WITFOR

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THE STELLENBOSCH DECLARATION
ICT IN EDUCATION: MAKE IT WORK

Preamble

This declaration is the result of the expert group of educators and specialists of ICT (*Information and Communication Technologies*) in Education, from six continents, who met and worked together in Stellenbosch, South Africa from 4th to 7th July 2005 at the IFIP 8th World Conference on Computers in Education (*"40 years of Computers in Education, What Works?"*) held by the IFIP Committee on Education (IFIP TC3).

We, the members of the group, hope that this Stellenbosch Declaration will improve the integration of ICT in Education as a resource for both better teaching and learning and as a preparation of citizens for the Knowledge Society. We address this to all stakeholders in ICT in Education: teachers, practitioners, researchers, academics, managers, decision-makers and policy-makers, in order to increase the access to Education for everyone around the World.

Information and Communication Technologies are changing the World. We are now in the Information Society, a Society in which information is an essential and valuable commodity that one can buy, sell, store, or exchange. But this Society may also be the Society of the Digital Divide, enlarging the gap between the haves and the have-nots. As educators, we know that information and knowledge are not the same. We want not only an Information Society, but also a Knowledge Society in which Knowledge can be shared and distributed all around the world, enabling all children and all people to access Knowledge and to benefit from being educated. Education is a key issue in the Knowledge Society, and Educators have a major role and mission.

Holding this Conference in Africa has made more visible the huge problems that African and other developing countries are facing, and it is the responsibility of all educators and decision-makers around the world to help such countries take part in the developments of ICT in Education.

Having reflected on many aspects of Education and the influence of ICT on Education, we recommend that stakeholders and decision-makers in ICT in Education focus on 6 major areas that will shape a beneficial use of ICT in Education:

- **Digital Solidarity;**
- **Learners and lifelong learning;**
- **Decision-making strategies;**
- **Networking;**
- **Research;**
- **Teachers.**

For each of these areas we formulate recommendations and we propose a set of possible actions (see Annex) in order to put the recommendations in place. These actions address 3 main levels:

L1: Societal level.
L2: Learning and teaching level.
L3: Technological and infrastructure level.

All stakeholders of these 3 levels are invited to consider the recommendations and actions as appropriate to their work.

1. DIGITAL SOLIDARITY

Information and Communication Technologies may increase the divide between people, and the "Digital Divide" is a major problem for our Societies, not only at the World level but also at the very local level. ICT have also enabled a huge number of success stories, of experiments and innovation, improving the access to Education and Knowledge, especially in developing countries. In the field of Education, ICT should help develop "Digital Solidarity". A World Digital Solidarity Fund has been established, together with the Digital Solidarity Agency. It is now the mission of educators, researchers, education-policy-makers, to make this Fund and this Agency achieve its aims in the field of Education. Digital Solidarity means dealing with the access to ICT infrastructure on one hand and admission to digital content and media on the other. It requires strong and joint actions of all stakeholders (political decision makers, education systems and industry) to guarantee the right of participation in the digital society for all students in the world.

Recommendations:

We recommend a **Digital Solidarity Action**. All stakeholders will agree on the importance of fighting the digital divide and on the principles for doing this described above. This action will:

- define as the most important aim for the next five years, that every child in the world has access to a digital information and communication infrastructure;
- support projects that establish collaboration of students and teachers on a global level and through networks;
- express the will to share digital educational content among education systems of different countries while respecting International Property Rights.

2. LEARNERS AND LIFELONG LEARNING

In the Knowledge Society, the Learner is not only the formally enrolled pupil or student. Lifelong learning has become an essential component of the Knowledge Society, and Education must take this into account. Every learner is a lifelong learner who needs to adapt to the knowledge-based society and actively participate in all spheres of social, cultural and economic life, taking more control of his/her future. The content and the methods of initial education must take into account preparation for lifelong learning. This gives Schools and Educators a new role and mission. ICT is a key tool for developing lifelong learning.

Recommendations:

- Education systems must integrate the mission of lifelong learning into policy and practice.
- The development of lifelong learning needs an integration of education into the real world - ICT should be used for this purpose.
- New and emerging key skills are to be identified and promoted, particularly basic skills and competency of literacy and numeracy.
- Impacts on curricula, learning content and methodologies, as well as on Education systems need accessible, affordable, inclusive, and secure ICT.
- Lifelong learning must be encouraged in all countries, as a tool for reducing the Digital Divide.

3. DECISION-MAKING STRATEGIES

In order to help decision-makers and to make decisions meet the real needs and improve the situation of Education and ICT in Education, the decision-making processes and strategies must be considered. Bridging research, practice, experimentation, innovation with decision-making is essential.

Decision-makers should make better use of the experience of Practitioners and the findings of Researchers. In turn, Practitioners and Researchers should make their findings and results more visible and usable for the Decision-makers.

In the field of ICT in Education, decision-making needs not only technical information; it needs a vision of Society, a vision of Education, and a vision of the place of Education in Society.

Recommendations:

- Educators and researchers should help in elaborating a vision and making it explicit. Decision-makers and stakeholders in Education should together create a context for informed decision-making.
- The decision-making processes should use a systemic approach, involving all stakeholders and promoting regional and international co-operation.
- A climate of collective ownership and responsibility for the development and implementation of ICT policies should be created.
- Stakeholders should use innovation and success stories of others to create and promote future ICT policy and implementations.
- Decision-makers should use the results of research; researchers should make their results readable and usable by decision-makers.
- There is a need for more practical implementation oriented research.
- Decision-makers should promote trust and security in the use of ICT.

4. NETWORKING

One main characteristic of the Knowledge Society is being networked and this means that many activities are no longer organised in a hierarchical or pyramidal way. The clearest example is the Internet, in which information is accessible in a networked way, and in which people can communicate in a networked way. In a network structure, there are generally several ways to go from one point to another; a network is interactive, and permanently evolving. Networks in Education offer many ways to access knowledge, offer many possibilities for networking people and developing collaborative work and enhancing the "collective intelligence". There are many different networks, local, global, and they can interact. The network structure of Society has an impact on policies, on the way systems are organised, and on educational systems.

Recommendations:

- Develop networks in order to facilitate access to information and knowledge and in order to enhance collaborative activities.
- Take into account the networked structure of society in the design of educational policies and in the organisation of systems.
- Make people be part of networks, in each community, in each country, internationally.
- Involve all countries, particularly developing countries, in the education networks. *Help in making real this sentence of an African child: "I am a child of Africa and a citizen of the world".*

5. RESEARCH

The development of ICT-based education and training processes is a growing reality. Evidence of this can be seen by progress made in distance educational and training systems, the development of Virtual Universities, the development of a variety of learning environments, and in the drive towards the definition of standards for the field of e-learning. Corporate training and professional re-skilling systems are other areas in which important developments have taken place.

There is therefore a need to continue research work on the development of these technologies and their applications. A certain realignment of research priorities is necessary, as we suggest in the following recommendations.

Recommendations:

- There is the need for the research community to consider the following aspects:
    a. Bridging the gap between technology and pedagogy (in the field of ICT-supported learning, pedagogy and technology have often been treated separately; pedagogy often being based on what the technology appears to permit, rather than fully integrated as a basis for technological design).
    b. Development of solid theoretical frameworks (the possibility of relying on solid theoretical frameworks is one of the key factors that can enable conception of the many positive experiences already taking place in order to reach the definition of reliable innovative reference models).
    c. Development of an understanding of the use and the effects of ICT in Education. This means considering positive aspects as well negative or problematic ones.
    d. Finding an appropriate balance between fundamental, applied, and development research as well as between public research and research made by the private sector.
- The output of research should be made widely available, as open source, for improving practice, decision-making, and resources development.
- Establishment of research networks in which developing countries are systematically involved.
- Research should take into account all cultures, not only western. One should critically look at results in terms of generalising and the possibility of adapting to different cultures.
- The establishment and development of a mutual understanding between researchers and practitioners.
- Encourage Research of different learning situations, including informal learning.

6. TEACHERS

The information and knowledge society provokes a continuous change in the role and the mission of teachers. Being a teacher in the Knowledge Society requires new specific competencies: a teacher has to deal with new knowledge and new ways for accessing knowledge; a teacher has to deal with a networked world and with new types of co-operation and collaboration; a teacher has to deal with a society in which knowledge plays a crucial role; a teacher has to deal with lifelong learning. The networked Knowledge Society results in teachers working in a more collaborative way, not only locally in their school, but regionally, nationally and also globally. The teaching profession therefore needs to evolve strongly and quickly.

Clearly it appears that teachers are the key agents in the education system and are instrumental in the evolution of Education. Hence we must take into account their major central role when creating educational policies, and it is our common responsibility to help all countries, though particularly developing countries, to train and recruit teachers, and to involve all teachers in international networks. ICT changes teaching and learning, but technology is not the main issue. We should always remember: "Technology matters, but good teachers and good teaching, matter more".

Recommendations:

- Educational policies should consider teachers as key agents of Education, of the evolution of Education, and of the preparation of players and citizens of the knowledge society.
- The teaching profession should be made more attractive; the number of well-trained teachers should be increased.
- Teacher education should include not only knowledge and knowledge transmission but also the human and social components; teachers must be enabled to work with human beings and to work in the context of the society.
- Teachers must be empowered with ICT integration skills.

- One should empower innovative teachers and promote communities of practice for innovation, in order to facilitate the dissemination of innovations.
- Teachers must be involved in a lifelong learning context. Teacher professional development in the context of Lifelong Learning should include ICT knowledge and expertise. This knowledge should include not only technological abilities but also cultural and cognitive roots of computer and computer science, such as, for example, a knowledge of the history of the field, which is essential for understanding the present - its beliefs, desires and intents for ICT in education and how it might evolve.
- International networks of teachers should be developed and activated, systematically including developing countries.

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ANNEX
A list of possible Actions

For each of the 6 areas we propose a set of possible actions in order to put the recommendations in place. These actions address 3 main levels:
L1: Societal level.
L2: Learning and teaching level.
L3: Technological and infrastructure level.
All stakeholders of these 3 levels are invited to consider the recommendations and actions as appropriate to their work.

1. DIGITAL SOLIDARITY

(L1 - Society) Provide equal and open access to digital information, content and media for all students and their teachers.

- Everyone should have equal access to basic ICT products, services and user knowledge in their own native language.
- Making digital information 'content free' and 'open on the web' is a powerful way of reducing the knowledge gap and reducing confusion and intolerance between developing and developed countries.
- A climate needs to be created for collective ownership and responsibility for the development and implementation of ICT policies;
- Frameworks for partnerships need to be guided by clearly defined policies and objectives of governments;
- Always adopt a citizen-centred focus; co-operative in nature, seen as seamless from the beneficiaries, and transparent but accountable in decision-making.
- Determine the role of Civil Society and Non-Governmental Organisations (NGOs) in the Digital Solidarity Fund.
- It is important that the next World Summit for Cities and Local Authorities focuses on the development of an integrated ICT action plan, as well as the development of training as leverages for growth competitiveness.

(L2 – Learning and Teaching) Approach to networks for digital communication and support to establish interaction and collaboration among students and teachers in different parts of the world.

- Recognise the right of every student to have access to ICT.
- Create common criteria for quality assessment of e-Learning. Jointly accepted credit system, such as the European Credit Transfer System (ECTS).
- ICT must be embedded in local government policies.

- Local government must take a long-term view on achieving the goals of an information society – no quick fixes.
- Users, namely learners, teachers, trainers, etc., have to assert themselves as a driving force and not act only as consumers. It is necessary to maintain the focus on the social dimension of education-related activities and these cannot be reduced to just business and market issues.
- The newly established Digital Solidarity Fund should help promote and expand successful development projects, particularly those that have only been funded as innovations and would not otherwise be sustainable, so that excluded people and countries can enter the era of the Information Society.

(L3 – Technology and Infrastructure) Provision of an infrastructure for a global collaboration between students to share knowledge, experience and different perspectives.

- Standardisation of electronic interaction is needed.
- All educational institutions need a broadband Internet connection to facilitate teaching and the provision of such connections should receive governmental support.
- Governments should create an electronic portal (e-government) to support the creation of an information society, and this e-portal should be based on citizens' needs.
- A city's and local government's information and communications network should be established by the United Nations, to communicate information within local government and government in general.
- The Digital Solidarity Fund must promote low-cost access to telecommunications and Internet;
- The Digital Solidarity Fund should promote free and open source software.

2. LEARNERS AND LIFE LONG LEARNING

(L1 - Society) Changes in the Education system.

- We need to consider all learners as lifelong learners.
- The process of change does not only involve the methods and tools for education but also the different contents and their relative significance.
- Measuring ICT knowledge, understanding and skills must be part of all learner evaluations in today's (digital/information) society.
- Always give consideration to cultural and social contexts when introducing technologies in educational processes.
- Technology and pedagogy are to be considered together as it is pointless, from a pedagogical point of view to make ICT-based tools available if the educational strategies, and the activities in which the learners engage, are not suitably revised.
- Shift e-learning emphasis from content to activity.
- Informal learning should be better exploited and applied in structures and conditions of work at school so learners can be better accommodated and learning be more effective.
- Technology cannot refer only to pedagogical assumptions and to the organisational structure of existing educational institutions. New models and roles for teaching and learning, including non-institutional and non-formal settings, need to be studied.
- Learning for the socially disabled can be highly motivated by the use of ICT.
- Students should learn more collaborative skills at school. ICT provides avenues through which this can be done.
- Education in ICT is a gender issue as girls have different learning styles and social support needs. Certain relevant abilities (e.g. spatial skills) are also gender related.
- Computer games are a neglected but very important area of computer supported learning, which can promote critical thinking, strategic and logical skills, as well as co-operative and negotiation capabilities.
- Schools need to adapt to accommodate young students who enter education already possessing significant ICT skills.
- Online learning environments need to be designed carefully and appropriate instruments developed for reflection on what works and what doesn't.
- Lifelong learning is required to ensure economic, social, cultural and political development of education through ICT.

(L2 – Learning and Teaching)

- Develop basic skills and competency of literacy and numeracy.
- Generic skills – such as communication skills, collaborative skills – are more and more important.
- Students and teachers respond well to having choices in the technologies they use for learning and teaching, rather than compulsion.
- Rethink how to integrate ICT in schools; how to be more flexible to give more access to more students.
- Ensure ethical access to ICT.

(L3 – Technology and Infrastructure) Accessible, affordable, inclusive, and secure ICT.

- Internet safety is of great concern on a global basis and the world's youth are at risk unless parents, students and communities are educated on safe Internet use.
- More attention/awareness rising for the accessibility of digital learning environments and digital learning materials for students with a handicap/functional impairment.
- Recognise that accuracy, relevance and timeliness of data about students is of prime importance in enabling an effective educational management system.
- Learning should be tailored to the individual student's requirements by using meta-data-tagged source material.
- Learning systems should be tailored to the students' requirements and allow for collaborative work.
- There should be improved international and professional collaboration in the ICT professional field: i.e. try new mergers between international and political organisations.
- Develop portals for different age groups. To make sensible use of the immense data provided by a "meta-digital library".

3. DECISION-MAKING STRATEGIES

(L1 - Society)

- National initiatives and policies should encourage the use of educational technology and support communities that use technology.
- Much more attention needs to be paid to what is meant/understood by integration in national policy.
- Governments should create an electronic portal (e-government) to support the concept of creating an information society, and this e-portal should be based on citizens' needs.
- In a changing world, we need to have an idea about what Lifelong Learners do in their professional and their personal life to be able to develop effective policies.
- Public-private partnership must be policy driven through a framework.
- ICT is more than computers. It includes many other tools that should not be forgotten (PDAs, Mobile phones, digital transmissions etc.).
- ICT must be embedded in local government policies.
- The views of Education players, Civil Society, Youth, and other groups should be considered by the political and industrial leaders presently dominating the decision-making processes.
- Civil Society should be included in public-private partnerships.
- Determine where Civil Society fits into the critical ICT choices and decisions made by governments.

(L2 – Learning and Teaching)

- Maintain the focus for the use of technology (for instance through curriculum delivery enhancement).
- Encourage local ICT initiatives and build local capacities.

(L3 – Technology and Infrastructure)

- Encourage the use of open source software.
- Provision must be provided for the managing, financing and sustaining of technologies when moving forward.

- As a principle, any funding proposals should have an ICT component built in (e.g. an application to improve roads in an area should have a budget line for the laying of fibre optic cables at the same time), with possible applications to Education.
- Local governments must take a lead in the "last mile issue", in order to bring connectivity to all places.

4. NETWORKING

(L1 - Society)

- Use networking to encourage and develop partnerships.
- Involvement all stakeholders.

(L2 – Learning and Teaching)

- Use ICT to facilitate collaborative work, exchange and co-operation.
- Facilitate interactivity and create new learning spaces for activity.
- Establish virtual communities in Education, with common goals to pursue.
- Forums should be used for collaborative learning and debating.
- Creativity should be an encouraging underlying principle in education (and in teacher training).
- Develop e-Learning through networks as a way for 'Education for All'.
- Move from e-Learning to connected and networked learning (digital or D-learning).
- Create and extend research networks of excellence on a global basis.
- Share daily across the world, contributions and advancements in ICT education, to enhance and improve even the most remote communities.

(L3 – Technology and Infrastructure)

- Network municipalities, schools, universities, health organisations, etc, through digital infrastructure, to increase information sharing (share information and facilities to benefit from economies of scale).
- Ensure capacity (technical – producing, installation and roll-out) to get all schools connected.
- Provide through a multi-sectorial approach school laboratories, mobile libraries, virtual classrooms, innovation hubs, etc.
- Provide ICT collaborative and learning networked environments.
- Encourage the use of collaborative facilities such as web services in creating inter-operability infrastructures.

5. RESEARCH

(L1 - Society)

- ICT use in education must be effective and regularly evaluated.
- Reinforce research on the education issues of ICT outside western countries.
- Student evaluations of e-Learning should be more rigorously assessed and fed into the design of e-learning environments.
- Focus online-learning research and practice to include issues of student diversity.
- There is a need for dedicated software for teaching, as smart as commercial general-purpose products, but with pedagogical attributes.
- The shift of focus from teaching to learning necessitates a shift of focus from input to outcome, and from outcome to impact.
- It is important to introduce young researchers, who naturally have the "ICT culture", into research networks in order to expedite their integration into top research activities.
- Develop e-research culture that will lead to use of Internet for research.

(L2 – Learning and Teaching)

- The design of educational technology should include examples of meaningful pedagogical processes based on a widespread consensus derived from appropriate pedagogical research.
- There is the need to address research questions regarding what teaching and learning practices are successful and how it is possible to map effective teaching and learning in order to be able to reproduce the processes involved.

(L3 – Technology and Infrastructure)

- We have to build a reliable system to allow co-operation between universities and industry so that good ideas and prototypes are quickly transformed in products.

6. TEACHERS

(L1 - Society)

- The most important enabler for computers in education is the teacher. More focus should be given to training and motivating teachers.
- An international agreement on skills and competencies for teacher professional development may improve training in ICT.
- Empower practitioners and insist on collaboration between researchers, practitioners and decision-makers.
- Teachers in all countries should get a tax break on technology.
- Counter the effects of cultural, educational and pedagogical imperialism during the transmission of learning packages across cultural levels.
- Teachers need the philosophical underpinnings for inquiring into their practice.
- The teacher has to maintain his/her leading role in the classroom – too much technology is detrimental.
- The time teachers spend in planning and organising ICT-based teaching and learning activities should be considered within their current job timetable and not as an additional activity they have to perform at home outside their current school timetable.

(L2 – Learning and Teaching)

- Good use of ICT in education requires modifications in pedagogy.
- Good teaching skills are more important than good ICT skills in effective use of ICT in education.
- Developing teachers' communities of practice using ICT is a valuable possibility to foster a greater involvement of teachers at all school levels.
- Choice of software to support online learning should be undertaken by ICT experts in consultation with the teachers.
- Learning Management Systems should not control the pedagogy. They should not hide or steal the presence of the teacher.
- Basic skill training in ICT is still needed, but this should be carefully pitched at the adult learner level. This model is particularly useful for developing countries.
- An exemplary "computer engaging" teacher must conscientiously plan for opportunities where they can actively support children using computers during quality task based computer activities.
- Anchoring fundamental ICT concepts in subjects and subject matter is essential to getting students to "Being Fluent with Information Technology".

(L3 – Technology and Infrastructure)

- Computers and software should be made available for free to Educators, as professional tools.
- Empower public servants: access for teachers and principals; enforce ICT literacy among educators.

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