Africa ICT in Education Forum

1st African Ministerial Forum on ICT integration in Education and Training

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Report of the Forum

High-level workshop, 9-December 2013,
Interministerial meeting, 10-11 December 2013

United Nations Educational, Scientific and Cultural Organization

intel

Organisation Internationale de la Francophonie

ADEA Association for the Development of Education in Africa

This document is an account of the proceedings of the 1st African Ministerial Forum on ICT integration in Education and Training that was held in Hotel Ramada in Tunis, Tunisia, December 9-11, 2013. The report was prepared by the general rapporteur for the Forum, Mr. Mamadou Ndoye

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Acronyms

ADEA	Association for the Development of Education in Africa
AfDB	African Development Bank
AVU	African Virtual University
CEO	Chief Executive Officer
CLOM	Open and massive Online courses *(Cours en ligne ouverts et massif)*
CLOT	Online courses open to all *(Cours en ligne ouverts à tous)*
GeSCI	Global e-Schools and Communities
GSM	Global System for Mobile Communications
IBERTIC	Ibero-American Institute on ICT and Education *(Institut Ibéro-américain des TIC et de l'éducation)*
ICT	Information and Communications Technology
ICTE	Information and Communications Technology in Education
IICBA	International Institute for Capacity Building in Africa
IIEP	International Institute for Educational Planning
IP	Internet Protocol
IPv6	Internet Protocol, version 6
MOOC	Massive Open Online Course
NGO	Non-Governmental Organization
OIF	International Organisation of la Francophonie *(Organisation internationale de la francophonie)*
OER	Open Education Resources
RELPE	Red Latinoamericanos de Portales Educativos
REPTA	Education for All in Africa Network
SEAMEO	Southeast Asian Ministers of Education Organization
SMS	Short Message Service
TELUQ Montréal	Distance University of the University of Québec
UNESCO	United Nations Educational, Scientific and Cultural Organization
WW Education	Worldwide Education
WTO	World Trade Organization

Introduction

The First African Ministerial Forum on ICT Integration in Education and Training was held in Tunis from December 9 to 11, 2013. The meeting was co-organized by ADEA, AfDB, OIF, UNESCO and Intel, and enjoyed the hospitality of the Tunisian government.

The overall objective of the Forum was to establish a platform for high-level dialogue on policies and experiences that capitalize on the possibilities offered by integration of ICT in African education and training systems. To this end, the Forum focused on the continent's major concerns regarding ICT in education:

- To provide universal access to quality education as well as opportunities for continuing study to all young people and adults;
- To endow learners with skills that enable them to become full-fledged stakeholders in the knowledge society;
- To promote, through education systems, the digital culture and creativity that Africa needs to increase its innovation capacity in the ICT sector;
- To create the conditions and factors required for faster development in Africa, with regard to the human capital formation and the technological innovation capacity required for such acceleration.

The expected outcomes of the Forum were as follows:

- Promotion of a shared understanding of the concept and characteristics of relevant, effective integration of ICT in African education and training systems as well as the implications in terms of changes in the development, implementation and sustainability of policies and strategies;
- Awareness-raising on the need for firm political engagement in favor of methodical, programmed integration of ICT in African education and training systems;
- Sharing of best practices and innovative experiences in order to draw lessons concerning factors of success, identify levers of change for successful integration of ICT, and promote the skills required for the desired changes and for joining the knowledge society;
- Promotion of a network of dialogue and partnerships among stakeholders in national public sectors, cooperation agencies, the private sector and civil society in order to enhance the relevance and viability of policies and strategies for integration of ICT in education and training;
- Proposals for strategies to improve equity in education and training, between girls and boys, rural and urban areas, the rich and the poor, etc.;
- Establishment of a platform for sharing knowledge and experience in order to provide better information for ICT integration policies and for the development of educational solutions that are relevant to African contexts;

- Sensitization of the private sector to the benefits of investment in ICT integration policies and strategies, particularly through innovative financing based on a win-win public-private partnership.

This report presents and analyzes the proceedings and outcomes of the discussions held during the three days of the Forum. It is structured as follows:

a) Participation in the Forum and proceedings of the meeting;

b) Contextualization of the major development issues raised by ICT integration in education and training in Africa;

c) The need for national policies on ICT integration in education and training;

d) The potential gains from ICT in education and training;

e) Integration of ICT in African education and training systems: innovation and reform issues;

f) Leveraging the potential of ICT in education and training;

g) Emerging trends in the use of ICT in Africa: the example of mobile technology;

h) Certain risks and strategies for avoiding them or lessening their impact;

i) Conclusion.

1. Participation in the Forum and proceedings of the meeting

The Forum was attended by a wide variety of stakeholders in education and the ICT sector (see appended list of participants). In addition to the co-organizers, these included:

- African ministers of education, training, information and technology, or their representatives;
- Representatives of African, Asian and South American organizations for regional and inter-ministerial cooperation;
- Representatives of bilateral and multilateral development agencies;
- Representatives of civil society organizations, the African diaspora, youth and NGOs specializing in the field;
- Representatives of the private sector, telecommunications operators, providers of ICT solutions and designers of digital educational content.

The Forum was in two parts: a high-level workshop on December 9, 2013, followed by the ministerial Forum properly speaking on December 10 and 11.

1.1. The high-level workshop

The high-level workshop brought together ICT professionals and experts from African ministries of education and training, civil society and various other institutions. Introductory speeches and welcome addresses were given by:

- Boukary Savadogo, Education Division Chief, AfDB
- Fengchun Miao, ICT in Education Specialist, UNESCO
- Ma-Umba Mabiala, Director of Education and Youth, OIF
- Moise Leye, Africa Corporate Affairs Director, Intel
- Hamidou Boukary, Officer in Charge, ADEA

The participants then heard a keynote speech by John Davies, Vice-President, Intel, on **"Education Transformation through ICT Integration",** followed by presentations of experiences with the lessons learned, based on three case studies:

- The case of Portugal: **"Education as a Development and Change Factor: The Integration of Digital Technologies in Education, the Portuguese Case"**, presented by José Manuel Canavarro, member of the Portuguese National Council for Education;
- The case of Tunisia: **"Tunisia's ICT in Education Strategy: Implementation, Monitoring and Evaluation, Lessons Learned"**, presented by Skander Ghenia, Director-General of Tunisia's National Educational Technology Center;
- The case of Lebanon: **"Open Your Tomorrow: A Disruptive Initiative to Drive Education Transformation in Lebanon",** presented by Hussam Kayyal, Advisor to the Minister of Telecommunications of Lebanon, and Bernard Rizk, Chairman and CEO of Triple C, Lebanon.

After these presentations, delivered in a plenary session, the participants divided up into five breakout groups to discuss the main lessons to be drawn from ICT integration in education and training. The groups addressed the following five themes:

a) Policy development, funding, implementation and monitoring;

b) Strengthening capacities of teachers: Teacher professional development and pedagogical practices;

c) Digital content development and sharing;

d) Equitable deployment of ICT equipment and connectivity;

e) Evaluating and scaling up innovation.

The workshop participants heard and discussed the reports giving the results of the discussions in five breakout groups in order to derive from them a set of messages and recommendations for the ministerial meeting. These included:

- The urgent need to formulate national policies on ICT in education through participatory processes that promote internalization and local ownership as well as partnerships between government, the private sector (notably including telecoms operators), and civil society to narrow the digital divide and facilitate access to electrical power;
- Searching for innovative means of financing, seizing the revenue opportunities arising from G3 and G4 licenses and/or the transition to digital television to finance the considerable investments required for integration of ICT in education;
- Capacity building for teachers through pre-service and in-service training modules focusing on ICT, with incentive measures such as recognition and certification of experience and/or career enhancement, while supporting the necessary changes in teaching cultures and practices to promote innovation and learning;
- Encouragement of and support for production of digital content that meets the specific needs of national education systems and is suited to African cultures and languages;
- Initiation of experimental phases in the implementation of policies in order to develop models that properly match the country's specific characteristics through capitalization of lessons from experience, supported by a monitoring and evaluation (M&E) mechanism and a supporting research mechanism geared to this purpose.

1.2. The inter-ministerial meeting

The inter-ministerial meeting began with welcoming remarks and introductory speeches by:

- Aly Abou-Sabaa, Vice-President, AfDB;
- The representative of Clément Duhaime, Administrator of OIF;
- John Davies, Vice-President of Intel;
- Dzingai Mutumbuka, Chair of ADEA;
- Hon. Mongi Marzouk, Minister of Information and Communication Technology, Tunisia.

Two introductory speeches were next. The first, delivered by Anthony Salcito, Vice President WW Education, Microsoft, was concerned with **"Trends in ICT in Education: Africa and Beyond"**. The second, on **"Smart Media in Education: A Blessing or a Curse?",** was given by Dr. Peck Cho, Distinguished Professor, CTL, Dongguk University, Republic of Korea.

The guidelines and recommendations produced by the high-level workshop were then presented to the ministerial meeting, which then proceeded to hold six successive thematic sessions, each consisting of presentations followed by discussion.

Session 1

- Theme: **"Developing policies to leverage potentials of ICT for quality education for all"**

Five presentations were made, followed by discussions:

I. "Côte d'Ivoire's Ministry of Education ICT Strategy :", presented by Aboubacar Coulibaly, Advisor to the Minister in charge of ICT, Ministry of Education;

II. "ICT Integration in Basic Education: Lessons from Kenya's Laptop Project", presented by by John Temba, Head, ICT for Education, Ministry of Education, Kenya;

III. "Argentina's ICT in Education Policy: Promoting Social Inclusion and South-South Cooperation through IBERTIC", presented by by Diego Filmus, international cooperation specialist, Organization of Ibero-American States (OIE);

IV. "Leadership in Policy Development and Strategy for Effective ICT Integration in Learning and Teaching", presented by Jerome Morissey, CEO, Global e-Schools and Communities Initiative (GeSCI);

V. "From ROI to ROE: The Important Success Factors for ICT in Education Strategies", presented by Martin Rist, Education Business Manager Africa, Hewlett-Packard

Session 2

- Theme: **"Ensuring equal access to digital resources and opening up education"**

After the remarks of the Hon. Marie Jacqueline Nana Togola, Minister of Education, Mali, the session comprised six presentations followed by discussions:

I. "MOOC as OER to Promote OERs", was presented by Robert Grégoire, Moncton University, Canada

II. "Promoting Equal Access to Digital Content and Opening Up Education", was presented by Mar Mbodj, Gaston Berger de Saint-Louis University, Senegal

III. "The Ibero-American Network of Educational Resource Portals", was presented by Laura Marés, Executive Secretary of RELPE, IBERTIC

IV. "Addressing the Missing Keystone in Implementing National ICT Strategies: IP Number Resources and IPv6", was presented by Mukom Akong Tamon, Training Manager, AFRINIC

V. "Global Engineering Education Resources and Opportunities for All", was presented by María M. Larrondo Petrie, Executive Director, Latin American and Caribbean Consortium of Engineering Institutions

VI. "School Data Collection via Mobile Phone: An Innovative Tool for Educational Planning", was presented by Khadim Sylla and Ilona Genevois, IIEP, UNESCO

Session 3

- Theme: **"Mainstreaming the Transformative Power of Mobile Learning"**

Five presentations were made followed by discussions:

I. "Teachers' Professional Development in Madagascar: Mobile-Assisted Training", by Ralph Ankri, International Project Manager, Orange Labs

II. "Mobile Phone Literacy for Women and Girls: Lessons Learnt from UNESCO Case Studies", by Fengchun Miao, ICT in Education Specialist, UNESCO

III. "Intel: Examples and Impact of Usage of Mobile Computers in Education", by Frederico Carvalho, EMEA Solutions Architect, Intel

IV. "How Finnish Teachers Harness the Potential of Mobile Learning", by Satu Järvinen, expert in education partnerships, OMNIA, The Joint Education Authority of education in Espoo region, Finland

V. "Is there a Role for the Mobile Phone Technology in African Higher Education?", by Kilemi Mwiria, development consultant, Kenya

Session 4

- Theme: **"Making the delivery of massive quality education a reality in Africa"**

- Presentation of five case studies followed by discussions

I. "Education Services Platforms: The Experience of the African Virtual University", by Bakary Diallo, Rector, African Virtual University

II. "European Schoolnet Academy: MOOC and Teachers' Professional Development", by Patricia Wastiau, Principal Advisor for Research and Studies, European Schoolnet

III. "ICT and Robust Engineering Education in Africa", by Muhammad H. Zaman, Associate Director, Kilachand Honors College, Boston University

IV. "ICT-Enhanced Development of Teacher Educators in Africa", by Temechegn Engida, Programme Officer ICT Use in Education, UNESCO-IICBA

V. "Embedding ICT in Education: Case Study of a Holistic Approach", by Dyonis Ndungu, Regional Support Manager, British Council

Session 5

- Theme: **"Utilizing ICT to expand learning opportunities for marginalized populations"**

Five presentations were made, followed by discussions:

I. "Using Digital Boards for Literacy in Favor of the Excluded", by Gabriel Cohn-Bendit, Secretary-General, Education for All in Africa Network (REPTA)

II. "The Potential of Accessible ICT to Increase Education Participation and Achievement for Persons with Disabilities", by Nafisa Baboo, Senior Inclusive Education Consultant, Light for the World

III. "Mobile Internet Access in Rural Areas: The Tunisian Experience", by Taha Mansour, Director, Tunisian e-School

IV. "Empowering African Marginalized Populations by Using Networked Mobile Laboratories over Internet", by Hamadou Saliah-Hassane, TELUQ Montreal, University of Quebec

V. "Use of ICT in Reaching the Unreached in Education in Southeast Asia", by Abigail Cuales Lanceta, Southeast Asian Ministers of Education Organization (SEAMEO)

Session 6

- Theme: **"Public-Private Partnerships in ICT in education projects"**

Five presentations were made, followed by discussions:

I. "Millennium@Edu: A Private-Sector Initiative to Support ICT Integration in Developing Countries", by Mario Franco, President, Millennium@Edu Foundation

II. "Tunisie Telecom's Contribution to the Development of Education", by Mokhtar Mnakri, CEO of Tunisie Telecom

III. "Transforming Education and Creating Economic Opportunity", by Mark Chaban, Senior Director MEA Education, Microsoft

IV. "Accelerating the Quality and Reach of Education through PPPs by the Example of Education Cloud Solutions", by Johann Felfer, Director Education Industry Vertical, Growth Market Organization, Hewlett-Packard

V. "Ministry of Education and Tunisie Telecom: PPP to Connect All Public Schools to Internet", by Mehdi Ezzine, Director-General, ICT Department, Ministry of Education, Tunisia.

Before the closure of the session, a ministerial panel was formed with the participation of six African ministers from Angola, Mali, Mozambique, Niger, Senegal and Uganda, accompanied by AfDB's Director for Human Development, the director of UNESCO's Division for Teacher Development and Higher Education, and the OIF's director of education and youth.

Angola's Minister for Vocational training recommended an endogenous approach to ICT integration in education for national development, while emphasizing his government's attachment to the idea of establishing both national and international partnerships.

The Minister from Mali emphasized the challenges that covering a huge territory raises for the Malian government. However, deployment of fiber-optic cable is in progress, despite the obstacles created by the recent conflict, and the cellular network already covers 99% of the country. The government is determined to integrate ICT in education and to include isolated and vulnerable groups in this process. Lastly, the minister emphasized the need for partnerships, particularly with corporations like Microsoft and Intel.

The Deputy Minister of Education of Mozambique emphasized the importance of the Forum for all of Africa. He mentioned that strategic planning is crucial to meaningful integration of ICT in education, and he laid particular stress on the issue of production of local digital content, which Africa must achieve if it is not to be confined to importing foreign models.

Niger's Minister of Technical and Vocational Education and Training declared that ICT represents an opportunity to succeed in providing quality education for all. It can thus help to lay the foundation for the sustainable development of African countries.

The Deputy Minister for Primary Education of Uganda announced that his country has already implemented an ICT integration policy, with investment at all levels of the education system. Schools have access to connectivity, and use of solar energy is widespread. Uganda is moving forward on the right path, he concluded.

The minister of education of Senegal also noted the importance of the opportunity offered by ICT for educational development. He reported that his country had taken this opportunity to mount several projects concerning the various levels of the education system and teacher development.

The Ministers noted and reflected on the diversity of the African contests, as far as the integration of ICT in education is concerned. The panel of ministers also expressed its satisfaction with the outcome of this first forum and identified lines of action focusing particularly on the partnerships needed to accelerate the efficient integration of ICT in education and training.

The closing session comprised the reading of the general report of the Forum and the closing remarks of:

- David Atchoarena, Division for Teacher Development and Higher Education, UNESCO
- Agnès Soucat, Director for Human Development, AfDB
- Ma-Umba Mabiala, Director for Education and Youth, OIF
- Sven Beckmann, Africa Region Director, Intel
- Hamidou Boukary, Officer in Charge, ADEA
- Hon. Dr. Moncef Ben Salem, Minister of Higher Education and Scientific Research, Tunisia, who delivered the closing speech.

The analysis below seeks to draw out, from these three rich days of presentations and discussions, the main ideas concerning contextualization and development issues, directions of policy and action, lessons learned from experience, future prospects and messages and recommendations.

2. Contextualization of the major development issues raised by ICT integration in education and training in Africa

Africa, like all regions of the world, is part of a globalization process characterized by: i) the revolution in media, science and technology that has reduced time and space to make the earth a “global village”, ii) trade liberalization under WTO agreements, iii) the competitive hegemony of knowledge-based economies, and iv) the rapid, deep-seated changes driven by a faster pace of innovation.

On the wrong side of a number of divides – cognitive, technological, digital, etc. – Africa with its low competitiveness suffers from unequal trade in the global economic competition and is tending to become poorer, or even to fall behind the globalization process despite its increased rate of economic growth.

Yet Africa has no lack of assets: exceptional biodiversity, vast natural resources, enormous and barely tapped potential for solar and hydroelectric power, the demographic dividend, etc.

In fact, the main challenge facing the continent is structural change, that would enable it to depart from a set of economies based on commodities exports and low value added and evolve towards processed-goods economies generating higher value added, or even to still more competitive economies based on innovation and sophistication.

This structural change is an absolute requirement for the acceleration of development, and the key factor in achieving it is the training and deployment of the human capital needed for:

- Raising capacity to absorb technologies and innovations in the mass of the agricultural craft and manufacturing labor force in order to raise labor productivity and stimulate competitiveness in these sectors;
- Developing the technical and vocational skills needed to anticipate and utilize technological changes, to diversify and restructure the economy, notably through upstream and downstream linkages between growing industrialization, stimulation of agriculture and modernization of the tertiary sector;
- Promote an African leadership that can bring transformation at the political, economic, social, scientific, technological and cultural levels, capable of serving as an avant-garde for the qualitative leaps toward higher levels of development that are needed, through reform, innovation, invention and creation.

As shown by the example of Korea, education is a powerful factor of development. In 50 years, it lifted Korea out of the extreme poverty and desolation caused by colonization and war to a position in the leading group of developed countries. Dr. Peck Cho, emeritus professor of the

University of Dongguk, Republic of Korea, began his presentation on “Smart Media in Education: A Blessing or a Curse?” by taking us back in time to the 1950s, following the Japanese occupation, when Korea was “one of the poorest countries in the world”. The country’s disastrous situation at that time was reversed “within a single generation”, and Korea’s development is now founded on a flourishing economy.

Dr. Cho, an engaging speaker, emphasized that Korea had, as a matter of national consensus, put all its efforts into the education of its children: 11,000 schools were built, 483,000 teachers hired, etc. The most connected country in the world today (an average Internet connection speed of 14.2Mb/s), Korea continues to focus on education, but now it relies on ICT, which, given the ubiquity of smartphones in the country, has the potential to enhance skills for anyone, anywhere, anytime. “And the proof is”, he added with a laugh, “that 40,000 students can now take my courses each year, while in my previous 20 years as a professor, I taught only 4,000!” For him, the solution is clear: stop investing in traditional schools and concentrate on ICT, which is no more expensive than building schools.

However, the heart of his argument lies elsewhere. Dr. Peck Cho is persuaded that the use of ICT, without a change in our understanding of what learning is, will merely increase the quantity and speed of what can be the wrong kind of education. We need to develop better, more intelligent education, education that is active, interactive, integrating and contextualized. In short, we need to focus on learning and not on teaching, to leave room for the creativity and the emotions of individuals. While it is true that the OECD’s PISA ranking places Korea first in the world in mathematics, science and reading, it also indicates that Korean pupils are the least happy in the world.

Learning through ICT thus rests on two foundations: the accessibility of knowledge and information, and connectivity between teachers and learners. This will require a reform of teacher training and strong political will.

For Africa, the issue is simple: “Either accept the change or don’t! Do Africans want to remain consumers of ICT or become creators of ICT?” To affirm once again that Africa can overcome its handicap, as Korea did, he concluded with the famous words of the late Nelson Mandela: “It always seems impossible until it’s done.”

With the extraordinary means available in the 21st century, particularly the enormous potential of ICT, Africa should accomplish this feat in a much shorter time: 10 years? 20 years? 30 years?

All levels of the education system are called on to train the human capital required, from basic to higher education, including general and technical secondary education and vocational training. The fact is that, compared to other regions of the world, the performance of Africa, and particularly sub-Saharan Africa, is quite inadequate in all of these areas.

Indicator / Region	Literacy rate	Pre-primary GER	Primary NER	Survival rate in last primary year	Junior secondary GER	Senior secondary GER
SS Africa	62	12	76	70	41	27
South and West Asia	62	21	86	66	71	40
Central Asia	99	20	90	99	98	95
East Asia and Pacific	94	38	94	92	90	63
Arab states	72	15	84	97	83	53
Latin America and Caribbean	91	56	94	86	101	74
Central and Eastern Europe	98	50	93	97	92	84
North America and Western Europe	99	75	95	99	103	98

With regard to human capital requirements for development, this low performance calls for acceleration policies aimed at broadening coverage, increasing equity, enhancing quality and relevance of education and training at all levels.

The Forum looked beyond formal education systems, to where ICT opens up broader perspectives for learning, through the construction of African knowledge societies via the development and mobilization of all learning resources and opportunities – formal, non-formal and informal, in official education systems, the workplace, leisure activities, communities and families:

- Take advantage of the exponential and continuous flow of information and knowledge driven by the ongoing revolution in media, science and technology, with the volume of information doubling every two years;
- Share and develop information and knowledge through communities and learning networks. This information and this knowledge are no longer mere objects of learning, they are also, and most importantly, strategic factors of production, competitiveness and income growth;

- Promote lifelong learning as a necessity, given the need for continual adaptation to cope with the rapid, deep-seated changes of today's world, and still more the world of the future, in both the lives and the work of human beings.

In short, meeting the double requirement of improving the performance of education and training systems and building African knowledge societies is a necessary condition and a key factor in the acceleration of development in Africa.

This is a major challenge, which integration of ICT in education and training will certainly help to meet through the amplification and diversification of the various opportunities for learning: self-tuition and inter-learning, distance training, open learning, at any age and any location.

The stakes involved are enormous for Africa, in terms of economic emergence, reduction of poverty and inequality, cultural openness and dynamism, democratization, etc. However, it must be borne in mind that ICT integration in education systems also runs into serious challenges in current African contexts. In addition to high illiteracy rates and low access to information, these include:

- The absence in most countries of a specific, explicit national policy to guide the integration of ICT in education and training;
- The shortage of financing due to various constraints, particularly the wage bills, which leave little room for pedagogical investment in the budgets of education and training ministries;
- The dominance of educational cultures and practices focused on directive teaching methods, which foster active and/or passive resistance to innovation among the main stakeholders in the system, particularly teachers;
- The shortfall in or complete absence of locally produced digital content and the tendency to copy non-contextual models that lead to a dead end;
- The low penetration rate of ICT and the internal digital divide, which excludes a fair fraction of the population and of countries' territory from access to ICT, as a result in particular of the insufficient and inequitable coverage of African countries' telephone networks and power grids;
- The observed lack of control over the approaches and tools used for operational planning and implementation of ICT;
- The scarcity of systems and benchmark indicators for monitoring and evaluation of ICTE policies' impact on the ground; this scarcity works to the detriment of policy management and capitalization of experience.

These challenges must be met if the integration of ICT in education and training is to succeed.

3. The need for national policies on ICT integration in education and training

Many African countries embark upon ICTE projects without a policy framework to guide their action and give it coherence, direction and continuity. It is recommended, instead, that they begin by framing a policy that clearly sets out objectives, priorities and strategic lines of action with respect to integration of ICT in education and training. Such a policy is explicitly linked to national ICT policy but should nonetheless be separate from it. ICT in education policies should be holistic, both in the sense of covering all sub-systems and levels of education and training and in that of giving consideration to all existing systems and technological tools.

To contextualize ICTE integration policies, it is necessary to:

- Have a single national vision that sets policy directions, objectives and goals for ICT integration;
- Have solid information on the position and needs of the education system, on the availability of the technology required and on problems of connectivity and financing;
- Identify specifically and precisely the challenges to be tackled in terms of appropriate technological options, network coverage, planning, resource mobilization, skills development, etc.;
- Define standards and models specifically for ICT integration;
- Formulate the curricular and pedagogical reforms that are indispensable to innovative integration of ICT and to skills development for youth in the 21st century;
- Develop a holistic vision of ICT use in the formal, informal and non-formal sub-systems at all levels of education and training systems, as well as in building knowledge societies;
- Evaluate the strategic and operational options available through development plans and financial simulations so as to make choices that foster sustainability and cost-effectiveness;
- Plan ICT integration on the basis of thorough consideration of specific local characteristics;
- Adopt connectivity and communication infrastructure that matches the options and plan selected.

On this basis, the development of the policy framework should direct the goals and objectives of ICTE integration toward the search for solutions to the most urgent problems and challenges facing African education and training systems, which include:

- Integration of excluded groups and retention of those who leave the education system early; this will require reaching out to the most isolated areas and the poorest population groups to ensure universal access to ICT;
- Improvement of learning performance and educational quality;

- Increased equity at all levels: gender, geographical, socio-economic, cultural, etc.;
- Broadening scientific and technology culture and skills to include all men and women;
- Increasing the internal efficiency of the system, as well as the relevance and external efficiency of learning.

In policy implementation strategies, special attention should be given to:

- Formulation and strategic management of the holistic change required for successful integration of ICT in education and training;
- Formulation of an operational plan based on analytical studies, specifying the various phases of implementation, activities to be carried out, the required infrastructure and logistical facilities, costs and M&E indicators;
- The multi-sector approach to ICTE integration, which requires collaboration between education and training ministries, the ministry responsible for ICT, the finance ministry and other ministries concerned (industry, agriculture, health, youth);
- The establishment of multipartite partnerships between the government, the private sector and all other stakeholders, with specific and meaningful allocation of roles and responsibilities to the various levels (national, regional, local, etc.);
- Research and M&E systems that make it possible to monitor implementation and regularly adjust policy on the basis of the results obtained and the difficulties encountered;
- Pre-service and in-service teacher training programs as well as support mechanisms for schools to help with equipment maintenance.

Conditions for the success of ICT integration policies notably include:

- Promotion of sound, committed leadership at the national, local and school levels;
- A participatory, inclusive process of policy formulation, with genuine involvement of the various stakeholders and a preference for bottom-up approaches;
- An appropriate, flexible financing model that allows for gradual adjustment as the implementation process unfolds;
- Establishment of diversified financing sources and co-financing mechanisms including the government, private sector, development agencies, users, etc.

It is particularly recommended that implementation of ICTE integration policies begin with a pilot experiment accompanied by action-research in order to capitalize enough lessons to structure and stabilize an ICT integration model that is truly owned by stakeholders and matches their needs, resources and the realities of the specific context. On this basis, scaling up can be envisaged with serious chances of success.

The formulation and implementation of effective policies also requires a thorough knowledge of the potential contribution of ICT to the development of education and training, taking account of

connectivity, costs, coverage, digital content, stakeholder commitment and change management.

4. The potential gains from ICT in education and training

The most widely held opinion is that ICT has enormous potential for contributing to the development of education and training, both quantitatively and qualitatively. The fact is that integration of ICT in education and training systems can strengthen or even transform the physical and human inputs (curriculum, diversified teaching-learning materials, pre-service teacher training, etc.), school and classroom organization and management procedures, the teaching-learning process and evaluation methods (multimedia content, courses, exercises, tests, instructions, evaluation results, communication between teacher and learners and among learners, etc.), as well as all systemic support mechanisms (resource allocation and management, quality assurance mechanisms, national evaluations, etc.) and relationships with local communities and families.

Exploration of the potential of ICT in these areas gave particular attention to:

- governance and management of education and training systems,
- teacher development,
- learning.

4.1 Governance and management of education and training systems

The governance and management of education and training systems require, first of all, control over the quantitative and qualitative data needed for monitoring, evaluation and diagnostic analysis, that is, for identification of major problems needing resolution and for development planning. In this respect, it is difficult today to imagine an education management information system that does not use ICT. Via electronic administration and Internet (listserv, portals, websites, etc.), ICT considerably increases the fluidity of data, while facilitating its collection and analysis, increases the speed of information dissemination, supports communication among all interested parties and offers broader, open access to information on system performance.

ICT thus enables more rational, more reliable management of systems, but also participatory management thanks to the ease of communication and easy sharing of portals that it offers to stakeholders. By making information about education systems and their performance more accessible to all, ICT also strengthens transparency and accountability in governance, while at the same time promoting dialogue on education policy.

At the level of individual education and training institutions, ICT improves administrative and physical management as well as management of schedules, facilitates enrollments and recording

of grades, makes it possible to have a better view of learners' paths of study, to monitor their attendance, to evaluate and monitor trends in learning outcomes, and to plan remedial measures where necessary. All of this lightens the administrative burden on school principals so that they can devote more time and energy to their role as leaders in guiding change. ICT also enables schools to communicate more easily with parents and to increase their participation in education management and their support for educational processes.

4.2 Teacher development

ICT offers a large number of platforms for pre-service and in-service teacher training, as well as for motivating teachers and reinforcing their professional ethics, notably through:

- The availability of digital content that can support academic research as well as planning and development of teaching sequences;
- Access to vocational knowledge accumulated in various fields at the national and international levels and structured by teachers on the basis of lessons drawn from their work practices or by teacher trainers;
- Sharing and development of knowledge and experience with other teachers through exchanges and co-construction, as in the "massive open online courses" (MOOCs) that have been formed in North America and Europe;
- Distance training and open learning, particularly to end the isolation of teachers working in remote areas;
- Spaces for reflexive practices and communities of practice on the conditions and factors of effective teaching or for the development of innovation through critical thinking and elaboration on various teaching experiences and issues.

ICT can thus promote the transition from didactic teaching practices to more active approaches. Although it does not change teaching practices directly, it empowers teachers to change them.

4.3 Learning

First of all, ICT offers learners access to a mass of information that no teacher can possibly accumulate and pass on to students. This is an exceptional opportunity for them to learn how to search for relevant information and knowledge when given a specific problem to resolve. Beyond that, acquisition of the problem-solving approach requires that teachers provide methodological support to learners so that the latter develop cognitive skills: observation, analysis, synthesis, production, evaluation, critical thinking, etc. It has been demonstrated that ICT is an invaluable medium for the presentation and understanding of complex concepts and processes that otherwise would require 20 to 30 times longer to learn. Interactive digital boards, virtual laboratories, laboratory kits, and other learning support technologies improve learners' performance in that they facilitate the acquisition process, increase interest and motivation, provide access to resources and knowledge, generate new teaching-learning approaches, etc.

Moreover, ICT can facilitate the individualization of learning, with flexible processes that allow each learner to learn at his or her own pace and in his or her own way. In addition to stimulating their interest, this lets them acquire methods for self-study, including self-evaluation. ICT also offers platforms that allow collaboration and teamwork, thus favoring peer learning.

In summary, ICT helps to lay the foundations for lifelong learning: self-motivation, self-confidence, the ability to learn independently at any time and in any place. Most importantly, it has the potential to make education more attractive both for learners and for teachers, due among other things to the richness of multimedia: text, audio, images, video, simulations, interactions, etc.

Considering all these possible contributions of ICT, its added value can be demonstrated in all the areas that are crucial to the development of education in Africa, such as:

- Broadening the coverage of educational needs, particularly at the levels that are currently under strong pressure from population growth, such as higher education and vocational training, through virtual tracks and modules (which are becoming indispensable), open learning resources and distance training platforms. The Korean experience in higher education has shown that in terms of access, 20 years of face-to-face courses in a traditional classroom setting can be equivalent to one year of online courses (in this case, 4,000 students);
- Enhanced equity via the diversification of learning opportunities to meet the diversity of demand, which allows for individualized learning paths suited to the pace and learning methods of each learner in accordance with his or her needs and situation;
- Improvement in quality toward the goal of success for all, as a result of this adaptation of learning to each learner but also of the richer array of teaching-learning materials, the heightened interest and motivation, and the facilitation of learning offered by ICT, which help to bring about a noteworthy improvement in learners' performance;
- Enrichment of the learning environment to cope with contexts in which documents, teaching-learning materials and laboratories are in short supply;
- Access to information on the various scholastic and vocational tracks available.

Looking beyond education systems, ICT offers platforms for communities of practice and learning communities for the sharing and development of knowledge in all aspects of life, leisure activity and work. The building of African knowledge societies consists precisely in this: the formation and scaling up of these learning communities, which, thanks to ICT, enable learning at any age and in any location.

5. Integration of ICT in African education and training systems: innovation and reform issues

Certain approaches to ICT integration in education consider such technology as just another teaching aid. At best, in this view, ICT would enrich the physical environment of learning, with no impact on the management of schools and classrooms, teaching practices, the teacher-learner relationship, learning modes, curricula and evaluation. Such approaches in fact reflect resistance to integration of ICT, as they continue to regard education primarily as a process of knowledge transfer in which the teacher serves as the central "knowledge bank", while learning occurs mainly through a process of memorization, and the learner is merely a receptacle to be filled. Such resistance consists precisely in denying the innovative potential of ICT.

Other approaches do take this potential into consideration, but restrict it to methods of teaching and learning. In other words, integration of ICTE changes the teacher-student relationship and teaching practices, but does not change what is learned. Such approaches give learners direct access, thanks to ICTE, to the information and knowledge that the teacher is supposed to transmit to them.

In reality, in the presence of ICT the teacher can no longer be the "knowledge bank", because ICT gives learners access to more information and knowledge than any human being could memorize. That being the case, the status of the teacher changes from that of a "knowledge bank" to that of supporting the learner through the challenges of research and cognition: observation, analysis, synthesis, evaluation, etc. In other words, integration of ICT should change the teacher-student relationship as well as approaches to the teaching-learning and training process, not only in academic subjects (content, methods and cognitive aids) but in affective and teaching-related matters (creation, change, cooperation, dreams for the future, etc.).

However, knowing how to sort through the flood of information impelled by the media revolution to take what is relevant in the search for specific solutions to a given problem, knowing how to transform data into information, information into knowledge, knowledge into skills, and connecting all this with values that encourage consumption- and production-related behaviors that bring a positive individual and social return – all of this goes well beyond the question of *how* one learns and raises the question of *what* should be learned. In addition to the learning process and curricula in the narrow sense, integration of ICT has a definite impact on the organization and management of the education system, of schools and of classrooms, as well as on evaluation methods. For this reason, the last set of approaches considers that integration of ICT entails a system change, involving not only inputs (curriculum design, teacher training, choice of physical inputs, etc.) but also procedures (management, organization and operation) and results (evaluation of effects and impact).

It is essential to understand, however, that all these changes of paradigm, culture and practice do not occur simply as a result of introducing ICT in education and training systems. ICT is not a magic wand. It will help to produce such changes only if it is appropriately used for purposes of

pedagogical innovation, educational reform, the building of learning societies – in short, if it serves and follows a policy of transformation.

This is why innovative integration of ICT in education and training requires the formulation and implementation of policies and plans for change driven by education system managers, teachers, pupils and parents in:

- The planning and guidance of change;
- Promotion of systemic curricular reforms for the digital age: knowledge, skills and values;
- Endowment of schools, teachers and learners with appropriate digital devices (PC, digital tablet, interactive whiteboard, cell phone, etc.);
- The development of learner- and learning-centered teaching approaches;
- Capacity building for teachers according to training models that make use of technological and methodological innovations to lead trainers and other stakeholders (academic advisers, inspectors, principals, etc.) not only to learn to use ICT but also to know how to integrate it in an innovative way in order to change management and teaching cultures and practices, to drive and manage innovation, to help people learn in ICT environments, to adapt and produce digital content, to develop new monitoring and evaluation modes linked to ICT;
- The interactive approach in e-learning hardware and software: interaction between electronics and emotion; access to information and knowledge, on the one hand, and connectivity between teachers and learners on the other; technology and heart, empowerment and experience;
- The development in African contexts of bilingual teaching-learning strategies and digital content in which local languages are used as media of instruction.

Combined with this are the new demands – human, political, economic and social – of a new environment marked by knowledge economies and societies, and the upheavals caused by the scientific, technological and media revolution. Routine and manual tasks are increasingly giving way to tasks of abstract thought, innovation and sophistication, the proportion of which will have risen from 50% in 1960 to 70% in 2020.

To sum up, the aim here is to understand not only that young people learn differently with ICT, but also that the 21st century requires them to have new skills: communication, ICT literacy, critical thinking, innovation, teamwork, project management, entrepreneurship, scientific and technological culture, search for meaning, etc.

6. Leveraging the potential of ICT in education and training

Leveraging the potential of ICT in education and training requires, first of all, that policies, plans and projects concerning ICT integration be clearly visible and understood. Take-up of the philosophy and the process of change by the main stakeholders, as well as their empowerment, is a necessary condition for success. In current African contexts, it is particularly important to develop equity strategies in order to:

- Overcome the exclusionary barriers raised by lack of electrical power and insufficient connectivity coverage through the use of alternative energy sources and deployment of hardware and connectivity to the poorest areas and population groups, as in the experiment with mobile laboratories in Tunisia (a minibus with a VSAT Internet link, Wifi access pack, 16 laptop computers and a generator) and Mali's plan to extend the fiber-optic network to cover the entire national territory;
- Set up appropriate mechanisms for disabilities, ensuring accessibility and/or technological assistance for access to media and format, products, services, environment;
- Bringing technology within the reach of all, for universal access to a digital device, Internet connectivity and meaningful content that is relevant in learners' living and work environment.

Obviously, African countries today cannot ensure the conditions and factors required for the success of such strategies by themselves. This is why it is necessary to establish partnerships between the public and private sectors, between government and civil society, between the education and telecommunications sectors, between national authorities and international agencies, etc. In this partnership framework, it is helpful to develop a business model to be validated by all stakeholders that is geared to promote:

- The construction of an "ecosystem" that pools the interests and efforts of all stakeholders: government, solutions developers, businesses, content providers, users, etc.
- Joint advocacy for open-source materials, which allow for adaptation and take-up of ICT solutions;
- Development of local infrastructure and local production of digital content;
- Facilitation of new, free and open solutions;
- Policy dialogue and sharing of the most effective practices;
- Support and encouragement for the acquisition of ICT equipment and networking of public and private education and training institutions through government grants (including budgets for maintenance and exchanges) and tax reductions on equipment purchases;

- Support for research and development on the effectiveness and dynamics of ICT, in order to constantly improve the design of low-cost models of integration and for capitalization of the most effective practices;
- The establishment, right from the outset, of benchmark indicators and M&E mechanisms, including the production of periodic reports and an evaluation of results to monitor the course of ICT integration, measure the impact and the efficiency gains obtained in terms of a return on investment, and diagnose the problems encountered so as to address them.

In 2007, Portugal launched its plan for integrating ICT in education with an investment of €700 million over a three-year period, with the aim of providing a computer for every two students, possession of an ICT certification by 90% of teachers hired, and Internet connection speeds greater than 48 Mbits. With strong government backing, the plan made it possible to set up a school management platform by connecting each school to the Ministry of Education's official Internet portal, a comprehensive training and certification system on ICT utilization, the provision of 600,000 computers loaded with content to primary and secondary pupils, etc. Portugal now ranks third in the world in terms of equipping schools with ICT, and this has had many impacts in the education system and in the economy: sharpening teachers' skills, improving the quality of learning, growth of high-tech firms and companies specializing in education and ICT.

One of the major challenges to such an approach is financing, which, in addition to the above-mentioned partnerships, requires:

- The creation and management of dedicated budgets for ICT, provisioned through government subsidies and partners' contributions;
- Cost control through financial simulations and the selection of options on the basis of sustainability and cost-effectiveness criteria;
- Definition of financing priorities focusing on measurement of the highest returns from ICT;
- The introduction of specific ICT charges for learners, which should amount to about 10% of the cost of schooling;
- Reduction of taxes and customs duties by importing ICT materials specifically for education and training;
- Diversification of financing sources and introduction of co-financing mechanisms involving the government, private sector and external partners;
- Looking for innovative financing sources, for example through the sale of G3 and G4 licenses, the transition to digital television, and contributions from foundation and the local private sector, including banks and other financial institutions;
- Assessment of the funding required should put the cost of initial investment into perspective, since the unit costs fall in the medium and long terms.

Lastly, to leverage the potential of ICT it is necessary to initiate a process of production of high-quality content, with norms and standards as well as control mechanisms. Senegal's portal of digital content for teaching and learning provides an example: production of content by teachers and well-trained specialists, a rigorous system of evaluation and validation by inspectors at a higher level, structuring by technical educators, and a final validation test.

7. Emerging trends in the use of ICT in Africa: The example of mobile technology

Although it is still lagging behind, Africa is increasingly integrated ICT in education and training systems. The number of schools, teachers, trainers and learners using ICT is growing steadily. ICT integration promotes the emergence of new academic and pedagogical resources for teachers, just as it offers new alternatives for learning, self-training and inter-learning through online platforms and digital content. Worldwide, it can be observed that the ICT generation consisting of radio, television and personal computers is increasingly giving way to a generation of personal digital devices, smartphones, tablets, etc.

According to current forecasts, sales of tablets will exceed those of PCs in 2016, and the number of users of mobile hardware will rise to 788 million in 2015. The rate of growth is already exponential, at more than 2000% between 2005 (25 million users) and today (650 million).

This expansion of mobile technology has spread to educational contexts in the developed countries, as in Korea's "Intelligent School", Singapore's "Schools of the Future", and MOOCs in North America.

In Africa, the use of cell phones has also seen spectacular growth and has become quickly democratized, extending to rural areas and the poorest social groups. The mobile phone has become an education and training tool is being tried out at all levels of education systems and for all forms of education (formal, non-formal, informal). It can also meet needs in terms of policy formulation and planning, teacher development, and facilitation of reading and literacy.

Learning through mobile devices rests on three pillars:

- policy: curriculum, open learning resources, evaluation and validation, etc.;
- infrastructure: access to mobile technology and to the network; and
- pedagogy: the teaching-learning process, self-study and inter-learning.

It is recommended that attention be given to four experimental phases:

- evaluation of the ecosystem: existing model and infrastructure, number of learners to cover, program;
- planning and preparation for implementation: selection of sites and partners, customer service models, user needs, content selection, targets;

- distribution, training and adjustments: type of procedure, physical distribution, construction of the ecosystem and curriculum, professional development for stakeholders; and
- maintenance and support: adaptation of hardware, putting the service model into practice, feedback on sustainability and fungibility, and strategy for scaling up.

The example of in-service teacher training in Madagascar reveals a strategy of professional development for unqualified teachers based on the use of mobile phones. The "tutored self-training" method uses a "learning kit" made up of written and audio resources and a cell phone leaded with 41 files, with an MP3 reader and using solar power. The nine-month program comprises three face-to-face meetings as well as evaluations.

Teachers can train themselves and can telephone to their tutors at no charge, after their initiation in the use of computers and the Internet. The results show growing interest and motivation on the part of teachers, substantial participation in the various opportunities offered, and a positive impact of their work skills, both theoretical and practical. The second example, involving literacy training for women and girls, shows the potential of mobile devices as equity tools. The process consists in:

- evaluating the main barriers to literacy for women and girls;
- targeting the problems to be resolved, with emphasis on those relating to literacy;
- checking on whether certain preconditions in terms of infrastructure and ICT are met (electric power, access to computers and to the Internet),
- developing mobile solutions (telephones, SIM cards, memory cards, Internet connectivity, social networks like Facebook and Twitter);
- supporting delivery of content by mobile device with micro-lessons, visual aids, active learning exercises, and tests;
- designing teaching methods for mobile: communication by telephone, peer learning and cooperation, etc.;
- sensitizing and mobilizing policy-makers and local communities in regard to the conditions required for success and the support needed.

These lessons, drawn from 10 UNESCO case studies (some of which were conducted in African countries: Senegal, Niger, Nigeria, etc.), demonstrate that literacy training via mobile devices is effective when it focuses on the specific needs and situations of target groups, in terms of equipment availability, life skills and empowerment.

The focus on social representations is crucial here for changing individuals, their perception of themselves, and others' perception of them, in order to remove socio-cultural barriers.

A third example is concerned with the use of mobile technology in the strategic management of education. One of the main challenges here is to obtain good statistics: varied, reliable and current. Côte d'Ivoire's experiment with data collection via cell phone has made it possible to

gather data on the ground, notably at the school level, quickly, without losses or wastage, and with the broadest possible coverage.

School principals were trained in the use of the application and subsequently offered various options for sending in their data: SMS, Wifi, GSM, norm 36. Once sent, the data are automatically integrated into the database, with feedback sent to schools. The application used can also run on tablets and non-mobile computers. This approach offers a number of valuable solutions:

- Rapid data collection (nearly in real time);
- Easier access to isolated schools;
- Increased accuracy of data;
- De facto decentralization of data collection.

These experiences show that the use of mobile technology represents an emerging opportunity that governments should seize on to improve system governance, include the excluded, and improve the quality of education.

8. Certain risks and strategies for avoiding them or lessening their impact

Integration of ICT in education and training does entail some risks.

The first is the risk of exacerbating existing disparities through digital exclusion. This risk is particularly high in Africa, because of the many existing internal gaps (cognitive, technological, digital, energy-related) between urban and rural areas, between rich and poor, etc. If ICT integration follows the current map of the availability of infrastructure and other requirements, the most disadvantaged areas will be de-coupled from the overall process and left behind. In other words, it is those who are already relatively well-off who will benefit the most from the dividends brought by ICT in education and training, while the poorest will be excluded. This means that the existing gaps will grow wider, marginalizing the poorest groups still further. For this reason, ICT integration in Africa should pay particular attention to the design and implementation of the equity strategies discussed above.

The second risk is related to low level, and in some cases the complete absence, of locally produced digital content. This leaves countries with no alternative to the use of content designed for other contexts. Children and young people in learning situations will thus conceive of the world from a perspective that reflects cultures and languages different from their own. They are thus exposed to a process of cultural erosion that atrophies their own cultural “genius”. The expected response consists of strong national policies of support for teachers and local publishers producing digital content adapted to local cultures and languages.

The third risk is observed at several levels. Many young people today are addicted to video games, and that being the case, they lose the capacity to manage their time, or even to take

their place in the real world and participate in social life. This sabotages their education, which they often regard as being of secondary importance. In addition, they may be exposed to obscenity when they have free access to dubious websites. Such dangers call for responsible behavior by families, since developers have made it easy to exercise parental controls.

Conclusion

It is difficult or impossible within the limited scope of this report to evoke all the richness of the ideas exchanged during the three days of the Forum on ICT integration in education. By way of conclusion, we have decided to emphasize certain leading ideas emerging from the main messages addressed to policy-makers.

First, Africa cannot permit itself to remain on the sidelines of the scientific, technological and media revolution that places knowledge economies and societies in a dominant position in the globalization process. Otherwise, it will lose the battle for competitiveness and development, and will continue to suffer from unfair trade and the impoverishment of its people. In short, it will be a subjugated “sub-continent”, serving merely as a reservoir of natural resources for the rest of the world. For this reason, governments absolutely must seize on ICT as a means of economic acceleration, notably by taking advantage of the continent’s demographic dividend to train massive supplies of high-quality human capital. This is the primary condition for the structural transformation of economies through increased labor productivity and competitiveness, efficient processing of natural resources, and the development of innovation.

Next, investment in ICT to develop this critical human capital will bring a return only if it is conducted in a coherent, sustainable policy framework. Policies and strategies for ICT integration in education and training should be based on a solid foundation of information concerning needs, resources and the realities of national development, as well as on the results of the search for effective applications of ICT to improvements in access and in the quality of learning. In the design and implementation of these policies, it is particularly important to:

- develop equity strategies to provide access for all to hardware, software and Internet connectivity, particularly for the poorest groups;
- coordinate projects and form networks of stakeholders for the pooling of resources, while will certainly not suffice;
- give priority to local production and sharing of meaningful, relevant, high-quality content;
- invest in the training of competent stakeholders and in the development of communities of practice;
- encourage research and development in support of ICT integration and conjunction of efforts in order to learn from the various experiences and bodies of knowledge in this field;

- direct reforms toward the goal of enabling all people to learn in any location and at any time through ICT, social networks, learning communities, to bring about the conditions for lifelong learning and building African knowledge societies.

Lastly, the success of such policies will depend on a number of conditions and factors, including:

- firm engagement on the part of political leaders who are convinced of the value of ICT and who mobilize and make policy choices in favor of quality education for all, supported by integration of ICT;
- involvement of all stakeholders, with a strong consensus and broad social support, offering a favorable environment for the reforms needed to leverage the educational potential of ICT;
- the development and strengthening of social capacity for innovation and implementation.

The most fervent wish of the First African Ministerial Forum on ICT Integration in Education and Training may be encapsulated as follows:

More, different and better education with ICT, to make Africa the continent of the 21st century!

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