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From teaching technology to teaching with technology

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As in the previous year, my participation at elearning Africa 2009 was an exceptional opportunity to meet a lot of people concerned with the issue of ICT in Africa. Under the auspices of the Republic of Senegal, and attended by its President Abdoulaye Wade and Prime Minister Souleymane Ndéné Ndiaye, the conference attracted more than 1,300 participants from 85 countries who were involved in ICT and education in Africa. The two seminars over which I presided presented the preliminary results of Phase 1 of the PanAfrican Research Agenda on the Pedagogical Integration of ICT. But what does the pedagogical integration of ICT really mean?

ICT in an educational context refers to a set of combined technologies that enable not only information processing but also its transmission for purposes of learning and educational development. The scientific literature describes different pedagogical approaches to the integration of ICT into education. Many researchers, including myself, have made a clear distinction between two different types of ICT integration: physical and pedagogical. Physical integration consists of making technological equipment available to teachers and students and promoting its use for occasional pedagogical needs. Physical integration is therefore understood as a process that leads to the introduction and/or deployment of technologies in the educational institution. This is the predominant type seen in the 120 schools involved in the PanAfrican Research Agenda on the Pedagogical Integration of ICT. For example, the les Oiselets primary and secondary school in Bafoussam, Cameroon is equipped with computers, and several teachers use them with their students, but only occasionally.

In contrast, the pedagogical integration of ICT into schools means the appropriate, habitual and sufficiently regular use of ICT in order to produce beneficial changes in educational practices and improve student learning. This type of integration implies the routine use of ICT in the teaching and learning processes. The pedagogical integration of ICT must therefore be understood as integration such that the student



learns and socializes through a multitude of interactive and communication channels. It cannot be reduced to mere physical integration, which is nonetheless imperative. There are few examples of this type of pedagogical integration of ICT in Africa, one of them being at the École Front de terre in Dakar, Senegal.

Furthermore, the pedagogical integration of ICT does not necessarily mean introducing these technologies as a new curriculum subject and showing students how to use them (which most African schools do). Rather, students and teachers should use ICT habitually in real-life learning contexts in order to support and improve teaching and learning experiences and make them more meaningful.

Taken as a whole, the pedagogical integration of ICT means not only implementing networks and equipment, but also using a set of innovative technological techniques—audiovisual, information processing and telecommunications—to enhance learning at schools and in continuing education programs and for economic, social and cultural development. Currently, this higher-level integration of ICT is very rare in African schools, although the PanAf project identified a small number of programs, for instance at the Green Gardens Schools in Kiambu, Kenya.

In Africa, we find multidimensional uses of ICT, from primary school to higher education, and they are increasing used at

the preschool, kindergarten, primary and elementary levels. Aside from entertainment value, the greatest benefit of ICT is liberating students' ideas and aspirations. ICT also provide valuable and varying support for child learning, as they foster emotional and social development, motor skills, physical health, language acquisition, general knowledge, cognitive skills, and so on. ICT are used in preschool and primary schools as core learning tools for the educational basics: reading, writing, communication, listening, patience, and more. ICT appear to be even more widespread in secondary schools in Africa, including general secondary and technical schools, where teachers and students use them to teach and learn subjects. In 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, ICT integration 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 research for information for analysis and problem-solving.

In higher African educational institutions, ICT integration also appears to be considered a necessity, for both university students and teachers. Indeed, as we highlight below in the section on issues, many subjects are either not taught or poorly taught in Africa owing to the lack of qualified teachers. ICT 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 hold enormous potential for adult self-training and lifelong learning. Distance education has become increasingly common, particularly for adult learner communities in various university programs. In many African universities and training schools, ICT are used to facilitate self-training and successful cyberspace initiatives that are independent of time or location.

Although ICT occupy an ever-larger place in the daily lives of an enormous number of people, we must recognize that their ingress has not been consistent across all societies. This leads to 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 increasingly living in a world of technological deficiency, i.e., lack of access to knowledge that is available to everyone else via the Internet. The OECD (2006) recently concluded that

this lack of basic network infrastructure and international connection can 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 ICT are particularly slow to arrive.

Accordingly, if Africa wants to better prepare its citizens for the challenges of the third millennium, it must foster a thorough integration of ICT, i.e., regular and routine pedagogical integration of ICT 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 as well as within African countries and regions, technologies appear to be gaining ground with exponential speed. To illustrate, Senegal's capital Dakar has a steadily growing number of households with high-speed connections, a trend 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 certain 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 phenomenon of the digital divide is not just 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, we believe that there is another, more urgent concern: the pedagogical integration of ICT into African schools. Considering that ICT have barely penetrated some parts of African society, the digital divide in schools remains a central issue. In the pedagogical integration of ICT, Africa is largely still at square one.

Looking forward to meeting you at eLearning Africa 2010 at Lusaka, in Zambia.