the today's challenge consists in knowing how to succeed its **massive dissemination.** The European Union knows a quadruple digital gap, which it has to reduce (territorial, social, economic and cultural) but this gap is worsening in the southern countries which don't have neither sufficient infrastructures nor massive access facilities to these technologies, what means higher cost for them and inequitable time delays, then longer compared to those in the northern countries.

**The action plan of the WSIS may not be a uniform one, but on the contrary rich in multiple approaches: diversity, pluralistic,**

adaptable. It has to be equipped with sufficient means at a threat of rapid increasing disparities.

Here two examples of successful experiences of massive access to ICTs.

**Finland:** the decision of massive ICTs learning is a public decision, implicating everybody. Making it a national challenge has led to the success of this policy.

**Canada:** chose a creative and educational approach through training of ICTs (new reflections on the spaces, tools and apprenticeship, systematization of the digitizing cultural industries). It concerned thus a way for qualifying the people and an expression of a very entrepreneurial vision, in order to resist to the US and to promote own creators. For these two countries, education and training have reinforced the competitiveness and the creation of new services.

#### IV. THE ACTION PLAN OF WSIS: AN OBJECTIVE FOR CO-DEVELOPMENT.

In conclusion, the WSIS should be, ideally, synonymous with gain of autonomy, liberty, knowledge, performance, capacity to become integrated in a global world. It is there that ICTs play a determining role for democracy. ICTs are necessary for reducing inequalities and the promotion of dignity of individuals, as well as a means for assuring the freedom of expression, information, pluralism of opinions and participation of citizens. Democracy, solidarity and prosperity are intimately linked in the search for the reduction of poverty of the MDGs, being a part of the plan of action. **The reduction of the poverty passes through the improvement of the material means of life, but concerns also the access to “e-services”,** be it education, health care, commerce or administration. However, it should be carefully watched that the pursued objective of WSIS is well understood as an objective of cultural enrichment. Therefore, the less advanced countries should have at their disposal the capacity of production in order to valorize their creations and their cultural heritage.

Indeed, one of the objectives of WSIS should be a better circulation of art works and not the looting of cultural resources of those countries where the conservation of their heritage has not been developed. The countries of the South know a rapid transition towards ICTs compared with the mutations of Western countries. Europeans may not impose their concepts to others. The principle of reciprocity has to animate the relations of partnership as the basis of the plan of action. The idea of co-development is here fundamental. This can help us to carry out our own mutation simultaneously. At that level, there is to be noted the concordance of the agendas of the Lisbon strategy and the second phase of WSIS, as well as of concordance of the contents (e-programs).

The constitution of a universal cultural heritage promoted by UNESCO is a shared obligation of countries involved in WSIS. Examples as the Universal Library and the European Library show that cultural projects can constitute real driving engines. The most flexible level for initiating projects remains the local one and it is possible to note the very positive implication of territorial collectivities, underlining the importance to look for a partnership adapted to the size, the agenda and the financing of the projects. This is the reason why, I think, that **WSIS should be the frame for a development of an innovative engineering of multi-partnership.** Collectivities, political or private institutions like the NGOs, the enterprises, should have their place in the process.

The European Union must be implicated and share its experience in the domains of training, for example by supporting the association of research teams in other countries with their existing focal points.

The quality of the partnership for the realization of the plan of action will be essential to favor the positive impacts of ICTs and for giving a human content to information society. WSIS has confronted us with an immense challenge, the one of conceiving a world society which places technologies at the service of human progress. Will we be



able, in matters related to the governance of the Internet as well as to its daily use, to deal with ICTs “in conscience”, which is to say with lucidity about the limits and risks built-in in these technologies? When training and education are really indispensable, then without them, we are sure the miss the chal-

lenge. I formulate, as a way of ending, the hope that WSIS contributes to the emergence of a world civilization centered on respect of the peoples and their cultures by favoring a development characterized by solidarity and equity, in one word, co-responsibility.

■

## PRESENTATION AT THE UNESCO AND CLUB OF ROME WORLD CONFERENCE

**REIDAR ROLL**  
Secretary General of ICDE

I regard myself as privileged in being asked to address you here today on behalf of the International Council for Open and Distance Learning (ICDE). And I bring greetings to you from the Executive Committee of ICDE along with their hopes that the deliberations of this Conference will be fruitful.

ICDE's presence on this panel is as a representative of the education sector and, within that sector, the voice of Open and Distance Learning, which now fully embraces within its diverse methodologies, Information and Communication Technology. ICDE was established in 1938. It is now formally approved and recognised by UNESCO as the leading Global Membership Organisation in Open and Distance Learning. Consequently ICDE has been very active in the organisation of UNESCO's World Summit on the Information Society (WSIS). And of course ICDE membership extends throughout the world, bringing together the major institutions engaged in this activity both in developing and developed countries.

We are here to consider the use of ICT in the context of capacity building and it has become customary to begin discussions on this topic with a number of caveats.

- The first of these is the technology gap or technological divide between the developing and the developed countries.
- The second is the literacy gap in which basic reading and writing skills are lacking.
- The third is the curriculum gap in which there is seen to be a lack of courses, either in the appropriate language, at the appropriate depth or at the required level.
- The fourth is the energy gap in which

the power of electricity is either not available at all or available only on an intermittent basis

- The fifth is the economic survival gap in which the existence of food and clean water, the basic sustenance of life, is threatened.

There is no doubt that all these challenges exist. But if we begin to consider and measure, by whatever means, the enormity of any one of the challenges represented by these gaps, we simply become paralysed by the scale of what is needed. Nevertheless, we set goals for removing these gaps although, in reality, we are aware that we must inevitably fail to achieve these goals since they are so difficult to accomplish. And we tend to judge our progress on the basis of our failure to achieve the goals rather than our limited success. And so we end in despair.

But that is not - so I believe - how we should be approaching any of these challenges. The English have a saying (perhaps it exists in other cultures also) that "There is only one way to eat an elephant - and that is to cut it up into small pieces". The enormity of the problem that is faced in eating an elephant is such that anyone attempting such a task is immediately paralysed by the scale. But we should be measuring our progress not on whether the elephant is eaten but rather on how much of the elephant is eaten or indeed whether any parts of it are eaten at all.

In the short time available today, it is not possible to deal with all five "gaps" which I have identified; nor is it possible to address even a single one in the detail it deserves. But I would like to offer a few comments on the first three - technology, literacy and the curriculum - since they are within the ambit

of special interest for the educational world which I represent here today.

In July 2004 in New Delhi a nation-wide initiative was launched, the purpose of which was to facilitate the creation of knowledge centres in each of India's villages by 2007. The initiative has been called Mission 2007 and ties in with the 60th anniversary of India's Independence. It aims to bring the various on-going ICT activities in India into a national strategy and to do so by taking the benefits of this technology to every village. It envisages broadband connectivity at low and affordable costs with integrated applications which are applicable and relevant to the ordinary lives of those living in rural India. The initiative is startlingly ambitious when we consider that there are some 600,000 villages in India, almost all of which could be seen to suffer from almost all of the five gaps I have enumerated.

But the initiative is feasible when it is broken down into its various constituent parts. It has the singular advantage of being visionary in its conception. And so it captures the imagination of the private sector, academics, a whole range of various societies and organisations which exist within India - indeed, everyone who hears of it.

Some 44 years ago President John F. Kennedy announced that the USA would set a man on the moon by the end of the decade. Much of the technology required for that adventure was not available at that time. It was not simply the case that it had not been invented. Rather nobody had even begun to imagine what it might be. But it was a vision which ultimately came to fruition because it caught the imagination of the general public and had the support of public and private sector organisations throughout that country.

I would not be at all surprised if India's Mission 2007 falls into the same category. If it does, or rather as I myself believe, when it does, it will at the same time challenge the

concept of the digital divide, providing an answer to the technology gap to which I referred earlier.

And ICT is an enticing and often addictive medium whose participants learn peripheral skills as they go along in order to satisfy their inherent human curiosity. Generations of students who have not obtained the basic skills of four function arithmetic in the course of their traditional schooling do manage to attain very considerable mathematical skills after they have left formal education through playing games such as darts, snooker, dominoes and various playing card games in their leisure time. All of these games can now be played at any time of the day or night on a Personal Computer. But of course the Personal Computer also allows an individual to communicate with other players locally or globally. However, to do so you need literacy. The hobby or pastime pursued electronically encourages the literacy and numeracy skills which seemed so difficult and so boring in the traditional school context.

We may shortly see that Mission 2007 in India is something much greater than an attempt to bridge the digital divide, important though that is, and much more a major step in achieving universal numeracy and literacy in India in the regional and national languages and thus going a long way towards universal primary education, achieving for India the second of The United Nations Millennium Development Goals.

I could make reference to other examples, albeit not so extensive, in a range of developing countries in Africa and other parts of the world but I would like to conclude with a few words about the curriculum gap.

My experience, as Secretary General of ICDE, leads me to believe that the idea of a curriculum gap, a lack of courses, either in the appropriate language, at the appropriate depth or at the required level, is widely

exaggerated. Courses in Open and Distance Learning have been developed in what now amounts to thousands of institutions throughout the world. But institutions tend to suffer from a syndrome known as “not-invented-here” (NIH). They expend considerable resource on developing their own courses because they persuade themselves that other similar courses do not fit their own requirements to the last detail. This is a provider led view since in many cases the students would find other existing courses perfectly ample for their needs.

But it is not just the NIH syndrome which is a barrier to the use of courses, adapted where necessary, across a range of institutions and countries. Almost all creative works - and courses are creative works - are protected under a legislative regime that requires users to obtain a license from the copyright owner before any use can be made of the work. It would, in general, be true to say that creative works such as course materials cannot be used unless the copyright holder says that they can. Copyright law is based upon the premise that all acts are restricted unless the copyright holder explicitly grants approval.

The obligation to obtain copyright approval is a significant barrier for users who do not have expertise in obtaining clearance or - and this is more generally the case - resources to purchase the right to use the material. And nowadays it is made even more frustrating because technology can so easily make these materials available.

But times are changing. Many of you will be aware that The Open Source movement has for many years promoted the open availability of the source code of computer software on the web as a means of pooling knowledge to encourage innovation. “Open Source” is a term which has sprung from and is still largely associated with the production and distribution of computer software. But it is beginning to be applied in a wider sense to legal rights in relation to materials which are published electronically

in which the term “Creative Commons Licensing” is regularly used. The need for access to high quality material has given rise to a number of innovative strategies which include the concept of Open Educational Resources (OER). And UNESCO has promoted interest in this in the last three years and particularly at the Second Global Forum on International Quality Assurance, Accreditation and the Recognition of Qualifications in Higher Education here in Paris last June.

Perhaps the most notable development, at least in terms of media attention, has been the OpenCourseWare initiative at the Massachusetts Institute of Technology whereby MIT have made material from over 900 of their courses available on the web. So far the institutions involved in such developments have been almost all within the United States and in Higher Education. But the Bodleian Library, in Oxford, has recently come to an arrangement with the Internet search engine Google to make an estimated 1 million books from its collection available on the web

“Open licensing” is now addressing the traditional barriers of copyright by reversing the copyright licensing model so that all acts are permitted, the only exceptions being those explicitly withheld by the holder of the rights. It does so through a range of licensing models which have a number of common characteristics which deal with the right to modify a piece of work, offering back what has been modified to the community for further modification, crediting the original author and non-commercial exploitation.

The rate of development of what some are now calling Open Content has been rapid and there is now a very wide range of activity including -

> *Carnegie Mellon University Open Learning Initiative* [www.cmu.edu/oli](http://www.cmu.edu/oli)

> *Utah State University Open Content for Education* [www.oslo.edu/projects/oce](http://www.oslo.edu/projects/oce)

Rice University Connexions [www.cnx.rice.edu](http://www.cnx.rice.edu) and, in terms of support service the OSLO Group (alas nothing to do with my own country but rather the Open Sustainable Learning Opportunities based at Utah State University which offers an Open Learning Support service to 'wrap around' collections of Open access educational materials.

We are at the beginning of new developments which, if carefully nurtured can:

- offer the best courses for institutions to use throughout the world;
- allow institutions to modify these courses to target more specifically the precise local needs;
- make the originals and the modifications available throughout the world thus creating perpetual evolution;
- reduce by an order of magnitude the total costs of course production.

We are here today to examine the potential of ICT for Capacity Building. The building of capacity requires two things:

- a means of distribution
- something appropriate to distribute.

Neither of these is of any use whatsoever without the other. The history of open and distance education from the earliest days of satellite technology is littered with grandiose ideas and experiments which have failed because they concentrated on one while assuming that the other was already in place or could be put in place very easily.

Mission 2007 in India provides us with a sterling example of how new technology can be made to reach throughout a vast population whose needs, for all sorts of reasons, cannot be met by traditional means of education. The Open Content movement can open access to the immeasurably rich resources which have been built up in recent years, allowing those resources to be translated and modified to fit local or regional needs and thus to be available at no cost to all those who can make use of them.

The provision of ICT technology to a widely distributed population requires a national vision, such as has been created in India. Such a vision shows how the elephant, which none believed could be eaten, can in fact be easily consumed if it is cut up into manageable parts. And that vision energises the public and private sectors, industry and commerce towards the accomplishment of this widely agreed goal. Such visions require resources in equipment and know-how and in many cases that means aid from international donor bodies. But that sort of aid is of no use without a sound feasibility analysis of how the vision might come to fruition in practice, taking into account local infrastructures etc.

The provision of materials is a more global concept. The Open Source movement began in a highly competitive industry and has subverted many of the assumptions of how intellectual products are created and protected by copyright. As it is now being employed in education, it begins to remove what was previously "the control of knowledge" which excluded from that knowledge those who could not afford to pay for it. And it replaces that negative control by a more positive control which credits the original author and goes a long way to guaranteeing the maintenance of quality in adaptations which are made.

UNESCO has already taken an interest in this development as I have mentioned in my presentation. ICDE's members throughout the world have a unique knowledge and experience which is essential if this development is to move forward. UNESCO, together with ICDE as the NGO with Formal Consultative Relations in distance and online education, need to work together formally so that none of the most attractive possibilities of Open Content are lost. UNESCO and ICDE need together to provide a framework for the creation of some overarching global direction and I hope that work can commence on this following this Conference here in Paris.

■

# SATELLITE USE FOR COMMUNICATION, INFORMATION AND LEARNING

**FERDINAND KAYSER**

President and CEO SES ASTRA,  
Member of the Executive Committee  
SES GLOBAL

The progress of satellite technologies undeniable and contributes to the integration and several communication and information technologies. Radio and telephone technologies have their origins in the late nineteenth century, television in the middle and data processing in the second half of the twentieth century.

Technological innovation progresses towards digitalizing and integrating all of them. Satellite infrastructure around the

planet offers new, realistic and frequently already available perspectives, allowing access to inhabitants of regions and remote places to the Internet and other applications.

Satellites systems are at the edge of new opportunities for development, fighting illiteracy and the reduction of poverty through capacity-building and learning.

See further in Annex I.



**Chapter III.**  
Technology Partnerships for Life-Long  
Learning in Developing Countries

# CAPACITY-BUILDING IN A NETWORK FORMAT - THE MODEL OF THE UNIVERSITY OF THE SOUTH PACIFIC

## INGRID VOLKMER

University of Otago,  
School of Social Science,  
Dept. Communication Studies  
Dunedin, New Zealand  
Ingrid.Volkmer@stonebow.otago.ac.nz

Capacity building through the use of technology in educational environments has become a complex process. This is because technologies not only 'distribute' (e.g. deliver 'content' from a to b) or 'connect' (e.g. provide a feedback mode), but also create new multi-dimensional communication networks within the symbolic territory or 'space' of the global network society.

Sustained educational capacity building through ICT means in today's advanced globalization process and communication infrastructure to integrate sustained 'local' capacity into a 'global' educational environment. Key components of 'sustainability' within this globalized framework are not only 'access' to global communication flows, but the creation of 'active nodes': communication hubs as integral elements of global educational networks.

In my paper, I will briefly discuss satellite platforms in their roles of providing such an 'active node' in the context of the University of the South Pacific (USP), which is still today one of the most unique university networks in the world, in utilizing the cooperation of satellite and telecommunication organizations to provide tertiary education to a student population which is dispersed across the South Pacific ocean.

The University of the South Pacific (USP) was founded in 1968 by governments of twelve island nations in the South Pacific. These island nations are: Cook Islands, Fiji Islands, Kiribati, Marshall Islands, Nauru, Niue, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu, Vanuatu. Of these island nations, Fiji is the largest with a population of 800,000 and Tokelau the smallest (population of 1400). The member nations stretch across an ocean territory as large as Central Africa, five time zones and the international dateline. Some islands have a Gross-

National-Product equivalent of a US middle class household.

These Pacific Island countries are disadvantaged in multiple ways:

- Local economies suffer from isolation: the distances between these countries are tremendous, and travel is only possible by plane (which is expensive for the average earner).
- More than one thousand languages are spoken.

This brief list alone reveals not only the peripheral location of this region in geographic terms but also in terms of conventional capacity-building strategies.

Furthermore, due to the low population density and the low rank on the global policy agenda, technological aid programs by worldwide co-operations bypass this region.

It is not all surprising that these South Pacific countries are - from a 'global' viewpoint - faced with various communication divides (without reference to the telephone/fax divide).

**(a) Digital Divide:** in most of the twelve Pacific Island countries, the Internet penetration percentage is in most of the countries less than 1% and some do not have access to the Internet at all (such as Nauru, Niue, Tokelau, Tuvalu)

**(b) Satellite Divide:** in terms of satellite availability, the South Pacific is almost a nowhere land, located right between the large scale satellite footprints of Asia/Australia, which barely reach New Zealand in the west and South America in the east. The whole area is mainly covered by two C-band satellites: one Intelsat and one Panamsat satellite (PANAMSAT 2) as a satellite alternative, covering only the western part of the region (in the New Zealand area). Both



require not only large but expensive receiving equipment (a 6-7 m dish), which only large-scale institutions can afford (i.e. to purchase and maintain), such as USP.

The overall objective of the University of the South Pacific was to create an educational infrastructure as a common platform for sustained economic development, driven by twofold goals:

- to educate and
- to train professionals within the region and reduce the migration of the professional workforce to other world regions, both relevant capacity building factors.

Given the dispersed geographical location of the twelve member countries, it is obvious that communication networks represent not just add-ons to otherwise solid on-site university programs (as it is the case in many Western world regions). Communication platforms are the crucial component of this unique tertiary education system of the Pacific Island countries.

Already in its first year in 1968, the University created a so called 'university extension' division. Many USP students found it difficult to travel and live away from their homes, while it was equally difficult for the university to send teachers to isolated locations. The University Extension provided the same distance education to each member country through so called 'USP Centres' through print media.

#### IMPLEMENTATION OF SATELLITE TECHNOLOGY

The implementation of communication technology took place in a three-phase process and began in the early seventies. USP is considered to be the first university worldwide to include satellite technology as a key component of distance learning. Each of the following phases of satellite technology implementation represents one model

of satellite integration into an educational environment.

##### Phase 1:

###### Satellite and HF radio: Distribution

USPNet was founded three years after the university had been established. This first USPNet was an experimental satellite-based distance education system utilizing satellite links for the provision of audio-conferencing and was only available from the main campus in Suva/Fiji. Within this first model, Fiji served as a centre inside this closed local network. The satellite was used to transmit from a to b, i.e. to other peripheral USP members, which could not send themselves, only receive.

Satellite transmission was provided on a voluntary basis by NASA's ATS-1 satellite. In addition, High Frequency (HF) radio was used to complement the satellite network in order to reach all USPNet-members.

This experimental network was only partially successful, the radio transmission quality was low and the project was automatically halted at the end of the lifespan of the ATS-1 satellite.

##### Phase 2:

###### Limited Satellite Capacity: Connectivity

Around 1995, USP obtained a number of leased circuits on a former meteorological satellite at reduced charges not only to distribute audio conferencing from Fiji to other USP members, but to connect four centres who have also received discounted telecommunication facilities: Cook Islands, Tonga, Solomon Islands and Vanuatu. The others continued to rely on the postal mail system to send audio, video and printed materials to students in remote areas.

##### Phase 3:

###### USPNet 2000: Network

A multi-government initiative by Australia, Japan, and New Zealand finally inaugurated a new USPNet network model in 1998. Each government provided grants to specific member countries and has helped to build the network capacity of today's USPNet, linking all twelve centres by satellite.

The use of satellites in this network is not longer restricted to an a-to-b distribution or simply to connect its centers. The new USP-Net constitutes a closed satellite communication network, used exclusively by USP for distance education. It uses the bandwidth of Intelsat 702. Intelsat provides engineering support, such as antenna verification, support of voice data transmission and video-conferencing.

The network consists of twelve earth stations, each of which is located at each USP Campus. These twelve earth stations are classified into hub stations, mini-hub stations and remote stations.

Preliminary and foundation courses are offered entirely by the distance mode through which USPNet provides multimedia, satellite tutorials and discussions. Due to Intelsat's multiplatform architecture, USPNet has the ability to utilize the satellite platform not only for video transmission but also for Broadband Internet access. This component allows the creation of online courses which supplement video transmission. The latest segment of USPNet is the cooperation with AARNET (Australian Academic Research Network). Based on this access, other services are possible, such as IP-Video, which allows USP to participate in collaborative teaching and research with other Australian universities.

### CRITICAL SUCCESS FACTORS

Reviewing this model, the following critical success factors can be identified.

#### (1) Extra-regional support, intraregional cooperation

Satellite transponder lease requires external funds, such as from extra-regional governments. Intraregional cooperation requires organizational models for the management of shared resources.

#### (2) Technological Framework for Global Connections

Given the key role of technology (in particular in the USPNet region), state-of-the-art technology is required for integration into global frameworks. As pointed out in the introductory paragraph, not only 'connectivity', but 'active hubs' represent capacity building goals in the media infrastructure of the 21st century. In this sense, only multi-level technological frameworks allow sharing in global resources and encourage active participation in a globalized educational framework.

#### (3) High-Tech Hub in Low-Tech Environment

The USPNet represents a high-tech hub in a low-tech environment reserved by agreement with supporting governments and telecommunication industry to be exclusively used by USP. In order to build capacity through 'active nodes', it is important in particular for low-tech environments to share high-tech hubs with other local communities, such as businesses. In order to facilitate local businesses and circumvent the cooperation arrangement with the telecommunication industry, USP has formed a consulting agency, called USP Solutions.

In this sense, educational networks can be perceived as hubs for triggering and supporting transformation processes of low-tech environments.

Cooperation with the satellite industry requires a conceptual change from pure educational concepts, to creating 'active nodes' in otherwise low-tech regions.

Technologies (and satellite) are crucial factors, not only for the creation of a global knowledge society, but for building communication frameworks in order to make 'reflection' and 'discourse' substantial elements of global education in the 21st century.

■

# INNOVATING EDUCATION WITH ICT

**MARTINA ROTH**  
Director Education Europe,  
Middle East and Africa,  
Intel EMEA

As the Director of Education in Europe, Middle East and Africa I would like to talk to you about Intel's commitment to education. We believe that quality education is crucial in developing the citizens and leaders of tomorrow.

Information and communication technologies are a major factor in shaping the new global economy and producing rapid changes in 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 other fields. They also have the potential to transform the nature of education - where and how learning takes place and the roles of students and teachers in the learning process.

Education is the essential ingredient that prepares us all for a changing future. As the social philosopher Eric Hoffer wrote, "In times of change learners inherit the earth; while the learned find themselves beautifully equipped to deal with a world that no longer exists."

New technologies will continue to transform the world in ways we cannot yet imagine. To survive and thrive in this knowledge-based economy, tomorrow's citizens, employees and customers must be equipped with 21st century skills.

- Intel is committed to improving education today so that students will be able to thrive tomorrow.
- Intel is committed to playing a positive role in preparing our youth for the demands of tomorrow through the 'Intel® Innovation in Education' initiative.
- Intel is committed to collaborate in public, private partnerships with governments and NGOs all over the world

## EDUCATION AND ECONOMIC GROWTH

Developing human capital has become one of the greatest priorities of nations worldwide. This is hardly surprising, given that knowledge levels determine productivity, competitiveness and prosperity. Knowledge and information increasingly determine new pattern of national development and wealth creation. The key words in the educational system of the future are: production of knowledge, geographical and temporal independence, pedagogic and structural innovation.

The level of technological development is indicative nowadays not only of the economic power and living standards of a particular country, but also of the place and role of this country in the global community, the scope and prospects of its economic and political integration with the rest of the world. At the same time, the level of development and utilization of modern technologies in different countries is determined not only by their resources, but, to a large extent, by the degree of society's ability to produce, absorb and apply new knowledge. These achievements in turn, are tightly linked with the level of education.

## THE ROLE OF TECHNOLOGY IN EDUCATION

Intel works with governments around the world to inspire innovation and enable the effective use of technology in education.

This is not because technology is an end in itself but because it is the means to facilitate a more interactive style of learning. Problem solving, reasoning, communication, creativity, decision making and collaboration: these are the skills that will allow students to adapt to an ever-changing world, and meet the challenges of tomorrow. We applaud our partner governments for recognizing the need for this new kind of education, one that empowers

students to think and reason at a high level and to harness technology to help them solve increasingly complex problems.

The Intel® Innovation in Education initiative is a long-term, sustained effort designed to:

- Increase the effective and innovative use of technology in teaching and learning;
- Celebrate and promote success in teaching and learning science, mathematics and engineering;
- Accelerate the advancement of university curricula;
- Promote research in strategic technology areas;
- Improve technical fluency and problem-solving skills among under-served youth through effective community-based education;
- Increase the number of young women and under-represented youth pursuing successful careers in high technology.

We collaborate with leaders from education, governments, industry, academia and research organizations to design and deliver programs in more than 50 countries across six continents. Our programs are customized to meet the needs of each community.

### INTEL'S PROGRAMS IN EDUCATION

Since its founding in 1968, Intel has been committed to improving education in order to prepare students around the world for the knowledge-based economy. We recognize that educators are the key to this. We work closely with governments and the education community to create localized curricula, tools and training programs to enhance student learning. To this end, Intel invests more than \$100 million a year in education under the auspices of the Intel® Innovation in Education initiative.

### INTEL® TEACH TO THE FUTURE

Intel® Teach to the Future is an effort to help both experienced and pre-service teachers

integrate technology into their teaching and enhance student learning. Participating teachers receive extensive training and resources to promote effective use of technology in the classroom

National and local governments have partnered with Intel Innovation in Education to implement the Intel Teach to the Future professional program. The curriculum is adapted to meet the needs of each partner country. In addition to language translation, the curriculum is localized to address cultural issues along with local terminology, pedagogy, and country-specific content (such as Web site resources). Depending on their assessment of teachers' learning needs, countries have also provided additional software resources or basic computer skills training.

Within the EMEA region, this program was launched in the year 2000 and is active in 19 countries: Austria, Czech Republic, Estonia, Germany, Italy, Ireland, Israel, Egypt, Jordan, Lebanon, Saudi Arabia, UAE, Poland, Portugal, Russia, Switzerland, South Africa, Turkey, Ukraine.

In Germany, 2003 saw the introduction of "Intel® Teach to the Future - online training and collaborative learning". The new curriculum is a blended learning concept - it combines face-to-face and online training to provide new training experience that aims at collaboration and mentorship. The program utilizes the highest level of technological, pedagogical, methodological and subject competency to create a program that meets the demands of the EU Commission regarding online training.

Furthermore, in 2004 the program was awarded the D21 Award, celebrating its status as a model in public-private partnership. "Intel® Teach to the future - online training and collaborative learning" took first prize at the "Public Private Partnership Awards" organized by Initiative D21, an event which carries prize money of 5,000. Their aim is to give exposure to exemplary partnerships

between public and private institutions, as well as to the current “Best Practices” implemented in Germany. “Intel® Teach to the Future - online training and collaborative learning”, the professional development initiative for teachers, strengthens both team spirit and the use of new media in lessons. The project is supported by numerous Intel Partners made up of ministries of culture, the scientific community and private companies from the entire German-speaking area.

What convinced the jury about the project was mainly the usefulness for the target audience, the broad reach and the lasting effect, as well as the transferable skills developed by both the foundation and basic courses.

#### INTEL® HIGHER EDUCATION PROGRAM

The Intel® Higher Education Program is part of the Intel® Innovation in Education initiative. The program focuses on advancing innovation in key areas of technology, as well as developing a pipeline of world-class technical talent for Intel’s future workforce and the global knowledge based economy.

To achieve this goal, Intel collaborates with over 50 top universities throughout EMEA to accelerate the advancement of research, to expand university curricula development, engage in focused research, and to meet the challenges of rapid technological progress. The technical areas include semiconductor technology, high volume manufacturing, micro architecture/circuits, computing platforms, software, networking and communication.

Research projects and curriculum development projects funded by Intel look beyond current technology, advancing the communication and information industries at large.

#### INTEL INTERNATIONAL SCIENCE AND ENGINEERING FAIR (ISEF) FOR STUDENTS

More than One Million High School Students Compete in Science Fairs Each Year  
The Intel International Science and Engi-

neering Fair (ISEF) is the world’s only international science fair representing all life sciences for students. Every year, more than one million students in grades 9-12 compete in regional science fairs and nearly 500 Intel ISEF-affiliated fairs held around the world. More than 1,400 students from over 40 countries win the chance to compete for more than US\$3 million in scholarships and prizes at the Intel ISEF finals in 14 scientific categories and a team project category.

71 local winners from EMEA participated in the 2004 international final in Portland, Oregon. From these, 21 students won a total of 38 awards, including the top award for one German student which included a US\$50,000 scholarship.

#### INTEL COMPUTER CLUBHOUSE

The Intel Computer Clubhouse Network is an after-school community-based technology learning program. Intel Computer Clubhouses enable youth in underserved communities to acquire tools necessary for personal and professional success. A Computer Clubhouse is more than just a safe environment for youth; it is also a creative place where a “community of learners;” young people, mentors and staff, use technology as a tool for learning and creative expression. The philosophy of the Intel Computer Clubhouse is “beyond access,” a place where young people use professional software to create computer-based projects inspired by their own ideas. The Computer Clubhouse provides a supportive learning environment where youth build skills and self-confidence, as well as a future, working together with adult mentors who provide inspiration and serve as role models. Intel supports the establishment of Computer Clubhouses in underserved communities around the world. The objectives of the Intel Computer Clubhouse Network are to proliferate the learning model that was created by the Museum of Science, Boston and the MIT Media Lab, establish it as a

replicable model for technology learning, and support the success of individual Computer Clubhouses.

In the five years since the program began, the Intel Computer Clubhouse Network has reached more than 50,000 young people across almost 100 Clubhouses. Intel operates this program in alliance with both the Museum of Science in Boston and the MIT Media Lab, who offer ongoing support and program guidance for the global network of Clubhouses.

Within EMEA there are currently 10 clubhouses, in South Africa, Palestine, Israel and Ireland.

#### INTEL® LEARN PROGRAM

In 2004 Intel has launched a new program called the Intel® Learn Program. The program was created to build technological literacy and 21st century learning skills for young people from under-served communities, with little or no access to technology at home or in school. The goal is to help bridge the digital divide and help young people in emerging markets acquire the skills needed to compete in a knowledge-based economy.

#### CONCLUSION

Intel would like to thank all our partners for their dedication, and we look forward to continuing our collaboration in innovation in education.



# TECHNOLOGY PARTNERSHIP FOR LIFE-LONG LEARNING IN DEVELOPING COUNTRIES

## DIDIER PHILIPPE

Director, Philanthropy  
Education and Social Investments.  
Hewlett-Packard  
Europe, Middle-East and Africa

## ABSTRACT

The real case of the Digital Community Center in RSA was presented from it starts in October 2001 in Dikhatole (within the Germiston district) as a one site School established as a Philanthropic initiative to its sustainable phase.

The success was in growing up from what could have been a Technology initiative to a sustained Solution Center embedded within the community. The school was originally targeted for out-of-school kids and has grown as a center for young adults, empowering entrepreneurs and women job development.

Four Elements were critical in this success:

- The Community and Local authority drive all along, from the initial proposal submitted to HP.
- The quality and commitment of the leading NGO in charge of the project development (ORT).
- The broad set of partners cooperating on the Digital Community Centers, including local organizations.
- HP's framework and management commitment to foster resources, initiate project, foster resources, provide substantial initial grant for equipment and project management.

A fifth element must be added as critical: time. Up front, the project was set by HP as a three year initiative, with clear understanding from all that the project should continue as self sustained afterwards. From day one, every one was working in making the project sustainable over this time frame, and the time was long enough to allow the correct development.

On the operation side, the critical success factor was to benefit from outstanding com-

mitment of key individuals (most of them volunteering), including the head master of the adjacent public school.

## INITIAL PROJECT

South Africa, Dikhatole (Johannesburg neighborhood)

Project run by ORT (NGO) to address cycle of poverty and unemployment of one of the poorest communities on the East Rand. To train community members in employability, small business skills, IT literacy and specific skills required by potential employers. Also build capacity of teachers to introduce basic IT skills at primary and secondary schools

The project was to set up an HP Digital Community Center (DCC). A DCC is a centre where the information and communication infrastructures are strategically deployed to encourage the participation of all appropriate parties in the economic and social development that technology enables and enhances.

The project was about 50 student seats, with server and adequate printers and rich media products.

## PROCESS OF MANAGEMENT AND DEVELOPMENT

Since the beginning a Management Committee under the leadership of the Community was established.

Content, teachers, TOT, and daily management was under the leadership of ORT.

ORT was also in charge of driving the development and fund raising.

Quarterly progress reports were provided to all by ORT.

Initial effort was on Capacity building and Teacher training

Rapidly, training were extended out of the initial base of Kids to multiple initiatives requested by the environment and the community (life-skills training of trainers by red Cross, Dikhatole women's group, Women Entrepreneur development...).

#### PROOF OF SUCCESS

Not only the center is sustainable, but the original Scholl place moved into multiple sites embedded in the Community areas. It was extended from Kids to Young adults and Life-Long learning.

As a result, the Department of Labor is discussing the possibilities for leaderships and placement for graduates from Dikhatole community.

The Greater Germiston Chamber of Com-

merce is planning for entrepreneur-ships programs and leaderships for youth of Dikhatole.

Solution empowerment, supported by Technology, helps Dikhatole Community to move up from a "disaster area status" to a "partner area status" within its greater community.

#### LEARNING

HP expertise combined with Community and NGO expertises have set the base for a duplicable process for local community development. 12 DCC's have been established by HP in EMEA alone. The common learning has been in the need to help communities in terms of Entrepreneurship, micro business development and SME's. The expertise gained by HP is a useful complement to help this.

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# SATELLITE IP APPLICATIONS: A SOLUTION TO DIGITAL DIVIDE

**JEAN-CHRISTOPHE  
HONNORAT**

Project Manager on distance  
training for health,  
Alcatel Space

## 1. GENERAL OVERVIEW

ICT and the Digital Divide:

- Many regions in the world suffer from a lack of connectivity, especially in Developing countries: isolation of population, low growth, no communication means, no commercial or cultural exchange....
- Those concerned regions, on the other hand, have a very young population which needs to be educated, cured, informed and trained to better participate in their country's development
- Infrastructures and skills ( teachers, universities, hospitals, administrations ...) are not sufficient nor easily accessible for most of people, as territories are very large, with sometimes quite a low density, and a weak financial investment power

ICT for Capacity building: a Huge potential

- ICT and satellite solutions provide a unique answer to this problematic, as it offers performing and reliable communication means that can support most of the activities of the population, the institutions and the governments.
- A strong effort shall be put on the setting up of pilots and demonstration to raise awareness on the huge richness and potential of development brought by ICT's advanced applications, combined with satellite technologies

This problematic shall be addressed considering various aspects as follows:

- The Applications Domains / Thematic and Departmental fields: Most of the activities at local, regional , national and international scales can be efficiently enhanced and supported by advanced applications offered by ICT:

### > e-Community

Includes e-Education, e-Government, e-Inclusion, e-Economy: as it meets the same categories of concerns: to inform, communicate, educate, train, sensibly citizens, at any skill level, all along the

people's life and according to their specific needs or situation

### > e-Health

Includes Medical Training, Medical Tele-Assistance, Tele-Diagnostic [Tele-Staff (between radiologist, anesthetist, ...), Second Opinion (Tele-expertise)], Home Services and prevention: as it allows medical expertise being shared and accessible from anywhere at any-time, allows saving redundant costs and ensures a better quality of care

### > e-Risk

Includes e-security and all phases of Crisis management: warning/alert, response, Mitigation: offering new working tools, optimized efficiency for the organization of the rescue and its follow-up

- The Services and Applications which are the real targets to be studied for a long-term development and use: definition of needed functions and interface
- The Actors and their respective roles: from requirements up to daily usage
- The Technologies including Telecom Satellites

We will focus on Non Formal Education and gained experience in this domain

## 2. INTEREST OF SATELLITES

- Satellite main characteristics :

> Wide coverage ... with 1 or more satellites...up to worldwide connectivity  
> High bandwidth => high volumes and best quality of the content, better interaction => optimised Usage

> Quality of Services and Security

> Satellite eases the "test & deploy approach" : Small pilots, once successfully connected and active, can easily be extended to a significant number of additional sites

- Satellite homogenises connectivity and interoperability : It offers a unique answer to communicate from anywhere with anyone, as it allows combining satellite systems with heterogeneous

existing facilities and networks:

> In the same working session, users with different technologies may interact the one with the others:

2-ways satellite + 1-way satellite with terrestrial return link + only 1-way satellite + only Terrestrial= one unique live session

- Satellite can provide a wide range of Applications,

> Content distribution

> Web based working/learning

> From low to High-Quality Streaming (Live or Recorded)

> Videoconferencing

> Virtual classrooms and Collaborative Work

which can be accessed at anytime from anywhere

> **Autonomy:** The learner shall enter in the live session when he wants, when he can, ... without disturbing the others

> **Top Quality & Performance:** As a lot of practical training teachers/students are filmed in real conditions, it is essential to see and hear in a very high quality what is done and said by the expert/teacher for practical training (surgery, car-repair, how to make a bend for firemen....)

> **Interactivity:** The teacher and the learners sometimes have a crucial need to dialogue or to get an immediate feedback or evaluation

### 3. VOCATIONAL EDUCATION'S SPECIFICITY

- Characteristics :

> **Community Users:** Users do not have technical skills or awareness but need to use ICT for their activities

> **Need for High Performance, Integrity and Quality:** Users rely on these solutions to benefit from a concrete knowledge and training to be used in real cases (firemen, doctors, ...)

> The solution must offer flexibility because people have a professional activity that cannot always match with the constraints imposed by the existing face-to-face training system. Many workers cannot exclusively go to dedicated learning centres at fixed time, but prefer accessing the courses from home or office, at the most convenient time

> Vocational Training all along the life can be mandatory for some activities, to maintain and up-date professional expertise

> Vocational Training mainly addresses specific communities of users with specific usage and needs, but which can be spread in many regions interesting other users

- Required basic Features:

> **Ubiquity:** Distribution of contents

### 4. RETURN ON EXPERIENCE

**E-Training Specific roles and profiles':** The organisation, management and related responsibilities for e-Training rely on many complementary actors:

- **Tight collaboration and collective decision-taking between:**

> key actors on user side (deciders, actors, technicians, Information Systems managers ...) ....and

> key actors on the global solution provider side (skills and experience in line with the actors' needs, constraints ...)

- **Involved actors and related roles:**

> Teacher - expert

> Learner - being a student or a professional

> Moderator or tutor

> Technical team on the premises

- Actors have to be aware that e-activities can bring a huge added-value but requires to adopt new working ways, supports and methods and new organisation's schemes:

> Requires a good information of the actors to raise awareness on its added-value and proposed adapted models to be followed

> Requires a real will to evolve and a strong motivation to implement such a change in the activity's global organisation

- > Each user's type has to be **supported in its daily utilisation** to be brought to full autonomy
- > Each actor needs a **specific dedicated training to implement and use e-training and ICT solution**, according to its role and its profile
  - The **solution has to be global, "end-to-end"** to ensure a long-term acceptance by users and **easy to deploy**, to use, to manage, to administrate and to maintain...

**E-Training Specific Requirements in terms of contents:**

- Contents which will be used have to be **clearly identified**:
  - > **Nature & Formats**: still pictures, databases, documents, videos....
  - > **Quality**: Existing quality of the contents and evaluation of the quality necessary to support the activity
  - > **Destination of use, targeted audience...**
  - > Volume
- Contents labelling can be interesting to maintain an **homogenised quality**:
  - > Contents can be problematic in terms of **culture, mentality, centres of interest**, pedagogical differences and need to be adapted
  - > Contents often need **regular up-date to avoid being obsolete** within a short time-limit
  - > Some contents can be a way to spread wrong information : shall be labelled to **guide users on its origin and authors, and to avoid excess and maintain quality**
  - > Label ensures that the content's nature is compatible with deployed facilities and harmless for the network: **interoperability, security, integrity**

*Such an identification and characterisation of the contents is crucial at short-term, for technical reasons- dimensioning of the solution for the present activities and future evolution - and long-term, for a long-lasting implementation, as usage*

*needs to be supported by pertinent and compliant contents' production*

E-Training addresses **Communities of users: Common field of activity but heterogeneous situations to be studied on a case-by-case basis:**

- Large and uneven geographical spread of users over territories
- Disparity of technical means and skills on end-users sides ( PC, network, technical support ...)
- Variety of cultures, knowledge, acceptance levels, requirements...
- Different kind of profiles (actors), protocols (medical protocols) and different related contents ...

For example, various types of Information /Training needs around Healthcare:

- Doctors, nurses, medical staff, administration, have to be trained to acquire new skills and up-to-date information
- A medical Practitioner has to be trained to master a wide range of skills to run its activity and manage its office: Accounting, project management, law, etc ...
- A young student need to access databases and resources to be trained in Health , to get a job, and required skills in Medicine
- Citizens has to be informed in Health , for a better prevention, information, follow-up of care, to better understand the diseases , to better react in case of troubles, etc..
- Citizens suffering from a specific disease need to be informed, to better understand the disease, for a better comfort, follow-up, care and quality of life.
- Long-term hospitalised children cannot be incorporated in the regular educational system, but still need to be educated

The priorities of vocational training depend on the regions, the countries, the culture, the governments.

5. VARIOUS TYPES OF APPLICATIONS

- Internet access
- Telephony
- TV content -distribution
- E-learning, e-education, e-training
- E-medicine
- Emergency relief and e-Risk
- E-government
- Vision-conference
- Collaborative work
- Portal
- E-education off-line and on-line

Numerous functionalities to be incorporated in the end-to-end solution Package:

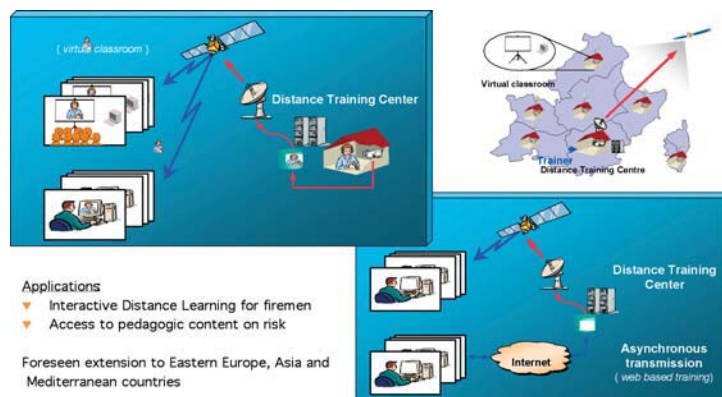
- Fast Internet
- Push of files & Mirror of URL
- Video streaming, Encoding/ Decoding
- Content Management

6. SOME EXAMPLES

6.1 Remote staff medical training and support



6.2 Example of e-Education for Civil Protections



6.3 Inter-continental deployment for Focolare Movement



Example of 25th sept 2003 event (Rome) Focolare Movement

- Live event**
- Brazil S.Paolo (300 pers)
  - USA, New York (50 pers)
  - Venezuela, Caracas (53 pers)
  - Holland (50pers)
  - Switzerland, Montet (200 pers)
  - Italy, Florence (300 pers)
- Off-line streaming just after event**
- Cameroon, Fontem
  - Cameroon, Douala

• USA, New York



• Brazil S.Paolo



• Uplink & Applications platform Focolare-Rome



• Cameroon, Douala

• Kenya, Nairobi

7. CONCLUSIONS AND RECOMMENDATIONS

- International Communities need ICT & Applications for capacity-building
  - > on a wide area, covering a country, a region, a continent, several continents
  - > Meeting various categories of needs and activities
- ICT's implementation requires to master many parameters: Socio-economic, cultural, affordability, existing infrastructures, regulation, climatic constraints....
- Need for Information, Demonstration, Promotion:
  - > People are not aware of the added-value solutions brought by Telecom Satellites
  - > People are not sure to make the right technological choice in the panel of

offered technologies

- Relationship with end-users is the key to success & Local/International Organisations can help in a very significant way
- The "Pilot-Approach" for a step-by-step success:
  - > Convinces International Communities of the added value of e-activities thanks to a real-scale implementation in concrete conditions
  - > Allows to better understand real end-users needs thanks to a mutual-benefiting dialogue and collaborations with user's representatives
  - > Helps finding the "good for all" solution
  - > Allows involving the user in building its solution and consequently makes him become a real actor.

## BUILDING CAPACITY FOR THE 21<sup>ST</sup>, NOT THE 20<sup>TH</sup> CENTURY

### STEPHEN HEPELL

Director of Learn3K  
National College of Ireland, Ireland

All around the world there has been something of a revolution in the way that we work with information and harness technology in our everyday lives. In amongst a lot of hype about new technologies themselves there have been real changes in both the way that we live our lives and in the expectations that we have for those lives. These impacts depend greatly on the institutions and organizations that we relate to in our learning lives. In making learning more engagingly effective, and in building capacity through education policy, we ignore these changes at our peril.

This adds up to a need to looking afresh at learning in the 21st century and at how it is significantly different from learning in the 20th century. That fresh look cannot be piecemeal. It needs a robust re-examination of the design of our school buildings, of the age phases and organization of learning, of the tools and models we have for assessment, of the communities that will be learning together, and of the expectations we have for successful learning. However, this does not mean we are facing the upheaval of a revolution. Instead we face the steady march of iterative evolution as each of the complex key components of learning edge forwards together. For that movement to be effective and directed we need a clear and shared view of what future learning should be like. Currently, that shared view, or vision, is almost wholly absent. Where there is vision, too often it is of a model of learning productivity with a focus on "transmitting knowledge" cheaper, faster, to larger groups or more rapidly. This static model sees learning as a constant, but with the cost of "delivery" as a variable. Nothing could be less suited to supporting the capacity that is needed for the 21st century.

The 20th century schools "delivered" a curriculum, with a dissemination channel that

was one way. In an input output model, students received wisdom, teachers communicated it whilst universities created and endorsed it. A production line model of learning saw the same disaggregation of tasks that characterized huge manufacturing companies, so that chemistry was somehow separate from biology and technology whilst the world was desperately short of bio-technologists and bio-chemists. If a few children were wasted in this "production line" process, none worried too much. The process required conformity and acquiescence; those were the students that passed through the system effectively.

But new technology has wrought changes in our family, community, cultural, civic and economic lives. Above all else it is a century of symmetry, where many have a contributory role. Some of the biggest changes in recent years have taken place where people have been given an opportunity to play their part: Google has made everyone a researcher, from family history to celebrity insights. Mobile phones, for really significant proportions of the world's population, have helped to build a complex network of peer to peer interaction, where texts, pictures and more are exchanged in an almost "viral" way that has defined a generation and beyond. At the same time cars, computers or even second hand items can be ordered, bespoke, from websites. The "perfect competition" of a freer market with many buyers and sellers, linked by clear information is very much where e-Bay and its competitors have evolved to. The openness of this peer to peer world should be empowering for both developing and developed countries.

The short version is that, rich or poor, we have become, or are becoming, more active and less passive; less willing to accept that "one size fits all" and quite aggressively

keen to see our own needs, wishes, cultures and demands responded to. The couch potato generation is passing. This is thus an era of personalized learning where "every child matters", learner centric rather than institution centric, and where lifelong learning is exactly that.

As we have seen with the News, portable technologies help to make everyone potentially a reporter. In the 9/11 New York terrorist attacks images and video were captured largely by private individuals who happened to have broadcast quality cameras in their bags or offices. By the time of the London 7/7 bombings this year News had already progressed to offer vivid phone-captured contributions, shot as individuals were exiting the scene of the disaster. That evening some major news providers were left with feeble requests on their websites for people to contribute any phone captured footage they might have; but at the same time those very images were already being passed vigorously from phone to phone in the viral, rapid, people centric way that characterizes the 21st century. In this new world of UGC (user generated content) those who sought to "control" or "deliver", making choice for the consumer, are struggling. Mapping these changes onto education and learning, it is clear that a new learning world that is agile, peer to peer, viral, ingenious and symmetrical, that is founded on community with communication, is a whole fresh challenge. Seeking to "deliver" the curriculum or to "control" quality already feels dated and indeed is.

Most excitingly for UNESCO, this new world of learning is very accessible to developing and underdeveloped nations and regions. The old 20th century world of learning saw some strong unassailable alliances between substantial capital and the learning "industry" - as we saw for example with the vast text book industry - often to the exclusion of the developing regions. This was a world of high costs, protected by aggressive IPR legislation and underpinned by a clear model of delivery with a clearly defined ver-

tical market. It heavily favored the economically mature nations. But those high costs, and the costs of protecting IPR, have the potential to be burden rather than an asset. The emerging nations can leap right past and into a newly symmetrical, equitable, affordable world with the potential to leapfrog their way past developed nations on the way. Perhaps this is why such exciting progress is in evidence across the Pacific Rim and S.E. Asia? Capital and content are not king any more, but maybe community is becoming sovereign in the form of learning communities?

But if the new capacities are about collaboration, ingenuity, creativity, equity, symmetry, technology and agility then a tough question is about the way that the design of learning environments around the world must respond to this new world of learning: already the trends are clear as schools organize increasingly in mixed age groups where the youngest chase the role models of the oldest, who in turn reinforce their own understandings by working with the younger students; geographical location is ceasing to define learning groups as new technologies open up conduits of learning between schools, or communities of learners, around the world; the time-blocks set aside for learning are changing too because working with new media takes greater concentration for longer periods of time, but is more motivating so that children make better progress in longer timetable blocks; subject specialisms are crumbling as project based learning sweeps across the world, and so on.

The schools needed to house this project based, time intensive, mixed age, subject domain free, geographically dispersed, collaborative learning are of course very different from the schools needed to house the old "factory" model of "stand and deliver". Again this is hugely advantageous to the developing and underdeveloped nations and regions because the old "learning factories" were capital intensive, with investment lives of many decades and dedicated, expensive,

plant. The new learning centres can be dispersed, local, culturally specific but joined through ICT to gain economies of scale of administration, short lived and co-located with sports centres, shopping centres, business parks and other community assets. Suddenly dramatic innovations are appearing: TK Park in Bangkok, an ambitiously effective community learn space temporarily located in a shopping mall; the short (5 year) design life of Unlimited school in Christchurch New Zealand; the fibre glass pod based Ingenium classrooms in London's Richmond on Thames; the tiny Stepping Stones school for between 3 and 10 students in the UK's rural Surrey.

All these are indicative of a newly bespoke learning environment. As communities of learners and communities of practice assemble around the world to evolve learning for the 21st century an essential role for UNESCO, surely, will be to look for the points of intersection between these learners and to support them. Inevitably, there is a constant tension between a wish to control and deliver information for people and a wish to empower people to do things themselves. New learning suggests that the future lies in building the capacity for us all to learn with each other.

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# ICT PARTNERSHIPS FOR CAPACITY-BUILDING

## JEAN-PHILIPPE COURTOIS

CEO, Microsoft EMEA  
Senior Vice President,  
Microsoft Corp.

### INTRODUCTION

I am very pleased to be able to take part in this session on best practices in partnerships to build ICT capacity as:

- Partnerships directly reflect how Microsoft approaches emerging markets and
- Partnerships are core to our business model in all markets

I believe that our private sector role in society is to innovate, apply knowledge and technology to problems and turn them into economic reality.

In turn, our public sector goal is to work in partnership with governments, international organizations such as UNESCO, local community institutions and local ICT industries to support their goals.

Partnerships are the key to effective capacity-building and economic development: Without them, there are dangers:

- Duplication of effort
- Lack of skills focus
- Reinvention of solutions already realized by others

With partnerships, however, there are important benefits:

- Convergence of skill sets
- Accelerated reforms
- Cost and efficiency savings
- Trust building and mutual understanding

It is also not simply about “giving” but also gaining:

- We gain insights and inspiration from others to push ourselves as solutions developers and
- What we learn in emerging markets can also be beneficial to more mature markets.

One of our broadest and most significant partnerships has been with UNESCO itself. Bill Gates, our chairman, signed an agreement here in this room last November with Director General Koïchiro Matsuura. Our goal is to work together and learn from each other how to better improve the access and use of ICT to promote socioeconomic development. The agreement focuses on:

- Education and learning
- Community access and development
- cultural and linguistic diversity preservation

I believe that this partnership will touch and improve the impact of all of our initiatives.

You heard another great example of a successful partnership earlier from Jordan’s Minister of Education, His Excellency Dr Khaled Toukan, when he described how we and industry partners have worked to accelerate education reform and ICT capacity-building on a country-wide scale through the Jordan Education Initiative.

<Related to Panellist Steven Nolan: Our participation in the global e-schools initiative supporting 21 schools in 5 African countries involving 9 of our industry partners>

Today I would like to focus on some of our shared challenges and examples of the ways we have partnered to build ICT capacity across the world.

### THE CHALLENGE

21st century challenges:

- Earth’s population has reached over six billion and is continuing to grow rapidly.
- This year the number of people accessing the Internet has passed one billion.
- Also for the first time, there are more people accessing the Internet in the

developing world than in the developed world.

- But over a third of the world's population have still never made a telephone call
- 70% of the world's population lives in rural and remote areas where access to information and communications technologies or even a telephone is scarce at best.
- Nature of the growth of the first billion is interesting but the way in which the next billion achieve access the internet will be an even greater challenge as the greater majority of these people will be in developing countries.

### CREATING PARTNERSHIPS TO BUILD ICT CAPACITY

Our broad approach focuses on 3 important areas to build ICT capacity in the larger economy, the community and education.

1. **ICT industry partnerships** that provide immediate local and world wide technology solutions and stimulate local economic growth.
2. **Community partnerships** that provide an environment where underserved populations can use ICT to support workforce development and thereby impact current and medium term workforce needs.
3. **Education partnerships** where we provide a broad range of support to improve teaching and learning effectiveness to build the skills those workforces need in the future.

#### 1. ICT INDUSTRY PARTNERSHIPS

A very important part of our business focuses on providing a software platform and tools enabling other software companies to build their own software applications.

- We consider these companies partners
- They are a crucial part of the commer-

cial software ecosystem and a central element of our business model

Local partnerships resulting in new emerging market applications include:

- Working with local academic and computer linguistics experts to create Local Language versions of our products - from Basque to Farsi. In addition to the 35 Full Edition languages for Office, another 19 languages have been made available as LLPs and another 18 are in production.
- Working with local NGOs and IT experts in countries like Bulgaria to support development and availability of high-quality text-to-speech recognition tools in Bulgarian, to enable blind people in Bulgaria access to education and employment through IT.

We are also working in partnership on the retail side to identify creative and effective purchasing models:

- We have recently piloted a Pre-Paid PC with a retail partner in Brazil. Similar to a Pre-Paid cell phone, the customer purchases the PC for a low upfront cost, and then purchases Pre Paid cards to use the PC. After a certain number of hours of usage, the PC belongs to the customer. Essentially, you have a finance plan, but payment schedule is completely up to the customer. Early returns show promise in this model.

Another area of development is that of the Low Cost Device, usually those under \$300. While there are many examples, let me highlight just one. We have worked with AMD on their Personal Internet Communicator (PIC). This device was recently launched in conjunction with Tata Telecom in India as a lower cost alternative to the traditional PC.

This device runs on Windows CE, the basis of our operating system used in embedded devices and cell phones. Users can surf the internet, listen to music, watch video, send

and receive email, and perform word processing and spreadsheet functions.

## 2. COMMUNITY PARTNERSHIPS

After consulting widely about community needs, we found that many governments wanted us to help create public private partnerships to develop the workforce skills of adults who are outside traditional school settings.

Our Unlimited Potential initiative supports lifelong, community-based IT skills training for the unemployed, elderly, people with disabilities and refugees.

Through Unlimited Potential we have supported:

- Over 1,000 community technology learning centres across EMEA, working with more than 200 community partners in 58 countries.

We are fortunate to have high-level, broad-impact partners that are in a position to promote global change, such as UNESCO, UNDP, UNHCR, NEPAD.

Examples of such local community partnerships are diverse and creative:

- Mtandao Africa, an initiative of SchoolNet, which empowers African youth to gain IT skills to develop African educational web content and use African languages on the internet. The program includes a pan-African competition for best content and websites that involves 10,000 young Africans from 17 countries.
- Red de Solidaridad Social, Columbia, an organization that seeks to achieve social and employment integration for underserved people ages 17-30 with limited education and who are victims of violence. The project not only provided IT training to the 195-program participants but also provided temporary job placement in collaboration with local companies.

### Digital Pipelines: Providing access in developing countries

To help address access to technology, we have launched a digital pipeline initiative which aims to move large numbers of refurbished computers to developing countries.

In Namibia we have opened our first refurbishment centre at a local technical college:

- In just a few months the centre itself has recycled almost 1000 PCs which are now being used in education and community projects.

Refurbished PCs often represent the lowest cost hardware available today. Our initial work in Namibia shows that refurbishment is costing between \$100-150, and with new software and servers, students can experience these computers like new ones. Refurbishment also addresses environmental concerns.

## 3. EDUCATION PARTNERSHIPS

We recognise governments want to create an effective teaching workforce and help students gain technology skills, but we also observe the changing nature of the educational experience:

- The change from traditional, teacher led education to student-centred learning is a real challenge but this really can be helped with ICT.
- This is not only a challenge in the developing world but in developed countries too.

And here is the long term trap:

Unless today's students, tomorrow's workforce, can learn new skills for this new economy, then the digital divide will get deeper.

Our Partners in Learning initiative has been designed to increase access to technology and technology skills, providing software and helping improve and expand teacher training.

I feel very proud about the progress the teams on the ground have made.

- We have signed Partners in Learning agreements with 95 countries across the world
- In just two years, we have reached 3.5 million educators and students
- The company's goal is to bring the benefits of technology and technology skills across the world to more than 250 million people by 2010

#### KNOWLEDGE NETWORKS

Knowing how others have used ICT to successfully accelerate capacity building is also crucial:

- Communities do not have the time or resources to make the mistakes that others have made
- When resources are limited we need to help teachers and administrators understand when and when not to use ICT and develop the teaching skills to be able to make the choice
- Knowing what works and doesn't work is crucial to building capacity and success, and we all know that success breeds success

To help in this we have a number of initiatives which help people share ICT knowledge and best practices.

#### SOLUTIONS SHARING NETWORK

Another innovative new tool is our Solutions Sharing Network. SSN, launched in November 2004, is an online community-based platform to promote increased communication and deeper information exchange and collaboration between:

- government organizations
- academic institutions and
- other public sector agencies

There are now 16 SSN sites around the world.

#### INNOVATIVE TEACHERS NETWORK

We are working now with UNESCO Bangkok to implement a pilot of the Innovative Teachers Network, a virtual community that will facilitate the development of best practices, content generation and sharing of information for teachers within UNESCO programs and beyond.

#### SCHOOL TECHNOLOGY INNOVATION CENTRES

We also recognize the need to have physical places to learn about and use innovative technology. In my region, we have started to build a network of School Technology Innovation Centres across EMEA with our partners Cisco, INTEL, HP and local governments.

These centres will be places for ICR decision makers to test new technology and document best practices. The first centre opened in Amman Jordan in February, and we have plans to open 5 more centres across EMEA.

All of these initiatives reflect the notion of seeking a multiplier effect, rapidly but carefully, by

- Absorbing and documenting what we all learn
- Sharing knowledge to enable others and, above all, by
- Making success lead to more success

#### CONCLUSION

In conclusion, these are both challenging and exciting times.

- We see working with partners in the community, education and private sector is the way to make a positive difference. We could not do this work alone.
- We see education as the crucial place to focus for the long-term and we can't be effective here without education partners
- We see ICT as being able to unlock the potential of citizens in the global economy but only if the broad range of com-

ponents and local strategies are developed

- And our work in the field shows that a coordinated approach can bring success

These are important lessons we want to reflect upon and share with others. We know that the World Summit on

Information Society (WSIS) in November in Tunis will be another important milestone in this journey.

#### GROWING PARTNERSHIPS: TWO CALLS TO ACTION

I'd like to end my remarks with 2 calls to action:

1. The first is for business to join forces even further with more cross-sector partnerships as well as with the public sector.

2. The second is for the IT industry, local media and civil society and all partners, to share ideas, answers and initiatives on how IT could also support the other basics - such as transparency, governance, local culture preservation and human rights - that also promote development and opportunity.

As the recent report by the Africa Commission says - the key word is NOW. The two words I would like to add are, TOGETHER and FASTER. We all need to accelerate policy adoption and reforms, and our business and social investments.



**Chapter IV.**  
Sustainability & Low-cost Infrastructure

# MICROFINANCE AND IT - AN IMPORTANT PARTNERSHIP

## A GENERAL PRESENTATION AND SEVERAL CASE STUDIES

**JACQUES ATTALI &  
MAREK HUDON**<sup>1</sup>

PlaNet Finance France & Belgium

### I. INTRODUCTION

Microfinance - financing for the poor - was developed and provided, since its beginnings in the 1970s, mostly positive results. Lately, the ever expanding information-technology (IT) sector has found its uses in the field of microfinance. Microfinance projects are being developed around the world and the impact of IT systems is being increasingly felt, as technology improves the quality of the services and provides new opportunities for advances in the development field. The field of microfinance is open now to IT sector and technology has the potential to make a significant impact in the development field in the future. PlaNet Finance, a young but fast growing development organization has attempted to use technology towards alleviating poverty and creating new opportunities for the poor with promising results. It purports to continue in this track in the future and to increase its use of IT in its mission to solve world's poverty.

The purpose of this study is to present a general picture of poverty, microfinance and IT systems as a solution for the poor and to bring two specific examples of successful IT projects undertook by several microfinance organizations. The first part of the paper looks at poverty, microfinance and IT solutions on a general level. The second part of the paper brings the picture into focus by presenting several successful IT projects in microfinance: the Grameen Foundation initiatives in Bangladesh and the PlaNet Finance projects in Benin, China and Nepal. The conclusion emphasizes the positive impact of these initiatives, the potential influence IT could have in alleviating poverty and the significant influence it could have with investment from the developed countries and organizations.

### II. MICROFINANCE AND THE IT INFLUENCE

Approximately three billion people worldwide - roughly half the Earth's population - live on \$2 a day or less. In fact, more than a billion people survive on \$1 a day, according to the World Bank report, which supports this as the definition of extreme poverty - \$1 a day is the lowest allowance on which a person can survive<sup>2</sup>. However, the definition of poverty is highly contested. According to Mosley, it is unclear whether poverty is largely about material needs or whether it is about a much broader set of needs that permits well-being. Consequently, the focus of many NGOs and government aid agencies is to improve the situation of poor people through direct financial aid but also through other means designed to ensure self sufficiency<sup>3</sup>.

The reasons leading to poverty however are subject to less debate. Regular wage-paying jobs are scarce in many developing countries. Instead, most inhabitants make their living through self-employment in the informal sector, undertaking enterprises such as selling tortillas, sewing clothes or selling vegetables in the street<sup>4</sup>. According to the International Labor Office, nearly 60% of Latin America's and two thirds of Africa's non-agricultural employment is in the informal sector. In India, the same source estimates, nine out of ten workers are in the informal sector, contributing 60% of net domestic product and 70% of income<sup>5</sup>. A similar situation occurs throughout the developing countries of the world. However, without access to quality, affordable financial services in order to fund their activities and reduce their vulnerabilities to external shocks, many of these micro-entrepreneurs cannot develop their micro-enterprise into a solid business and consequently remain trapped into a cycle of poverty.

<sup>1</sup>We are grateful to Firas-Eugen Taso for research work.

<sup>2</sup><http://www.worldbank.org/>

<sup>3</sup>David Hulme and Paul Mosley, *Finance Against Poverty - Volume 1*. London: Routledge, 1996, page 105

<sup>4</sup><http://www.accion.org/>

<sup>5</sup><http://www.ilo.org/>

It can be therefore concluded that a major part of the reason why such a large number of people around the world dwell in poverty is the lack of access of micro-entrepreneurs to credit. The reasons for this lack of access to credit vary from country to country, but similarities do exist. Commercial banks or other formal credit institutions do not serve these customers because the loans needed by these people are small (\$100 or less) and thus costly and unprofitable for the banks. Additionally, the hazards commercial banks encounter (screening, ex-ante, ex-post and enforcement problems) deter them from extending loans to poor people. Common traits such as living in rural areas or regions that are hard to access or to serve for major commercial banks, spread illiteracy, lack of consumer protection policies, lack of a credit history or assets to pledge as collateral are further major disadvantages for micro-entrepreneurs attempting to obtain credit under reasonable conditions.

This is the context in which the microfinance movement was born. Its goal is to ease the suffering caused by poverty and to help poor people work their way out of poverty. Microfinance is the term most often used to describe financial services for poor people in developing countries. It includes several components. Micro-credits or micro-loans represent small amounts of money lent to poor people in order to finance self-employed activities or for other purposes and constitutes the main occupation of microfinance institutions. Additionally, NGO's and government agencies involved in the microfinance sector encourage and collect savings and perform payment transfers - services which enable people employed in other parts of the country or the world to send small amounts of money regularly to family members back home. (In fact, this is a major revenue stream in many developing countries)<sup>6</sup> Furthermore, microfinance institutions provide micro-insurance services for the small entrepreneurs undertaking projects. Thus, credit is readily available for poor as actions are being taken to alleviate poverty around the world and to provide the

micro-entrepreneurs with a means to self-sufficiency and a better life.

The IT sector entered the microfinance sector slowly but surely. In the century of information and technology, it was inevitable that microfinance move towards the new trend. From computers, servers, websites and data bases to cell phones, the microfinance sector has been increasingly gifted with the latest technology. As a result, costs of operations have decreased, communication and sharing information between MFIs and their clients, as well as donors and government agencies is a lot easier. Due to information systems like credit bureaus (such as the one set up by PlaNet Finance in Benin since 2003) risk can be better managed -credits can now be awarded much easier and the repayment rates are higher - and more people can benefit from microcredits. The Internet, accessible everywhere in the world to whomever has access to a modem and a computer, a PDA or a mobile phone is becoming an increasingly useful tool for organizations like PlaNet Finance and for a major part of MFIs, as they can present their organizations and actions better and they can attract donors easier. Thus the IT sector and microfinance have moved in the direction of collaboration towards improving the services offered to the poor and making a significant impact on the life of millions from developing countries.

### III. NGOS AND THEIR IT MICROFINANCE PROJECTS

#### a) An Example: The Grameen Foundation and its IT Initiatives

The Grameen Foundation (the big sibling of Grameen Bank of 1976) oriented itself towards IT, understanding the sector's huge potential in serving the poor's needs. On March 26, 1997 a cellular phone provider for the poor - GrameenPhone - was launched in Bangladesh. After eight years of operation, GrameenPhone is the largest cell phone provider in Bangladesh, with over 2.8 million subscribers (as of March 2005)<sup>7</sup>.

<sup>6</sup>[www.villagebanking.org](http://www.villagebanking.org)

<sup>7</sup><http://www.grameenphone.com>



GrameenPhone has a dual purpose: to receive an economic return on its investments and to contribute to the economic development of Bangladesh where telecommunications can play a critical role. This is why GrameenPhone, in collaboration with Grameen Bank, aims to place one phone in each village to contribute significantly to the economic uplift of those villages.

GrameenPhone's Global System for Mobile or GSM technology is the most widely accepted digital system in the world, currently used by over 300 million people in 150 countries. GSM brings the most advanced developments in cellular technology at a reasonable cost by spurring severe competition among manufacturers and driving down the cost of equipment. Telephony helps people work together, raising their productivity, making development and business complementary. By bringing electronic connectivity to rural Bangladesh, GrameenPhone is delivering the digital revolution to the doorsteps of the poor and unconnected. By being able to connect to urban areas or even to foreign countries, a whole new world of opportunity is opening up for the villagers in Bangladesh. Grameen Bank borrowers who provide the services are uplifting themselves economically through a new means of income generation while at the same time providing valuable phone service to their fellow villagers. The cell phone has thus become a weapon against poverty.

Grameen microfinance & IT initiative is the Village Phone Program (VP). Initiated in 1997, the VP has continued to grow at a robust pace over the years reaching 95,000 subscribers in December 2004. The program facilitates women borrowers of Grameen Bank to the GSM technology through the village phones. They become effectively mobile public call offices. This not only provides rural poor with new, exciting income-generating opportunities, but it also helps enhance the social status of women from poor rural households. The VP works as an owner-operated pay phone. It allows the rural poor who cannot afford to become a regular subscriber, to avail of the service

with loans from Grameen Bank. The VPs in operation now provide access to telecommunications facilities to more than 60 million people living in rural areas of Bangladesh. According to some research studies, the introduction of VPs has made a tremendous social and economic impact in the rural areas, creating a "substantial consumer surplus" for the users.

Following the great success of the Village Phone Program, the Grameen Bank initiated a new assistance project for beggars in rural areas in September 2004. According to this new initiative, beggars in rural areas, who make much less than beggars in urban areas will be given cell phones so they can provide roving telephone services in exchange for money. To be eligible for mobile phones, beggars will need to become members of a Grameen Bank project. The bank will also provide a loan in cash to each 'cell-class' beggar so he/she can sell snacks, chocolates, cookies and nuts to earn additional income. Thus the Grameen Foundation, after starting small with the new technology implementation in the mid 1990s has realized the potential of this sector and is making remarkable advances in integrating the beneficial influence of IT into the microfinance initiative, to the sole benefit of the poor.

#### b) PlaNet Finance's Experience with IT

Founded in Paris in 1998, PlaNet Finance is an international non-governmental organization whose mission is to reduce poverty by using the potential of the Internet and information technology for the development of micro-finance and micro-enterprise. PlaNet Finance has representative offices in the UK, Spain, Italy, Portugal, Belgium, Dubai, and the US. PlaNet Finance also runs Country Programs in Asia (India and China), Latin America (Mexico and Brazil) and Africa (Morocco, Senegal, Benin, and Togo). In its 8 years of operation, PlaNet Finance has achieved international recognition for its microfinance expertise and innovative use of IT to bridge the digital divide and fuel community economic development around the globe. PlaNet Finance's 3 key areas for

action and intervention are the Training and Technical Support, its Rating and its Financing and Partnership activities:

a) The Training and Technical Support programs aim at increasing MFI capacities. Programs include numerical gap reduction, a microfinance portal, PlaNet Library (expertise shared by different microfinance actors through the internet), Impact Knowledge Market programs (a technical assistance and evaluation program directed to MFI) and PlaNet University (the e-learning and IT training for MFIs).

b) PlaNet Rating offers MFI rating, publishes evaluation reports conclusions and animates training sessions oriented to GIRAFE methodology, a complete evaluation and rating instrument especially created to answer to specific MFI characteristics.

c) The Financing activities of PlaNet Finance include raising funds for young or starting MFIs through the PlaNet Microfund or for established microfinance institutions with the help of the PlaNet BNP Paribas Responsibility Fund.

As PlaNet Finance's motto is "The Microfinance Platform" and its domain of activity and expertise is greatly based on IT and its implementation in the microfinance initiative, the organization has been working hard to design different projects around the world that use IT as a basis. For example, PlaNet Finance supports websites for many microfinance organizations in Africa, Latin America and Asia, providing the organizations with access and exposure to the web. This allows MFIs to reach donors, to publish a newsletter and to provide information about their operations world wide at little or no cost. It also allows them access to more resources and to attract more clients, contributing to the overall beneficial impact of microfinance. In addition, PlaNet Finance, with the help of donors worldwide, designs assistance programs to MFIs, provides them with computers, software, cell phones and other accessories that increase the efficiency and allow access to communication for these firms. PlaNet Finance is thus making efforts to involve more and more MFIs in

the IT world in order to help their mission of alleviating poverty around the world.

Some specific examples of PlaNet Finance's involvement in spreading IT in the microfinance sector are its Credit Bureau projects in Benin and Morocco, Africa. More than 400 MFIs are currently active in Benin, serving more than 2.6 million people. This is a huge impact on poverty and is helping the country immensely, but with the high competition in the microfinance market the risk of default on credits was rather high. PlaNet Finance, through its Benin office and with the help of CARE International designed a Credit Bureau experiment based on IT. After having created websites for several microfinance organizations, the project commenced in 2000 with 5 MFIs sharing their information. It involved creating a data base where information about borrowers was kept and to which MFIs could subscribe. It was such a success that in 2003 PlaNet Finance and CARE were given a grant by the World Bank to set up a countrywide Credit Bureau. Using the internet and NTIC (New Information and Communication Technologies) PlaNet Finance managed to move forward in successfully designing a project which integrates IT and microfinance. Today most of the MFIs in Benin are subscribers of the Credit Bureau together with banks and commercial institutions. This way risky borrowers are prevented from taking loans, the interest rates are kept at a low level to the benefit of the poor.

PlaNet's experience with credit bureaus extended to Morocco. Here, the project has just begun and makes good use of IT in the microfinance initiative. Of the 11 MFIs acting in Morocco, most of them have 99% or even 100% repayment rate. However, as is the case with Benin, bringing the business to new areas and competition endangered the high repayment rates and increased the risk of lending. That is why PlaNet Finance, through its Morocco office, decided the development of a credit bureau for MFIs. Operational since April 2005, the credit bureau has an estimated volume of 1 million transactions a year. The credit bureau is

similar to the one in Benin as it is based on Microsoft and IBM technology. The bureau has several databases: the CAIS (Credit Account Information Sharing), very important and comprehensive, the Bureau Inquiry Database and the External database. MFIs have access and update the databases regularly, making awarding loans easier and improving the efficiency of the sector in Morocco. The cost of the project was 600 000 DHS (approx. US\$ 67,000) and was entirely supported by PF Morocco. Thus PF uses IT in important endeavours such as credit bureaus in its attempt to develop and improve the microfinance sector around the world.

Another successful example of IT and microfinance comes from China. PlaNet Finance China, the representative office of PlaNet Finance, has as its mission the support and promotion of microfinance programs in China through the use of IT. Since 2004 PlaNet Finance has begun implementation of 6 CTLC projects in urban and rural China. These projects have become one of the primary activities of the PF China office. The first CTLC was established for migrant workers in Beijing, in partnership with the All-China Communist Youth League and the Xicheng District Library. The project involves volunteer training and basic IT training for 80-120 migrant workers per quarter. The other CTLCs were established for “barefoot bankers,” teachers, civil servants, and farmers in rural areas of Fujian, Guizhou, Shaanxi, and Shanxi provinces. This second CTLC initiative has been implemented in partnership with the China Foundation for Poverty Alleviation and the Ministry of Science and Technology. PlaNet Finance is currently in the process of launching a new business planning and management information system tool for rural and urban microfinance programs in China using Microsoft Excel.

A final example of PlaNet Finance’s successful attempt to integrate IT in the microfinance initiative comes from Nepal. There, PlaNet Finance India designed the project Rough IT in November 2004. RoughIT provides base training at the grassroots level in

order to expose the microfinance practitioners to IT practices and to initiate the learning process. IT tools are important for the microfinance practitioners in order to ameliorate the functioning of their organization, to be more efficient and able to propose the best solutions to their clients needs. Ultimately, not only the MFI will benefit from the better utilization of IT tools, but all its clients as well. RoughIT lies on a very simple idea: trainings are the occasion to share rather than to impose, to guide to the solution rather than to teach, to favour a supple approach and encourage adaptation rather than rigidity. RoughIT proposes to cover the entire IT spectrum, from the basics to the creation of a network or the update of a website, the content depending on the needs exposed by the participants during the preparation of the activity. This ongoing project greatly increased the awareness and computer literacy of MFI practitioners in Nepal, which has eased their mission and contributed to the improvement of the microfinance initiative.

#### IV. CONCLUSION

Microfinance is an important and successful solution to improving the lives of million around the world living at or below the poverty line. The micro-loans ensure that they work their way out of their situation, maintaining their dignity and lowering the existent gap between genders and social status. Stories coming from all over the world prove that the initiative works and that the results are not just on paper, but actually have names and professions. The IT sector has been playing an increasingly important role in the development of the microfinance initiative. Projects like the ones undertaken by the Grameen Foundation or by PlaNet Finance are just a few of the examples of introducing IT solutions to MFIs worldwide. The sector is only in the development stage and many more initiatives are in the process of being developed. Fishermen using cell phones to get the latest weather updates for their business, wire-

less networks in remote villages granting access to the World Wide Web to people trying to sell their products, training and educating people in new technologies and technical equipment are only a few ideas that are being researched by experts.

The IT sector is advancing with lightning speed. Similarly, microfinance has come a long way since Prof. Muhammad Yunus introduced it to Bangladesh. The potential for both sectors is still great and the impact that they can make on mankind is significant. A closer partnership in the future between these two sectors is therefore not only an idea, but a necessity that needs to be pursued and implemented whenever possible. Organizations like Orange, Microsoft or HP have already shown interest and provided invaluable support to microfinance projects. The rest are still to follow suit, as the goal of both sectors is improving the life of many as efficiently and painlessly as possible.

#### About Planet Finance

Planet Finance ([www.planetfinance.org](http://www.planetfinance.org)) is an international non profit organization, which aims at alleviating poverty in the world by contributing to the development of the microfinance sector.

Planet Finance supports Microfinance Institutions (MFIs) and accelerates their growth by federating them and providing them with services in terms of capacity building and financing.

Planet Finance operates in more than 60 countries and has permanent programs and offices in 15 countries (Mexico, Brazil, Morocco, Benin, Senegal, China, India, Italy, USA, UAE, Portugal, UK, Spain, Belgium, France).

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# DIGITAL DIVIDE IN THE DEVELOPING WORLD

## CAN INDIA OVERCOME IT?

**ASHOK JHUNJHUNWALA**  
TeNet Group, Indian Institute of  
Technology, Madras-Chennai

*Prof. Ashok Jhunjhunwala is Professor of the Department of Electrical Engineering, Indian Institute of Technology, Chennai, India and was department Chair till recently. He received his B.Tech degree from IIT, Kanpur, and his MS and Ph.D degrees from the University of Maine. From 1979 to 1981, he was with Washington State University as Assistant Professor. Since 1981, he has been teaching at IIT, Madras.*

*Dr. Jhunjhunwala leads the Telecommunications and Computer Networks group (TeNeT) at IIT Madras. This group is closely working with industry in the development of a number of Telecommunications and Computer Network Systems. TeNeT group has incubated a number of technology companies which work in partnership with TeNeT group to develop world class Telecom Access products. The group has also incubated a company which aims to install and operate telephone and Internet in every village in India.*

### ABOUT TENET

Established a decade ago, the TeNeT Group is today a coalition of 14 faculty from the Electrical Engineering and Computer Science & Engineering Departments of IIT-Madras who work together towards a few common goals in research and product development. The focus is to address pressing needs of India and other developing countries by market-driven product development, strengthening of Indian telecom/networking industry, technical training and education, and driving telecom/IT policy.

Our vision is "World-class Technology at an Affordable Price". At different times, this vision translates to various tangible goals. For some years, it was to enable 100 million telephone and Internet connections in India. As this goal is a reality, we now have other missions.

These include:

- enabling 50 million broadband connections in the next five years
- doubling the rural GDP of India
- turning India into a telecom Design House for the world
- enabling one or two billion-dollar product companies in India
- driving the next generation of international wireless standards specifically for India
- high quality distance education with an emphasis on rural areas.

The TeNeT Group has about two hundred full-time researchers, engineers and other technical staff, and project students working in over 10 dedicated labs. Currently, the Group works in diverse areas including Wireless Communications, Computer Networking, Fibre Optics, Digital Systems Architecture, Network Management Systems, Integrated Voice/Video/Data Communications, Indic Computing and applications for rural development.

The expertise in the TeNeT Group spans the entire gamut of specialisations pertinent to the TeNeT mission: digital communications, wireless networks, computer protocols, optical communications, digital signal processing, speech, audio and video technologies, computer vision, network management, multimedia, digital system design and embedded systems. In addition, there is a small group of experts in areas such as rural finance, small scale enterprises for rural areas.

The type of activities of the TeNeT Group includes teaching and training, product development, incubation of technology companies by alumni, telecom and IT policy studies, and front-line research in the specialties.

### TEACHING AND TRAINING

As part of the IIT Madras curriculum, the TeNeT faculty regularly teach a wide variety of undergraduate and postgraduate courses in all the specializations mentioned above. IIT Madras is recognized today as having an extremely high-quality program in communications and networking. The number of graduating students in these fields has more than doubled in the last few years. In addition, a very large number - close to 1,000 - engineers and technicians have been trained to become top-notch designers by working hands-on in the numerous projects undertaken by the TeNeT Group in the last decade.

However, the group has been seized of the issue of how to scale their efforts so as to at least partly fill the ever-increasing gap between the demand and supply of engineers in the Information Technology (IT) sector. It became clear that there are limits to increasing supply by simply scaling the size of the existing teaching institutions. On the other hand, the numerous engineering colleges that have come up in the last decade do graduate a large number of engineers, despite poor infrastructure and under-staffed faculty. These engineers have several gaps in their preparation, and the IT industry needs to impart significant additional training before they can begin to contribute.

Bearing this situation in mind, the TeNeT group has pioneered the concept of finishing schools. The first one to be set up, as a joint effort between IIT Madras and the Usha Martin Group, was the Usha-Martin Academy of Communication Technology (UACT). Over a period of three years, this institution ran three-month intensive programs throughout the year for fresh industry recruits in the areas of telecommunications and networking. The courses, which include nearly 50% laboratory content, were carefully designed by TeNeT faculty such that the gaps in the preparation of these fresh graduates are filled, and they are

introduced to the latest concepts prevalent in the IT field. UACT has drawn on the resources of experts from all the IITs and other leading institutions in preparing the course material. UACT had the capacity to train about a thousand engineers each year for industry.

The second training center to be opened by the TeNeT Group was the Analog Devices-IITM DSP Learning Center, also at IIT Madras. This center is dedicated to training final year engineering students from engineering colleges, as well as industry personnel, in programming Digital Signal Processors. There is a severe shortage of engineers in the area of DSP programming, and most opt for other software avenues primarily due to lack of exposure and the mystique associated with DSP. The DSP Learning Center seeks to redress this lacuna. It runs its programs throughout the year and trains a few hundred students each year.

Building on these experiences, the TeNeT Group is now starting a multi-institutional finishing school that will use the Internet for delivery of live and recorded lectures.

### RESEARCH

One of the key beliefs of the TeNeT group is that all the latest technological developments worldwide have to be brought to bear on its mission of enhancing telecom and Internet in India. While systems developed abroad for a different market may have only limited application in India, the technologies incorporated in them, with appropriate redesign, give rise to systems that are more affordable and better suited to our requirements. It is therefore imperative for the TeNeT group to be at the forefront of research in wireless and optical technologies, system design and ASIC development, communication protocols, audio, video and image processing, and international standardisation efforts.

■

# SATELLITE RADIO THE EXAMPLE OF WORLDSpace

**PIERRE CASADEBAIG**  
Director-General WorldSpace  
France

*WorldSpace, Inc. was founded in 1990 by Noah A. Samara, its Chairman and CEO, with a mission to provide digital satellite audio, data and multimedia services primarily to the emerging markets of Africa and Asia. A pioneer of digital satellite radio, Mr. Samara was also instrumental in the development of the satellite radio industry through his early involvement with XM Satellite Radio in the United States.*

*The company's mission is to provide a variety of high quality programming through a subscription-based service that uses low-cost portable satellite radios and is available in underserved markets that lack programming choices. WorldSpace is the first and only company with rights to the world's globally allocated spectrum for digital satellite radio. Its broadcast footprint covers over 130 countries including India and China, all of Africa and the Middle East and most of Western Europe – an area that includes five billion people and more than 300 million automobiles. Its two fully operational satellites and ground infrastructure are based on proprietary and patented technology.*

## WHAT IS WORLDSpace SATELLITE RADIO?

WorldSpace is the only satellite radio service outside of the USA, Japan, and South Korea. Through its subscription-based service, WorldSpace broadcasts news, sports, music and educational programming to satellite radios throughout a global area that includes more than four billion people. WorldSpace is also credited with creating the evolution of satellite radio. WorldSpace was the first to create and broadcast programming via company owned and launched satellites AfriStar™ and AsiaStar™ to deliver 100% digital audio and exclusive WorldSpace created programming to satellite radio receivers throughout Asia, Europe, the Middle East and Africa. WorldSpace was also one of the principal founding shareholders of XM Satellite Radio in the U.S.

and is responsible for some proprietary technology and original programming and format structure, which is currently used to broadcast to over 1.5 million subscribers across the U.S. The WorldSpace Global Content and Programming department provides approximately 10% of the original content music programming heard in America on XM Satellite Radio.

## HOW DOES WORLDSpace WORK?

WorldSpace uses its two satellites, AfriStar™ and AsiaStar™, to broadcast more than 100 digital-quality audio channels to people around the world who want world class programming that is not available or rarely found on local, regional or national terrestrial radio. Each satellite has three beams and each beam is able to send up to 80 channels directly to portable satellite radios. Inside each WorldSpace Satellite Radio digital audio receiver is a proprietary chipset designed to lock onto the WorldSpace satellite signal in your region of the world.

## EQUAL ACCESS

Radio remains the medium of choice to reach audiences in the developing world. One example is Equal Access, an NGO from San Francisco, that uses WorldSpace to reach the Developing World via Satellite Radio, and concentrates on two practical applications of this medium. Equal Access broadcasts content directly to the community sites via satellite, where organized listening groups discuss the content following the broadcasts. It also forms partnerships with radio stations for content rebroadcast. As the primary medium of information distributed on the EA channel is audio programming, partnerships with local broadcasters allow "Equal Access" to reach a much broader audience in hundreds and thousands of communities.

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## CAPACITY-BUILDING: THE ROLE OF LOW-COST SATELLITE COMMUNICATIONS

**PIETRO LO GALBO**  
Head of the Telecommunications  
Department  
European Space Agency (ESA)

From the Message to WSIS from Kofi Annan, United Nations Secretary-General

*"We are all familiar with the extraordinary power of information and communications technologies.*

*From trade to telemedicine, from education to environmental protection, we have in our hands, on our desktops and in the skies above, the ability to improve standards of living for millions upon millions of people. Information and communication technologies are not a panacea or magic formula. But they can improve the lives of everyone on this planet.*

*We have tools that can propel us toward the Millennium Development Goals; instruments with which to advance the cause of freedom and democracy; vehicles with which to propagate knowledge and mutual understanding.*

*We have all of this potential.*

*The challenge before this Summit is what to do with it."*

ESA presentation on the subject of Capacity Building and use of satellite communications is an attempt to provide some concrete answers to Mr. Annan above statement. On one hand it is now well accepted that ICT can play a big role in capacity building initiatives on the other hand ICT based solutions seem very often devised for the western part of the world where access to ICT tools and solutions is generally not a problem. The big issue which a vast part of the world is facing is in fact the availability of affordable solutions for accessing ICT from any geographical location and most important from remote areas. For this reason it is widely accepted that satellite communications can provide a solution to this quest for the following reasons:

1. Often the only viable short term solution in remote areas
2. Quick and easy to deploy
3. Well suited for bundled community services
4. Regional, Continental or Worldwide coverage
5. Seamless integration with existing terrestrial solutions
6. Broadcast, one way and two way services through a single platform.
7. Most powerful for rural solutions in combination with wireless technology.

So the potential is there and solutions are available but there is a but....The "but" is mainly an economic reason as most of the areas of the world where such action is needed are not seen as short term investment opportunities and hence they have no potential for generating return on investment in a reasonable time. For this reason is clear that some external intervention is needed and the international co-operation could channel government money to joint efforts and provide satcom infrastructure investments that once in place would quickly start a reaction chain capable to boost capacity building initiatives involving local champions and hence with high probability of long term sustainability.

In this respect before outlining ESA vision and possible road map on the subject a breakdown of the major costs involved for the provision of satellite communications services and infrastructure is given. This is based on the main four cost elements:

- User terminal
- Satellite Capacity
- Installation & Maintenance
- Operations



#### USER TERMINAL:

Impact on service costs: LOW TO MEDIUM  
Depending on deployment scale and on user site architecture: e.g. one satcom terminal can serve hundreds of PC connected through wired or wireless LANs

#### SATELLITE CAPACITY

Impact on service costs: HIGH  
Despite large number of transponders are currently unused, capacity cost is high. Large number of users or user communities aggregation is needed to have reasonable ROI.

#### INSTALLATION & MAINTENANCE

Impact on service costs: MEDIUM/HIGH  
Can be optimized through involvement of local players or users themselves, when capable.

#### OPERATIONS

Impact on service costs: MEDIUM  
Can be optimized through one or more teleports with worldwide coverage.

#### CONCLUSIONS

On the basis of the above it is clear that the aggregation of common resources at international level towards the common goal of universal access via satellite in remote areas in order to make available suitable applications that could boost local skills and facilitate capacity building initiatives.

ESA vision on the way forward is the following:

1. Adopt standard based solutions for boosting competition and pushing terminal price down.
2. Provide "ad hoc" low cost integrated services for capacity building through dedicated regional or global infrastructures adapted to developing countries user needs.
3. Involve local players in all elements of value chain to guarantee long term capacity building perspectives.
4. Provide easy & cheap access to unused sat capacity through special deals with operators on a best effort basis

ESA is willing and ready to join forces with other International Institutions willing to work together through satcom solution to provide quick and effective answers to urgent capacity building issues worldwide.

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## DEMAND, UTILITY AND IMPACT OF LOW-COST MOBILE COMMUNICATIONS IN DEVELOPING COUNTRIES

### PETER JOHNSTON

Head, Evaluation and Monitoring,  
DG Information Society  
European Commission

Mobile communications has the greatest and widest utility, namely to foster community building, and specifically the establishment of so called **market networks**, in both developed and developing countries. There is therefore a substantial demand, even in the poorest communities, for affordable mobile communications;

This demand can be met by a number of low-cost technologies, some already available (e.g., GSM) and others currently being developed by leading EU, US and Japanese companies. Increased use of low-cost mobile communications in developing countries will make a substantial contribution to economic growth and stronger social networks;

These benefits will only be realised with on one side, continued investments in technology developments towards low-cost communications, in Europe, US and Asia, and by a business-environment in poor communities that facilitates social and business innovations.

The utility of mobile voice communications is wider than that of key-board-based e-mail for a number of reasons:

*The views expressed are those of the author(s) and do not necessarily reflect the policies of the Commission of the European Union.*

- It is accessible to the illiterate and those without keyboard skills;
- It is inherently multi-lingual: any language can be used in a local social network;
- The handsets are easy to use;
- They can be very cheap; they are light and can be carried easily;
- Energy use is very low, and occasional battery re-charging is possible from local and renewable energy sources.

“Phone Ladies” in Asia and Africa are the focal points of contact of whole communities that relies upon them to keep in touch with relatives in the outside world; to do business and a vital link to emergency services. They are key clients to Grameen bank microfinance, and a vital first step to many new business initiatives.

Data from rural communities in Tanzania from the “Growing Sustainable Business” initiative of the UNDP, ILO and UNIDO shows that 50% of people in the villages know and have used mobile phones; a further 45% know of them but haven’t used them; despite that only 5% actually own one. Over 50% intend to buy one when affordable.

This awareness of mobile phones contrasts with the lack of awareness of computers and e-mail: only 2% of the same group know of, and have used e-mail; only 9% know of it, but haven’t used it; and 90% are not yet aware. For PCs, only 2% have used a PC, only 32% know of PCs, but haven’t yet used one, and 67% not yet aware of PCs.

There is still a digital divide in mobile phone use in developing countries, but it is closing fast: use in Africa is still low, and worldwide, total subscriptions are likely to reach 2 billions by 2010, of which 30% will be in Asia and only 18% in Europe<sup>1</sup>. In Africa as a whole, still only 6% of the population subscribes to mobile telephony, compared with 15% in Asia, ~55% in the US, and >80% in EU-25 (>70% Europe as a whole)<sup>2</sup>. In Tanzania, the number of subscribers has grown from 50,000 to 2 million in 6 years to 2005<sup>3</sup>. In Africa as a whole, there were over 50 million subscribers at the end of 2003, a ten-fold increase from 1998.

<sup>1</sup>. OMSYC data, “The World Mobile Market, 1996-2004).

<sup>2</sup>. ITU data

<sup>3</sup>. Sunday News, Tanzania: 6th February 2005.

The digital “mobile” divide is being closed by a new generation of low-cost handsets and infrastructure equipment; and by market liberalisation enabling new business models and entrepreneurial innovations. However, there is still a major challenge ahead: in Tanzania, 90% of the territory and 75% of the population do not yet have access, although the World Bank now estimates that 77% of the world’s population lives within range of a mobile network and access could be provided to 50% of the population by 2015.

The new major investments in the new low-cost systems are being made by the European, US and Japanese leaders in technology development, and will extend the market well beyond the 2 billion subscribers projected with current technologies.

Low-cost technologies are not low-tech. Low retail and usage costs come from greater electronics integration and miniaturisation; greater energy and spectrum efficiencies, and the optimum use of the competitive advantages of all world regions in the supply chains. Low-cost mobile technologies incorporate the latest innovations for Third Generation systems. Therefore, investments in next generations in Europe and the developed world, have major impact on developing countries.

Low-cost services also require innovative business models - notably of shared use of mobile communications in poor communi-

ties; but also for a wider range of mobile services - such as cheap and secure payments and messaging.

The mobile phone is the technology with the greatest impact on development. The new assessments by Prof. Leonard Waverman of the London Business School in the recent report on the impact of Mobile Phones in Africa<sup>4</sup> show a positive contribution to economic growth (GDP per head) greater in developing, than developed countries - with an increase in use by 10 people per 100, increasing GDP growth by 0.6%. Experience in Africa shows that they can also cut transaction costs, notably for small businesses and individual entrepreneurs; avoid the need to travel for information; and broaden market networks.

The social and entrepreneurial benefits are even greater than the economic benefits: mobile phone strengthen social networks - family and friends, and contribute to personal security.

#### Conclusion

There is now sound evidence that the first and most valuable contribution from ICT to capacity building can come from wider availability of mobile communications. There is a viable business case for low-cost technologies to meet demand, even in the poorest communities - this involves investments in technology developments in Europe and the developed world, and a business environment in developing countries which facilitates business and social innovation. Partnership in development is therefore essential.



<sup>4</sup>. [www.vodafone.com/assets/files/en/AIMP\\_09032005.pdf](http://www.vodafone.com/assets/files/en/AIMP_09032005.pdf) -

# ONE LAPTOP PER CHILD (OLPC). AN OVERVIEW

## NICHOLAS NEGROPONTE

The Media Lab Massachusetts  
Institute of Technology  
The OLPC non-profit Association

## EXECUTIVE SUMMARY

Massachusetts Institute of Technology (MIT) and the One Laptop per Child (OLPC) non-profit Association, propose a global program to equip many millions of students and their teachers with ultra low-cost, individual, connected laptop computers to dramatically enhance the children's primary and secondary education. These will be fully powered, general purpose laptops, sized for children and adolescents, running Linux, with wireless connectivity. Among other unique features, each will carry a suite of software--informally known as MIT Inside-- designed by a team of world leaders in educational technology. They will be built and sold for \$100, or less, apiece.

In its pilot phase, the program would be divided on a country-by-country basis into culturally-diverse regions -- emphasizing, when possible, rural and remote areas -- where all students in all primary and secondary grades receive a personal and connected machine: One Laptop per Child.

An essential feature of the pilot program would be training, logistics and an administrative initiative based in the host country. Here, in partnership with local educational organizations or other groups to be determined, MIT would help create a center to implement a carefully-designed, exponential process to impart the necessary technological and pedagogical skills to classroom teachers over a period of six months or less.

The project's technological infrastructure would incorporate design and engineering advances developed at MIT's Media Lab, plus innovations in manufacturing and distribution to bring costs in line with the host country's budget structures. The laptops would be made available only to schoolchildren and their teachers, through govern-

ment programs, and not through retail or commercial channels. MIT and OLPC would license or give away the IP necessary to bring similar products to retail.

## THE VISION

Once upon a time only the very adventurous traveled, and only a few people had access to knowledge. Then, technologies such as the compass, paper and printing transformed the world by expanding these limits. Today there is a new opportunity to transform the world once again, to create and disseminate a technology that will allow schoolchildren in even the most distant places access to knowledge and learning on an unprecedented scale.

Preparing students for success in a knowledge-based science- and technology- rich society requires more than dispensing facts and practicing textbook skills. It requires developing new ways of thinking. It requires a culture of science, information and global understanding. And it requires learning foreign languages. The question we address is how this essential work can be accomplished in distant communities, so far poorly served by the digital revolution, where teachers know of the new technology only from poor or incomplete descriptions in books.

Our answer is to provide every student with a personal laptop -- a full-powered computer with permanent wireless connection that can be used at home as well as at school, and is easily carried to places of play, culture and social action. Quantitatively this permits more high quality learning than can be achieved in the hours spent at school. But the real gain is qualitative: the \$100 laptop removes the barriers that separate learning from living, school from family

and society. It embodies the new culture and fosters individual growth within that culture. Just as a language is best acquired by speaking it, a culture is best acquired by living it.

Savings help offset costs. Under OLPC, governments can distribute required texts digitally, and update them freely at a fraction of the cost of printing and shipping hard copies. Plus there will be an even greater savings for those books that every student should be given but only comparatively rich families can afford. These include encyclopedias, full dictionaries and professional quality atlases, as well as personal subscriptions to periodicals.

The computer can serve as a library, a laboratory and an art studio, saving construction costs while making existing facilities far more useful. It can reduce the number of teachers for specialized subjects: for example students can learn English by interacting with English-speaking students online. There are also savings that come from having greatly reduced numbers of students with “learning difficulties.”

It is important to note that everything we have said here about how students will learn with their laptops applies equally to teachers. They also need to learn. The days when a future teacher could be “trained” to do everything that needs to be done in a career of teaching are over. The world changes too fast. Teachers need to be permanently engaged in learning as they teach. Every student is exploring new knowledge and challenging the teacher as much as the teacher is able to challenge the students.

In the same spirit, when the children take the laptops home they are also bringing new ways of thinking into the family and giving their parents new opportunities to learn. Thus, the laptops will transform education not just in the narrow sense of schooling. We are talking about transforming society. Which of course is what education should be about.

One final point -- not about the laptops themselves, but about how to implement far-reaching change in a very large and complex system. Experience in every country shows that issuing rules and instructions for change works poorly. People re-interpret the rules. Besides it is enormously complicated and expensive to work out all the details of a new kind of education. We propose an approach that is far simpler. Saturate the country with this hyper-modern digital object-- the \$100 laptop --which will induce the kind of change in thinking that is needed to live in a digital world. One object may be worth ten thousand rules.

#### EXPERIENCE TO DATE

The concepts underpinning the One Laptop per Child concept have already taken root around the globe. One of the earliest programs was started in 1989 when the Methodist Ladies College in Melbourne, Australia, began requiring all incoming students from the fifth to twelfth grades to arrive with their own portable Toshiba laptops.

Since then, schools in numerous countries have followed the Methodist Ladies College’s lead. For example, Costa Rica’s program for bringing computers into education, the first, and still most-widely-praised program on a national level, is based a design by Seymour Papert<sup>8</sup>. It has been implemented in collaboration with a team from the Media Lab.

Other initiatives range from the modest - a small but so-far promising program involving 50 children in two remote Cambodian villages - to the ambitious, such as the U.S. State of Maine where the State legislature has mandated that all middle and high school students be issued their own permanent laptops. An estimated 1000 U.S. school districts have followed Maine’s example. There are two similar programs currently underway in France, including one in Marseilles, the nation’s second-largest city, but

8. <http://www.papert.org/>

a poor town, with enormous ethnic and cultural diversity.

It is too early to assess the full impact of One Laptop per Child in detail, but the most extensive study to date, a four-year investigation of 50 schools across the U.S. conducted by Saul Rockman<sup>9</sup>, a widely-respected educational consultant, ratifies Seymour Papert's constructionist theories that underpin the One Laptop per Child philosophy. Among Rockman's key findings:

**Learning environments are transformed.**

- Educators involved in laptop programs ... promote collaborative learning and ... provide individualized instruction.
- ... students and teachers move around more. Instead of staying put to do seat-work, students gather to work on projects
- ... (this) frees teachers to roam about the room helping those who have problems or need remediation.
- ... learning in laptop classrooms is often more self-directed

**Assessment techniques change**

- Teachers in laptop classrooms are more willing to assign presentations and multimedia products to students, and score them using customized, project-driven rubrics and even self-assessments.

**Students are highly engaged.**

- Like teachers, students also show improved technology skills and sophistication.

**Productivity increases.**

- Students develop better organizational skills because they now need them to keep track of what's on their computer and to accomplish complex project work in a timely manner.

**Attitudes toward writing improve.**

- 76% of students said they enjoy writing more on the laptops than on paper<sup>10</sup>;
- 80% indicated laptops make it easier to rewrite and revise their writing
- 73% said they earn better grades for laptop work.
- The data demonstrate shifts in not

only students' writing attitudes, but also in their practices. These are changes we've also observed in language arts teachers' writing instruction strategies, and in the attitudes and practices of other content area teachers.

"It absolutely begins to transform the high school," said one school administrator in Florida. "It's the single most dramatic thing I've seen affect the classroom-in a very positive way."

**LAPTOP ECONOMICS**

Global implementation of One Laptop per Child clearly is infeasible when the average cost of low-end machines is \$600. When the price of a full-feature laptop is just \$100, however, One Laptop per Child makes compelling economic sense, in part because it comes closer to the cost of providing the students textbooks.

We reduce costs in five major ways.

1) Reducing to nearly zero the usual profit margin, together with sales, marketing and distribution costs. Together, these typically account for over 50 percent of a laptop's price.

2) Innovation in the machine's display. The display accounts for 50 percent or more of the machine's remaining cost. We have devised several strategies for reducing those costs to about \$30 per machine.

3) Putting the laptops on an operational diet, so to speak. This saves up to 75 percent of the residual expense by deploying a scaled down processor and needing less memory, using a significantly lighter weight operating system - - a "skinny Linux."

4) Designing and building our machines to be rugged and durable, thus reducing the annualized cost of using them.

<sup>9</sup>. <http://millennium.aed.org/rock-bio.shtml>

<sup>10</sup>. From a recent U.S. survey measuring students' attitudes about writing

#### 5) Moving in entirety to an open-source model for software: OS and applications

We commit to holding and driving down costs in the future, as well. The enormous potential volumes of these machines should enable unprecedented scale economies in manufacture. also, OLPC is a non-profit association, meaning that our mission of providing high-quality laptops at the lowest possible price will not conflict with the more typical, profit-making responsibility of increasing shareholder value.

Our machines will be less prone to theft, because they will not be available on the retail market. Initially at least, anybody seen using one had better be a student or a teacher.

In time, implementation of “One Laptop per Child” also will considerably reduce the need to purchase expensive and bulky textbooks that in many disciplines quickly are out of date. Laptop data are infinitely updatable.

### GENERATIONS OF MACHINES

Two generations of machines are planned: Gen-1 and Gen-2. An exciting innovation and a powerful emergent technology are two of the reasons that both iterations of the \$100 laptop will be special and unique in all the world.

The innovation is the toggle-controlled capacity of our Gen-1 machine screens to switch back and forth between full color and black-and-white displays at 3X resolution. The \$100 laptop will be the world's first portable computer to double as an e book. Plus, the displays will be fully readable in direct sunlight.

The new technology, called E Ink, permits thin-screen, exquisite text reproduction with very low power consumption. Developed at the Media Lab by Prof. Joseph M. Jacobson, this full-color, bi-stable technolo-

gy will be ideal for textbook replacement and general purpose, low-cost laptop display in new form factor, including flexible plastics. E Ink also is as much as 10 to 100 times less expensive than the lithographic based processes used to create TFT's for equivalent sized areas. We see prices headed as low as \$0.10 per square inch.

Currently, there are about two dozen efforts, both at start-ups and within large corporations, focused on adapting the economics of printing to the manufacture of TFT's and displays. As an indication of where this field might go, E Ink Corporation, using its ultra low power display laminate along with partners including Plastic Logic (Cambridge, UK) and Polymervision (Eindhoven, Netherlands) has recently demonstrated a series of displays that incorporate printed organic transistor backplanes on flexible plastic substrates. Other companies such as Kovio are developing printed inorganic transistors more similar to the transistors found in standard TFT's. Prof. Joseph Jacobson is a founder of both E Ink and Kovio. We plan to use printed electronics in Gen-2.

### THE PEOPLE

An elite team of scientists, theorists and technology experts with backgrounds in both academia and industry has been assembled to plan and guide the One Laptop per Child initiative. They include:

**Nicholas Negroponte**, chairman and co-founder of the Media Lab at MIT. Besides creating the Media Lab, Nicholas lectures and writes extensively on computational and telecommunications issues. He sits on the board of directors at Motorola, as well as other companies that are start-ups, in which he has been involved in creating over fifty. His books include the international best-seller, *Being Digital*.

**Seymour Papert**, a mathematician and one of the early pioneers of Artificial

Intelligence, is a world authority on how computers can change learning. Emeritus LEGO Professor of Learning Research (a chair created for him) at the Media Lab, he is also the inventor of the Logo computer language and an author most widely known for *Mindstorms: Children, Computers and Powerful Ideas*.

Alan Kay is world famous as inventor of the laptop, which he called a Dynabook. Among Alan's many other achievements, he invented Smalltalk, the first complete, dynamic, object-oriented computer language and operating system. The popular open-source version of Smalltalk is called Squeak, designed for children and learning while he was at Disney.

Joseph Jacobson, a physicist, is a professor at the Media Lab, where he co-founded and is co-principal investigator of the Lab's Center for Bits and Atoms, and leads the Molecular Machine Group, as well. His best-known invention is "electronic ink" for low-cost paper-like and flexible displays, which will be the display technology for our third generation \$100 laptop.

Mary Lou Jepsen's expertise is in optical science. Her areas of focus have been manufacturable optical and display solutions, microdisplays, liquid crystals, projection display, and diffractive and polarizing optics. Before joining OLPC, she was director of technology development in Intel Corp.'s Display Division. She is also co-founder of the MicroDisplay Corp.

V. Michael Bove, Jr. is a principal research scientist at MIT, as well as a co-founder and former technical consultant to WatchPoint Media, Inc. He was responsible for some of the earliest video compression ideas and provided the core and initial theories behind representing moving images in a structured format.

Mitchel Resnick is LEGO Papert professor of Learning Research at the Media Lab. He is the director of the Lifelong Kindergarten Group at the lab and currently serves as the Academic Head of Department for Media Arts & Sciences. His research group developed ideas and technologies underlying the LEGO Mindstorms robotics construction kits, used by millions of kids all over the world.

Edwin Selker is a world-class inventor with countless patents, as well as a professor at the Media Lab. He is a former research scientist and manager at IBM, where Ted, among other things, invented and developed the familiar track-point technology used on many keyboards.

#### THE ONE LAPTOP PER CHILD ASSOCIATION (OLPC)

OLPC is a U.S.-based, Delaware-incorporated, not-for-profit association<sup>11</sup> established for the purpose of enhancing worldwide primary and secondary education through implementation of a \$100 laptop.

Around the globe there are roughly one billion children of primary- and secondary-school age. International production of laptops is just below fifty million units. OLPC's challenge is to further reduce laptop costs and prices and to increase worldwide distribution dramatically, keeping in mind that the company's mission is learning, not laptop sales.

Rather than simply theorizing about the extraordinary educational value of one laptop per child, issuing white papers and delivering lectures, OLPC is turning the concept into reality. As a non-profit corporation, the company has distinct advantages in this endeavor, all deriving from the fact that there is no shareholder interest in equity appreciation. For example,

<sup>11</sup>. In U.S. legal language: a 501(c)6 corporation.



instead of growing profit margins, OLPC can translate each technological advance into a lower-cost, lower-price (or higher-functioning at unchanged cost/price) machine. Likewise, as soon as a model is released, we won't move derivatives up-market, but will try just the opposite - move them down-market, devoting ourselves to serving what some people call "the bottom of the pyramid." We call the project \$100 Laptop simply to make a point: this can be done and we're doing it, skeptics notwithstanding.

Certain industry figures, including Bill Gates of Microsoft, believe that the main problem of the "digital divide" is connectivity. While worldwide connectivity is certainly imbalanced and inadequate, we believe it already is on a trajectory toward rectification through the combined results of such efforts as WiFi, 3G, WiMAX and mesh networks. In fact, each \$100 Laptop will be an element in a mesh network. Furthermore, telecommunications bandwidths are elastic, inasmuch as any given bit rate can be shared by a variable and increasing number of kids without anything close to proportional delays. By contrast, the cost of laptops for a 100 kids

is 100 times the cost of one. For this reason OLPC has focused on the laptop.

OLPC will launch with at least seven corporate investors, of which three already are publicly committed: Google, AMD, and News Corp. Each company funds a combination of MIT, OLPC and the 2B1 Foundation<sup>12</sup>, for a total program of \$14M. At present, three additional companies are considering joining OLPC. We are choosing these companies deliberately and carefully so as not to create overlaps in corporate expertise. In parallel with the proposal, we are in discussions with a telecommunication equipment provider, a software company, a disc manufacturer and a display device maker. We expect to announce the next three partners in the near future. In all cases we have a back-up company with whom to extend such discussions if need be.

At the same time, OLPC is working with the World Bank and the United Nations. While neither of those organizations is known for speed, both are important to the long-term future of the project, especially for smaller and very poor nations. (See Annex III for further details)

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<sup>12</sup>. 2B1 is a non-profit charitable foundation whose purpose is, among other things, to give away laptops free to the really poor and needy.

# PERSPECTIVES FOR LOW-COST SATELLITE COMMUNICATIONS

**DIRK BREYNAERT**  
CEO Newtec Group, Belgium

## 1. INTRODUCTION

The provision of low cost satellite communication services in developing countries will be a reality in a few years from now. Low service cost is possible if each actors in the service Value Chain optimally contribute to this objective. Main actors in the value chain are satellite operators, telecom operators, solution providers and service providers.

As a satellite communication solution provider, Newtec (<http://www.newtec.be/>) is representing only one element of this value chain. However, the role of the solution provider is crucial for obtaining low service cost: he is indeed responsible for designing low cost user equipment and bandwidth efficient communication networks. Newtec is therefore well placed to offer “perspectives for low cost satellite communications”, the subject of the present paper.

Within this paper, Newtec objective is to forecast as realistically as possible the most promising technical solution and cost related issues. As an example, solutions for offering low cost telecenters to remote communities will be examined. A case study will be proposed to evaluate telecenters cost evolution and to forecast investment costs. An outlined business model to optimise telecenters self-sustainability will be presented. As a conclusion, key success factors for the provision of low cost satellite communications in developing countries will be presented.

## 2. TELECENTERS

### Definition

‘Telecenter’ is a generic term defining a multi-users communication facility which is openly available to the people living or working in its vicinity.

A telecenters can be an ‘Internet Café’, a ‘Telephone Kiosk’ or any other facility offering a variety of communication and information services to the people which do not have basic communication means such as telephone, Internet access (PC), or even in some cases any radio or television at their premises.

### Services offered

Possible services to be offered by telecenters are multiple. The most usual ones are: telephony, email, Internet access, Fax, printing, copying.

Additional services can also be, depending on the circumstances and community needs: wireless telephony, paid-TV, public & private radio & television and specific content provision.

Specific content can be as diverse as: distance learning, target information to the whole community (AIDS and tropical disease prevention, administrative services etc.), or target information to farmers or fishermen (daily crops/fish market price, weather forecast, techniques,...).

The possible services to be offered to an user community are therefore very wide.

### Strategic importance

Thanks to these facilities, people in remote communities are able to communicate with the external world. They can communicate with their families and friend, but also with potential business partners, for example for better selling their local production (such as crops, fish), locally or even remotely with international partners (facilitating ‘Fair Trade’ with developed countries). Telecenters offer therefore an enabling infrastructure for local entrepreneurs and small businesses.

Local entrepreneurs have the capability to commercially operate the telecenters. Experience has shown a lot of creative examples of such entrepreneurship.

Telecenters offer also an enabling infrastructure for community Capacity Building. For example, thanks to the telecenter, specific education content can be easily delivered to a remote community.

#### Key issues

Experience has shown that some key issues impeding a large proliferation of telecenters are the following:

- Lack of energy (to power the communication system)
- Local regulations (e.g. for IP telephony)
- Difficulty of installation and maintenance
- Investment costs
- Services self-sustainability

The present presentation will address the 2 later issues.

#### Today satellite equipment cost

Satellite equipment costs are today still very expensive for developing countries or less economically favoured regions. As an example a telecenter equipped with one satellite terminal and 4 PCs cost today about 5000 Euro.

In this example, the main costs elements are the following:

- Satellite terminal: 1600 Euro
- PC & peripherals: 4 x 900 Euro

#### Today satellite service prices

Satellite services are equally very expensive today for developing countries. As an example, for satellite mobile service it is typically:

- 2 \$ per minute for public telephony (Inmarsat mini-M)
- 7-10 \$ per Mbyte for Internet access (Inmarsat BGAN)

In comparison, cellular service price is rela-

tively affordable

- typically 25\$cents per minute (Tanzania)

Unfortunately, cellular coverage can be very much limited in the poorest countries, and the cellular service is therefore not available to most remote communities. Fixed public telephone and Internet services are often also not available for these communities. In these circumstances, satellite offers the sole mean to offer communications to remote communities.

### 3. TECHNICAL SOLUTION

#### Triple-Play concept

In order to offer low cost communications to remote communities, Newtec is proposing the 'Triple Play' satellite concept.

The principle of the 'Triple Play' concept is to provide the 3 basic access services (Television, Internet access and Telephony) through one single satellite communication network.

As a matter of comparison, in 'terrestrial' communications, telecom operators are offering today "Dual play" by providing both voice telephony and ADSL internet access over the same network (via traditional telephone copper cables). Some cable TV operators are competing with them by offering a "Triple-play" over their coaxial cable networks (first with propriety solutions then more and more with open standard such as VoIP).

Similarly, the 'Triple Play' satellite service is expected to offer the 3 access services together to remote communities, at an affordable cost.

#### Satellite terminal

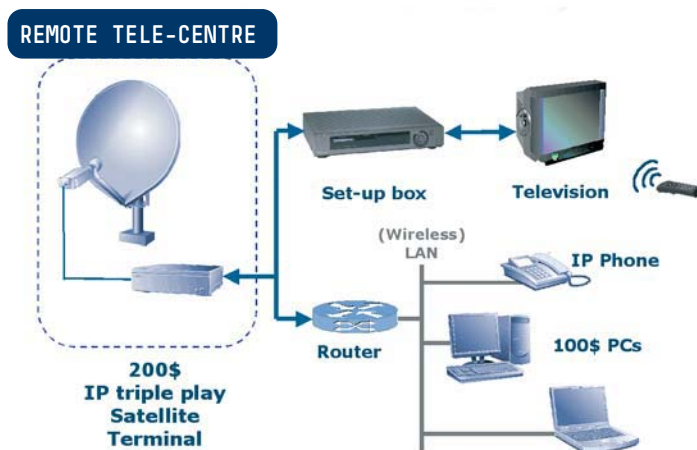
In order to achieve low cost, the communication terminal is making use of existing standard satellite TV reception equipment: TVROs (TV Receive-Only terminal). Such

equipment is presently manufactured in very large quantities for the Direct-To-Home (DTH) consumer market, and is therefore easily available and very cheap.

The 2-way Triple play satellite communication terminal is making use of a (1-way) 60/75 cm TVRO antenna equipped with a small transmitter offering limited bandwidth return channel.

The Triple play terminal includes an In-Door Unit (IDU) containing the satellite modem with the communication interfaces (see fig below).

**Triple play remote Telecenter**



The Triple play terminal will offer communication access to remote telecenters. The telecenters will be equipped with some communication devices, which, according to the size and the needs of the community, will include one or several (IP) phones and personal computers.

These devices are connected through a Router and a Local Area Network (LAN) which can be wired or wireless (see fig below).

A television set can be connected to the Triple play satellite terminal through standard TV Set-Top box.

Terminal installation can be simple and straightforward, the only conditions being availability of electrical power, and free view to satellite (within the satellite footprint).

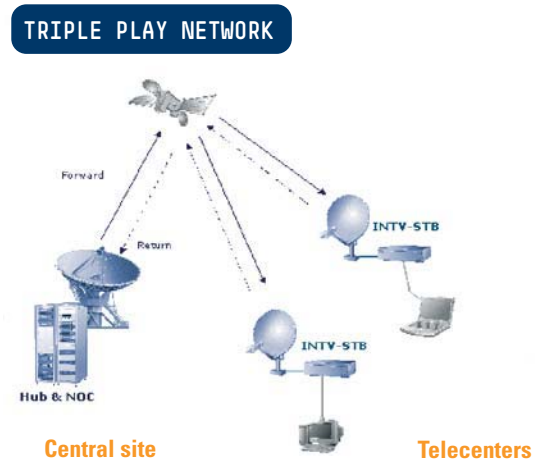
In places where no electricity is available, the Triple play satellite terminal can be solar powered.

**Triple-Play satellite Network**

The satellite Triple Play network is mainly composed of:

- one 'Central Site' containing the Hub Station (accessing the satellite) and the Network Operation Center (NOC)
- the satellite terminals providing communication to the remote telecenters (see Figure below).

The satellite(s) to be accessed to must be equipped with Ku-Band spot beams, in order to be compatible with the use of small 60/75 cm TVROs antennas.



**Network access & Service provision**

A Network Access Provider operates the Hub station.

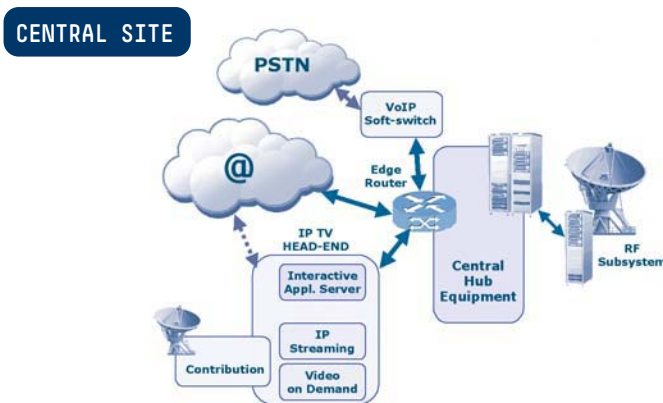
In order to provide connectivity, the Hub (see Figure below) is connected to specific networks:

- for IP telephony services: to the

worldwide terrestrial telephony network (Public Switched Communication Network - PSTN) through a 'VoIP soft-switch'

- for Internet services: to the worldwide internet backbone
- for digital TV broadcasting: to a satellite TV contribution network, through an 'IP TV Head-End', providing access to multiple channels programming

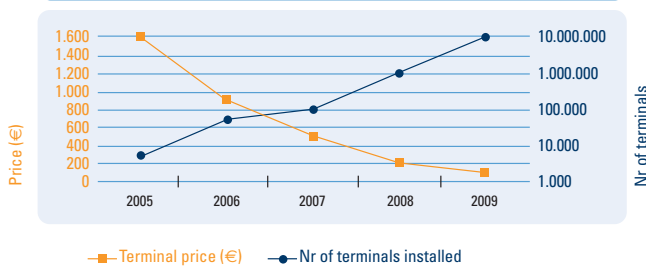
In a given country, Local Service Provider(s) will offer the service to the communities (terminal installation, service subscription, terminal maintenance etc.).



**Low costs**

Triple play satellite terminal price will go down with quantities: target price for 2008 is 200 , assuming 1 Million terminals will have been ordered at that time (see Figure below). For broadband Internet access, communica-

**Satellite Terminals price versus quantities**



tion service cost will be about 0,5 cent per Megabyte, which is quite cheaper than today satellite service prices.

For IP telephony, cost will be 0,2 cent per minute , which is about 1000 times cheaper than present Inmarsat prices.

**4. CASE STUDY**

In order to have an idea of the investment cost required for offering telecenters access to a large number of people, we propose a case study:

Let's imagine a typical remote community with 400 people.

We assuming 1 PC can be shared by 100 people.

1 Telecenter with 4 PCs will therefore serve such community.

We also assume that, in 2008, a key user device, the PC, will be available for 100 (see abstract from Mr N. Negropte from MIT on "the 100\$ laptop", presented at the same conference).

As a consequence, such a Telecenter will cost about 800 , according to the following cost breakdown:

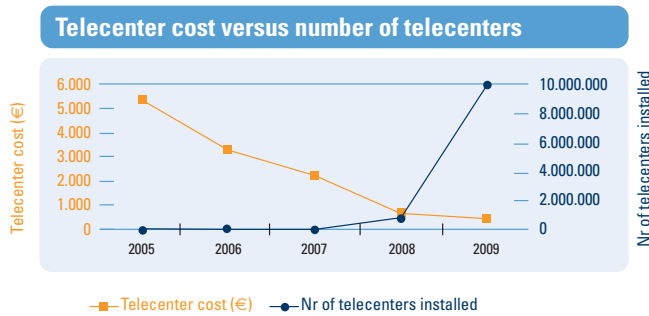
- Satellite terminal 200
- Set Top Box 50
- Router 100
- PCs 4 x 100
- IP Telephone set 50

In such a case, the investment cost will be 200 per connected PC.

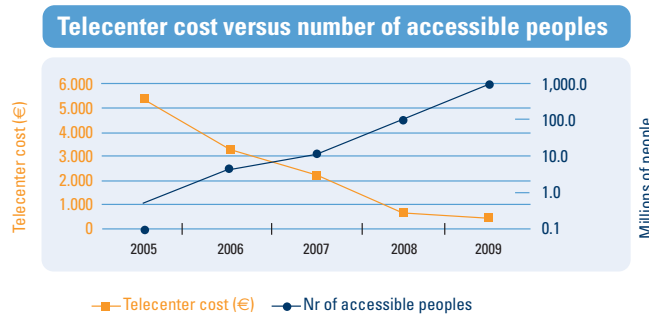
In the same case, investment cost per accessed people will be only 2 .

These figures are of course valid starting from 2008. From now on, telecentre price will decrease together with the price of its components (mostly satellite terminal and PCs).

The telecentre price will go down with the number of telecenters installed (see Figure below).



As a consequence, the total number of accessible peoples will increase significantly with the number of telecenters installed (see Figure below).



It can be concluded that the equipment cost will not be predominant barrier to the large scale deployment of information and communication technologies to remote communities.

### 5. BUSINESS MODEL

#### Objective

The long term viability of telecenters assumes of course that a number of other conditions are fulfilled. It is not the scope of this presentation to analyse these issues.

There is however one key issue which must be pointed out: the self-sustainability. Experience with telecenters already deployed in remote areas of developing countries - and which have been in most cases subsidized - has shown that this is by far the biggest issue.

For that purpose, we will outline a typical business model to optimise telecenters self-sustainability potential.

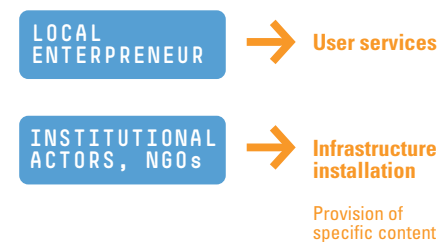
#### Local entrepreneur

A key actor in any realistic business model is the Local Entrepreneur, which offers the services to the local community.

Belonging to the community, the entrepreneur must be responsible for telecentre technical and business operation. He must be committed to the provision of the services and the success of its own business.

For that reason, the portfolio of different services to be offered to the community must be selected by him, according to the specific needs of his community.

#### Roles



As explained above, the local entrepreneur is a key actor to assure the long term economic sustainability.

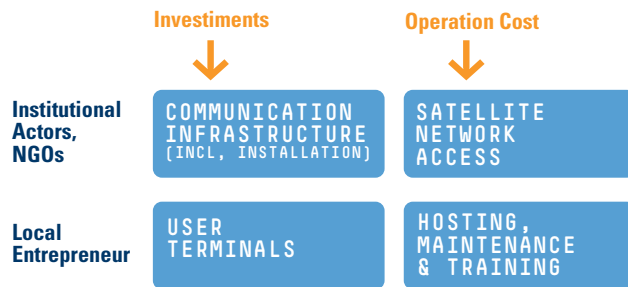
Other key actors are the Institutional actors

(local ministries, international organisations etc.) and Non Governmental Organisations or NGOs (see Figure below). Institutional actors and NGOs will be responsible for the telecenters infrastructure installation (including

satellite terminals and user devices). The Institutional actors and NGOs will then have the opportunity to make use of the infrastructure to provide specific multimedia content contributing to community's capacity building (distance learning etc.).

**Cost sharing**

Non-recurring investment costs related to the communication infrastructure and installation will have to be subsidized by Institution-



al actors and/or NGOs (see Figure below). Some recurring costs, including satellite communications costs, will also have to be subsidized, at least in the first 5-10 years of operation.

On the other side, the Local Entrepreneur will take in charge all recurring costs related to local operations (hosting, maintenance, users training etc.) and to the replacement and update of user devices (PCs, software etc.).

**Local financing**

After an initial period, the local entrepreneur's revenue generated by the services provision (bills for telephone calls etc.) is expected to be large enough to cover its own costs. At this point, self-sustainability will be assured.

However, in the initial first years period (start-up phase), the local entrepreneur will have to face substantial financial charges. It is therefore proposed to support him by mean of "micro-credits".



**6. CONCLUSION: KEY SUCCESS FACTORS**

As a conclusion, some key success factors to 'bridge the digital divide' in poor remote communities are the following:

- Suitable satellite capacity must be available on time. For example, today, there is not enough suitable capacity for 100K Triple Play users in Africa.
- Satellite terminals must be manufactured in large quantities (> 1 Million) to get the target 200 unit price.
- To validate the business model, telecenters must be deployed on a large scale in several countries.
- Satellite infrastructure and communication costs must be initially subsidized by Institutional actors.
- Initiative has to be taken to set-up of a new standard which defines basic infrastructure requirements. When such a standard and a proven business model will be available, industry will then invest in the development of very low cost communication terminals.\_

# **Chapter V.** GDLN Interactive Participations

Part I. **LATIN AMERICA**

Part II. **ARAB STATES**

Part III. **AFRICA**

Part IV. **ASIA**



# INTRODUCTION

The Global Development Learning Network (GDLN) of the World Bank Institute, initiated in June 2000, offers the use of advanced information and communication technologies to connect people working in development around the world.

GDLN enables organizations, teams, and individuals around the world to communicate, share knowledge, and learn from each others' experiences in a timely and cost-effective manner.

GDLN facilities include classrooms or meeting rooms with access to videoconferencing and high-speed internet resources (such as email and instant messenger).

The use of this network allowed the present World Conference to share the experience

of local initiatives from around the world. Three countries per region/continent were bundled in a session of three hours. In this way, it was possible to integrate four sessions, spread over the three day World Conference and having participations from:

Latin America : Brazil, Mexico and Argentina

Arab States : Kuwait, Jordan and Egypt

Africa : Tanzania, Senegal and South Africa

Asia : Afghanistan, India and China.

The video-conference studios of the GDLN network, being linked among them, allowed the session participants to share the presentations and discussions of in the remote places as well as well with those in the conference site at UNESCO in Paris.

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# BRAZIL

## ICTs IN POOR URBAN AREAS, IN THE LEGISLATURE AND VIEWS OF YOUNG PEOPLE

### HEITOR GURGULINO DE SOUZA

Former Vice-Rector  
of UNILEGIS.  
hgurgulino@aol.com

### EDA C. BARBOSA

Director-General  
Institute of Higher Education  
of Brasilia (IESB)  
iesb@iesb.br

### FILIFE RIZZO OLIVEIRA

Diretor CDI-Brasilia  
cdi@cdi.org.br

### I. THE COMMITTEE FOR DEMOCRACY IN INFORMATION TECHNOLOGY (CDI)

CDI is a non-profit organization with the mission of fostering the social inclusion of less-privileged social groups by using Information and Communication Technologies as tools to encourage active citizenship. We work in low-income communities and with institutions assisting individuals with special needs including, among others, the physically and mentally disabled, the visually impaired, homeless children, prisoners and indigenous populations.

Learning new technologies not only creates job opportunities, but also expands access to knowledge and encourages social interchange. At CDI, we believe this initiative contributes to changing the lives of individuals and has a profound impact in community development. CDI opens Information Technologies and Citizens Rights Schools (ITCRS) in partnership with community-based associations, providing free computer equipment, software and implementing educational strategies for a continuous training of local instructors. Through periodic visits, CDI coordinators monitor its performance identifying key challenges and opportunities. School coordinators work together with CDI representatives to find creative ways of addressing problems, formulating and sharing solutions. Each School is an autonomous unit, self-managed and self-sustainable through a symbolic contribution collected from its students.

This fund covers the maintenance costs, and the payment of instructors. Presently, there are 946 autonomous and self-sustainable

ITCRS using CDI's methodology and model concept throughout Brazil.

CDI developed a socio-educational approach to teach information technology. Students learn how to use computers and software while discussing issues of particular interest to their community, such as human rights or environment. Furthermore, the model is based on the concept of helping people to help themselves.

CDI trains the future teachers of the schools, who, in turn, will train others back in their communities. CDI is continuously expanding its national and international network. Presently our offices are located in several Brazilian states and in three other continents. CDI regional committees are self-sustained and administratively autonomous. Their mission is to replicate CDI experience and educational strategy when implementing the schools. Periodic follow-up visits to the committees guarantee the quality and the continuity of the CDI project. (Presentation made by Filipe Rizzo of the CDI Brasilia Office).

### II. UNILEGIS

A new University created for all Legislatures of Brazil. A major objective of the Federal Senate of Brazil when it established UNILEGIS (Universidade do Legislativo Brasileiro) was to promote and maintain activities to improve legislative procedures and to study, at the highest level, strategic matters related to the development of our country. It represented one more initiative of the Senate to offer Brazilian society new

mechanisms to train leaders and to provide better conditions for the development of our citizens and institutions, with direct benefits to the process of strengthening our democracy. The specific goals of the University are the generation, development, transmission and application of knowledge, through teaching, research and extension activities, using ICT's, in capacity building, in all areas related to the legislative domain, and specially, in relation to the organization and legislative procedures.

Honored with an invitation from the then President of the Federal Senate - **Senator José Sarney I** have accepted the challenge and was the Vice-Rector (Academic) of UNILEGIS, for two years, until last April. The President of the Senate is also the Rector of the University.

This pioneering and ambitious initiative, links all legislative houses of the country: at the Federal level in Brasilia (Senate, House of Representatives and the Federal Accounts Tribunal) with all 27 State Assemblies (there are 26 States in Brazil and the Federal District of Brasilia), and with all Municipal Chambers (County Boards of elected officials). Since there are 5,561 counties in Brazil, the estimated potential "student" body of our University, to be reached especially through distance education, comprises 70,000 Members of Parliaments and 150,000 of its supporting staff. Already by the end of this year, about 2,500 counties - less than half of the total- will be linked to Brasilia and with each other, through the Program Interlegis (a joint initiative, funded by a US\$40 million project, supported by the Brazilian Senate and the Interamerican Development Bank) already functioning, that has supplied computers, printers and access to the internet to a large number of them. The Senate in Brasilia and all 27 State Assemblies are also already linked through excellent video-conference facilities provided by the Interlegis Program.

UNILEGIS started its teaching activities in the end of 2002, offering a graduate Course

and its first students completed all the academic requirements early in 2004. Their graduation ceremony took place last May when 83 Graduates (out of an initial enrollment of over 100 students) received their **Certificate of Specialist in Legislative Law**, thanks to a partnership that UNILEGIS had established with the Federal University of Mato Grosso do Sul (a public University accredited by the Ministry of Education).

This year UNILEGIS is again offering a face to face **Specialization Course on Legislative Law**, for 50 students, and two new Courses: one in **Legislative Administration**, also for 50 students and one in **Control of Constitutionality of the Laws**, for 45 students, with the cooperation of Brazil's Supreme Federal Tribunal.

These last two Courses are offered in partnership with the University of Brasilia. All three courses offered this year have a duration of 360 hours, require an attendance of over 70% of the classes, students are required to attain a grade of 7 (in a scale 0-10) and also have to prepare a monograph, on a topic of their own choice, at the end of their Course. All Courses offered are developed in accordance with the Regulations set forth by the Ministry of Education and the National Council of Education of Brazil. The previously created Brazilian

Legislative Institute (ILB), is the Executive Body that provided support for UNILEGIS Administration and for its initial activities. The University has an Executive Vice-Rector, who is also the Director-General of the Senate, so that it can mobilize other already existing important resources of the Parliament such as: its Radio and TV stations, its excellent Library and ICT resources, its computer data banks (Prodasen) and the Printing Press (Gráfica) to support our University work. We are just beginning a very long journey and there is still a lot to be done. But, in our view, UNILEGIS has indeed a great potential and could serve as an example of good use of ICTs for other countries to follow.

### III. INSTITUTO DE ENSINO SUPERIOR DE BRASILIA - IESB

Integration and sharing of knowledge in the academic communities, made possible by the revolution of the ways of communications, has permitted a meaningful circulation of scientific investigation and the improvement of teaching and learning processes.

Nevertheless, the expansion and universalization of these effects doesn't happen in a homogeneous way. Great disparities among technology advances and its real absorption by societies generate great differences among individuals and social groups, deepening the existing ruptures.

In Brazil, there is a paradoxical situation: at the same time it seems to be included in the information society by the modernity of some of its governmental and social programs, it is excluded when we consider the effective results of these programs and the low universalization of the means.

We are convinced that the process of digital inclusion should be considered in the construction of democratic citizenship in many and diverse dimensions.

We believe that the academic community should assume a natural leadership in the process of digital inclusion by the means

of mobilization, associated with others sectors of the society, particularly in bringing the knowledge and circulation of information. Given the fact that a minority of the population has effective access to the means (computers and communications) the process of digital inclusion asks for an impressive governmental and societal movement to spread the availability of equipments and communications means to the population. As it is now, the access to modern means of information and communications tends to deepen the gap between rich and poorer classes of the society.

The deficiencies in pre-school, primary and secondary education, either quantitatively as well as qualitatively, makes a significant challenge to the inclusion, since the children and youngsters do not have the necessary background to enter the era of digital inclusion.

At last we understand that the machines (equipments) alone have neither noxious effects nor benefits, but the sense that is given to its utilization. That's what allows a real social transformation, by means of a thorough citizenship building, taken into account the several dimensions of social, political, economical and cultural life.

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# MEXICO

## E-MEXICO - BUILDING ON SUCCESS, FOR SUCCESS

### TERENCE KARRAN

Director,  
Virtual Campus, Universidad  
Autonoma de Guadalajara, Mexico

When considering the growth and role of information and communication technologies (ICT) for capacity building in México, and its ability to meet the challenges of the emergent Information Society and the Global Knowledge Economy, it is necessary to address the social and economic contexts of the country, which define the particular problems of México and affect its ability to deal with them. By many standards, México has a strong economy. In terms of total GDP, the combination of a population of 100 million and GDP per capita over US\$5,000 makes México the tenth largest economy in the world. With US\$232 billion in trade in 2002, it is the USA's second trading partner (after Canada), and far ahead from the third trading partner (Japan with US\$184 billion). Moreover, the OECD *Economic Survey: México* undertaken in November 2003, showed that México's economic performance improved during the 1990s, with vigorous growth in GDP, and steadily falling inflation. Since the 1995 peso crisis, the financial system has been strengthened, so that, when compared with many other Latin America countries, the Mexican economy has been stable.

However, despite this improving situation, México's economic growth performance has been poor, and potential GDP growth estimates have been revised down to below 4%, which is too slow for a country with low levels of income and productivity and high rates of population growth, and hence too slow to narrow the gap in living standards relative to other countries. México's GDP per capita is equivalent to about one quarter of that of the United States. Over the 1990s, it increased by only 1% per year,

preventing México from catching up with more advanced nations. Over the same period, GDP per capita rose by 3% or more in Greece, Portugal and Korea, three other nations with comparatively low income levels. Economic growth in México is constrained by low levels of human capital development, and additional finances are needed to improve and expand the inadequate physical infrastructure, and combat widespread acute poverty that leads to poor health and social marginalization. Hence, in the short term, targeted programs are needed to attack poverty and ensure that basic needs are met, but in the longer run, poverty can only be addressed systematically through improved access to a more effective educational system, which will improve the skills base of the workforce and thereby strengthen human capital. However, despite major improvements over the past decades, especially in increasing basic school enrolment for a rapidly growing school-age population, the level of the skills base of México's human capital lags behind many other countries. The quality of education services and training is below OECD best practice, so that many school-leavers have poor literacy and numeracy skills, and the cost effectiveness of education programs needs to be improved.

However, data from the OECD *Information Technology Outlook* reveals that the growth of the ITC Sector in the Mexican economy has been substantial. The largest exporters of communication equipment in 2002 were the U.K. and the USA, followed by Germany, Korea, and México. Of these countries, exports for Korea and México increased most rapidly from 1996 to 2002, by 32%

and 23% per year respectively. Moreover the share of ICT Manufacturing in Total Manufacturing Value added is greater in México than that in many European nation states, and from 1995-2001 this share grew faster in México than all other OECD countries apart from Finland. Similarly, the share of ICT manufacturing in total manufacturing employment has been very high in México when compared with other OECD countries.

Not only has ICT manufacturing increased in México, so has the purchase and use of ICT equipment. Data from the OECD *Communications Outlook* shows that the number of cellular mobile phone subscribers in México is below average by international standards, but it is growing very fast. Similarly, the proportion of households with access to a home computer is low, but is catching up with European nations. In 1997 the number of PCs in México was 3.5 million, but exceeded 8 million by 2002. In addition, more people are accessing the Internet - the number of internet users in México rose from just over half a million in 1997 to over 7 million by 2002, and was expected to reach 15 million by the end of 2004. As the OECD *Science Technology and Industry Scoreboard* for 2004 shows, the number of Mexican registered websites, although low, is growing at a faster annual rate than the OECD average. This growth has been aided by the liberalization of the telecommunication industry in the 1990's, starting with the privatization of TELMEX and the emergence of new providers like TELCEL.

Hence, in terms of building ICT capacity, the situation in México is one of successful growth in the ICT manufacturing sector, and in the purchase and use of ICT equipment, albeit from a small base, and despite an economic climate characterized by low growth. Building on this success requires political will, and another important factor in the last decade has been the election of President Vicente Fox. The effect of the election of Fox after 71 years of rule by the PRI was both symbolic and substantive, as the new

administration recognized the need to address the impact of new technologies within society. This led to a major policy initiative in the form of e-México (<http://www.e-mexico.gob.mx/>).

The objective of e-México is to create a technological system with social content, which can offer all the tools and opportunities that are available through the use of Information and Communications Technologies, in order to increase the quality of life for all Mexicans.

e-México is being developed through five thematic areas, as follows:

**e-Learning** - will provide new options of education and training which will stimulate learning as a means of integral development for Mexicans, promoting education for all, while respecting identity and cultural diversity;

**e-Health** - will increase the level of health and well-being of society by placing within the reach of the entire Mexican population general medical information which will promote human development and the development of the health institutions, eliminating barriers to the access of information and the health and social security services;

**e-Economy** - will accelerate the process of development of the digital economy within businesses, specially micro, small and medium size businesses (MSMBs) thereby increasing the competitive position of the Mexican economy; as well as developing a computer culture within society, particularly amongst consumers;

**e-Science, Technology and Industry** - will integrate and develop an information society and knowledge economy, facilitating a greater level of development by focusing on the needs of Mexicans to strengthen their industrial infrastructure, and by direct linkage with the research sector, thereby enabling the achievement of highly competitive quality standards as measured in world markets;

**e-Government** - will provide full information on, and access to, all State services offered at Federal, Regional, National or City level, thereby guaranteeing that all Mexican people can access and take full advantage of all public services.

The success of the e-México initiative in improving human capital will depend on its success in raising the level of education. This in turn depends on the willingness of the educational and training sectors to adopt new technologies. This will be vital first, because global competitiveness will depend on the extent to which people leaving education have acquired high level ICT skills - so teachers will need to know how to use ICT, in order to use it to teach more effectively themselves, and teach others how to use it. Secondly, and more critically, the current population growth is outstripping economic growth. México does not possess the resources to increase the level of education by increasing the physical number of schools and universities, and therefore needs to turn increasingly to using new technologies in teaching and the greater use of open and distance learning, which are more cost effective.

México is one of the countries with the greatest experience in the field of distance education in the world. The main purpose of the SEP (Ministry of Education) National Distance Education Program (PROED) is to raise the level of educational opportunities by incorporating electronic and computer technology media into education. Its intention is to expand its coverage, combat educational backlog and regional disparities in educational opportunities, and promote training programs for human resource development through a series of initiatives including:

**Telesecundaria** - launched over 31 years ago, the Telesecundaria, a televised based distance secondary program, currently has more than 14,000 schools totaling approximately 1,200,000 stu-

dents and 40,000 teachers.

**Red Escolar** - a computerized system of information and communication based on the Internet for México's student community, which has 4,000 units installed in more than 1,000 educational units

**Edusat** - Educational Satellite Television Network - is a closed-circuit system based on the most advanced digital technology. Its 12 video and 24 audio channels broadcast all over México, and it reaches over 30,000 educational centres in the country, through receivers in secondary and technical schools and public and private universities.

**Enciclomedia** - has enabled the digitalization of primary education textbooks in CD-ROM format. Along with the material from the textbooks themselves, a plethora of resources, including videos, complementary information and the use of the Microsoft Encarta student encyclopedia, are available to teachers and students. The system began as a pilot in the 2003-04 year, is now in place in close to 22,000 fifth- and sixth-grade classrooms around the country, and is expected to expand to thousands of schools during 2005-6

Hence e-México will develop new initiatives within México to build on previous successes in open and distance learning, and take up the challenge of new technologies to move both conventional and open and distance education forward. There will be a need to use new technologies to create high quality intensely supported active learning environments for students, both on an off campus. The technology already exists to provide these new environments. However, the major challenge lies in trying to use new technologies to shift the educational process away from a passive didactic transmission model of teaching to an active constructivist conversational model of lifelong learning. This requires changes, not just in pedagogy but across the entire educational institution. To be successful, this new generation of e-learning will require teachers to

adopt a new educational and pedagogic paradigm based on learning and to change their role radically from being deliverers of subject content to facilitators and promoters of learning.

The role of universities as catalysts for change will be vital in this process. First, because they will supply high level training necessary for both continued growth in the development and manufacture of ITC, and its integration in all aspects of the economy and society. Secondly, because universities' research activities put them at the cutting edge in the development of new technologies. Previously the role of universities in the industrial economy was to supply highly trained workers for the manufacturing sector. By contrast, in the information society global knowledge economy, universities are primary producers of the main product, knowledge, and so are crucial in the process of building learning regions within the global knowledge economy. This has led to a convergence between universities and high tech companies in the knowledge economy, often facilitated through the development of university science parks. Whether or not México manages to use the

e-México initiative to accelerate its successful growth in the manufacture and use of ITC remains to be seen. Making international benchmarking comparisons is very difficult. However, it is worth noting that one nation which has been able to transform itself through the use of ICT in the last three decades has been Finland. The defining benchmarks in Finland's success have been a strong ICT manufacturing base lead by Nokia, the deregulation of the telecommunications industry, consequent high usage of ITC, a strong tradition of open and distance learning facilitated by technology, collaboration between universities and industries (facilitated via technology transfer and science parks), and a national policy initiative which put the development of ICT at the heart of its economic and educational strategy. By adopting similar benchmarks, México can build on its current success to expand its ICT industry and infrastructure, and use policy instruments like e-México to promote the widespread use of information and communication technologies, in homes, schools and universities, and business and industry, with substantial social and economic benefits for all the Mexican people.

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# ARGENTINA

## TELEWORK, NEW WORK METHODS AND LOCAL JOB DEVELOPMENT.

### ANGÉLICA ABDALLAH

President, Argentine  
Telework Association  
aabdallah@aat-ar.org

### WE SHARE THREE REGIONAL EXPERIENCES AS AN INTRODUCTION:

**First case:** a pastry artisan that offers her products in her quarter. Due to a relative's suggestion, she started selling them on the Internet. In a second stage of this enterprise, some artisans from other cities join, thus developing a network which gets trained in the manufacturing of these products, how to deliver them, how to keep the records, marketing techniques, etc. The access to the Net is made from public centers located at public cabins.

The web page of this experience is: [www.tortasperu.com.pe](http://www.tortasperu.com.pe)

Let's see, in their own words, what Tortas Perú's team (year 2000) has learned:

- It is possible to create an electronic company in our country, even with simple products like pies.
- Pastry manufacturing can also be coupled with children care and the use of Internet, without leaving our home.
- For the population of developing countries, this is an opportunity to use our imagination and creativity to create jobs and income sources.

Medium-complexity technology (a web page with an electronic cart), which complements a personal micro-enterprise not related to ICTs, and can also grow by the entrance of new entrepreneurs. ICTs make their part, the human group overcomes the obstacles and there is growth and work.

**Second case:** a little town in the northern region of Argentina, whose traditional trade was the manufacturing brooms made of

Guinea straw -a trade that was disappearing due to the introduction of plastic materials. In 2002, this people published an add on the Internet, in the classifieds sections, offering Guinea straw brooms and an e-mail address to contact them. Orders start arriving from different places, for instance, from Canada, requesting 70,000 brooms. The hindrance to overcome in this case was to have the different families sharing the best of their own knowledge to manufacture, all together, a uniform and good quality product to satisfy the shipments.

Low-complexity technologies (an ad on the Web and an e-mail address) that made possible to give a fresh impetus to the trade. Technology worked its magic, the human group tried to overcome the obstacle... there was growth.

**Third case:** a Chilean town (Lota), whose main -and, virtually, the only- activity, was mining. When the coalmines were closed (1997), work sources disappeared. The marches to the capital claiming for a solution become more and more frequent, thus creating violent scenes. This situation continued for more than one year. When the main state bank was considering the place to establish its contact center, the political decision was... to establish it in the town that was present in the pages of the national press almost every day, because almost each day it has no work to do. The contact center was opened in 2001.

After three years of operation, when evaluating the impact of the contact center, the Teleoperators acknowledged the training and the learning experience, the job

stability and the prestige related to being working in that company; the teleoperator's relatives could not deny the socioeconomic improvement and the improvements introduced in the families' dynamics; the bank recognized the city as an excellent platform for an efficient business (qualified personnel, low cost, and access to technology); the community admitted the decrease in the unemployment of the city (especially, youngsters and women), the impact on consumption, the contact center as the "symbol" of a new reconversion plan (utilities, technology, a modern building, support to national government).

High-complexity new technologies (a state-of-the-art contact center), which enabled the city revitalization. The ICTs made their work, all social player joined forces. In view of this temporary pushing situation, decisions had to be made by the government, the key player in such kind of proposals.

#### TELEWORK, NEW WORK METHODS AND LOCAL DEVELOPMENT...

In the three cases mentioned before, technology has very much to do. In the first case, we remark the "appropriation"; not only the access but also the "know how to do" through the ICTs. In the second case, technology is applied to the revitalization of the typical trade of a community and, at the same time the confirmation that it does not necessarily destroy work sources. In the third case, technology is used to build synergy, make arrangements, and add political efforts to make possible the development of a less favored territory.

When we speak about ICTs, we speak about a process, social and institutional transformations. This is something that primarily represents a great opportunity for development, to become part of a "globalized" world, which we should continue building, with the greatest equity and respecting "diversity".

With these cases, we tried to give examples of how technology can be applied to work. In these new work methods, we include the web page designer, who works as a freelancer in a little town and offers his work to other towns in the country or abroad; the artisan -rather, an organization of artisans- who offer their products directly from a web page that includes catalogs, prices, packaging, delivery routes, different payment methods... in other words, a "virtual window" that enables the community to retain in its territory all the value generated by those activities.

We also include the "training" centers, which offer their services through the Internet. And of course, we cannot forget about the "virtual" organizations, which do not require that their members should be located in large urban centers and close one another; conversely, they make it possible for any team member to work from his or her location. A virtual organization that may provide services to farmers of different communities, offering information about prices, climate, tools, leads; an organization that may link the different players of each community, and gathers their stories and traditions to share them with the rest of the community and the world through the Internet.

In all this work, there is also a very important added value: leads, income, reinvestment, growth, innovation. Everything moves, circulates, grows, strengthens, is generated and regenerated in the place where the story begins -in the local community.

This is our vision on the possibilities of the new information and communication technologies, and on the factors that should be also present to obtain better results. And this is what we try to implement from the ATA in the RUTEL Telecenters (Free Telecenters - UNESCO Network) that we have opened in Buenos Aires; two Telecenters, in which different social groups work in the rebuilding of ICTs capabilities by using free software.

Apart from the skills acquired in the use and application of ICTs, those who participate in the activities of these telecenter develop other kind of competencies related to collaboration, teamwork, practical application, commitment, research, etc.

Our experience is only a small sample of the variety of options that we can develop hand in hand with ICTs. In many cases, those options depend on who has the responsibility to make the political decision, on the

community's willingness and motivation, and their members' desire to grow. There are always alternatives to start. The most important thing is to be aware of the opportunity we have. And many of us must also be aware about our role in the development of knowledge, skills, competences, and attitudes. We should work for a real "appropriation" of the ICTs, a real building of capabilities, knowing what to use, how to use, what for...

■

# KUWAIT

## ICT IN HEALTH AND EDUCATION IN KUWAIT

**HAMEED AL-QAHERI**  
**MAGDY EL-HUSSAINY**

Kuwait University,  
Kuwait

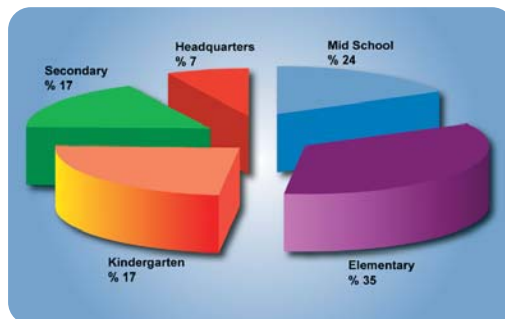
REGIONAL CENTER  
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EDUCATIONAL SOFTWARE.  
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### 1. ICT IN EDUCATION

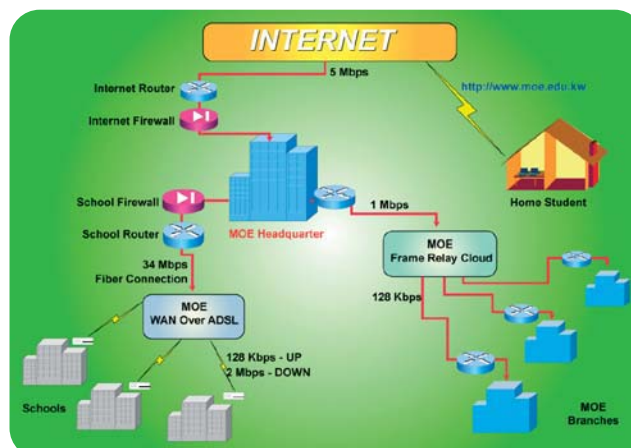
#### 1.1 ICT in K-12

Total Numbers of Computers in Ministry of Education 31,214 PCs connected within LANs and all are WAN connected via the Ministry CLOUD, with approximately cost 41.4 Million dollars.

##### 1.1.1 PCs Distribution



##### 1.1.2 Ministry of Education Network



#### 1.1.3 Teacher Training: International Computer Driving License

9000 Teachers out of 35,000 (25%) are ICDL certified and the rest are following, MOE expects all teachers to be certified by year 2007.

#### 1.2 e-Learning and Distance Learning at Kuwait University

##### 1.2.1 Infrastructure

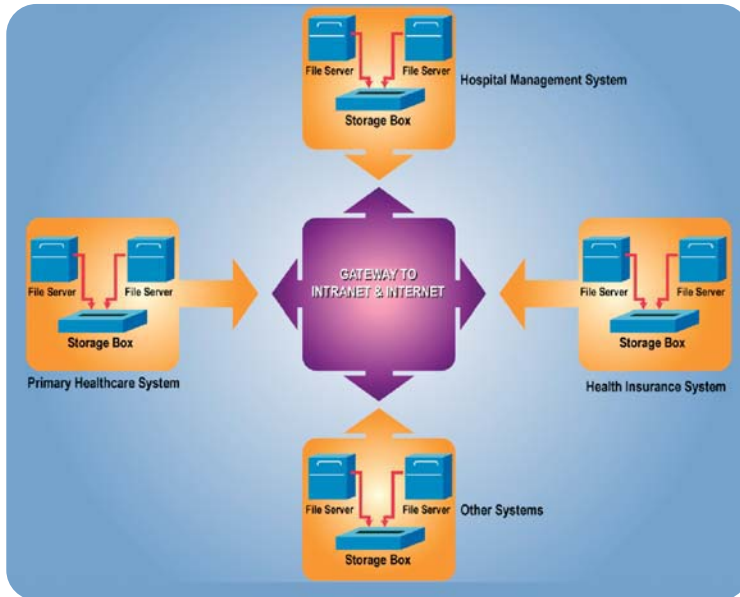
- Cisco Model Network.
- Clusters of Alpha Servers.
- 1 Gbits Fiber Optic Connecting the 6 Campuses (to the Buildings).
- UTP within the Buildings.
- 18 Mbits Internet Access within each Campus.

##### 1.2.2 Applications

- Portal-Based, Fully
- Automated Student Information System (SIS).
- Oracle Finance and HR Systems.

## 2. ICT IN HEALTH CARE

### 2.1 Ministry of Health: HealthNet



### 2.2 HealthNet Main Features and Objectives.

Kuwait Health Care System (Health under implementation.Net) is partly implemented and partly

#### 2.3 The objectives of the Health Net are:

- Single Patient View via Unified Patient Index.
- Improve clinical practices and Provide Better Service.
- Self-service options to access standard services for patients and physicians.
- Inline with Kuwait eGov Initiatives.
- Reduce Service and Administrative costs.

#### 2.3.1. Primary HealthCare System (PHS)

- Unified Electronic Patient File.
- PHS in 80 Clinics consisting of the following stations:
  - Reception.
  - The Attending Doctor.
  - Pharmacy.
  - Nursing.

## MINISTRY OF HEALTH: HEALTHNET

### 2.3.2. Staff Training

- During the Period of 2001-2004
- Over 1000 Trainings Courses were conducted.
- Over 11000 Users (Doctors, Pharmacists, Nurses and Staff) were trained.\_



# THE JORDAN EDUCATION INITIATIVE - JEI

**ANDREAS COX**  
Program Manager

**MAJIED QASEM**  
Program Director

## JEI defines partnerships

### ACHIEVING OUR VISION

An opportunity of this kind is now emerging in the Jordan Education Initiative (JEI), born in the vision of His Majesty King Abdullah II and endorsed by the World Economic Forum, whose members are contributing to the enrichment, strengthening and deepening of this initiative.

In fact, so powerful is the capture of the JEI that to date no less than 17 global corporations, 17 Jordanian entities, and 11 governmental and non-governmental organizations are working together to achieve the JEI objectives with the Government of Jordan. Direct contributions to the initiative from global and local partners have reached over US\$10 million. These, coupled with the Government of Jordan's in-kind contribution of over US\$3 million, are being innovatively channeled to advance this public private partnership model for effective and advanced learning development.

The JEI is in many ways a bold experiment - on the one hand the experiment must hold firm to the four "pillars" or objectives of the initiative. On the other hand, the experiment, of necessity and from an impending sense of urgency to take advantage of this rare opportunity, must actively and aggressively facilitate the rapid generation and application of innovation - in part through untested partnerships and unique and untried approaches to defining and overcoming challenges. In many respects, the JEI is both the "keeper" of an exceptional vision as well as being the "enabler" of that vision.

The two hands of the experiment must work together if the JEI is to achieve the success that many are envisioning. How we maxi-

mize the effectiveness of this partnership depends on you - the partners of the JEI. The answers you provide must quantitatively and qualitatively enhance the ability of the public and private sectors to work together in a concert of effective synergy.

The challenge is threefold. First, we must arrive at a shared understanding of the exceptional experiment called the JEI. Second, we must channel our collective interest, wisdom, commitment and energy to define the most effective ways to rapidly enable the JEI to live, grow and realize that unique vision. Third, we must reach depth within - challenging our own assumptions about what it is we offer to the experiment in order to provide those critical elements and resources essential to the future success of the Jordan Education Initiative.

### OBJECTIVES

1. Improve the development and the delivery of education to Jordan's citizens through public-private partnerships, and in the process help the government of Jordan achieve its vision for education as a catalyst for social and economic development.
2. Encourage the development of an efficient public-private model for the acceleration of educational reforms in developing countries based on unleashing the innovation of teachers and students through the effective use of ICT.
3. Build capacity of the local information technology industry for the development of innovative learning solutions in partnership with world class firms, creating economic value that will lead to mutually beneficial business opportunities.
4. Leverage an environment of national commitment and corporate citizenship to build a model of reform that can be exported to and replicated in other countries.

# EGYPT

## ICT FOR THE TAHA HUSSEIN LIBRARY BLIND AND VISUALLY-IMPAIRED AT THE BIBLIOTHECA ALEXANDRINA

**SOHAIR F. WASTAWY**  
Chief Librarian Library  
of Alexandria, Egypt

Within the Taha Hussein (TH) Library for the Blind and Visually Impaired, a specialized library in the Bibliotheca Alexandrina (BA), there has always been a strong presence of Information and Communication Technology (ICT). Unfortunately, Egypt has over three million Egyptians who are blind or visually impaired, a large heterogeneous group, that mostly fell on the wrong side of the digital divide up until the TH Library. Now, through the multiple resources, assistive technology and trained librarian, TH users can independently read for pleasure, education, lifelong learning, career advancements, and an overall improvement in their quality of life.

The BA's TH library after 2 years of its inception, a grand total of 97 users have completed training on the proper use of the available assistive technology. TH memberships, in 2005, reached a total of 221 memberships, and library non-member visitors reached 12,055 visitors a year. The TH Library provides a variety of services to their users, such as the ability of transforming text into Braille or speech, digital texts to be read with synthetic speech, enlargement software and a Braille display. Moreover, the TH library offers a number of resources, including periodicals, study materials, brochures, reference materials and books, all cataloged by title and author and available for search on the BA Catalog.

### THE INFORMATION AND COMMUNICATION TECHNOLOGY PRESENCE

The ICT infrastructure in the TH library can be divided into two groups, hardware and software:

**Hardware:** The TH Library contains 10 personal computers, 10 scanners, 3 Braille printers, 2 Braille displays, 1 Braille keyboard and 2 CCTV (closed circuit television).

**Software:** All software assistive technology (AT) support all standard windows applications and internet explorer with special features such as links lists, frames lists, forms mode, reading HTML tables and graphic labels.

- **JAWS** (Job Access With Speech) transforms digital text to speech, supporting almost all European languages. JAWS also includes a unique scripting language for further customization with non standard windows applications and proprietary software.
- **Sakhr Text To Speech (TTS)** converts any Arabic/English digital text to speech, with a larger focus on an Arabic TTS engine that can match the quality of the human voice.
- **The Diacritizer** engine inserts the diacritics needed in Arabic texts automatically, in order to insure all texts are as clear and accurate as possible.
- **Ibsar** is a technology based on the Sakhr TTS and Sakhr Optical Character Recognition engines. Ibsar enables blind users to read printed books and documents as well as electronic files on their own, without assistance. Not only

does Ibsar enable users to read, but it also enables them to write texts in both Arabic and English, in addition to saving and printing these texts in Braille.

- Kurzweil 1000 (Scan, Read and Write Software) includes a powerful scanner, writing and editing tools, study tools, online information search, low vision features, audio file creation and a Kurzweil virtual printer.

- The TH Library also offers music software which scans music notes, editing and printing them into Braille.

#### THE TH TRAINING PROGRAM

The TH Training program includes a brief introduction to computers and the assistive technology, including mastering computer keyboards and typing rules using Ibsar software; an introduction to the windows environment (desktop icons and components, start menu, etc.); use of the Paper Reader Program; Web browsing; searching the library catalog; and use of the Screen Readers. The training duration is eight weeks, held for five groups of five people each.

TH users that have received training in the past were surveyed in order to measure the assistive technology educational and research impact, the overall training program, and the social and personal impact. Of the 44% who are totally blind and 52% who have low vision, it was found out that 64% don't have computers in their homes and 68% of them do not have access to the internet. Survey results also showed that 80% stated they come on a daily basis, 8% twice a week, 4% on a weekly basis, 4% every two weeks, 4% occasionally. The use of ICT for the blind is not much different than their sighted counterparts, for example 80% of TH members use the library to surf the internet, 68% to read, 60% to study, 40% to conduct research, and 12% to visit the library and meet friends.

When the survey participants were asked about the ease of use for the AT used in this library, 72% reported that as a result of the

training they could use it unassisted once it had been set up to suit their needs, 12% could use it unassisted, and could adjust it themselves to suit their needs, 4% required occasional help because it was not well suited for their needs, and 12% required frequent help because it was not well suited for their needs.

When asked about the purposes AT is serving, 72% reported that they use the technology to study and research, 68% for finding information, 48% in leisure reading and only 20% use word processing.

As the library offers a great number of e-resources, participants were also asked about the frequency of using such resources. The results showed that 60% could use e-resources unassisted, once it had been set up to suit their needs, 8% could use it unassisted, and could adjust it themselves to suit their needs, 24% required occasional help because it was not well suited for their needs, and 8% required frequent help. Regarding the use of the Internet, the 64% of these patrons reported listening to music and movies most, 60% browse & search for specific information, 20% use Email, 8% search for information on visual impairment, and 4% use it for chat.

As for the efficiency and effectiveness of the training program on assistive technology, 80% had no prior experience using assistive technology; 88% use the assistive technology available at the library; 96% use PCs most frequently; and 61% of TH members who received training said that it was very useful, 11% think it was good, 11% think it was mediocre and 11% think it may need some adjustments.

It was clear from the survey results that after attending the training program, users began doing other things such as general browsing, exploring the web, and using search engines to find information, rather than using the internet exclusively to for personal entertainment such as listening to music. Through the training program, TH



users are developing many information literacy skills, developing recognition of need for information, an ability to locate information (using search engines), and evaluating, using and sharing the information.

The presentation offered some interpretation of the above mentioned survey results, and

spoke of the current barriers and limitations and the need to expanding the size of the TH Library, upgrade and acquire new computer software and hardware, and the need to examine innovative approaches to create the next generation of library services to this special group of users especially children and youth.

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# TANZANIA

## DEVELOPING ICT SKILLS AND TOOLS FOR EMPOWERMENT FOCUSING ON YOUNGSTERS, WOMEN AND REFUGEES, THROUGH THE ONEVILLAGE RURAL COMMUNITY TELECENTRE (SANAWARI, ARUSHA)

### TITUS TOSSY

<http://www.kukaye.tk>;  
tmtossy@yahoo.com

### EXECUTIVE SUMMARY

The project took almost 8 years to become true through his dedication and efforts for harnessing the potential of ICTs for community development. In 2002 the community Telecentre was officially opened with 4 old personal computers.

The project has trained 167 people (47 women, 52 youngsters and the rest are men), serving two districts (Arumeru and Arusha District) with a population of 799,526 (among whom 392,180 are male and 407,346 are female). The project has managed to reduce the economic and digital gap between marginalized groups, rural and urban, through embracing ICTs as a means of providing internet access and education for community development.

### TELECENTRE ESTABLISHMENT

In the year 2002, OneVillage Rural Community Telecentre was officially launched in Arumeru District (for the purpose of serving two districts, Arumeru and Arusha district) under the personal initiative and sponsorship of T. Tossy, an orphan. The main Goal was to bring ICTs as an enabler of Community development closer to hands of people (especially rural areas and marginalized groups) and let them exercise and use it. I believe that "Educating a woman is educating whole nation" has used this principle and has materialized. Hence, all efforts has been put to educate and train a woman, girls, refugees and marginalized groups to use ICT for their development. Mr. Tossy is a strong woman Development activist with great vision to serve his community.

### ABOUT ARUMERU AND ARUSHA DISTRICTS

The district has a population of 799,526 (with 392,180 and 407,346 men and women respectively). The main economic activities are farming, livestock keeping and trading. More than 75% of people are living in rural areas, for which more than 47% are women and youngsters. Internet connection is very expensive here (for ours I have lined a wire 4 km with more than 5 hubs between)

### SERVICE OFFERED

The following are the services being offered by this Telecentre: computer Training (more than 67 women and youngsters has been trained), Secretarial services, IT Consultancy and Internet and Emails. We plan to establish the following services if we will have funding from self-motivated people and groups: Photocopying (seeking photocopy machine), Scanning (seeking Scanner), CD Burning (seeking CD-Burner), Video hire/ shooting/show (seeking video cameras, etc.), Fax and Telephone (seeking telephone and fax machine, plus installation costs), Conference room (seeking funds to hire big building).

### USERS OF TELECENTER

The users of the Telecentre are: children, youths, women and adults. But there is great gap between men and women who have access to the center.

### TELECENTER MANAGEMENT

The management of the Telecentre is well constructed which consists of: LSC-Community Level (such as Government representative, Farmers and livestock keepers, Business people, Academicians/ professionals, Women groups) and PMC-National Level (consisting Representative from respected donors, LSC Chairperson & Project Founder/manager).

### PROJECT SUSTAINABILITY

At the beginning the sustainability of the project was very difficult due to internet cut off. As a result, founder to keep investing the funds from his pocket. But after few months the sustainability is assured for running of the project and the workers are paid

### CHALLENGES

Some of the challenges faced in implementation of this project are: Community Resistance to Changes, Poor telecom infrastructure (internet connection), Constant power cut off, Language barriers, Poor facilities I have and in low quantity, Few computers while we have large population, Support form the local and international level and Small room and no conference room to facilitate our training.

### SUCCESS

We are proud that 78 youngsters out of 120 trained has secured employment and the rest has self-employment, 49 women out of 89 trained has secured employment and the rest has self-employment and All of the men secured employment, Many community NGOs use our Telecentre for printing and

typing their works and for communication, It has accepted great attention from community level and all are asking to train their kids and family members, Received more than 26 requests from different regions requesting us to establish similar projects (emphasize to be managed by women).

### FACTORS LEAD TO SUCCESS

Some of the factors lead to success are: Accountability/Good Management Team, Community Participation & women ownership, Proper accounting systems, Good policies, Services should address community needs, Use of volunteers from local community and international community, Easy access to services, Good Customer Care.

### WHAT NEXT?

The founder through the established charity, and through support from different people and groups, expect to establish community Telecenters, much managed by women and youngsters, ICT Education for women and youths, ICTs workshops and seminars for women, Training and conferences centers and Establishment of ICT community Trust Fund.

### IN CONCLUSION

I believe that “Educating a woman is Education the whole Nation” and “It is not the strongest species that survives or the most intelligent ones, but the ones that are most responsive to changes”.

The orphan believes that “Together we will reduce the digital divide” hence requests the international and local aspirants to join him through material and financial donations.\_

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# SOUTH AFRICA

## COMPUTAINER HIV AWARENESS TRAINING KIOSKS

### MARK VAN DER MERWE

Managing Director  
CompuTainer Pty Ltd,  
South Africa

Faced with the challenge of 5.2 million HIV infected people and a population of 27 million in the age group of 15-49 years of age it became very apparent that current methods of awareness such as peer education were facing a massive capacity issue in South Africa. With approximately 250,000 people a year facing peer education it would still take us 109 years to educate the target group on HIV, AIDS, TB and Malaria.

With this in mind CompuTainer set out two years ago to develop a model that not only would give comprehensive education but also incorporate a model that would provide employment at the same time.

The CompuTainer HIV Awareness Training Kiosk is an innovative way to run mass training on HIV, AIDS, TB and Malaria. Topics covered during the training include:

- What is HIV and AIDS
- How HIV Infects
- How HIV doesn't infect
- Sexually Transmitted Diseases
- Condoms
- Safer Relationships
- HIV and AIDS and Nutrition
- Antiretrovirals
- Tuberculosis
- Malaria

The interactive kiosks can be used to train over 1,000 people a year at costs far less than any provider can produce today. At a maximum cost of R34,000 (\$5,420) per kiosk, deployed, supported and maintained in any geographic location within Southern Africa, one can train in excess of 1,000 people for the cost of only R34.00 (\$5.42) each.

With the kiosk training materials updated every 6 months, subsequent years reinforcement training is lowered to a maximum cost of only R10.00 (\$1.60) per person due to the yearly maintenance fee of only R10,000 (\$1,600).

CompuTainer has also recently released an interactive CD version of the training for organizations and companies that have PCs already. With this high quality content now available on interactive CD we give the user permission to run the CD at the offices and should they have access to PCs at home then the license extends to home use thereby doubling the return on investment in HIV, AIDS, TB and Malaria education. The CDs are priced on volumes and range from R266 (\$43) down to R12 (\$2).

With monies allocated from training budgets, corporate responsibility funds and marketing funds, the cost of implementing the CompuTainer HIV, AIDS, TB and Malaria Awareness Training Kiosk and/or the CompuTainer Interactive HIV, AIDS, TB and Malaria Training CD, is affordable even to the smallest of companies in Africa. We believe that the CompuTainer HIV Awareness Training Kiosk is simply the best way to begin your HIV and AIDS education programs in your company or community. Language releases are based on the following schedule:

English: Currently shipping

French : Release date 16th September 2005

Portuguese: Release date end October 2005

Arabic - Release date mid December 2005

For contact please use one of the following methods. Telephone: +27-73-355-4191.

E-mail - mark@computainer.com

■

# AFGHANISTAN

## REACHING RURAL AFGHANS WITH INFORMATION AND EDUCATION BY SATELLITE

### ABDULLAH FAIM

Equal Access, Radio Danesh,  
National Solidarity Program

### MUSTAFA BABAK

Technical Manager  
Equal Access, Radio Danesh,  
National Solidarity Program

### STRENGTHENING RURAL GOVERNANCE BY ESTABLISHING A COMMUNITY LEVEL STRATEGIC INFORMATION SYSTEM

Equal Access has been funded for this project by UNAMA, DFID, and The United Nations Foundation, initiated in July, 2004. The project calls for distribution of satellite radios, broadcasting on the Equal Access channel of WorldSpace Satellite, to elected Community Development Councils of the National Solidarity Program. The NSP is the largest development initiative in Afghanistan, currently working with 7,000 rural villages. This has presented significant communications challenges for the Ministry of rural Rehabilitation and Development, as villages are in very remote places with largely illiterate populations. The program content:

- Provides information about the NSP that assists villagers in developing their

villages, as well as other general educational programs geared to family health, women's programs, livelihoods and business development, farm information, narcotics curtailment, and other awareness-raising programming.

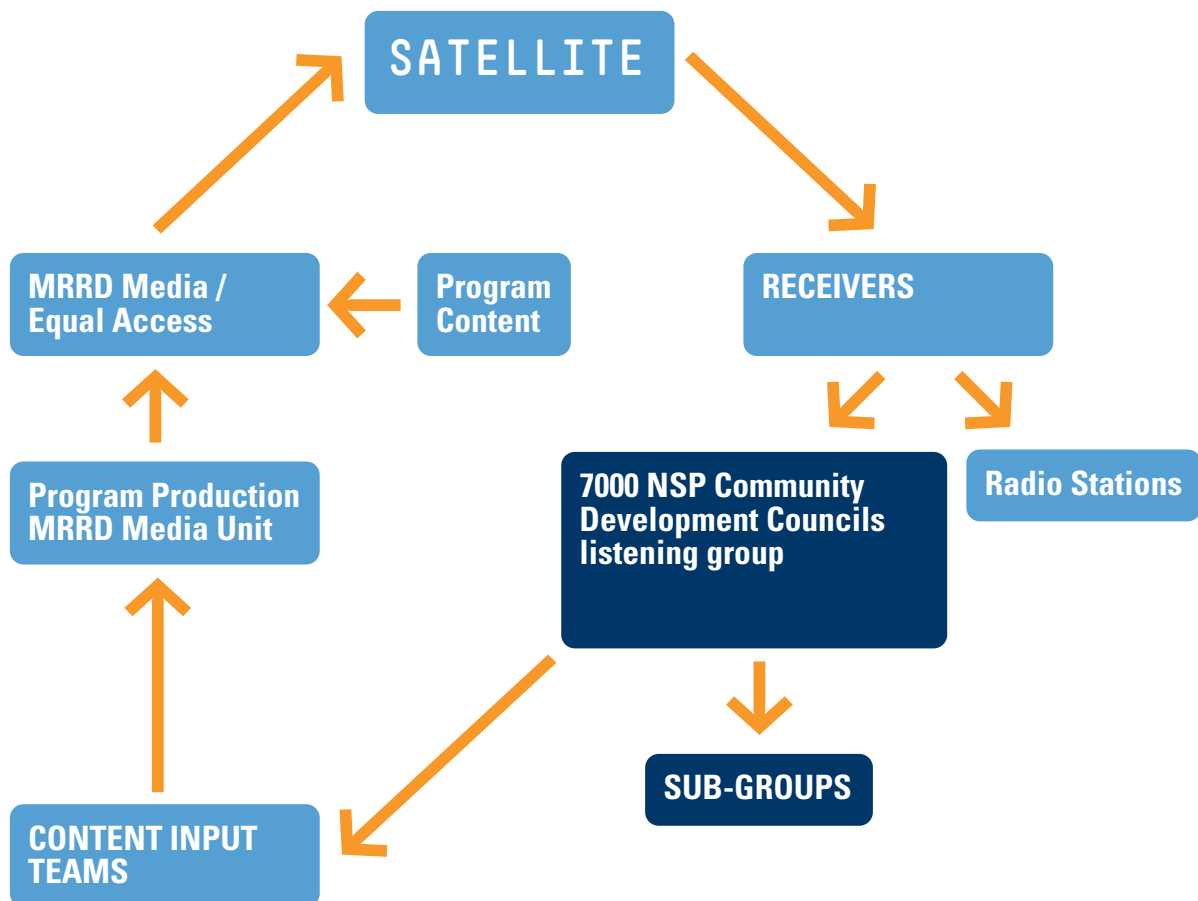
- Provides education and training programs to villages for distribution to teachers, police, and other public officials or organizations.

### IMPLEMENTATION STRATEGIES AND CHALLENGES:

The NSP is implemented by 22 International NGOs, and distribution of the equipment was accomplished through this network. The Equal Access model works with an interactive feedback loop that is best accomplished through relationships with implementing partners.

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EQUAL ACCESS SATELLITE RADIO  
NATIONAL SOLIDARITY PROGRAM COMMUNICATIONS MODEL  
FOR THE MINISTRY OF RURAL  
REHABILITATION AND DEVELOPMENT (MRRD)



# INDIA

## NAMMA DHWANI FROM THE PROGRAM ICT IN THE HANDS OF POOR

**ASHISH SEN**  
Director Voices

**SAVITHRI SUBRAMANIAN**  
UNESCO New Delhi Office

### INTRODUCTION

Located in the village of Budhikote in Karnataka, about 100 kilometers from Bangalore, Namma Dhwani is a partnership between the poor farmer community, NGOs MYRADA and VOICES, and supported by UNESCO. It comprises a radio studio, with an audio production centre where the local community produces and cable casts their own radio programs daily into the houses of the village thought a local cable network. Complementing the cable initiative, community narrowcasting is regularly carried out which reaches a cluster of 35 villages in the area. A telecenter featuring computers and other multi media tools enables web browsing and computer skills learning.

### TIME LINE AND GROWTH

1) Training and Sensitization: Between April 2000 and September 2001, volunteers from the community, selected by Self Help Groups working in the area, were trained in radio programming and production, in collaboration with AIR. Many of these programs were broadcast on AIR and narrowcast at community meetings.

2) Community Participation & Management: In September 2001 the Namma Dhwani Audio production Centre was operationalized with UNESCO support.

Managed by the community, the centre produced audio programs on local issues such as agriculture, water problems and health issues. The programs were narrowcast through tape play back as well as a loudspeaker narrowcast during the weekly market day, when people from surrounding vil-

lages visited Budhikote.

3) Community Ownership: In May 2002, the relevance of the loudspeaker narrowcast was picked up by the local school. Programs made by the school children were cable cast into the senior class rooms. The community members recognized its potential and articulated the need for household access to cable. Consequently, in March 2003 the first phase of cabling from the audio centre into homes was put in place. Programs comprise a mix of information and entertainment and include bus timings, market prices, indigenous medicine, agriculture, health and issues related to the panchayat Community management and ownership at Namma Dhwani is exemplified through its management committee who are responsible for:

- 1) Supervising the running of the station - on a day to day basis, the station is run by three studio managers with voluntary assistance from the village youth
- 2) Evaluating the programming.
- 3) Recruiting volunteers, especially women and girls.

### TECHNOLOGY -HARD-/SOFTWARE

Namma Dhwani represents a mixed media model that combines audio, cable and computer technologies. Radio programs are cablecast daily to houses in Budhikote using an eight channel mixer, cassette and CD decks, microphones and a computer for digital editing. People listen to the service either through TV sets or specially modified radios with a jack to plug in the cable. Another connection takes the signal to the

high school about 1000 meters away where students listen to their own programs for two hours a week using a speaker which is positioned at the front of the class room. In three neighboring villages, loud-speaker broadcasts that comprise a mix of local and live presentations take place daily using speakers that are strategically located on buildings or trees. These originate at the local information resource centres. Internet connectivity remains fragile, although cell phone connectivity through a reliance cell phone has enabled access to the Internet. Given this, offline internet activity is carried out through websites that are copied in Bangalore. These are stored and delivered to the centre using portable USB drives. Similar content is also gleaned from a variety of CD based media. Local information that ranged from market prices to health and income generation activities are packaged using MS word, Powerpoint and Excel.

### SUSTAINABILITY

**Training:** Namma Dhwani has from its inception aimed at developing training resources within the community to facilitate community participation, management and ownership. Today this resource has actively engaged in training other communities in audio programming and production.

Training both in radio and loudspeaker production and narrowcasting is provided to NGOs, CBOs and communities especially Dalits and People with disabilities. Groups who have trained with Namma Dhwani include NGOs like the MS Swaminathan Foundation, Youth Democratic Forum, Green Foundation, National Institute of the Visually Challenged and ActionAid India partners.

Computer training is also provided at a nominal fee and is generally taken by the local youth in Budhikote and nearby villages. The courses cover computer basics and MS Office. Modules on basic accounting for the Self Help Groups and use of regional fonts and softwares have now been added. Last year Namma Dhwani started

paid certificate courses in association with a computer institute in Bangarpet town situated some 16 km away.

**Renting Equipment:** The computer centre is popular for scanning and printing as well as recreational computer usage. Web browsing and e-mail usage are other mechanisms which will be shortly used as income generating mechanisms.

**Documentation work:** Namma Dhwani is positioned as the Community Information Arm of the Jagruthi Resource Centre and three other resource centres facilitated by MYRADA. Audio documentation and equipment hire provides income generation to Namma Dhwani

**Community Fund:** Namma Dhwani community fund has also been set up to which the local community contributes. This will gradually be refashioned to promote a membership model.

**Volunteers:** Volunteers are critical in sustaining the life force of the station. In Namma Dhwani, the management committee facilitates the process of building a volunteer base. Each member of the committee ensures that volunteers, especially women from their self help groups participate in producing radio programs at the centre. Currently, of the 28 volunteers who help, 13 are girls.

### WINNING HEARTS AND MINDS

Since its inception, Namma Dhwani has linked itself closely with issues related to governance and development. Health, Education and Income Generation programs are emphasized through the audio production centre.

These have enabled Namma Dhwani to link itself both with the local community and other players in civil society including the government.

The School Audio program has been approved by the Block Development Officer. Its popularity has now resulted in the idea being discussed in the other primary schools in Budhikote.

There have been other areas where Namma



Dhwani has managed to touch both the heart and the heads of the local communities as well as the local government. The examples below reinforce the point.

1. Namma Dhwani's monitoring and cable casting of the recent gram panchayat elections evoked considerable community participation. It also reinforced transparency. A local reporter, Nagaraj went to Bangarpet with a mobile phone to monitor the counting of votes. He gave reports every fifteen minutes which reached the speaker phone placed in the radio station. A microphone was placed near the phone and thus every word Nagaraj spoke was cablecast. The reception was tremendous says Nagaraj, "people kept calling the Namma Dhwani Centre till three in the morning".

2. In June, 2003 Budhikote was grappling with drought. The water pipes had dried up and there was no water for eight days. Despite protests from the local community and promises from the authorities nothing happened. Finally, Nagaraj decided to record the sentiments of the community "Women complained and shouted into the mike and vented their anger at the village chief's indifference." The tape was played that evening through the cable centre. The message struck home, the pipes were repaired and the water supply restored.

3. Another significant intervention was in the area of disabilities. While subsidized public transport was guaranteed for people with disabilities, the community was informed that in order to be eligible they

had to fill a form which cost Rs 100. Namma Dhwani found this to be a racket where middlemen were making money. It cable cast the correct information and the bubble was burst.

Health, income generation, culture and education are other popular programmes of Namma Dhwani. The school audio initiative ensures that educational programs (many made by the children) are cablecast regularly to the nearby government school. Namma Dhwani's program about indigenous medicine is another popular program. Addressing minor ailments like cold, cough and fever, it has also strengthened the cause of indigenous medicine.

About 1.5 km from Budikote lies the Dalit village of Ambedkar Colony which is connected to Namma Dhwani by loudspeakers. It has low media penetration levels, low knowledge levels about diseases like AIDS, Tuberculosis and low knowledge levels on information about their elected representatives. Through loud speaker narrowcasts, Namma Dhwani provides awareness to the local community about these issues.

#### CHALLENGE AHEAD

While the current mix of cable and loud-speaker narrowcast have impacted the lives of the community, community radio, legislation would enable Namma Dhwani to go to scale and cover a cluster of villages in the region.

■

# CHINA

## INITIAL EXPLORATION ON THE TRANSITION OF RURAL DISTANCE EDUCATION MEDIUM TO DIGITAL APPROACH

### ZENG YICHUN

President, Central Agricultural Broadcasting and Television School (CABTS), China

The China Agricultural Broadcast and Television School (CABTS) were set up in 1980. CABTS' work in agricultural distance education is strongly supported by governments from national to local levels, and is enthusiastically received by farmers and local leaders. CABTS operates in a cost-effective manner, reaching large numbers of students across vast geographic areas in rural China. The School is dedicated to serving rural areas, agriculture and farmers. CABTS provides education and training services to diverse audiences, including youth, grass-roots leaders, agricultural technicians, women, ethnic minority group members, and farmers ranging in education levels from those who cannot read or write to those working toward university degrees.

CABTS is governed by a Leading Group whose members include the Ministry of Agriculture, Ministry of Education, Ministry of Finance, Ministry of Organization, State Development Planning Commission, Ministry of Personnel, Ministry of Social Security, State Family Planning Commission, State Forestry Administration, State Administration of Radio and Television, China Science and Technology Association, Central Committee of Democracy Development, China Youth League, All China Women's Federation, All China Association of Industry and Commerce, Poverty Alleviation and Development Office of the State Council and the China Agriculture Association. This broad support for CABTS has strengthened the leadership and coordination of agricultural education through broadcast and television.

CABTS functions through a five-level administrative system having one Central

School, 38 Provincial Schools, 330 Prefecture Schools, 2,408 County Schools, and 23,000 Township Teaching Stations. CABTS employs a total of 46,000 full and part-time staff. CABTS is now the largest agricultural distance education system in the world, with annual enrolments of over one million students.

CABTS offers five major types of education and training: short courses in applicable agricultural technology, Green Certificate training, secondary diploma education, professional certificate training, and college degree education.

At present, CABTS offers courses, covering most areas of agriculture under the categories of crop cultivation, livestock, economics and management, agricultural engineering, forestry, agri-ecology, rural home economics etc.

CABTS teaches its students both through distance education media and face-to-face. Distance teaching is conducted through a range of media, including radio, television, audio and videotapes, video compact discs (VCD), and print materials. The teaching programs of the CABTS are broadcasted regularly by national television and radio networks (China Central Radio Station and China Central TV Station). At the same time, the teaching programs are broadcast by broadcasting stations and television stations at provincial, prefecture, and county level. Students may listen to and watch the programs and study written textbooks and supplementary materials at home. Or they can be organized by the county branch schools or township teach-

ing stations to listen to or watch teaching programs in tapes, videotapes and VCD that are made and distributed by the Central School or provincial schools. Face-to-face teaching at the local level supplements distance teaching provided by higher levels in the CABTS system.

In recent years, CABTS started up its pilot projects in using digital means to deliver distance education. It officially launched its “China Rural Distance Education Network” in 2000.

With the financial support of the government, it started to build its satellite-based distance education system in 2001, and at present there are over 60 receiving stations in the country and a live broadcast studio in Beijing. Another 300 receiving stations are under construction and be completed by the end of this year, which will cover most branch schools at prefecture level and some at county level.

With the support of the Food and Agriculture Organization of the United Nations, CABTS in 2002 initiated the project of “Strengthening Distance Education in Agriculture and Rural Development Using Digital Technologies.

**The specific objectives are:**

- To enhance the institutional capacity of CABTS to incorporate digital delivery methods in its provision of education for agriculture and rural development;
- To enable CABTS’ staff to effectively adopt new training methods for farmers and other rural target audiences;
- To improve the institutional capacity of CABTS to meet the learning needs of farmers and other rural target audiences.

**The main outputs of the project are:**

- To develop a strategic plan entitled CABTS Strategic Plan for Digital Delivery of Education for Agriculture and Rural Development.
- To conduct a staff training programmes:
  - a) senior management
  - b) managers and administrators on “Leading and Managing Distance education for Agriculture and Rural Development in China”,
  - c) instructional designers and production technicians for Learning materials.
  - d) teaching and learning in a digital environment
- To develop new teaching materials in digital formats. The four subjects are selected as new instructional materials for development:
  - Integrated use of biogas
  - Home economics service provider
  - Non-pollution tomato production technologies
  - Non-pollution cucumber production technologies

The project also produced minority language versions of the following materials. High efficiency production of new and unique vegetables in sunshine greenhouse (Uygur):

Pest management of pear trees (Uygur),  
Cattle production (Kazak)  
Pest Management of Tomato (Tibetan).

- To establish an online learning platform.

The most effective approach to deliver training resources to rural people is the “Blended learning model”, as such to prevent the new educational technologies from creating barriers to education for rural people.



# Chapter VI.

## Synthesis

# REPORT ON ICT FOR CAPACITY-BUILDING: CRITICAL SUCCESS FACTORS

**ELIZABETH LONGWORTH**  
Director Division of Information  
Society, UNESCO

## A) DATE, PLACE AND ORGANIZERS

1. The Conference "ICT for Capacity Building: Critical Success Factors" was held at UNESCO Headquarters in Paris, France, from 11 to 13 May 2005. The Conference was recognized as one of the "thematic meetings" of the World Summit on the Information Society (WSIS).

2. The Conference was organized by UNESCO and the Club of Rome in relation to Chapters 4 "Capacity building" of the "Declaration of Principles" and the "Plan of Action" respectively, adopted by WSIS in December 2003 in Geneva, Switzerland, and aimed in particular at contributing to the Chapter 4, paragraph I I of the WSIS Action Plan stating that "Everyone should have the necessary skills to benefit fully from the Information Society. Therefore capacity building and ICT literacy are essential. 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".

3. The Conference was held under the patronage of leaders and decision makers from governments, international organizations, private sector and civil society.

## B) PURPOSE OF THE CONFERENCE

4. The Conference aimed at discussing the use of information and communication technology (ICT), including satellites, for capacity building, and its key strategic role for achieving the UN Millennium Development Goals (MDGs) and for building knowledge societies. Its main focus was on new delivery methods of formal learning and

other skills development. It gave particular attention to the special needs of marginalized groups in areas that are un reached by the traditional education systems but could be given access to new forms of education delivery through satellite technologies.

5. The purpose of the Conference was to:

- Identify prerequisites and success factors for capacity building using ICT;
- Collect and disseminate testimonies and case studies from around the world on how to make a quantitative leap in development by using ICT;
- Give IT industry a platform to present technology that is both appropriate to the development environment and meet the needs of emerging markets.

## C) PARTICIPANTS

6. The meeting was attended by more than 320 participants from over 70 countries. Links were established via satellite facilities to twelve centres affiliated with the Global Development Learning Network (GDLN) in Africa (Senegal, South Africa and Tanzania), Asia (Afghanistan, China and India), Arab Region (Egypt, Jordan and Kuwait) and Latin America (Argentina, Brazil and Mexico). Entirely web cast, the Conference brought together local leaders, community educators in learning, members of Permanent Delegations of Member States to UNESCO, and representatives of IGOs, NGOs and the private sector.

## D) STRUCTURE OF THE CONFERENCE

7. Valdas Adamkus, President of Lithuania, Janis Karklins, President of the World Summit on the Information Society Preparatory Committee, Raoul Weiler, President of the

Brussels-EU Chapter of the Club of Rome, and Koïchiro Matsuura, Director –General of UNESCO addressed the Opening Ceremony.

8. Four strategic sessions on "Policy making and critical success factors", "Technology partnerships for life long learning in developing countries", "Sustainable solutions for capacity building" and "Low cost technology solutions for capacity building" alternated with the presentation of case studies live from Latin America, Arab States, Africa and Asia.

9. During the strategic sessions, development experts, academics, and representatives from industry, non governmental and intergovernmental organizations evaluated the impact of the current investment in ICT projects, debating the key issues of sustainability, impact monitoring and evaluation, infrastructure solutions, human capabilities, appropriation of technologies and content by local communities, and the social dynamics of these projects.

10. The conclusions of the conference were presented in final wrap up session by Elizabeth Longworth, Director of UNESCO's Information Society Division,

11. HRH Prince El Hassan bin Talal, Jordan, President of the Club of Rome (via video-recording), Raoul Weiler, President of the Brussels-EU Chapter of the Club of Rome, and Abdul Waheed Khan, Assistant Director General for Communication and Information, UNESCO addressed the closing ceremony of the Conference.

## CONCLUSIONS

*"We need to redesign learning around what is effective rather what is convenient"*

*"It 's not just about knowledge, but it is about building communication spaces"*

*"Vocational skills have a new value in ICT world"*

*"We don't have 109Years to train people on prevention of HIV/AIDS"*

*"Content is no longer king community is sovereign"*

*"What matters are people and communities, process, not the products"*

## A) CONTEXT

12. Capacity building today is subject to a variety of developments which can be summarized by new literacies, new pedagogical paradigms, new forms of knowledge with an strong emphasis on the education of teachers as knowledge transmitters and the need to "un-learn":

- New literacies include technology literacy, information literacy and media literacy and new forms of learning paths, particularly of younger generations and their new forms of memory organization and information management, largely driven by new technologies;

- The new pedagogical paradigms are characterized by the phenomenon that learning is a constructive process that increasingly takes place in non formal institutions and in a dialogue. New flexible learning environments emerge which largely cooperate with ICT and media institutions while keeping educational autonomy;

- Knowledge is increasingly transdisciplinary and contextual, and needs to be created through application ('learning by doing'), thereby reflecting local/regional realities;

- These developments result in an increased emphasis on teacher education, which is conducive to improving the status of teachers and strengthening professional education;

- The new environment requires attitudes of "un learning" including de activating obsolete practices and authoritarian approaches, which believe in absolute certainties.

## B) CRITICAL SUCCESS FACTORS

13. Within this overall context, the Conference identified twelve factors that are critical for the success of projects in the area of ICT and capacity building:

### I. Clear vision:

Projects should take a humanistic approach, focusing on people rather than on technology.

### II. Holistic and integrated approach:

Projects should be aligned with national and regional policy objectives to optimize benefits. They should also take advantage of economies of scale of sufficient consequence to lower the costs of services and technologies (e.g. bulk buy of bandwidth, consortia approaches to similar initiatives, learning objects repositories, one platform combining applications to share capacities, education, public services, entertainment and business) while responding to the specific needs of local communities.

### III. Local ownership and community participation:

Projects must involve local communities to get their commitment, build local entrepreneurship and enhance local know how such as on crafts. Volunteers and NGO community should also be involved in projects to bring their expertise in delivery of practical activities and local knowledge and networks.

### IV. Develop not only skills but state of mind and attitude:

Projects must create a dynamism among all actors involved to develop imagination, motivation and the desire to be productive, and to build a "culture of innovation" based on the familiar and friendly use of technology. The role of inspiring youth is essential in building this cultural identity.

### V. Government support:

Governments must be prepared to think innovatively (e.g. broadband models, solar energy, wireless, PDAs, mixed technologies), and identify as principal priorities the development of basic infrastructure requirements such as energy supply and telecommunications using bundling demand models (e.g. satellite platforms) to be used for multiple applications and services.

### VI. Multi stakeholder partnerships:

Multi stakeholder partnerships based on trust and a shared vision are essential to create impact and to build scale so that knowledge can be leveraged across the world. Networks should be built around the projects with active participation of private sector for support and input into the reform process.

### VII. Flexibility to enable innovative solutions:

Flexibility and innovation require changes in attitudinal approaches and state of mind in order to be able to meet the different levels of sophistication of the users.

### VIII. The need of the appropriate technology environment

Innovative solutions need flexibility in the choice of technology and an open regulatory environment (e.g. open standards, facilitating access to licenses and mixed technology approaches). Technology solutions should be easy to deploy and maintain ' and be upgraded continuously to develop skills and abilities to make use of more sophisticated technologies.

### IX. Localization:

Projects must be adapted to local communities and contextualized taking account of local competencies (e.g. in terms of language), curricula and content should be localized.

#### X. Development of human capacities:

Project methodology and approach should be geared towards building capacity, specifically with the partner organizations aimed at promoting local knowledge and skills transfer. In this way a project should:

- Adopt continuous approach of the acquisition of skills where people are training themselves;
- Train educators, including teachers;
- Pay special attention to inclusive policies involving women, youth and marginalized groups;
- Ensure training in policy advocacy and coordination expertise;
- Pay special attention to transfer experience and knowledge to young people; and
- Understand the power of networks and identify within the community “change agents” that can help implement the projects, provide special training, support teachers, and become a most reliable support of most powerful influence.

#### XI. Involvement of women:

The involvement of women is essential for building trust in projects. Educating a woman is also educating her family and the families to come.

#### XII. Sustainability:

Projects must become integrated in the life of community to be sustainable. That means that projects should:

- Identify key stakeholders in the community and ensure that they are involved in the project as a way of ensuring economic sustainability;
- Deliver recognizable value and prove itself;
- Work with a core group which multiplies; IGOs leave; and
- Ensure local counterpart teams so that the knowledge and skills stay behind after the
- Offer bundling services and become a hub for a range of community activities;
- Have a high quality project management

#### XIII. Monitoring and evaluation

Projects should include monitoring and evaluation mechanisms by identifying intermediary and final outcomes that can be measured continuously even using ICT-based tools.





**Chapter VII.**  
Closing Address

## CLOSING MESSAGE

His Royal Highness Prince  
**EL HASSAN BIN TALAL**  
President of the Club of Rome

In spite of the higher standards of education and globally networked information, I think the challenge that we face here today is how a growing number of people are protesting the failure of our governance. I say this in the context of the Commission for Globalization and Democracy, the Helsinki Process with which I am directly associated. And I would like to point out that global problems of governance include poverty, social instability, sanitation, water management, health care; a range of issues where degradation of good governance means the degradation of our environment, both human and physical. And it is a paradox, I suppose, that the breakdown of communication also comes at a time of advanced networking of communication skills.

So let us ask ourselves a question as the world rallies with the UN's Millennium Development Goals. Is a conference like this going to highlight truths about the reality and challenges that the world faces today? Can we summon a moral global commitment to bettering human conditions? In the words of Mahatma Gandhi: "if you want something really important to be done, then you must speak in terms of not only satisfying reason but also moving the heart". The appeal of reason or the passion of moving the heart brings to my mind inner net not only internet but the inner understanding of man.

The information age as we know is fuelled by two major components: information and communications technologies on the one hand, globalization on the other. Both of which have dramatically affected societies in both developing and developed countries. Technological advancement of communication is undisputed, but has this potential provided the participation for all in its accessibility?

As in the statement of the Club of Rome to the World Summit on Information Society in Geneva 2003, we emphasized that emerging knowledge-society itself adds new challenges. And there are tremendous opportunities of course involved but enormous risks as well. Advanced technologies, especially information and communication have created the infamous digital divide. The info-rich are getting richer and the info-poor poorer. The question is will these advanced tools for development reach the poor and underprivileged, or will they simply become another major factor in increasing the digital divide?

All too often, the troubling reality has been persistently a growing disparity between the 'haves' and 'have nots'. So many places seem to be floundering hopelessly and helplessly between poverty and disease, violence and public failings. Again, the failure of governance, in spite of these competing priorities that urgently need to be addressed, the importance of culture and human dignity that would ultimately generate better societies, is sidelined as a luxury.

I feel what is needed is not track one, governmental action, or track two, civil society, as we know there is nothing global about a global civil society, but possibly a track one and a half which makes UNESCO's partnership with the Club of Rome so important. We addressed this issue during our last meeting when we said culture should be given equal opportunity to the baskets of security and economy. Culture should not be an after thought. The forces that threaten the breakdown of order usually stem from a crisis in identity, hence the importance of the cultural crisis. Can we move towards a cultural participation? It is important to develop shared solutions across cultures, supra-culturally if you will to transform the omnipresent culture of war to a

culture of peace. To reconstruct education psychologically.

It seems to me that in these highly interconnected and intercommunicative times we do have a chance to enhance inter-cultural conversation, interactive conversation, where our mutual ability affects each others' lives.

I feel that this positive impact, the role of the human element in development cannot be divorced from the notion of investment in human capital via education. Apart from being an effective change, education as a value and as a passion provides a possible bridge to a better world by enabling individuals to help themselves out of poverty and ignorance. And in this context, I would like to emphasize the importance not only of illiteracy but of all forms of illiteracy including legal illiteracy as we create citizenship from the bottom up.

The role of the media is crucial only in alliance with the power of ideas. That important marriage of the media and of academia. It is in this context that I look forward in June of next year to hosting in Jordan the World Congress of Middle East Studies, the four networks for Middle East Studies in the western hemisphere and subsequently hosting the network of Middle Eastern studies in the former Eastern bloc.

And I feel that prejudices can be addressed in the context of this positive alliance. I feel that the Socrates, Minerva and Erasmus programs have addressed the subject of putting yourself in the shoes of the other. And it is in this context that I'm happy to announce MECA, Middle East Citizens' Assembly, where last March we were able to host citizens from countries including Palestine, Turkey, Iran, Azerbaijan and Israel attending either as participants or as observers. The aim of course of such civil society networking is to bridge divides and in addition to encourage the emergence of transnation-

al civil society, supranational civil society.

In addition I would like to emphasize the importance of working for something, not only against anti-Semitism, against Islamophobia, against discrimination, but for a racial equality index, culturally for a Centre for Mediterranean Humanities and I am delighted to announce that a centre of that name has been announced only a few weeks ago as an extension of the Parliament of Cultures that I discussed with my friend the late Yehudi Menuhin many years ago as I did with Walter Sisulu in South Africa.

I feel that individuals of all races and faiths have a right to developing an understanding of the other not only in the present but also in the context of literary texts, and for that matter it is important to develop the encounter of Mediterranean, Iberian and Latin American cooperation.

But I would like to remind you that events come and go. In 1978 we met in Buenos Aires calling for the development of what we then called a database of South-South cooperation. We met under the auspices of UNDP and today we are no closer to developing a knowledge-based society. And I think that what is important in 2005, marking as we do the 35th anniversary of the Helsinki Final Act, that we are no longer closer to a vision of multilateral action; unilateralism is still the order of the day.

In a knowledge-based society, in a wisdom-based society to which we aspire, I do believe that sharing of information, sharing of knowledge and indeed interactively developing international institutional structures or what we call capacity building, all of this has to be updated from the family to the concept of World Governance. It is this interaction which I seek to promote through this valuable discussion in Paris today, and I thank you for giving me the opportunity to address you on this topic.

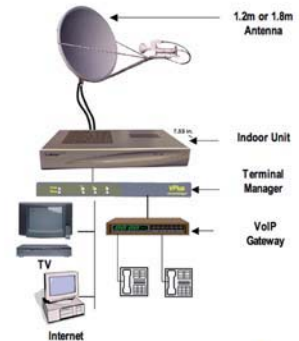
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# SATELLITE APPLICATIONS

**FERDINAND KAYSER**  
 President and CEO SES ASTRA,  
 Member of the Executive Committee  
 SES GLOBAL

## Typical Remote VSAT Terminal

- Single terminal can provide two-way access to full multimedia content package
- Remote terminal cost between US\$ 1000 and US\$ 5000, depending upon required configuration
- Terminal can service one user, a network, or act as a node for local wireless distribution
- Typical low-end Internet access costs start at US\$ 250 per month for 64kbit/s, to US\$ 1200 per month for 512kbit/s shared services



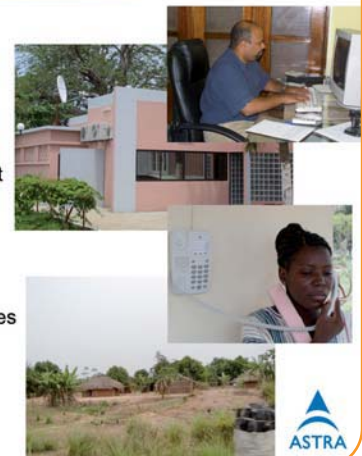
## Local Wireless Distribution

- Locally adapted wireless network can provide multiple-user access with coverage of up to 20 km from point of transmission
- Remote wireless access point cost of US\$ 650
- Integrates with VSAT terminal at wireless head end
- Reduces access cost per user by increasing the number of users served by each VSAT terminal
- Ideal for rural and urban services



## Africa and IP VSAT Networks

- Two-way IP VSAT services are well-established in Africa
- Satellite IP networks, combined with cellular technology, bring more new users into the telecommunications environment than any other technologies
- Local companies provide more added value, through innovative product design and high quality support, than overseas companies
- Product evolution ensures sustainable future for IP satellite networks



# SATELLITE APPLICATIONS

## ICT Capacity Building in Africa

- Need for an initiative to uplift all Africans economically and socially through better education
- Satellite can deliver free educational material:
  - TV Channel
  - Data material through Internet
- Local and international donors and corporate sponsors can join forces
- Education can be combined with telemedicine channels using the same platform



## Accelon and QKon – True African Companies



- African Companies providing integrated network services via Wireless and Satellite
- Services include Internet Access, VoIP, Virtual Private Networks, Managed network Services
- Both companies strongly supported by satellite operators and equipment vendors
- Each company manages between 700 and 1000 two-way VSAT terminals at any one time in multiple Sub-Saharan African countries
- Companies provide full engineering and logistic support
- Active networks in Angola, Ethiopia, Burkina Faso, Zimbabwe, Ghana and Nigeria
- There are many Accelon's and QKon's that can provide quality service at manageable cost



## Conclusions: Suggested Policy Approaches

- An environment conducive to this approach requires:
  - Easy access to licenses in a non-discriminatory fashion
  - Possibly special licenses for educational purposes
  - Project sizing that will ensure optimization of resources and rapid results
  - National and regional guidelines for projects to allow for alignment with national policy objectives
  - Willingness by parties to develop and participate in private/public sector partnerships

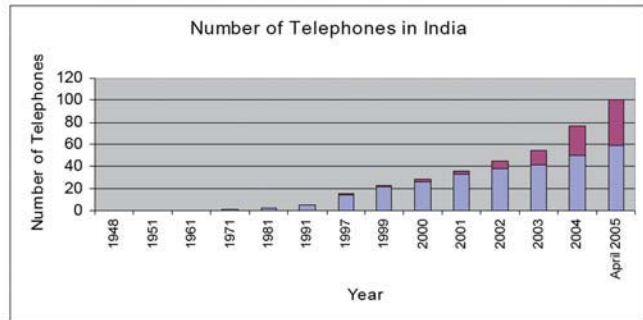


# CAN INDIA OVERCOME IT?

**ASHOK JHUNJHUNWALA**  
TeNet Group, Indian Institute of  
Technology, Madras-Chennai

Wireless has enabled India reach 1994 dream of crossing 100 million telephone lines in a decade

TeNET  
IIT Madras



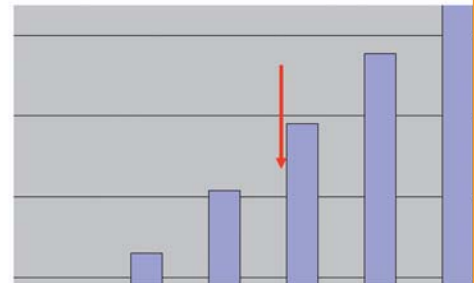
How has this happened?

can rural telecom grow in a similar manner?

## Mobile Market in India boomed

5 million ⇒ 50 million ⇒ 150 million ⇒ 400 million

- with handset price of US\$40 plus
- Infrastructure cost reduces to enable
  - service at 1.5 cents per minute
  - and ARPU of \$ 7 per month



- Need a different price point for the next 300 million rural subscribers

- Service at 0.5 cents per minute
- ARPU of US\$ 2 per month

## Fibre goes deep in India

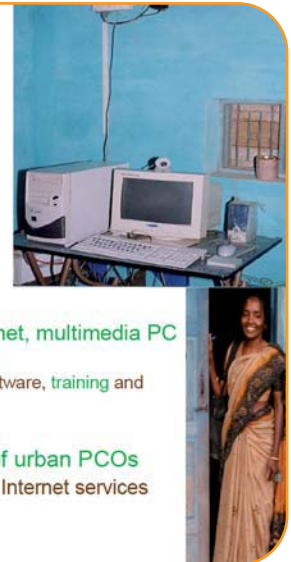


- BSNL, Tata, Reliance, Bharati, Railtel has fibre connectivity to most County (taluka: 15 Km radius) towns
  - Privatization has brought down prices drastically

## Innovative approach

### • n-Logue : A Rural Service Provider

- aggregate demand into a kiosk
  - and get an entrepreneur to drive it
- 
- US\$ 1200 per Kiosk providing telephone, Internet, multimedia PC with web-camera, printer and power back-up for PC
    - plus Indian language software, video conferencing software, training and maintenance
  - set up by a village entrepreneur on the lines of urban PCOs
    - provides telephone, stand-alone Computer and Internet services
    - needs US\$ 80 per month to break even



## Distributed Production enabled by Internet

### • Embroidery for Life

- Women embroiderers trained by designer entrepreneur in villages
- An emerging business model for entrepreneur and kiosk operator

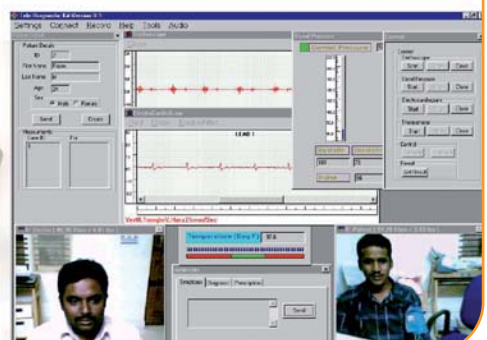
### • Bags for Life

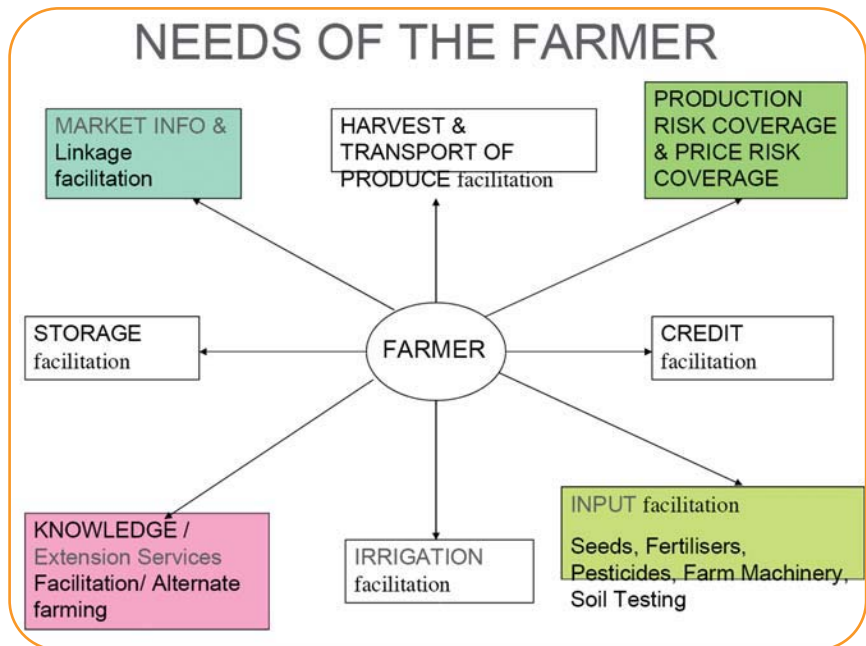
- Training in handmade paper bag, organizing production, quality control
- Quality products for the domestic and export market



## ReMeDi™ Tele-medicine solution

TENET  
IIT Madras





### As kiosks want a second computer

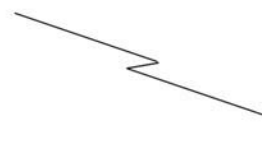
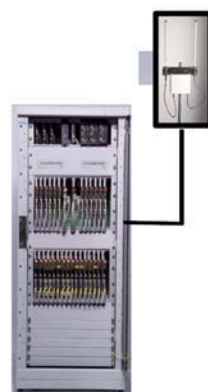


- **Introducing NetPC (Multimedia Network PC)**

- Connected to a PC Server on LAN
  - ▣ No virus, no back-up required
- Target price: US\$ 80 plus monitor



### Introducing Broadband corDECT



- **Broadband Wireless**
  - 256/512 kbps dedicated connectivity to each user



# THE US\$ 100 LAPTOP FREQUENTLY ASKED QUESTIONS

**NICHOLAS NEGROPONTE**  
The Media Lab Massachusetts  
Institute of Technology  
The OLPC non-profit Association

## WHAT IS THE \$100 LAPTOP, REALLY?

The proposed \$100 machine will be a Linux-based, full-color, full-screen laptop that will use innovative power (including wind-up) and will be able to do most everything except store huge amounts of data. These rugged laptops will be WiFi- and cell phone-enabled, and have USB ports galore. Its current specifications are: 500MHz, 1GB, 1 Megapixel.

## WHY DO CHILDREN IN DEVELOPING NATIONS NEED LAPTOPS?

Laptops are both a window and a tool: a window into the world and a tool with which to think. They are a wonderful way for all children to "learn learning" through independent interaction and exploration.

## WHY NOT A DESKTOP COMPUTER, OR-EVEN BETTER-A RECYCLED DESKTOP MACHINE?

Desktops are cheaper, but mobility is important, especially with regard to taking the computer home at night. Kids in the developing world need the newest technology, especially really rugged hardware and innovative software. Recent work with schools in Maine has shown the huge value of using a laptop across all of one's studies, as well as for play. Bringing the laptop home engages the family. In one Cambodian village where we have been working, there is no electricity, thus the laptop is, among other things, the brightest light source in the home.

Finally, regarding recycled machines: if we estimate 100 million available used desktops, and each one requires only one hour

of human attention to refurbish, reload, and handle, that is forty-five thousand work years. Thus, while we definitely encourage the recycling of used computers, it is not the solution for One Laptop per Child.

## HOW IS IT POSSIBLE TO GET THE COST SO LOW?

First, by dramatically lowering the cost of the display. The first-generation machine may use a novel, dual-mode LCD display commonly found in inexpensive DVD players, but that can also be used in black and white, in bright sunlight, and at four times the normal resolution—all at a cost of approximately \$35.

Second, we will get the fat out of the systems. Today's laptops have become obese. Two-thirds of their software is used to manage the other third, which mostly does the same functions nine different ways.

Third, we will market the laptops in very large numbers (millions), directly to ministries of education, which can distribute them like textbooks.

## WHY IS IT IMPORTANT FOR EACH CHILD TO HAVE A COMPUTER? WHAT'S WRONG WITH COMMUNITY-ACCESS CENTERS?

One does not think of community pencils—kids have their own. They are tools to think with, sufficiently inexpensive to be used for work and play, drawing, writing, and mathematics. A computer can be the same, but far more powerful. Furthermore, there are many reasons it is important for a child to "own" something—like a football, doll, or book—not the least of which being that these belongings will be well-maintained through love and care.

**WHAT ABOUT CONNECTIVITY?  
AREN'T TELECOMMUNICATIONS  
SERVICES EXPENSIVE  
IN THE DEVELOPING WORLD?**

When these machines pop out of the box, they will make a mesh network of their own, peer-to-peer. This is something initially developed at MIT and the Media Lab. We are also exploring ways to connect them to the backbone of the Internet at very low cost.

**WHAT CAN A \$1000 LAPTOP DO THAT  
THE \$100 VERSION CAN'T?**

Not much. The plan is for the \$100 Laptop to do almost everything. What it will not do is store a massive amount of data.

**HOW WILL THESE BE MARKETED?**

The idea is to distribute the machines through those ministries of education willing to adopt a policy of "One Laptop per Child." Initial discussions have been held with China, Brazil, Thailand, and Egypt. Additional countries will be selected for beta testing. Initial orders will be limited to a minimum of one million units (with appropriate financing).

**WHEN DO YOU ANTICIPATE THESE  
LAPTOPS REACHING THE MARKET?  
WHAT DO YOU SEE AS THE BIGGEST  
HURDLES?**

Our preliminary schedule is to have units ready for shipment by the end of 2006 or early 2007. Manufacturing will begin when

5 to 10 million machines have been ordered and paid for in advance.

The biggest hurdle will be manufacturing 100 million of anything. This is not just a supply-chain problem, but also a design problem. The scale is daunting, but I find myself amazed at what some companies are proposing to us. It feels as though at least half the problems are being solved by mere resolve.

**HOW WILL THIS INITIATIVE  
BE STRUCTURED?**

The \$100 laptop is being developed by One Laptop per Child (OLPC), an independent, non-profit association based on the "constructionist" theories of learning pioneered by Seymour Papert and later Alan Kay. It is totally separate from MIT, with its own board, executives, location, and staff. Its founding members are AMD, Brightstar, Google, News Corporation, and Red Hat, all of whom have funded both OLPC and the MIT Media Lab.

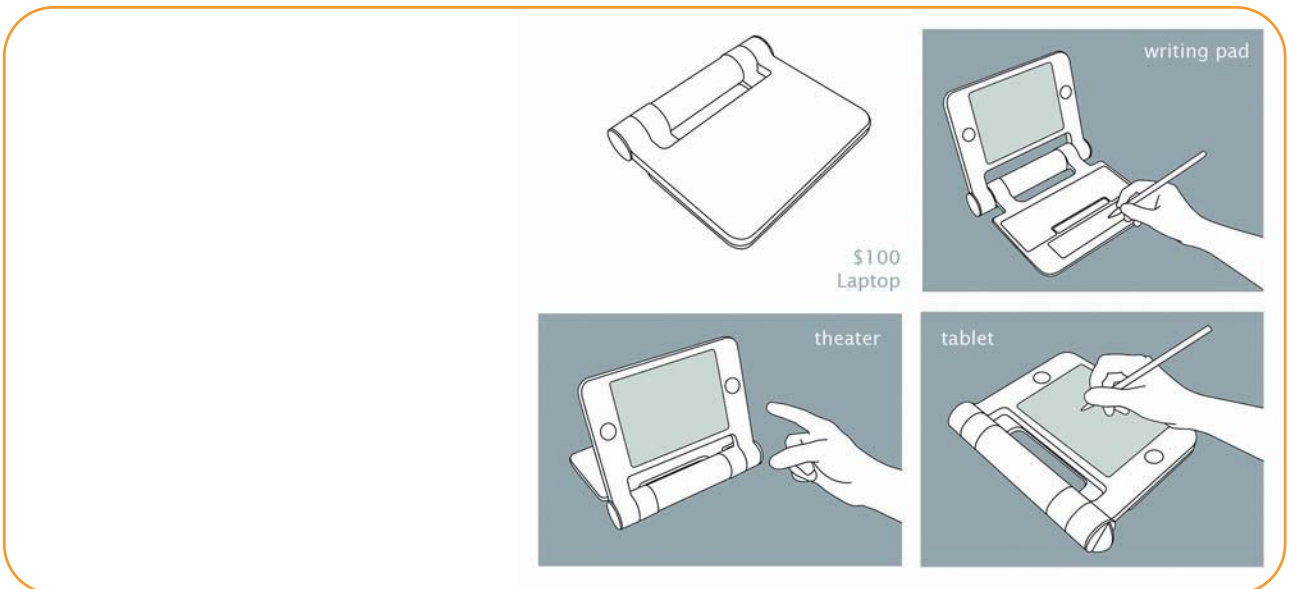
OLPC is funding research at the Media Lab focused on developing the \$100 Laptop.

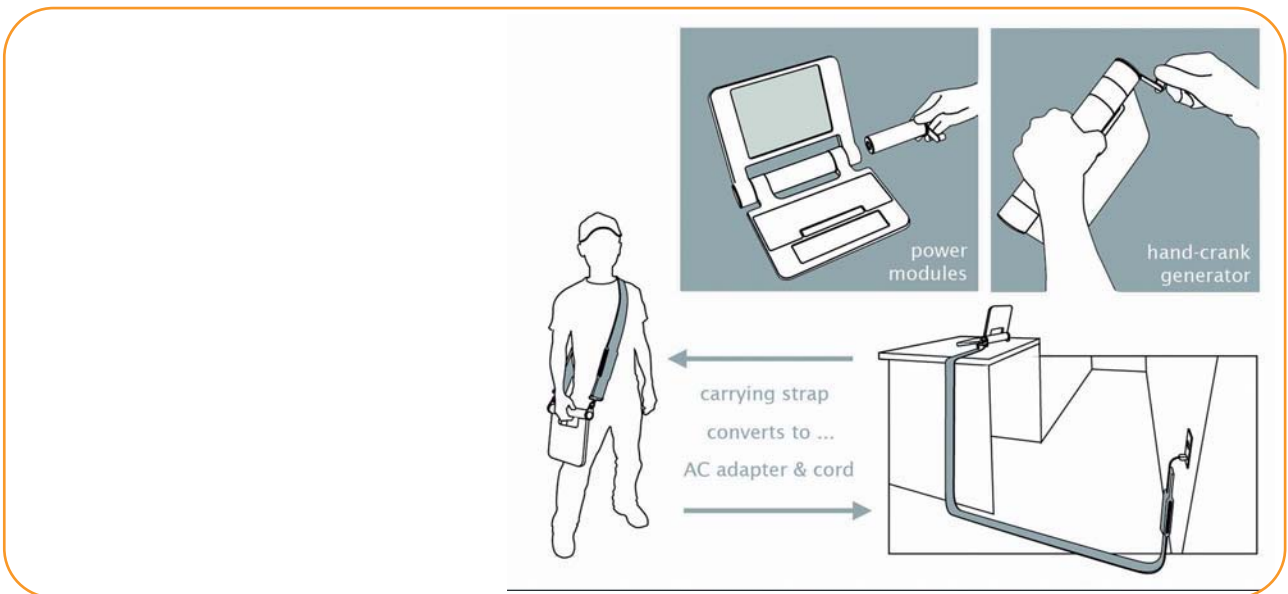
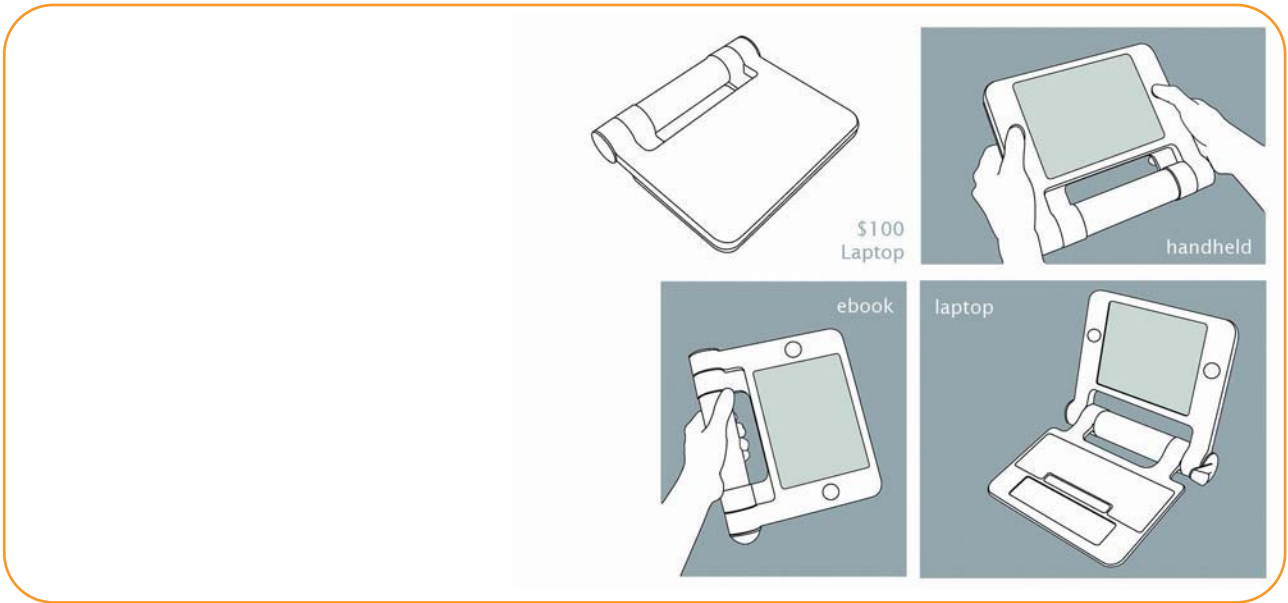
The three principals at MIT are faculty members at the Media Lab: Nicholas Negroponte (a founder of the Lab), Joe Jacobson (serial entrepreneur, co-founder and director of E Ink), and Seymour Papert (one of the world's leading theorists on child learning).

Additional researchers include: Mike Bove, Mary Lou Jepsen, Alan Kay, Tod Machover, Mitchel Resnick, and Ted Selker.

■

# THE US\$ 100 LAPTOP DESIGN STUDIES





# ACRONYMS

<b>AT</b>	Assistive Technology
<b>CABTS</b>	China Agricultural Broadcast and Television School
<b>CAIS</b>	Credit Account Information Sharing
<b>CDI</b>	Committee for Democracy in Information Technology
<b>COR</b>	The Club of Rome
<b>DCC</b>	Digital Community Center
<b>DTH</b>	Direct-To-Home
<b>EMEA</b>	Europe, Middle East and Africa
<b>ESA</b>	European Space Agency
<b>GDLN</b>	Global Development Learning Network
<b>GDP</b>	Gross Domestic Product
<b>GIRAFE</b>	Governance, Information, Risk assessment, Activities and services, Financing and liquidity, Efficiency and profitability
<b>ICDE</b>	International Council for Open and Distance Learning
<b>ICT</b>	Information and Communication Technology(ies)
<b>IDU</b>	In-Door Unit
<b>IPR</b>	Intellectual Property Rights
<b>ISEF</b>	Intel International Science and Engineering Fair
<b>IT</b>	Information Technology
<b>ITCRS</b>	Information Technologies and Citizens Rights Schools
<b>JAWS</b>	Job Access With Speech
<b>LAN</b>	Local Area Network
<b>LLP</b>	Local Language Partnerships
<b>MDG</b>	Millennium Declaration Goals
<b>MFI</b>	Micro Finance Institutions
<b>MIT</b>	Massachusetts Institute of Technology
<b>MRRD</b>	Ministry of Rural Rehabilitation and Development
<b>NGO</b>	Non Governmental Organization
<b>NIH</b>	“Not-Invented-Here”
<b>NOC</b>	Network Operation Center
<b>OECD</b>	Organization for Economic Co-operation and Development
<b>OER</b>	Open Educational Resources
<b>OLPC</b>	One Laptop Per Child
<b>PDA</b>	Personal Digital Assistant
<b>PREPCOM</b>	Preparatory Committee of WSIS
<b>PSTN</b>	Public Switched Communication Network
<b>ROI</b>	Return On Investment
<b>SATCOM</b>	Satellite communication
<b>SME</b>	Small and Medium Enterprises
<b>TFT</b>	Thin Film Transistor
<b>TH</b>	Taha Hussein Library for the Blind and Visually Impaired
<b>TTS</b>	Text To Speech
<b>TVRO</b>	TV Receive-Only
<b>UAE</b>	United Arab Emirates
<b>UGC</b>	User Generated Content
<b>UNCTAD</b>	United Nations Conference on Trade and Development
<b>UNESCO</b>	United Nations Educational, Scientific and Cultural Organization
<b>USP</b>	University of the South Pacific
<b>VCD</b>	Video Compact Discs
<b>VOIP</b>	Voice over Internet Protocol
<b>WAN</b>	Wide Area Network
<b>WSIS</b>	World Summit on the Information Society

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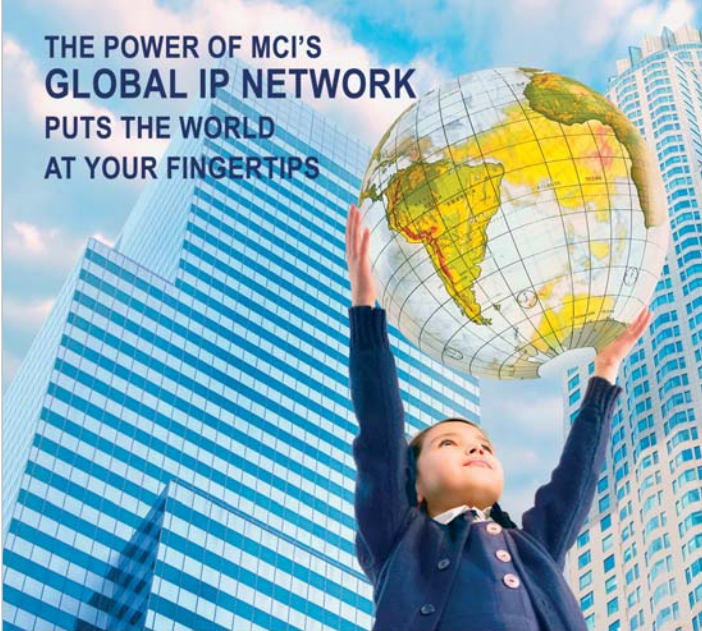
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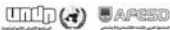
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#### EDITORS:

Raoul Weiler, Abdul Waheed Khan

Roland A. Burger, Thomas Schauer

#### ADDITIONAL INFORMATION:

THE CLUB OF ROME - EUROPEAN SUPPORT CENTRE

Tuchlauben 8/15 . A-1010 Vienna, Austria

E-Mail: [office.europe@clubofrome.at](mailto:office.europe@clubofrome.at)

<http://esc.clubofrome.org/worldconference.html>

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BIC Tower . Via Siemens-Str.19

I-39100 Bolzano/Bozen

Italy

Avenue Louise 149/24

B-1050 Brussels

Belgium

E-Mail: [infowsis2005@nematrix.com](mailto:infowsis2005@nematrix.com)

<http://www.nematrix.com>

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