

## Closing the Digital Gap in African Higher Education

Anna Bon

Anna Bon is at the Center for International Cooperation, VU University Amsterdam, Amsterdam, Netherlands. E-mail: a.bon@cis.vu.nl.

In the past decades, information and communications technologies (ICTs) have fundamentally changed higher education and research, with the emergence of the World Wide Web—the greatest human-information construct in history—and the introduction of ICTs in teaching and learning, which spurred new interactive dynamic-learning methodologies and enabled cross-cultural and flexible collaborative interactions. ICTs have become essential for higher education, as an infrastructure, a channel for information and communications, and a tool that helps drive innovation.

### **BOTTLENECKS IN THE ICT INFRASTRUCTURE**

Currently, many sub-Saharan African universities are lagging behind in the deployment of ICTs, compared to peer institutes on other continents. A variety of technical weaknesses in the basic physical ICT infrastructure can often be observed at many sub-Saharan African universities—where Internet capacity (bandwidth) is usually insufficient, shortages of computer equipment and software are widespread, energy supplies are unreliable, information is poorly secured, and technical end-user support is often absent. It is evident that this state of ICT infrastructures has to improve.

Over the past few years, African universities made great efforts to close the digital gap by building physical ICT infrastructures and implementing information systems. Often with support of externally funded projects, computers were acquired and campus networks were built. Student-information systems were installed and connections to the Internet put in place. Yet, the main challenges relate to teaching and learning, creating an adequate research infrastructure, and delivering high-level experts for African society.

### **OPPORTUNITIES OF ICTs**

African universities need a good ICT infrastructure—first, as a channel for distance education—which is considered of highest importance for Africa. ICT-enabled distance education in Africa is believed to increase educational coverage. Moreover, distance education can reduce enrollment costs and facilitate access, as an example, for women and geographically isolated people.

ICTs are necessary to improve research capacity. Although research is encouraged through higher education policies, academic publishing at African universities remains in poor state, and research infrastructures are still inadequate. ICT networks can provide a channel toward participation in international research communities, enabling publishing and joint-knowledge creation.

Africa needs good education programs to deliver high-level ICT experts for the labor market. Currently, many private ICT academies exist in Africa, delivering network specialists and system administrators—important experts at the vocational level. However, Africa also needs ICT expertise at the master of science and PhD level,

to fill the high-level positions in industry and society, and to enable ICT research in the local context of Africa. The latter is indispensable, because the existing problems of the “digital gap” can only be solved with knowledge of the local context.

## **CHALLENGES**

The technical shortcomings in the ICT infrastructure at many African universities are often attributed to external factors. Indeed, high costs of ICT equipment and maintenance represent challenges for African universities that are permanently short of the budget. Another external factor hampering the proper deployment of ICTs in higher education is “brain drain” of ICT staff, because universities are unable to offer competitive salaries.

Donor-funded ICT projects, with investment budgets for ICT infrastructure, only solve the equipment shortage temporarily but often fail to establish sustainable solutions for institutional ICT management. Often, more emphasis is put on the technical implementation of information systems and virtual learning environments, than on the use of these ICT tools within the local context.

Despite many external factors hampering ICTs, higher education institutes in Africa can take measures to raise the quality of ICTs within the institutional walls, by improving on ICT governance, and creating organizational culture and climate that allows innovation.

## RECOMMENDATIONS FOR IMPROVEMENT AND INNOVATION

Definitely, ICT governance must be improved at the organizational level. Top managers need to understand the role of ICTs in their organization and focus on service delivery, project management, and organizational culture. They must be aware that introduction of ICTs always causes changes in organizational culture. An open dialogue between end users, the ICT service unit, and higher management is essential, in the process of organizational change and the adoption of innovations.

From the point of view of research, studies on how to adapt ICTs within the local African context are crucial for African higher education. One example of a specific African condition, related to ICTs, is the recent spread of mobile telephony within African society. This phenomenon creates opportunities for new methods of (mobile) learning and knowledge sharing among people with low-reading skills and low incomes. Research topics—such as, development of “Web 2.0” tools for rural development, mobile learning, and knowledge sharing in rural communities—are a few examples of ICT-related research topics, which can be relevant in the African context.

A useful example of a research methodology in the African context is the Living Labs concept, which applies a systematic approach of user co-creation in the development of new products and ICT services. The concept is user centered, makes use of collective intelligence and community activities, and may result in reinvention and adoption of “travelling ideas.” In South Africa, Living Labs are now being used, for example, in the Meraka Institute. This concept may soon spread to other research groups in Africa.

If African universities are to succeed in their role as innovators for society, an innovative climate is needed for research and education to flourish. Opinion leaders play an important role in the spread of innovations. Nevertheless, innovation processes take time and never occur overnight. African universities need to convert themselves into learning organizations, in which knowledge is not static but rather dynamically linked to action and creating favorable conditions for knowledge transfer and co-creation of knowledge. In such an environment the mind-set of the opinion leaders, be it managers or researchers, is of greater significance than the availability of technical solutions.