

The Open access Online Observatory of the Panafrican Research Agenda on the Pedagogical Integration of ICT

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ABSTRACT

The specific aim of this research project is to better understand how the pedagogical integration of ICT can improve the quality of teaching and learning in Africa. In the first two-year phase of the project, we are developing an open online Observatory. It is designed as a dynamic space where a community of researchers and practitioners across Africa can pool their knowledge on the pedagogical integration of ICT. New, school-scale data will be collected and shared. The initial participating countries are Senegal, Mali, Cameroon, Central African Republic, Republic of Congo, South Africa, Mozambique, Kenya, Uganda, and Egypt.

IMPORTANCE OF ICT FOR EDUCATION IN AFRICA

In 2008, the Internet will celebrate its 39th birthday. In the space of only a few short years, this invention, which was initially possessed by the army and later by universities, has become a common tool, used daily by all kinds of individuals on every continent. The number of Internet surfers on the Earth has expanded explosively, from 16 million in 1995 to over a billion in 2007. This exponential use of technologies has hastened a revolution that has long been awaited by educators. The global knowledge community, promised in the 1970s, proclaimed in the 1980s, and anticipated in the 1990s with mixed fear and disbelief, has in the 21st century become an undeniable reality for all people.

As Kofi Annan declared at the last World Summit on the Information Society in Tunis, we are living in an era of rapid change, where technology plays an increasingly central role in all aspects of our lives. Information and communications technologies (ICT) greatly influence the evolution of all societies on the planet, wielding significant impacts on economic, social and cultural dimensions. With the introduction of ICT, everything changes: our approaches to teaching, living, learning, working, and earning our livelihoods. Most individuals and nations agree that we must not let this societal metamorphosis pass us by, nor should we submit to it with indifference. On the contrary, citizens of all countries, including the African nations, which are lagging

behind in many such areas, must be ready to take their destinies into their own hands. And to do so, they must take an active part in the technological world.

Although technology has jump-started the information era, it is now incumbent on all nations to take part in building the information society so that no person is barred from access to the knowledge that is available on the Internet, and so that every person might share the benefits of a brighter future, market globalization and internationalization.

OBJECTIVE

The general objective of the Panafrican Research Agenda on the Pedagogical Integration of Information and Communications Technologies (ICT) is to participate in the construction of development knowledge in the information era. The Panafrican Research Agenda on the Pedagogical Integration of ICT provides an unprecedented opportunity for knowledge networking on the topics of ICT policy and training and the use, impact and sustainability of information and communication technologies in schools across Africa.

Taken as a whole, the pedagogical integration of ICT means not only the implementation of networks and equipment, but also the use of a set of innovative technological techniques—audiovisual, information processing and telecommunications—to enhance learning at schools and in continuing education programs and to foster economic, social and cultural development.

The specific aim of this research project is therefore to better understand how the pedagogical integration of ICT can improve the quality of teaching and learning in Africa. The development of an open online Observatory is the main activity of the initial two-year phase of the project.

OPEN ACCESS ONLINE OBSERVATORY

The Observatory is a dynamic space where a community of researchers and practitioners across Africa can pool their knowledge on the pedagogical integration of ICT. New, school-scale data will be collected and shared within and between countries. The initial participating countries are Senegal, Mali, Cameroon, Central African Republic, Republic of Congo, South Africa, Mozambique, Kenya, Uganda and Egypt. The proposed 160 Observatory indicators were developed through a highly participatory process involving researchers—both male and female—from universities in 11 different countries throughout the African continent and at a workshop held in Africa in 2007. The 160 indicators were designed to monitor policies, access, teacher training, ICT use, learning, school administration and gender. Both qualitative and quantitative research methods will be used to gather Observatory data. Data on several of the indicators currently exist in some of the countries or on the Internet, but they are disparate. Brought together in one place by a research community, new data

combined with the existing data will build the foundations for future research and collaborative efforts on the pedagogical integration of ICT in Africa. Observatory data will also be used to support policy development initiatives, particularly those related to teacher training, a crucial factor for African development. Partnership agreements could be signed with organizations, some of which have already expressed their intention to collaborate and their willingness to contribute by developing content for the Observatory and/or helping promote it.

Besides producing enriching information and organizing it via a user-friendly interface, the Observatory will contribute to capacity building in African higher educational institutions, with a particular focus on the pedagogical integration of ICT in order to advance educational change in the 21st century. African academic researchers will have opportunities to engage their students in Observatory activities. A thematic newsletter will be issued every two months to report on Observatory data. Opportunities for policy discussion will be offered under the communication strategy. Special mechanisms will be put in place to encourage all participating researchers to contribute to the newsletter content and to prepare scientific articles for publication, based on knowledge and analyses generated under the project.

CONTEXT

In the 1970s, a few of the better-endowed African schools were already undergoing a minor audiovisual crisis. They were using fragile, cumbersome and costly equipment that necessitated time-consuming repairs. There was also a compatibility problem between the different components. However, the underlying reason for this scholastic failure was that this audiovisual breakthrough took place at the margins of pedagogy. As Michel (1981) explains, they did not know what to do with new and unfamiliar tools. To add to the problem, teachers were unsure as to which overall strategy to use—integration across all disciplines, independent work, individual or collective work, and so on. Advances in audiovisual technology were hindered by both the fears and hopes it raised.

Against this background, the first computers began to infiltrate African schools.

Computers made their first appearance in certain schools in Northern Africa at the end of the 1960s, mainly for management applications. It was only in the 1970s that they were used in educational institutions in North America and Europe. In Africa, the first computers arrived in educational institutions at the end of the 1970s. For instance, the LOGO project was set up in Senegal in partnership with the Massachusetts Institute of Technology (MIT).

Governments at the time were motivated by a dual goal: to initiate students to the computer and to introduce certain software programs. Two streams were predominant: Skinner's programmed teaching and LOGO language, developed by Papert. LOGO, the first computer language for children, was especially popular in North America. Seymour Papert, LOGO's creator, had studied with Piaget in Geneva

and was working at MIT at the time. His most famous work, *Mindstorms – Children, Computers, and Powerful Ideas*, became a universal reference. Papert's overriding aim was to develop educational tools and software with socioconstructivist potential. More precisely, he wanted to develop a language that would allow students to build their own knowledge. LOGO software was initially developed for the Apple II, and later for IBM computers.

For more than a decade, introductory computer courses in Africa were offered in only a few *lycées* and some universities. Information and communication technologies were largely ignored. Instead, computer processing was considered a requisite discipline. This urgency was particularly felt in Africa in January 1982, when Time Magazine acknowledged the importance of the computer by naming it "Man of the Year," the first time a machine was honoured in this way.

USE OF TECHNOLOGIES IN AFRICAN SCHOOLS, AS HIGHLIGHTED IN THE OBSERVATORY

The emerging importance of the computer meant that computer processing was, and still is, taught in many schools throughout the 54 countries on the African continent. Thanks to the dominance of the behaviourist educational approach, the next development was computer-programmed teaching (CPT). Teachers then became interested in teaching certain subjects with the help of technology. From teaching computer programming *per se* and computer programmed teaching, the move was towards computer-assisted teaching (CAT), which was widely adopted in North America and Europe. And now, just a few short years later, an entire spectrum of tutorials has been developed for educational purposes. Tutorials, or educational software, were designed to help learners acquire knowledge and develop skills (Clark & Mayer, 2003). By the early 1980s, computer-assisted learning (CAL) emerged on the scene, and in the mid 1990s, ICT was being used in a variety of disciplines. Since the late 1990s, the pedagogical integration of ICT appears to be on the ascendant in educational circles. The hope now is that teachers can better teach all manner of subjects with the help of information and communication technologies, and that students will learn more, and more easily, using ICT. In today's education community, information and communication technologies are recognized as a cross-curricular competency for students and teachers alike.

In Africa, we find multidimensional uses of ICT, from primary school to higher education. ICT are increasingly used in primary education, including preschools, kindergartens, and primary and elementary schools. Aside from entertainment value, the greatest benefit of ICT at this level is the liberation of students' ideas and aspirations. ICT also provides valuable and varying support for child learning, as it fosters emotional and social development, motor skills, physical health, language acquisition, general knowledge, cognitive skills, etc. The use of ICT in preschool and primary school is a core learning tool for the educational basics: reading, writing, communication, listening, patience, and so on.

ICT utilization appears to be even more widespread in African secondary schools, including general secondary and technical schools, where it is used by both teachers and students to teach and learn. In the technical and professional schools, ICT are used more specifically to teach and learn specialized disciplines. Thus, we observe that certain disciplines have developed ICT-related practices. Accordingly, integrating ICT into learning activities in secondary schools would seem to be all the more important, since it goes beyond interpersonal communication and integrates several dimensions such as interactive learning, collaborative learning and information research for analysis and problem-solving.

In the higher African educational institutions, ICT integration would also appear to be a necessity for both university students and professors. Indeed, as we highlight below in the section on issues, in Africa, many subjects are either not taught or poorly taught owing to the lack of teachers. ICT utilization for online learning (e-learning) is one way to address this lack, as it would provide broader access to higher learning. Moreover, the higher education sector includes graduate teaching and continuing education, where ICT holds enormous potential for adult self-training and lifelong learning. Distance education has become increasingly common, particularly in adult learner communities in various university programs. In many African universities and training schools, the use of ICT for distance learning fosters self-training and successful cyberspace initiatives that are independent of time or location. ICT enables coaching and tutoring outside regular class hours. This opens the way to a new approach to the concept of time units, learning locations and learning activities. Furthermore, online learning allows international cooperative teacher training. It also promotes national and international exchanges between teachers and contributes to the fine-tuning of pedagogical practices.

ICT are present at all levels of education systems and specialized training programs in Africa, and it would be important for this research project to cover all teaching levels and training contexts, from preschool, primary, and secondary school to university and beyond.

AFRICA AND THE DIGITAL DIVIDE

Even though information and communication technologies occupy an ever larger place in the daily lives of an enormous number of people, we must recognize that the ingress of ICT has not been consistent across all societies. Hence, the well known “digital divide” between the so-called developed and developing countries. In fact, many African countries, which are also some of the poorest on the planet, are living in a world of even greater technological deficiency, with no access to the knowledge that is available to everyone else via the Internet.

The OECD (2006) recently demonstrated that this lack of basic network infrastructures and international connections may be blamed on the more pronounced digital divide in the world’s lowest income areas. In concrete terms, apart from countries at war, the West and Central African countries are lagging the furthest behind the Western World in this respect. For instance, Niger regularly ranks at the top of the list in two

categories: poorest countries in the world and countries where information and communication technologies are particularly slow to arrive.

Accordingly, if Africa aims to better prepare its citizens for the challenges of the third millennium, it must also foster a thorough integration of information and communication technologies, i.e. regular and routine pedagogical integration of ICT into education in order to tap new, attractive, promising and diversified potentials. On the other hand, we must note that African initiatives to connect to the Internet are not in their infancy. In fact, despite the great divide between Africa and the Northern countries, and within African countries and regions as well, technologies appear to be gaining ground with exponential speed. To illustrate, the Senegalese capital Dakar has a constantly growing number of households with a high-speed connection, a situation that was almost inconceivable a few short years ago. Moreover, a recent study funded by the IDRC (Karsenti et al., 2005) revealed that almost 75% of students in some Senegalese *lycées* had an email account. And yet, particularly in the southern part of the country, a large number of schools and villages have never had electricity. Thus, the digital divide is not only between Northern and Southern countries it is also felt within the African continent and within specific countries.

Caused by a combination of social, economic, political and environmental factors, the digital divide is a complex and widespread issue in Africa. Nevertheless, our view is that there is another, ever more important, issue: the pedagogical integration of ICT into African schools. Given that ICT have barely penetrated some African societies, the digital divide remains a great concern in education. When it comes to the pedagogical integration of ICT, most of Africa is still at square one.

WHY ICT IN AFRICAN EDUCATION?

Despite the progress Africa made in the late 1970s, we note almost 40 years later that the introduction of information and communication technologies into the education system—which is fundamental to the knowledge economy—has been a difficult struggle, and in the opinion of some researchers, far too slow.

Many have pointed out that it is utopian to talk about education technologies in a continent where a large number of schools have neither electricity nor running water, where there are schools at all. The current situation of the African education system would appear to rule out ICT use in schools. This is because school policies must address such overwhelming needs that hard choices have to be made. Little priority is given to computer equipment, and even less to the pedagogical integration of ICT. Consequently, the ICT needs of students and teachers are typically the last on the list. These arguments are important, but they should not be used as a reason to eliminate technologies completely from the African education system. Education should prepare Africans for today's realities, and this is paramount. But African education systems must also prepare children for tomorrow's realities. At the same time, it must help

preserve the past so that technologies do not become a Trojan horse in the form of cultural or intellectual imperialism.

Why introduce ICT into education? Because, as explained above, ICT wields a fundamental impact on political, economic and social conditions in societies that are undergoing change. For this reason, the key stakeholders in African education—teachers, school principals, specialists, parents, and government ministers and officials—must be actively involved in ICT use and content, and above all the pedagogical integration of ICT into education. Furthermore, we must be concerned about ICT in education because it is clear that ICT will continue to significantly impact all societies worldwide, in all economic, social and cultural aspects. Education cannot escape this trend. While ICT have largely infiltrated schools in the Northern countries, Africa lags far behind. For several years now, African education systems have been coping with a multitude of problems, and countries have initiated reforms that generally do not attach much importance to ICT. The ADEA (2002), for its part, has stressed that ICT provide a learning channel with the potential to enormously improve the quality of basic education. And yet, as noted by the World Bank (2002) and in the latest report by the Massachusetts Research Association (2005), there is a serious lack of ICT research in Africa addressing effective educational uses and the potential impacts on the quality of African education. Moreover, an exhaustive review conducted in 2003 by the IDRC (Karsenti, 2003) found that only a very few studies on the integration of ICT into African education have been carried out, apart from some works by South African scholars.

Moreover, the findings of these studies are striking and paradoxical: the more that African societies use ICT, the less they are used, proportionally, in schools. The spillover into education has not yet occurred. Should we be concerned about when ICT arrives or the disparity between the social and educational use of ICT? Do we really need to question why or why not schools are equipped with ICT? It is not surprising that schools are slow in adapting to social change. After all, schools are considered as noble institutions that embody a commitment to the long term, with a mission to instruct and educate. So the important issue is probably not so much a question of when ICT arrives in the classroom, but rather a greater pedagogical use of ICT to foster educational goals. Hence the importance, in our view, of focusing less on the digital divide debate and more on the pedagogical integration of ICT into education.

MAIN PARTNERS

The main project partners will be education faculties in eleven countries across Northern, West, Central, East and Southern Africa: Cameroon, Central African Republic, Congo, Kenya, Mali, Morocco, Mozambique, the Republic of South Africa, Senegal and Uganda. The *Réseau ouest et centre africain de recherche en éducation* (ROCARE) / Educational Research Network for West and Central Africa (ERNWCA) will be responsible for continent-wide project coordination. The University of Montreal will be the technical partner, playing a key role in matters of science, technology and

publication. The national committees will approve the Observatory content, and an international scientific committee will oversee project evolution. The Observatory will be assessed in part by a statistical analysis of Internet data and an online survey. Lessons learned will be documented and continuously incorporated as the project unfolds.