PanAf II: Supporting the development of evidence-based scientific articles on the pedagogical integration of ICTs in Africa

The Phase II (2009-2011) of the PanAf II: Supporting the development of evidence-based scientific articles on the pedagogical integration of ICTs in Africa

The Phase II (2009-2011) of the PanAfrican Research Agenda on the Pedagogical Integration of Information and Communication and Technologies (PanAf II) was launched in Dakar, Senegal, during a meeting that took place from 8th to 10th December 2009. The meeting was attended by the lead researchers and the scientific committee members to discuss about the project’s activities on the period 2009-2011.

PanAf II’s principal strategies to support scientific publication based on the Observatory data (www.observatoiretic.org) include a series of three writing workshops where participants, in small groups (2-3 country teams per workshop) will proceed from the first stages of writing, to the submission of an article for publication.

Through this strategy, in the two years of Phase II (2009-2011), the PanAf network aims to support the development of evidence-based scientific articles on the pedagogical integration of ICTs in Africa.

PanAf II covers 13 African countries which include Cameroon, Central African Republic, Congo Brazzaville, Côte D’ivoire, Tunisia, Ghana, Kenya, Mali, Mozambique, Senegal, South Africa, Uganda and Zambia).

With Phase I (2007-2009), the PanAf network succeeded both in collecting an unprecedented depth of data on ICTs in African schools, and in developing exceptional international partnerships with the World Bank and UNESCO. The schools described in the Phase I research represent nearly 245 000 learners and 9000 educators, and paint a never-before-seen portrait of the pedagogical integration of ICTs across Africa.

The PanAf network represents the first continent-wide description of leading “ICT in education” practice, and has been widely and internationally recognized for its boldness and innovation in terms of data collection, sharing, and capacity building.

For more information, see visit the PanAf Observatory at: www.observatoiretic.org and the PanAf Webportal at: www.panaf-edu.org
In contrast, the pedagogical integration equipped with computers and several school in Bafoussam, Cameroon is Les Oiselets primary and secondary Integration of ICT. For example, the schools involved in the PanAfrican predominant practice seen in the 120 educational institution. This is the deployment of technologies in the thus, understood as a process that needs. Physical integration is, use for occasional pedagogical and students and promoting its equipment available to teachers consists of making technological pedagogical. Physical integration an educational context: physical and different types of ICT integration in teaching technology to teaching and learning processes. 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 whereby the student learns and socialises through a multitude of interactive and communication channels. It cannot be reduced to mere physical integration, which remains nonetheless imperative. There are few examples of pedagogical integration of ICT in Africa, one of them being at the École Front de Terre in Dakar, Senegal.

Currently, higher-level integration of ICT is very rare in African schools, although the PanAfrican project was able to identify a small number of programmes where it takes place, for instance at the Green Gardens Schools in Kiambu, Kenya. Here, the integration of ICT not only means installing equipment and networks, but also using a set of innovative technological techniques – audiovisual, information processing, and telecommunications – to enhance learning at schools and in continuing education programmes, as well as for economic, social, and cultural development.

Even though the pedagogical integration of ICT is still in its infancy in many places, the general outlook is nonetheless bright. The survey shows that there are multidimensional uses of ICT in Africa, from primary school to higher education. In higher African educational institutions, ICT integration 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 taught poorly in Africa due to the lack of qualified teachers. ICT for online learning is one way to address this shortage, 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. Evidence for this is the fact that distance education has become increasingly common, particularly for adult-learner communities in various university programmes. In many African universities and training schools, ICT is used to facilitate self-training and successful cyberspace initiatives that are independent of time or location.

ICT is also increasingly used at preschool, kindergarten, primary and elementary levels as a core learning tool in imparting educational basics: reading, writing, communication, listening, patience, amongst others and more. ICT appears to be even more widespread in secondary schools in Africa, including general secondary and technical schools, where teachers and students use it both to teach and to learn subjects. In technical and professional schools, ICT is used more specifically to teach and learn specialised disciplines. Thus, we observe that certain fields 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.

Many researchers, including myself, have made a clear distinction between two different types of ICT integration in an educational context: 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, thus, understood as a process that leads to the introduction and/or deployment of technologies in the educational institution. This is the predominant practice seen in the 120 schools involved in the PanAfrican Research Agenda on the Pedagogical Integration of ICT.

Africa must find its path from teaching technology to teaching with technology: This is what Canadian researcher and eLearning and development expert Thierry Karsenti contends based upon the findings of a recent study he conducted in 120 schools on the Continent. In the following, he considers some of the action points uncovered by the PanAfrican Research Agenda on the Pedagogical Integration of ICT.

Mr Karsenti has recently published a book with further results and analysis of his work entitled Pedagogical Use of ICT: Teaching and Reflecting Strategies. It can be downloaded here: http://crdi.crifpe.ca/karsenti/docs/livre.pdf

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Source: www.elearning-africa.com/newsportal/english/news204.php

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Browsing through PanAf Observatory data on responses of schools and teacher education institutions as to the nature of their usage of computers, (Indicators 3.4.1, 3.8.2 and 3.8.4). This article argues it appears there is no coherent, systematic and creative integration of Information and Communication Technologies (ICTs) within all aspects of teaching and learning. This is consistent with what transpired in Europe during the first decade of the emergence of the Internet where the use of ICTs in teaching and learning was described as disappointing (Leach and Moon, 2000).

Discussion of the use of ICTs in Africa is often dominated by issues of access. The reality is that access to computers and the Internet will be variable depending on the socio-economic backgrounds and location of various institutions and the data demonstrates this. Castells (2001) observes that “the double logic of inclusion and exclusion cuts across countries” denoting the dominant and the dominated or those integrated or disintegrated into global and local societies respectively.

The speed and intensity with which interactive and knowledge creating domains on the World Wide Web are being used in the rest of the world vis a vis Africa justifies some concern. The reality is the “digital divide” is also geographical divide even though pockets of the North exist within Africa. However, of utmost concern is the “content divide” which raises questions about who are the Internet content providers and where are they located? Who determines the form and content ICT medium? What is level of integration of ICTs into curricula and pedagogy?

The extent to which educators view themselves as autonomous curriculum developers and researchers into the curriculum process will probably determine the level of sensitivity “to a range of dimensions when incorporating ICT into their pedagogic practice” argue Leach and Moon (2000:394). Introduction and integration of ICTs ought to impact on the nature and quality of the following dimensions:

Educational goals, Knowledge, Learning purposes, Learning and assessing activities, Teacher and learner roles and relationships and Discourse

Emerging Data
The ability of teacher-trainers to use ICTs (basic skills) (Indicator 3.4.1)

At the Universidade Pedagógica – UP in Mozambique teacher trainers abilities are limited to browsing the internet searching for information then they analyzing it to adjust to the student level and reality and communicating with each other through e-mail. They also use PowerPoint and other software programs. They mainly use Word, Excel and PowerPoint.

At the Kenya Technical teacher’s college, teacher trainers are offered computer- literacy skills training using Word, Excel and PowerPoint, Internet and Web Quests.

At University of Education of Winneba in Ghana the data indicates that “most (80%) faculty members have various levels of basic skills and knowledge of using Word-processing editors (Microsoft Word), PowerPoint presentation graphics, Internet surfing for research and personal purposes, the online student information system for grade processing and reporting. Faculty members in some academic departments (Mathematics Education, Music Education, Pre-School Department, Special Education, Fine Arts School, etc) use subject-based software for teaching and learning. Some faculties also use multimedia authoring applications such as Microsoft Movie Maker, Camtasia Studio, ULead Video Studio, CorelDraw, etc to create instructional materials. Faculty members also use SPSS to analyze statistical data. Through the Open Educational Content Development Project, faculties are now able to create and share digital educational content and instructional materials within the university community (students and faculty) and the WikiEducator Community. So far 81 faculty members have their course materials already uploaded to the servers of this project.” The institution even has an URL: [http://www.wikieducator.org/About_UEW_Open_Educational_Content_Development_Project](http://www.wikieducator.org/About_UEW_Open_Educational_Content_Development_Project) that allows access to their project.
courses are offered jointly between various institutions.”

From this data it is interesting to note that Ghana is utilizing ICTs in a diversified and perhaps more advanced manner compared to Wits School of Education with Kenya and Mozambique utilizing it in the most basic way. The University of Education of Winneba has started engaging with the pedagogical process of authentic knowledge creation and dissemination with 81 faculty members having uploaded their courses compared to 6 at Wits.

The presence of ICT in teacher-training curriculum (Indicator 3.8.2)
At the Universidade Pedagógica – UP The problems rise from the shortage of the ICT equipments and reduced number of lecturers skilled on the use of equipments has meant that ICT are not present in any meaningful way on the teacher training curriculum. Student teachers only acquaint with computers is typing assignments.

In Kenya at the Kenya Technical Teacher’s College the presence of ICTs on the curriculum is limited to the use of computers especially on business studies curriculum. The use of computers is encouraged in all the curriculum subjects.

Wits School of Education in South Africa is on the same wavelength with the University of Education Winneba in terms of integrating horizontally and vertically articulated ICTs courses within the curriculum which expose students to hardware and software, operating systems, databases and programming languages with relevance to teacher education. Passing these courses is a pre requisite for graduating at both these institutions.

Description of ICT in educator professional development (continuing education) (Indicator 3.8.4)
There are differing conceptions of what it means to integrate ICT in professional development across institutions. At the Universidade Pedagógica – UP in Mozambique it is ad hoc and limited to browsing the internet for information.

The Kenya Technical Teacher’s College is slightly more structured with preference or priority being given to Heads of Departments and their deputies are taught “The main focus of the training is in basic computer operations, use of computers in record keeping and use of the Internet.” (Indicator 3.8.4)

The University of Winneba in Ghana and Wits School of Education has a comparable conception of the level, nature and structure professional development should take. In Ghana it is not articulated into the course structures or credit systems of the university because it takes the form of induction and is limited to new faculty members so that they are able to integrate ICTs into curricula and pedagogic practices. The success of this approach has limited for a variety of reasons.

Wits School of Education on the other hand has the most highly developed conceptualization of continuing professional development with structured programmes which are horizontally and vertically articulated into the University’s qualification framework from certificate levels up to PhD levels. It offers wide ranging courses on various aspects of ICTs. It is beyond the scope of this article to go into these in detail suffice to say that a good beginning is being made to produce educators who will be able to engage with ICTs at the most advanced levels of developing and disseminating content which is appropriate and relevant for the African context.

The landscape in Africa is variable in terms of the scope and depth of engaging with ICTs. The possible and desirable ways in which educators and learners can best utilize ICTs are beginning to emerge through the development of study programmes that will allow integration of ICTs into the various dimensions of the professional knowledge bases. If African educators are to research, publish and communicate “information literacy” that reflects how ICTs are part of the dynamic that is influencing developments within their profession then they also need to start interrogating and engaging with what is available on websites as active participants rather than passive and uncritical assimilators and purveyors of other people’s content.

The data available indicates challenges of access to ICTs as well as something far more insidious, the alienating nature of the ICT medium where educators are failing to take ownership of the process of creating appropriate and relevant local content that addresses issues of different languages and cultures of teaching and learning. I acknowledge this appears a tall order, a daunting task, considering the shift in cultural orientation as well as the skills required. Compression of space, time as well as the pace of change places demands on educators in an environment where the working conditions are not always conducive.

Questions about why, by whom and for what purpose the current content was created are inevitable. Educators in Africa need to move beyond a passive response to active knowledge construction to reflect their contexts and orientations to professional knowledge while developing skills in multi-modal approaches. This is an urgent agenda.

While the information superhighway is heralded as a vehicle into lifelong learning the paradox is that this postmodern contraption is anchoring the South into a modernist reality as it tends to perpetuate structures of domination of western modes of knowing and being – a re-emergence of empire in an altered state – a form that will relegate the new south wherever it might be as a footnote in the new history of ICTs. Just to be sure Africa is still home to a greater part of that south.

This article calls for an investigation of the extent to which educators in Africa are part of networked “communities of
practice’ that access, discuss and evaluate various ideas, materials and practices” while developing their own online learning and teaching content. The work being done at the University of Winneba and Wits School of Education offers hope for a sustainable development of the skill base necessary for participation in these globally networked communities.

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The influence of culture and language on teaching and learning in general has been a subject of perennial debate. The emergence of Information and Communication Technologies (ICTs) and their use as both media of communication and platforms for knowledge production and distribution takes the language debate to another level. This article seeks to demonstrate how ICTs have further opened up the public spheres of information and communication making it freely available to those who have the resources to participate.

ICTs offer a powerful resource for educators in Africa to join their colleagues in the rest of the world to participate in teacher education and schooling discourse practices. Currently the language of communication is the imperialist languages of domination such as English, French and Portuguese to a limited extent. In fact is the data from Mozambique a Portuguese speaking country which triggered ideas for this article. In this country teacher educators cite the predominance of English on the internet as a barrier for effective participation in a country where the lingua franca seems to be Portuguese. The teachers seem to suggest that the content of ICTs should be translated into Portuguese if the students and educators are to benefit effectively from their use. Of interest in Mozambique is that some respondents regard Portuguese as a mother tongue while others regards it as a second language (see Mozambique Indicator 12.1.1)1. While this is of interest, it is also a telling commentary on how, for mother tongue speakers, the use of second or third languages hinders the understanding and interactivity with ICT (see Mozambique Indicator 12.1.1)2. This is because thinking has to be processed and transferred through a number of languages. Consequently students remain locked in the mode of mere translation and could never exhibit critical and creative thinking. The cognitive difficulty or dissonance experienced in comprehending the surface meaning of content on the internet is likely to de-motivate and hinder deeper engagement with pedagogic processes or disciplinary knowledge.
Interestingly, there is no suggestion from the Mozambican institution for translation to be done in mother tongue languages. These educators seem to have internalized the use of the colonial language as if it is their own. Based on the data, there seems to be no interrogation of the impact of second language use on learning in general and learning through ICTs in particular. Teachers appear to operate within a structural functionalist ideology with its positivist and universalising orientation and its reification of reality.

Teachers in South African Schools who probably teach at schools where the majority of learners use English as a first language indicates that they did not face any language difficulties vis a vis use of ICTs (see South African Indicator: 12.1.1)3. Like the Portuguese counterparts above, there does not appear to be any sense of awareness of the need to have ICTs accessible in African languages. There seems to be a high degree of comfort with the English language (see South African Indicator: 12.1.1)4.

At a school in Ghana, educators indicate that although English is a medium of instruction in learning institutions, it poses a challenge for learners to access and utilise and be fully operational in ICTs (see Ghana: 12.1.1)5. They recognize the importance of introducing African languages in ICTs, but are quick to rationalize how this would be a challenge given the nature and differences in the characters of the alphabet the local mother tongue languages utilise (see Ghana Indicator: 12.1.1)6. These educators are still operating within a structural functionalist paradigm with tendencies towards liberal progressivism. Educators in Africa need to quickly appreciate and interrogate how language facilitates and captures thought while giving or denying voice to engage with the world. Language shapes and produces identities while reflecting the struggle within power relations over the nature of the discourse to be defined and negotiated (Giroux 1997). A critical pedagogy should problematize the marginalisation of African languages in ICT.

This article seeks to demonstrate further that apart from verbal and written form of literacies required to engage in learning, ICTs represent another form of [global] language which operates within a specific culture. Langsdorf (1995: 55) posits that “literacy in one means of communication does not assure or even automatically encourage literacy in another”. There is a major cultural shift required from both teachers and learners, particularly those who are not exposed to the ICTs culture, which should not be overlooked in teaching and learning.

By their very nature ICTs appear to capture the discourse of plurality by affording an open space for multiple agents with multiple realities to articulate their subjectivities “constituted within difference”. What seems to be ignored is the importance of contextual background, especially for Africans as agents with multiple realities. Giroux (1997: 202) asserts that “one of the most important theoretical and political advances of postmodernism is its stress on the centrality of language and subjectivity…” Language is viewed “as a system of signs structured in the infinite play of difference, and in doing so has undermined the dominant, positivist notion of language as either a genetic code structured in permanence or simply a linguistic, transparent medium for transmitting ideas and meaning.” (Ibid)

ICTs appear to be an exemplification of the postmodern paradox (based on the data) in that they represent, in a universalising and positivist manner, the culture of the dominant groups. While the place, space and time ICTs arenas or forums offer is open it is also closed to different and multiple forms of being, knowing and representation through language limitation for some educators and learners/students.

This paper argues that African educators, governments and the private sector in collaboration with the national and international development agencies have an urgent responsibility to mobilise resources to embark on a multi-pronged and multi-phased project to translate current computer languages into African languages to be completely inclusive than exclusive. Failure to do this will condemn Africans to being “piping Toms” or voyeurism. If the critical stakeholders see merit in the need to start a translation project, this would offer an invaluable opportunity to kick start the long overdue task of cross curricula multi disciplinary knowledge translation into mother tongue languages.

Finally, there is a need to investigate the nature of ICT language and culture and to research how reasoning is affected when learners switch from mother tongue to second language to ICTs language. What are the implications for this “linguistic plurality” for teaching critical thinking and reasoning? Furthermore, there is a need to problematize the kind of training that teachers experience and have been exposed to.

References


Is language a barrier when accessing ICTs in Africa? A South African translation initiative

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Martindale (2002), in an article for a Linux journal promoting a non-profit open source translation project in South Africa argues that navigating the digital world is daunting for first time users without having to do it in a language that is not their home language.

In the PanAf research project, educators and parents in both Mozambique and South Africa inferred that learners experience a problem when accessing ICTs in a language other than their home language (Indicators 12.1.1 and 12.1.2). Interestingly in countries such as Kenya and Uganda in which English is the official language and Kiswahili is the national language in addition to numerous indigenous languages, it is stated that as English is predominantly the language of instruction, learners do not experience any problem when accessing ICTs. Similarly the majority of instruction in Gambia is done in English and should learners whose home language is not English encounter a problem with operating ICTs, through the use of icons and standardized symbols even those with the slightest command of English are able to use them with ease. The user-friendliness of the interface of the computers makes the relationship between first / home languages and ICT in education insignificant (Gambia Indicator 12.1.1). Ghanaian educators report that as the teaching of ICT goes well with demonstration, problems are minimized (Ghana Indicator 12.1.1).

While the above countries may argue that there is no relationship between the first language of the learners and ICT in education, firstly due to English being predominantly the language of instruction and secondly due to the easily accessible computer and software interfaces, other countries disagree.

Just under half of the Mozambican population speaks Portuguese. Educators in Mozambique indicate that while some computers are formatted in the learner’s mother tongue of Portuguese, the learners benefit from the exposure to the “international language” English (Mozambique Indicator 12.1.1). English is often the third or fourth language for the majority of these learners, yet the necessity of having to master English in order to succeed in ICT usage is seen in a positive light.

A South African initiative, translate.org.za, founded by Dwayne Bailey, focuses on the localization of open source software in the 11 official South African languages. The lack of linguistically appropriate educational software is an important issue as Keniston (2001) points out that in order to minimize the power structures between the rich and poor, software that ensures the content of the Internet is meaningful for different language groups needs to be developed. This is addressed by Thabo Mbeki’s advised that “care should be taken not to perpetuate the domination of nations of the world by certain languages and cultures.” To ensure that all communities feel part of the global information society, the content on ICTs needs to be relevant and appropriate to all communities as well as being available in their languages (PNC on ISAD, 2009).

There are very few documents available on the Internet in African languages, written by Africans themselves. An educator at a South African primary school highlights that through rote-memorization and demonstration of certain key features

of software programs, any language difficulties can be bypassed (South Africa Indicator 12.1.1). Code-switching is also a technique employed – basically the educator will verbally translate what is on the computer screen into the learners’ home language.

While it should be the right of every learner to have the opportunity to learn and be taught in his / her mother tongue can language be seen to be a barrier when so many learners and teachers have developed mechanisms and coping strategies to bypass difficulties they may encounter when accessing ICTs? To conclude with the words of an educator at a rural school in South Africa: “To those who have not been exposed to the language used in the computer, grasping skills is a slow process that needs a lot of patience on the teacher’s side” (South Africa Indicator 12.1.1.). The question we need to ask is how much longer should learners have to wait until they can access ICTs and the Internet in their home language.
PanAf database forms reference point for new course on ICTs in education for governments in Africa

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Where does one go in search of rich case study material on the pedagogic integration of ICTs in Africa? This question faced the designers of a new certificate course aimed at policy implementers in government, teacher education institutions and NGOs. We found that we could go to documents and websites associated with various ICT in education projects on the continent for valuable material. Some examples are:

- NEPAD eSchools initiative (www.nepad.org/en.html)
- Connectivity for Educator Development programme in Uganda (www.connected.ac.ug FRAMESET.HTM)
- Schools OnLine’s programmes in Senegal (www.schoolsonline.org/whatwedo/senegal.htm)
- Schools OnLine’s programmes in Tanzania (www.schoolsonline.org/whatwedo/tanzania.htm)
- World Links’ programmes in Ghana (www.worldlinks.org/english/html/ghana.htm)
- Commonwealth of Learning’s Southern Africa Teacher Training Programme (www.col.org/programmes/catalyst/safricateacher.htm)

However, while there is valuable information to be obtained from such sources, we have found that the PanAf Observatory presents us with much more interesting pedagogic possibilities in a course in which we expect students to build their own multifaceted case studies of African countries of their choice.

The conceptual model that we use to guide such learning comes from Kozma, and is known as the ‘knowledge ladder’ (Kozma, 2009: 11):

This model allows one to plot the current state of ICT in education using various indicators, and relate this to future objectives. We like it because it puts serious consideration of pedagogy, assessment and curriculum issues at the centre of education in government. As a conceptual tool, it makes it virtually impossible to ignore the pedagogic integration of ICTs in planning for schools. It helps us to ensure that government officials cannot allow “the technological tail to wag the pedagogic dog”, which is all too often the case when computers are pushed into schools.

One of the things we do in our new course is to ask students to plot their own national contexts, or even local contexts, onto the model to serve as a starting point for a policy planning and implementation exercise. Existing case studies tend to constrain them, in that the data is predetermined in some or other implicit conceptual model. However, when they use the PanAf Observatory, they are able to search for data in a much more open ended way, and thus build up a more complex action plan closely related to their own emerging understanding of their own contexts.

The course in question is the Certificate in ICT in Education for Policy Implementers, to be offered from March 2010 by the University of the Witwatersrand, Johannesburg (Wits). It is a collaboration between the World Bank Institute, Microsoft, Intel, Cisco, Education Impact and Wits, aimed at strengthening implementation capacity in this specialized area of government. It is targeted at officials and professionals involved in the roll-out and integration of ICT in schools and colleges across Africa. On completion of the course, we anticipate that participants will be able to:

- Use the UNESCO ICT Toolkit in Education for Decision Makers, Planners and Practitioners.
- Analyze their national ICT in Education context
- Plan ICT-in-Education projects and programmes
- Describe and motivate the use of computers in schools for pedagogic, organizational and administrative

Research
purposes.
• Understand the practice of teaching using digital technologies, and identify the local imperatives in this regard for capacity building amongst teachers.
• Plan and facilitate the creation of learning environments conducive to effective utilization of ICTs in different institutional contexts.
• Initiate and conduct processes related to the management and financing of ICTs in schools.
• Understand the role of policy makers in the relevant adoption of ICTs in an information society.
• Analyze the success or failure of extant ICT innovation projects in education in their country contexts, and plan for future ICT interventions in this regard.

Another unintended outcome of the course, however, will be more exposure for government officials in Africa to the data on PanAf Observatory. Because of its strong pedagogic possibilities, the PanAf database seems ideally suited to support a capacity development process of this kind.

Our colleagues in PanAf may be interested to know that our partners’ longer term intention is to make the course freely available to other higher education institutions in Africa under a Creative Commons Licence, so that they too may start to offer similar courses in future. We look forward particularly to our colleagues in Francophone and Lusophone countries building French and Portuguese versions of the course in future.

More information on the course contact may be found at http://web.wits.ac.za/academic/humanities/education/shortcourses

References


Towards an inclusive African Knowledge Society:
Strategies for Boundlessness

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Twenty years have passed since the Jomtien Conference on Education For All (EFA) held in Thailand in which a commitment to education for all and the framework for action to meet basic learning needs was made.

The mention of ICT at this conference when resources and instructional materials were discussed is conspicuous by its absence. Provision of textbooks took the centre stage. It is quite evident that this goal has been elusive. Attempts to improve educational quality through availing of learning materials at an affordable cost have been an ongoing concern. The coming onto the scene of ICTs has compounded the issue of equity and access in educational settings.

Within 20 years ICTs have emerged and spread mushroom-like, with over four billion people on the planet with access to the Internet. The PanAf Observatory data on availability of equipment, connectivity and access highlights only information pertaining to participating institutions. In the majority of cases these institutions have computers but varying degrees of the numbers of computers connected to Internet or the number or percentage of institutions with Internet connectivity. (Indicators 2.1.1, 2.1.2 and 2.2.1) Data pertaining to Ghana, Kenya, Mozambique and South Africa was analysed. The number of institutions with access to computers ranges from 90% in Kenya and Mozambique to 100% in Ghana and South Africa. Kenya and Ghana have 50% and 40% institutional Internet connectivity. These figures do not vary greatly with the percentage of computers connected to Internet within these ranges as well. (Indicators 2.1.1; 2.1.2 and 2.2.1).

It is important to underline that these statistics refer only to schools participating on the PanAf Observatory project. They are not generalisable to Africa as a continent. This
data masks the reality of what obtains on the ground in all the African countries.

This article therefore speaks to the deafening reality on the ground which is brought into sharp relief by what the data is silent on – lack of access to equipment and connectivity for the majority of institutions in Africa – and proposes a way forward. In Africa only isolated pockets within urban or peri-urban areas have the ICT infrastructure. The concern is how can the existing oasis of ICTs become the hub of cascading access to ICT resources into the hinterland in a way which collapses the “digital” and geographic divides?

This paper calls for a strategy to ensure widespread availability and exposure to ICT infrastructure by communities which are at the margins of the information superhighway so that a good mix of educators are brought into the dialogue and pedagogic process of “content” development in a way that demystifies the existing reified and dominant content.

The aim is to ensure widespread indigenous participation on equal terms while avoiding an illusion of digital inclusion. This model requires coordinated collaborative partnerships at the national, religion and international levels. Public, private and non-governmental institutions, civil society as well as the private sector should mobilize resources and work out strategies to make this a reality. The current silo mentality of “them and us” would need to change if the model is to work.

A centre periphery model which allows the emergence of multiple centres within the periphery will begin to dent the reluctance of technology averse generation of educators while steadily building up their confidence and self esteem with a supportive framework. New learning and lifelong learning has to be a characteristic of the professional development and educators’ knowledge and experience base.

This is a model which requires vision and a strong sense of creating a legacy. It will encourage renewed engagements with knowledge and its sources, collaborative learning, promote effective technology leveraging and unlock the professional potential and talent at various levels within entire African communities.

While any proposal for change is challenging, engaging with ICT culture is even more daunting to the excluded and uninitiated.

What I am proposing is something akin to the concept of Teachers’ Resource Centres (TRCs) (Hoppers W. (nd) a concept essential for professional support structure for teachers and schools. Hoppers (ibid) defined Teachers’ Resource Centres as “meeting points for teachers and others involved in education for the purpose of facilitating teachers and school development. Often TRCs are associated with physical structures of different size and complexity, offering a variety of facilities and services, but
What kind of ICT training for West African teacher-trainers?

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Background
Scientific research (Paud et al, 2002; Fonkoua, 2005; Karsenti and Lessard, 2007), seems to be unanimous to say that a sound integration of ICTs in the training of teachers in Africa could lead to the challenge of a qualitative and quantitative training to be addressed. However, in terms of the usage of ICTs in any teacher training context, the human factor is the essential variable (Cuban, 2001). In fact, drawing on trained teachers, some skills could emerge from the future teachers that teacher training institutions do not have or seldom have the opportunity to bring out. Whereas an increasing number of teacher training institutions in West Africa are turning to ICTs to meet the needs of educational systems. We deemed it necessary to see these institutions keep abreast of the needs of their teachers in training integrating ICTs.

Methodology
From the data available on the ICT observatory (www.observatoiretic.org) of the PanAf project; we conducted a comparative study of teacher training institutions in West Africa taking an interest in the number of trainers who were trained from 1 to 50 hours, and those who were trained above 50 hours integrating ICTs. Our corpus is made up of five teacher training institutions which are: École Normale Supérieure (ENS) (Advanced Teacher Training College), Abidjan in Côte d’Ivoire, École Normale Supérieure (ENSup) (Advanced Teacher Training College) of Mali, University of The Gambia (UTG) in the Gambia, Faculty of Sciences and Education and Training Technologies (FASTEF) of Senegal and the University of Education (UE) of Winneba in Ghana. These West African mixed public institutions for teacher training are all urban. It is worth noting that the training of teachers in the Gambia is done by a body under the control of UTG.

Results
With 322 trainers, UE has the largest number of trainers (table 1) among the four institutions while ENSup with 71 trainers has the smallest number. It should however be noted that if UTG has 174 trainers, only 5 handle teacher training.

<table>
<thead>
<tr>
<th>Institution</th>
<th>Number of teacher trainers</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENS</td>
<td>175</td>
</tr>
<tr>
<td>UTG</td>
<td>174</td>
</tr>
<tr>
<td>ENSup</td>
<td>71</td>
</tr>
<tr>
<td>FASTEF</td>
<td>109</td>
</tr>
<tr>
<td>UE</td>
<td>322</td>
</tr>
</tbody>
</table>

Table 1: Number of trainers per institution

Among these institutions, ENS is the only institution that has never provided training below 50 hours integrating ICTs for trainers. Indeed, no trainer from this institution (figure 1) took part in a training of 1 to 50 hours integrating ICTs. In contrast, UE, ENSup, FASTEF and UTG organise training integrating ICTs for their trainers. Thus, 99.07% trainers from UE, 21.1% trainers from FASTEF, 19.72% of trainers from ENSup and 0.57% of trainers from UTG participated in 1 to 50 hours of training integrating ICTs. EU thus provides the highest training from 1 to 50 hours to trainers.

Figure 1 Percentage of trainers who participated in 1-50h of training integrating ICTs

ENSsup is the training institution which organises the highest training over 50 hours integrating ICTs for trainers. As a matter of fact, 43.66% of trainers from this institution (figure 2) have over 50 hours of training integrating...
ICTs. It is followed by FASTEF with 27.52%, UE with 3.11% and UTG with 0.57%. No trainer from ENS has over 50 hours of training integrating ICTs. Moreover, the percentage of trainers from ENSup and FASTEF having more than 50 hours of training is higher than that of trainers having 1 to 50 hours of training. In contrast, less than 5% of trainers from UE have more than 50 hours of training integrating ICTs. Thus, FASTEF and especially ENSup are the institutions which provide their trainers the highest training of more than 50 hours.

If UE is the only institution to have provided training integrating ICTs to all its trainers, ENSup and FASTEF appear as the institutions which provide their trainers the highest training integrating ICTs. However, UTG and especially ENS offer the least training to their trainers integrating ICTs.

By way of conclusion and prospects

The results of this study show that if some teacher training institutions in West Africa seem to take the challenge of training teachers in ICTs, others are however lagging behind. This study suggests the exploration of reasons why some institutions have trained trainers, whereas others do not have. Furthermore, a comparative study on the impact of such training integrating ICTs on the job of trainers would be a welcomed initiative. The results of these two studies could enable the putting in place of strategies and mechanisms for the training of trainers in teacher training institutions in West Africa.

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Discrepancies in the integration of ICTs in education in Central African Republic: case of public and private schools

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Data on the use of information and communication technologies in institutions of learning showed a large discrepancy between schools visited in Bangui, capital of the Central African Republic [1]. For about fifteen years, efforts have been made for a pedagogical integration of ICTs into education patterns with a view to benefiting from the opportunities that these tools offer. However, results collected on the field are insignificant but show some interesting trends.

Pedagogical integration of ICTs has several meanings as Karsenti et al. [2] underscore. The need to integrate ICTs in educational activities in Central African Republic had already been seen by many users as shown by the existence of a document “Policy, strategies and action plan of the building of the Information Society in Central African Republic [3]”. In the public sector, reception facilities are overcrowded with an ever-increasing student population. The private sector consequently becomes a solution – even though so limited - to the problem of enrolment. The infatuation for ICTs is real in these two sectors; however, no national measure has been taken to promote their pedagogical integration into education.

Yet, in spite of this situation, how is ICT integration seen in public and private schools? How can the vision of these two sectors of training be harmonized for a more structured and more efficient integration of ICTs?

The results obtained from six schools within the framework of the PanAf project, Phase1 [1] are recorded in Table 1. Seven indicators are taken into account to show the discrepancies which characterize this integration.

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Five government schools</th>
<th>Five private schools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enrolment of learners</td>
<td>11974</td>
<td>2124</td>
</tr>
<tr>
<td>Presence of computers</td>
<td>80%</td>
<td>100%</td>
</tr>
<tr>
<td>Computers for educators</td>
<td>60%</td>
<td>80%</td>
</tr>
<tr>
<td>Computers for learners</td>
<td>40%</td>
<td>80%</td>
</tr>
<tr>
<td>Lessons integrating ICTs</td>
<td>40%</td>
<td>80%</td>
</tr>
<tr>
<td>Connection to internet</td>
<td>20%</td>
<td>60%</td>
</tr>
<tr>
<td>Plan to integrate ICTs</td>
<td>20%</td>
<td>20%</td>
</tr>
</tbody>
</table>

Table 1: Results for seven indicators

Only one school out of five (20%) developed an integration plan to conduct the introduction of ICTs in education. This stems from the willingness of officials who wish to structure this integration.

Even though one could note the presence of computers in schools (80% in government schools as against 100% in private schools), all of them do not integrate ICTs into the conduct of courses in government schools (40%) and in private schools (80%).

The craze for the use of the computer by teachers in the ten schools is real. This could be explained by the curiosity on the part of the latter to exploit the advantages offered by ICTs.

Learners benefit more from possibilities offered by the computer in private schools (80%) than in government schools (40%). Considering the specific constraints in the private sector (payment of fees by learners), officials of these schools are obliged to satisfy practical aspects of training. This is not the case in the public sector. Table 2 underscores this aspect by illustrating the ratio between computers and learners on the one hand and access to computers and learners on the other.

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Ratio of computers – learners</th>
<th>Ratio of access to computers – learners</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Ratio of computers – learners</td>
<td>0.39%</td>
<td>4.14%</td>
</tr>
<tr>
<td>2 Ratio of access to computers – learners</td>
<td>0.21%</td>
<td>2.77%</td>
</tr>
</tbody>
</table>

Table 2: Different ratios
Connection to internet signals is more significant in private schools (three out of five schools) than in government schools (one out of five).

This survey brought into play two types of schools which, though with the same learner-training objectives and excellence do not always react in the same manner to the requirements of these objectives. Negligence often seems to characterize the public sector than the private sector. The results of this survey are obvious when one observes the high rate of presence of computers, internet connection, courses integrating ICTs, computers for teachers and learners in the private than in the public sector.

The survey organized by PanAf project shows a real interest for ICTs in Central African Republic, both in the public and the private sector, where initiatives have been made to take ownership of them. However, the nonexistence of a national ICT integration plan does not promote a harmonized, more structured and efficient integration.

Bibliography


Online education and interactions in educational discussion forums

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Introduction

Online learning uses new forms of pedagogy where teachers and learners are not grouped in a classroom and where the virtual “replaces” the real. This method of education integrates in its application the necessary consideration of interactions between the different parties involved in this system and proposes the “chat”, the “mail” and “discussion forums” as alternatives likely to “replace” interactions in a classical classroom. But what is it really about?

The empirical research that we shall present involved students of the National School of Engineers in Tunis. It focuses on online interactions through an educational discussion forum as well as their dimensions that are likely to influence the methods of access to knowledge and their co-construction.

Interactions in class

Interactions in class are done especially in a highly linguistic dimension and, to a lesser level, in a gestural dimension. They carry known and shared meanings. On their part, teachers are the interpreters of what happens in class. This interpretation activity is however not limited to written or spoken speech. Teachers should constantly “read and interprete” the class, movements of students, their reactions, progress made, their motivations (Tochon, 1993).

They also impose meaning, guide pedagogical communication and contribute in this way in directing the ongoing programme of action according to the meanings they aim at. As for learners, they try to interprete teachers’ messages by distinguishing between what the teacher wants and what he wants to say. The interaction that they establish among peers in a learning situation is not enhanced. It hinders the progress of the lesson and interrupts teaching time.

Interactions in an educational discussion forum

The educational discussion forum is a space open to a small group of learners on an online teaching platform where the latter are expected to communicate among themselves, provide contributions to a topic, react to messages posted by other participants and share knowledge. The forum
replaces class interactions with distance interactions which have an essentially written language dimension and a temporal flexibility which exceeds the setting of the classical classroom. Interactions are also made through signs and coding which may be common to all groups or specific to one or several groups.

**Experimentation**

Engineering students were requested to carry out work on Arab-muslim science as part of their history of science lesson. This work was supposed to be done exclusively online by using the forum that we set up on the moodle platform. This work was spread over a period of two weeks coinciding with the period of spring vacation and also the constitution of quadrinomials thus making up 13 working groups. The data collection protocol was restricted to screenshot recording of the interface of the forum environment as well as the saving of work posted by engineering students at the end of the second week. Content analysis where the message is the unit was chosen as the method of analysis.

**Results of the research**

The first groups that were set up comprised individuals who had already worked together in other disciplines in classical education. They agreed from the outset on the job to be done as well as their respective roles. Intuitively, they set up a sign and code system which enables them to communicate easily and rapidly. The other groups struggled to set up. We noticed a high student activity since connection periods were above 28 hours and the number of messages posted on the forum was up to 766. Drawing on the work of Robert Pléty (1998), we succeeded in identifying the same behavioural profiles in engineering students working in groups on the forum by building on the volume of contribution from each of them, the type of contribution as well as their reactions to others (what others’ contributions lead to). It is in this way that the facilitator, the verifier, the collector as well as the independent are almost always present in all groups showing that the characteristics of classical groups are found in those working from a distance.

The analysis of the messages that we saved and indexed shows that these messages could be classified as follows: messages with a goal of initiating an interaction and starting a topic of discussion, messages in which information is requested and in which a response is being expected from others, messages in which others’ requests are answered, questions and queries from others are answered and finally earlier messages which clarify or deepen a current discussion topic.

These messages have three facets. Indeed, they could have a social, cognitive or even affective dimension. The social dimension is closely linked to communication between engineering students, the way they cooperate and collaborate. This dimension includes all statements where one takes stock of greetings, forms of politeness as well as elements of group creation and management.

The cognitive dimension is closely linked to cognitive operations of the group connected to the acquisition of some knowledge.

This dimension includes all statements in which one takes stock of expressions such as understand, analyze, discuss and which show that before appropriating knowledge, engineering students process it critically and collectively. Finally, the affective dimension which is closely linked to affective aspects which engineering students develop during a discussion. These are elements of messages which show an awareness, recognition and consideration for others’ emotions, control, as well as the smallest or greatest motivation to perform a duty.

**Conclusion**

The work we carried out shows to which extent the forum could be useful for learning. As a matter of fact, we show that online communication via a forum encourages the setting up of groups, creates social and affective links between learners and affords the opportunity of jointly building knowledge. The frequency of interactions, their nature as well as their durations could be the result of a fruitful collaboration which is synonymous to quality work.
The Tunisian university, which is supposed to be in symbiosis with the society, has begun integrating ICTs in education. In fact, computer-aided testing (CAT) is a form of experimental teaching which has started becoming a reality in the teaching of biology. In this regard, teachers of Life and Earth sciences serving at secondary or college levels, are called upon to offer a CAT module in their continuing education. This module is done in a laboratory equipped with 6 effective posts placed at the disposal of a group of 12 teachers, that is 2 per post.

In the course of this research, we attempted to better understand the benefits of CAT by interviewing 33 trainee teachers of Life and Earth sciences who offered this module. They were called upon to express themselves on what they thought of CAT and its usefulness in their teachings in the biology class. The semi-direct discussions that we conducted focus on the following questions: how did you find the module and why? In your opinion, what are the benefits of CAT to classical practical laboratory work? The interviews carried out with teachers were recorded and completely transcribed. As regards a qualitative study, we opted for content analysis to study the speeches collected.

The analysis of the corpus collected shows that most of the people interviewed think that the CAT module is useful and that it has many advantages. Its benefits are diverse and varied. However, we were able to characterize three levels of benefits:

Didactic benefits
27 teachers out of 33 interviewed consider that CAT allows one to better understand and appropriate biological notions and phenomena. Among these 27 teachers, 16 seem to agree on the fact that CAT offers the possibility for one to make some experimentation which were not “feasible” in classical laboratory work. This possibility to tackle some biological phenomena or notions in experimental teaching, which until then were not possible or scarcely accessible, explains the didactic scope of CAT. Indeed, the CAT chain offers a variety of experiences and thus makes it possible to acquire different biological phenomena and notions which were not feasible in laboratory work before having measuring chains associated to the computer. It thus enriches the experimental teaching of biology.

Among the 27 teachers who mentioned didactic benefits, 13 are of the view that CAT makes it possible to better understand the biological phenomena studied. As a matter of fact, according to those interviewed, “the CAT chain generally makes it possible to illustrate the biological phenomenon studied with the help of graphs which facilitates a great deal the understanding of this phenomenon…”.

Pedagogical benefits
A majority of those interviewed (28 out of 33) consider that the use of a CAT chain was a very motivating discovery which led them to feel like working and experimenting. They strongly believe that this experience is transmissible to their learners. In fact, they think that their students love anything that is related to technology and that an experience of using a computer, probes and software would be highly appreciable. It would lead these students, natives of the digital era, to better quality learning.

Teachers think that CAT enables learners to get back in touch with this “right to error” which was “almost” forbidden to them. They can thus henceforth experiment and re-experiment without having to think of waste of material but especially of irreversible errors that they can make. Students can repeat, as many times as they wish, the stages that would lead them to the expected results. Experience becomes less rigid thus making possible a better apprehension of experimentation.

Epistemological benefits
Some of the people interviewed (3 out of 33) consider that CAT allows a more experimental teaching of biology. According to them, these technologies introduced into teaching make some experimental activities accessible which were before too laborious. They restore the liking for biological experimentation by giving the urge of “doing” and “experimenting”. The experimental is thus once more placed at its central position in the practical experimentation process. For these teachers, CAT would enable learners to get closer to the career of the biologist confronted with a real situation.

Conclusion
This study, conducted as part of work on the computerization of the teaching of biology, enabled us to observe that trainee teachers are involved in experimental protocol. They are attracted by CAT which allows a quick collection of data including on one’s own organization and has the advantages which we listed earlier. However, this process has limitations and runs the risk of preventing learners from understanding the principles of the experimental protocol in biology. In fact, focusing on the computer and the technology behind it would lead learners only to take into account measurements and miss the point of the real issue in biological experimentation which is the understanding of the living.

Benefits of CAT in the teaching of biology: points of view of Tunisian teachers

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The use of ICTs by secondary school educators: realities and challenges

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Côte d’ivoire

For some years, African leaders have been multiplying international meetings by laying emphasis on issues linked to the integration of ICTs in education. In fact, the importance of ICTs for the quality of training of learners in schools is a reality nowadays in many African countries. Educators, kingpins of training, use these technologies in many ways in their pedagogical practices. In Côte d’Ivoire, what use do secondary educators make of ICTs and what are the challenges they face?

On the whole, educators acknowledge the importance of ICTs in teaching. These tools are used to prepare lessons, choose assessment techniques by combining classical methods with those used in other educational institutions. The use of video conferencing, tools such as the retro projector, video projectors, Internet and other multimedia devices during teaching shows that ICTs are actually present in some schools.

Software commonly used are Word, Excel and PowerPoint to record lessons, illustrations by graphs, tables and charts. Research on the Net enables educators to enrich the content of their lessons, improve their knowledge so as to enhance their skills and better train the learners. These technologies also allow them to use subjects or methods of assessment of schools in northern countries to compare the knowledge level of their learners with those elsewhere.

Some educators use other tools such as ACADEMIA, TRIADE, SINE-QUA-NON and MATHTYPE. The first is designed in a way that each teacher would fill the marks of his learners and would himself make the different calculations of averages. The second allows for frequent exchange of views with parents of learners no matter where they are. The last two are specific to mathematics.

However, the average use of these technologies by educators is very low. It varies from one hour to three hours per week no matter whether it is men or women using them.

Even if in some secondary schools educators show some interest in the use of ICTs considering the place of these technologies in training, most educators do not use these technologies especially for pedagogical practices.

Most often, they use information technology only to share information between friends at national and international levels. This situation is essentially due to the non-mastery of the IT tool by many educators given that their basic training does not integrate ICTs. The pedagogical use of ICTs by educators is still low because many challenges have to be overcome: inadequate training of educators of ICTs; lack of pedagogical training from ICTs; insufficient material in some schools, etc.

As a whole, educators acknowledge the importance of ICTs in pedagogical practice. These technologies are indispensable today for any quality training. That is why the involvement of all actors is desirable for the sound usage of ICTs by educators in Côte d’Ivoire.
ICTs in the Senegalese school arena: changes in perspective

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Introduction

The integration of ICTs in the Senegalese school arena made its first steps in 1983 with the LOGO experience that was hosted in Dakar by the then ENS and pilot primary schools. Other pioneer experiences later emerged towards the late 90s, led by GEEP and World Link (Camara et al, 2005, Seck et al, 2001). With school projects and contribution from different technical and financial partners, there were fresh signs of potential improvement of the administrative and pedagogic environment of schools benefiting from ICT equipment.

This article draws on data from the PanAf Observatory to give account of the changes made in Senegalese schools which are part of the PanAf project. These changes are seen by the stakeholders of these schools as pioneer initiatives within them. We are highlighting the improvements made in the administrative and pedagogic environment of these schools and their opening to the world.

1. Improvements in the administrative and pedagogic environment

1.1 Initial situation

In the Senegalese school arena, the processing and management of administrative data (list of students, internal memos, etc were conducted in the lower schools, in manuscript form and, in the upper level and secondary school, it was done in typescript (with a typing machine) At the pedagogic level, the main documentary sources of teachers and students in this school arena were made up of annals, school manuals and other types of printed documents (reviews) that they found in libraries (for schools that could afford ) and in public libraries located out of schools (Camara et al, 2005)

1.2 Background of technologies

The introduction of ICTs through its multiple functionalities offers the Senegalese school real opportunities to meet sporadic concerns, consistent with the solving of administrative and pedagogic problems which the stakeholders are facing.

In some schools, the use of ICTs has thus enabled managers, teachers and learners to make achievements which, some years back, were exceptional cases, in view of the technological lack of equipment in these schools.

1.3 Achievements

Some of the achievements concern schools targeted by the PanAf Agenda, for instance an elementary school Ecole Serigne Amadou Aly MBAYE (SAAM) of Dakar, three colleges (le CEM Lamine Senghor de JOAL, Collège Africain Sport Etudes, Collège Sacré-Cœur de Dakar) and two high schools (Lycée Limamou Laye de Pikine and lycée Demba DIOP de Mbour).

The handling of indicator 4.13.1 on pioneer initiatives of the PanAf ICT observatory allowed us to identify these achievements which are the milestones for a qualitative improvement of the administrative and pedagogic environment of these schools.

The major achievements in line with ICTs focus on

- The development of administrative databanks;
- The production of printed documents;
- Pedagogical integration with the Integrator Project (IP).

1.3.1 The development of administrative databanks

In all the schools, the introduction of ICTs enabled school managers to have office automation to type and record the lists of staff and students, manage time tables, print internal memos; which results in a better control of workforce and a better supervision of administrative activities.

1.3.2 The production of printed documents

In most of these schools (collège Sacré Cœur, lycée Demba Diop), teachers and students used ICTs to produce booklets, exercise books and school journals.

The production of booklets concerns mainly history and geography (HG), life and earth sciences (LES), coordinated by a forum of teachers of these disciplines who use the Internet to conduct research and select documentary resources on their own programmes (from form one to upper sixth in HG), (from form one to form four in LES). It seeks to make up for the absence of manuals appropriate for the programmes of targeted disciplines.

The exercise books are the products of mathematics and physics teachers. They select, based on research on appropriate sites, exercises consistent with Senegalese programmes which they compile and print to place at the disposal of their students.

As regards the students, specifically those of collège Sacré-Cœur, access to ICTs enabled them to regularly publish their school journal. The articles are typed and submitted to a review committee set up by French and Philosophy teachers before they are printed and sold to other students.

1.4. An ICT pedagogical integration model: the Integrator Project (IP)

The elementary school known as SAAM unrolls the Integrator Project (IP), a tool developed by ORE and Ineade researchers. The IP not only formalises the integration
of disciplines, but also gives meaning to learning. In the skills approach, it allows learners to be led to acquiring mobilizable practical knowledge in case of need in everyday life (Ineade, 2010). Indeed, it leads to both intramural and extramural activities (Diouf & Camara, 2009).

2. Opening to the world

Two types of initiatives with ICTs mark the opening of these schools to the outside world whereas they could not envisage such a possibility about some fifteen years back.

At Lycée Limamou Laye, the introduction of ICTs partly corresponds with the commencement of the “globe approach”, a practical science approach which brings a significant complement to the scientific, technological and environmental education policy.

In this programme, targeted students are made to collect meteorological data on their school, enter it and process it statistically and graphically, to subsequently provide it to researchers on the programme’s website.

Lycée Demba Diop and Collège Africain Sport-Etudes, ensure the visibility of their schools by creating a website. The former designed theirs with a sister school, Lycée Denis Diderot in France, and the latter made an advertising medium, a means of contact with its partners and an online registration platform.

Conclusion

We used data from the PanAf Observatory to highlight the changes made by ICTs in the administrative and pedagogic environment of the six PanAf Senegalese schools as well as the opening to the world of two of them. This data, which is already over one year old, will be updated and completed in the activities of the second phase of PanAf. Value added is expected to appear on the changes mentioned earlier. Besides, these achievements, indeed sporadic, would constitute the first milestone in the institutionalization of ICTs in Senegal. In this regard, it would be necessary to have a clear vision, define a policy, an integration plan as well as an ICT curriculum.

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The integration of advanced technological equipment in the running of distance education in University of Education, Winneba from Ghana

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Distance education can be described as a method of imparting knowledge, skills, and attitudes which is rationalized by the application of division of labour and organizational principles as well as by the extensive use of technical media, specially for the reproduction of high quality teaching materials which make it possible to instruct great numbers of students at the same time wherever they live (Peters, 1973). Globally, the domain of education which has perfectly adopted individual and experiential learning is distance education. Hence, Ghana has no choice but to adopt the distance education mode for training a segment of her needed manpower.

In 1996, the University of Education, Winneba, introduced the Distance Education programme to train more competent teachers for Ghana. In order to make the work for administrators of the distance education programme and that of students a little bit easier, there have been deliberate efforts right from the inception of the distance education programme to make use of advanced technology. Hence, the institute acquired equipment such as computers, printers, photocopiers, scanners, LCD projectors, VCDs, mobile phones, and generators for use both at the headquarters and at the 12 study centres.

The computers are used in typesetting course materials. Graphic designers of the institute also use the computers in drawing diagrams for the various course materials. Whenever it becomes necessary to scan materials the institute has scanners which are used in the scanning. The University has internet connectivity. As a result graphic designers are able to download appropriate diagrams which are inserted into course materials if need be. Limited copies of the course materials are printed in the university by using photocopiers. There is a massive mobile phone revolution in Ghana. Hence, staffs communicate among themselves and students normally communicate with the staff of the distance education institution via mobile phones. Therefore, it is very easy for a student who needs urgent information about the distance education programme or about a particular subject to call tutors or any staff who can give the information to do so. This brings the students very close to the university and thereby reduces student isolation from the university. With the aid of computers and LCD overhead projectors tutors are able to present their lessons in power point to the students. This makes teaching and learning very easy for both students and tutors because tutors find it very easy to move back to things that have been covered already if need be. It also makes it easier for tutors to illustrate things to the understanding of students. Back up generators were provided to each study centre. Hence, in times of power failure, the generators are put on to power the machines at the study centers.

However, one major challenge that the use of technology in running the distance education programme faces is the procurement of equipment that turn to be of sub-standard or faulty. Since the equipment is most often purchased in bulk, it is common to find some of them to be inappropriate or faulty. Hence, some equipment break down very easily within the shortest possible time. This calls for stringent specification regimes so that newly acquired equipment can be very durable.
One of the innovations of the new curriculum of secondary education in Mozambique is the learner-centered education approach. So this paper tends to show how ICTs are fostering the Learner-centered education in Mozambican secondary schools. This analysis is based on the results of our surveys for the PanAf Observatory. We analyzed 9 secondary schools, in Maputo Province, 4 of them in the city center and 5 in suburban areas, and we came to conclusion that there are two types of ICT impact on the learners.

The first one is the indirect impact of ICTs on the learners where teachers use computer to produce typed handouts and tests for their students. This saves teachers’ and students’ time in the classroom because learners don’t have to spend a lot of time copying from the board and teachers have ample time to explain the content of the lessons. This leads to interactive classrooms and conducive learning and teaching environment. It was noticed that learners easily read typed handouts and tests compared to some teachers’ eligible handwriting. Handouts sometimes bring clear pictures or images and graphs that catch learners’ attention because they clearly visualize the contents, fully understand and consequently learn faster and easily. Typed tests reduce the chances students used to have for cheating while the teacher was still busy writing the test on the board. This is, somehow, just the tip of the iceberg toward a learner-centered education. All 9 schools use typed handouts and tests.

The second one is the direct impact of ICTs on the learners where learner themselves use computers to type their own school work and search for information in the internet. This helps the learner to cope with spelling and grammatical errors since the computer indicates these errors. In using computers learners are able to produce clear and more organized school work. When doing any assignment there is no need to rewrite the whole document when they find some mistakes in it. On the other hand, the use of internet has brought a great revolution toward a learner-centered Education which is one of the principles of our curriculum in Mozambique.

All schools have a network system installed but not all of them are connected to internet because the exorbitant internet cost which many schools are unable to pay from their budgets. Since the cost of internet is very high, only few schools are connected to internet. In schools where learners have access to internet; there is visible active participation during the lessons and they perform higher in the subjects taught using ICTs. As such, learners are no longer considered object but subject of the teaching and learning process because internet contributes to reduce student’s fully dependence on teacher to obtain information, giving, in this way, room for a livelier and dynamic lesson, breaking up the traditional teaching approach where the teacher is the centre, source and the holder of all knowledge.

Now with the advent of ICTs in these schools, teachers’ tasks have changed a lot, now he/she has become a mediator, facilitator, where most of the time his/her role is to summarize and systematize the lesson. Teachers and students are very happy and excited with the use of ICTs. However, many students do not know how to select information from the internet.
The pedagogical integration of ICTs in some Cameroonian secondary schools: successes and challenges

Yeba Judith Sama éponge Mouokuio Meno
ERNWACA, Cameroon

This article seeks to assess the degree of penetration of ICTs into the curricula of some schools in Cameroon. Our core concern consists in evaluating the strides made by some Cameroonian primary, secondary and higher institutions of learning in the appropriation of the ICTs as a new pedagogic tool. Qualitative data was collected from 10 schools in Cameroon. The data was collected from the methodological guide of the Pan African Research Agenda on the Pedagogical Integration of ICTs, category 4, sub categories 5,6,7,8,9 collected through visits to the schools, interviews with educators and learners.

A number of scholars and researchers have identified a catalogue of hurdles and shortcomings that favour or impede the smooth integration of ICTs into the school curricula in Africa particularly, in Sub Saharan Africa. Several authors have demonstrated that the new technology represents a unique and fascinating option in the teaching and learning processes. Mbangwana (2006) says that a good number of potential benefits of using computers have been identified. The introduction of ICTs in schools is changing the delivery of education, the role of students and teachers and it is producing a shift from an industrialised to an information-based society. Balanskat, Blamire, Kefalla (2007), reviewed in their report that there are positive benefits of ICTs on the learning process, such as motivation, concentration, cognitive processing, independent learning, critical thinking and teamwork. ICTs enhance a more student-centred learning approach and can benefit likewise academically strong and weak students as well as students with special needs.

According to Howell and Lundall (2000), the key factors blocking educational institutions from using microcomputers as teaching and learning tools are insufficient funds, insufficient number of teachers, lack of teachers with IT skills, teachers’ inability to integrate the computer into the different subject areas, and lack of appropriate microcomputer teaching programmes. According to Tchombe (2006) attitudes towards ICTs can be barriers in themselves and can influence or be influenced by other barriers. Computer anxiety and anxiety about change are key factors limiting teachers’ use of technology. Larner & Timberlake (1995). Underlying these anxieties is fear of embarrassment when using computers and fear of losing professional status through a downgrading of traditional pedagogical skills (Russell & Bradley, 1997).

From data, which was collected and analysed, we realised that in most schools some of the trained teachers said they use ICTs once or twice a week to do research, to communicate on the internet, to improve pedagogy, for documentation, and to access teaching and learning materials for classroom use. The pedagogical integration of ICTs has a motivating effect on the students evidenced from the influx during the hours of ICT use. The knowledge gained has enabled them to obtain information, do research, learn understand and communicate better. The successes of integrating ICT can be evidenced from the improved performance of the students, improvement in teacher’s research skills, and frequent use of the ICT observatory by researchers to do research. Also teachers training colleges use ICTs to improve pedagogy.

Major challenges in all the schools include the fact that it is difficult to train all the teachers on how to use ICT in teaching because trainers are few, and most teachers are reluctant to learn because they fail to see the benefit of ICT to them as individuals, and as a means of updating their lessons. In some schools, the multimedia centre is open to the public, and this hinders the use of computers. Other major handicaps include difficulties in sustainability, insufficient training for researchers, and lack of mastery of the equipments. Some of the materials downloaded from the internet are often virus infested and as at now, most of the schools do not have updated version of antiviral programs. In some of the schools, the number of computers available is too few for the students’ access to the IT centres are regulated by school timetables. This makes it difficult for students to use it in their learning process at their free time especially during short and long breaks. This problem of accessibility is a hindrance to the pedagogical integration of ICT in all of the schools, yet as Tchombe (2006) says, the use and effect of ICTs can only be referred to if there is access.

To conclude we can say that in all the schools the educators are devoting conscious, and considerable efforts to integrating pedagogically even though they encounter a number of hitches in the process. As recommendation, school administration should facilitate access to ICTs for teachers and students by increasing the number of computers at the IT centre and allot more time to computer studies. Schools should facilitate sustainability by instituting maintenance services as well as effective supervision of the multimedia centres. Teachers should develop interest in ICTs because they are the main actors in the educational process. They should also take interest in attending ICT seminars and workshops to sharpen their know how in this area.
The twenty first century is an era where technology plays an increasingly central role in all aspects of our lives. Information and Communication Technologies (ICTs) in particular greatly influence the evolution of all societies. Nations that want to enjoy all aspects of development will have to check their educational infrastructure as regards Information and Communication Technologies (ICTs). Equipment, connectivity and access must be considered. When ICT is introduced in anything, everything changes: our approaches to teaching and learning in particular. We must therefore not let this important phenomenon bypass us. On the contrary, citizens of all countries, including the African nations, which are lagging behind in many such areas, must be ready to build their own destinies.

This article examines the level of equipment, connectivity and access of 10 institutions of basic, secondary and higher education in Cameroon. We wanted to find out whether these schools are following the wind of information and communication technology change so that the Cameroon society is not left out.

It was observed that all 10 schools have been equipped with computers as shown on figure 1 below. Ecole les Champions FCB de Memiam has an encouraging pupil/computer ratio of 23:1; Collège des Lauréats has 900 learners to 26 computers thus a learner/computer ratio of 35:1. Lycée Bilingue de Yaounde with the highest number of learners (7000) in this paper is equipped with 60 computers (according to the data in the PanAf observatory). This gives a learner/computer ratio of 117:1. Ecole Normale Supérieure Yaounde has 30 computers for 4550 learners giving a learner/computer ratio of 151:1.

<table>
<thead>
<tr>
<th>Institution</th>
<th>Number of Learners</th>
<th>Number of Computers in Institution</th>
<th>Ratio of learners /computers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collège des Lauréats</td>
<td>900</td>
<td>26</td>
<td>35/1</td>
</tr>
<tr>
<td>Ecole Les Champions</td>
<td>280</td>
<td>12</td>
<td>23/1</td>
</tr>
<tr>
<td>E. N. S Yaounde</td>
<td>4550</td>
<td>30</td>
<td>152/1</td>
</tr>
<tr>
<td>Ecole Pri et Mat Oiselets</td>
<td>600</td>
<td>8</td>
<td>75/1</td>
</tr>
<tr>
<td>LCC Bamenda</td>
<td>2426</td>
<td>70</td>
<td>35/1</td>
</tr>
<tr>
<td>Lycée Bilingue de Yaounde</td>
<td>7000</td>
<td>60</td>
<td>117/1</td>
</tr>
<tr>
<td>L C et Moderne de MVOMEKAA</td>
<td>1118</td>
<td>44</td>
<td>25/1</td>
</tr>
<tr>
<td>Lycée Général Leclerc</td>
<td>5182</td>
<td>67</td>
<td>77/1</td>
</tr>
<tr>
<td>Lycée Joss</td>
<td>2497</td>
<td>75</td>
<td>33/1</td>
</tr>
<tr>
<td>Lycée Technique de Bafoussam</td>
<td>1417</td>
<td>14</td>
<td>101/1</td>
</tr>
</tbody>
</table>

9 of the 10 schools have provided computers for teachers though not sufficient for the majority of schools. At Ecole Normale Supérieure Yaounde we have a teacher/computer ratio of 3:1. Lycée Bilingue de Yaounde has 10 computers for 250 teachers thus a teacher/computer ratio of 25:1, while Lycée Général Leclerc has 5 computers for 188 teachers giving us a teacher/computer ratio of 38:1. Teachers of Lycée Joss Douala have not yet been allocated computers as figure 2 shows that the school has 75 computers but 0 for 95 teachers. At Ecole Primaire et Maternelle les Oiselets, we have a teacher/computer ratio of 18:1. Our findings also show that the teacher/computer ratio is more encouraging than the student /computer ratio.

These teachers have access to the 75 computers in the school computer lab during their free periods or following established timetables as we gathered from teachers through interviews and participatory observations. “Though we have access to the computers in school and do use them, the computer laboratory timetable is not very comfortable and so we often find ourselves obliged to use the cyber cafes” says one of the teachers during interview.” This goes to join Dakpo, Hounsinou and Awohne (2008) who pointed out the difficulty in accessing ICT equipment in schools in Benin. Students are privileged than teachers in accessing the computers in schools as the school and computer laboratory time tables allocate more time for students in the computer lab than teachers.
Table 2: Teacher/computer ratio

<table>
<thead>
<tr>
<th>Institution</th>
<th>Number of educators in the institution</th>
<th>Number of computers in the institution for educators</th>
<th>Ratio of educators/computers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collège des Lauréats (Bonamoussadi)</td>
<td>71</td>
<td>3</td>
<td>24/1</td>
</tr>
<tr>
<td>Ecole Les Champions FCB de MEMIAM</td>
<td>9</td>
<td>3</td>
<td>3/1</td>
</tr>
<tr>
<td>Ecole Normale Supérieure de Yaoundé</td>
<td>125</td>
<td>36</td>
<td>3/1</td>
</tr>
<tr>
<td>Ecole Primaire et Maternelle les Oiselets</td>
<td>18</td>
<td>1</td>
<td>18/1</td>
</tr>
<tr>
<td>Longla Comprehensive College</td>
<td>94</td>
<td>5</td>
<td>18/1</td>
</tr>
<tr>
<td>Lycée Bilingue de Yaounde</td>
<td>250</td>
<td>10</td>
<td>20/1</td>
</tr>
<tr>
<td>Lycée Classique et Moderne de MVOMEKA’A</td>
<td>34</td>
<td>14</td>
<td>2/1</td>
</tr>
<tr>
<td>Lycée Général Leclerc</td>
<td>188</td>
<td>5</td>
<td>38/1</td>
</tr>
<tr>
<td>Lycée Joss</td>
<td>95</td>
<td>0</td>
<td>95/0</td>
</tr>
<tr>
<td>Lycée Technique de Bafoussam</td>
<td>111</td>
<td>2</td>
<td>56/1</td>
</tr>
</tbody>
</table>

Table 3: Percentage of computers connected to the internet.

<table>
<thead>
<tr>
<th>Institution</th>
<th>Number of computers in the institution for learners</th>
<th>Number of Computers connected to the internet</th>
<th>Institution has Internet Connectivity?</th>
<th>% of Computers connected to the internet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collège des Lauréats (Bonamoussadi)</td>
<td>20</td>
<td>26</td>
<td>Yes</td>
<td>100.00 %</td>
</tr>
<tr>
<td>Ecole Les Champions FCB de MEMIAM</td>
<td>9</td>
<td>0</td>
<td>No</td>
<td>0.00 %</td>
</tr>
<tr>
<td>Ecole Normale Supérieure de Yaoundé</td>
<td>132</td>
<td>113</td>
<td>Yes</td>
<td>86.67 %</td>
</tr>
<tr>
<td>Ecole Primaire et Maternelle les Oiselets</td>
<td>6</td>
<td>7</td>
<td>Yes</td>
<td>100.00 %</td>
</tr>
<tr>
<td>Longla Comprehensive College</td>
<td>65</td>
<td>61</td>
<td>Yes</td>
<td>92.86 %</td>
</tr>
<tr>
<td>Lycée Bilingue de Yaounde</td>
<td>72</td>
<td>72</td>
<td>Yes</td>
<td>100.00 %</td>
</tr>
<tr>
<td>Lycée Classique et Moderne de MVOMEKA’A</td>
<td>61</td>
<td>45</td>
<td>Yes</td>
<td>100.00 %</td>
</tr>
<tr>
<td>Lycée Général Leclerc</td>
<td>58</td>
<td>50</td>
<td>Yes</td>
<td>94.03 %</td>
</tr>
<tr>
<td>Lycée Joss</td>
<td>69</td>
<td>69</td>
<td>Yes</td>
<td>100.00 %</td>
</tr>
<tr>
<td>Lycée Technique de Bafoussam</td>
<td>10</td>
<td>14</td>
<td>Yes</td>
<td>100.00 %</td>
</tr>
</tbody>
</table>

On the state of connectivity of the schools we realised that 9 were connected and just 1 (Ecole Primaire et Maternelle les Oiselets) was still to be connected to the internet. In some of schools like Collège des Lauréats Bonamoussadi, Lycée Bilingue de Yaounde, Lycée Classique et Moderne de MVOMEKA’A, Lycée Technique de Bafoussam and Lycée JOSS Douala all the computers were connected to the internet. Ecole Normale Supérieure Yaoundé, Longla Comprehensive College and Lycée General LeClerc Yaounde have a less than 15% of computers not connected to the internet. Ecole les Champion FCB de Memiam has no computer connected to the internet.

Conclusion

Dede (1998) pointed out that most of society’s current attempts to shrink the widened equality gap that new educational technologies could create focus on access and literacy. On this account extra effort is made to increase the number of computers and communication available. We agree with Brundrett & Terrell (2003), who say the type of head teachers and principal we recruit in our schools will determine how well we can fare in integrating information and communication. These administrators are those to see how well these schools can be equipped, how well these computers can be used by both teachers and students and whether the schools are connected to the internet or not. Answering to our objective which was to present the state of things (in reference to equipment, access and connectivity) in some ten PanAf schools in Cameroon as far as information and communication technologies are concerned, we realized that all 10 schools were equipped with ICTs. Access to the computers in schools has been much more reserved for students than teachers though the teacher/computer ratio is far encouraging than the student/computer ratio. When we looked
at connectivity, only one (Ecole les Champion FCB de Memiam) is not connected to the internet while four of the ten schools have less than 15% of their computers without connectivity. Cameroon is therefore aware of the importance of equipping and connecting schools to the rest of the world, thus building their own destinies. The ministries of Basic, Secondary and Higher education in collaboration with school administrators need to double their efforts in equipping schools in order to improve on the student/computer ratio, allocate more time for teachers to use school computers and get into agreements with internet suppliers and technicians that all computers in schools can be connected to the internet.

Activities

Acacia Research and Learning Forum
Approximately 200 participants, mostly researchers and the media attended the Acacia Research and Learning Forum (ALRF) held in Dakar from 5 to 8 October. This important meeting brought together the research partners of Acacia (Access and Connectivity in Africa) with the aims to discuss the partial results of the evaluation of the dozen of Acacia networks / projects funded by IDRC, share experiences and contributions in the field of ICT and research for development. The different sessions provided the opportunity to discuss around varied and diverse issues as Policy and ICT Regulation in Africa, lowering barriers to the participation in the information society, the roles of public and private sectors in terms of equitable access to ICTs, the contributions of ICT4D research projects to African development, innovations in the field of ICT4D, implications of networked societies and stimulating equality across networked societies.

Fostering the measurement of societal progress: the role of ICT and training
The 3rd World Forum on “Statistics, Knowledge and Policy” took place in Busan, Korea on 27-30 October 2009 and attracted some 1 500 high level participants with a mixture of politicians and policy makers, opinion leaders, Nobel laureates, statisticians, academics, journalists and representatives of civil society, from over 130 countries. Prof. Thierry Karsenti, Director of the Interuniversity Research Centre on Education and the Teaching Profession, CRIFPE attended the forum and presented a paper during the session on Fostering the measurement of societal progress: the role of ICT and training. The 3rd Forum, organised by the OECD and the Government of Korea, builds on the outcomes of the previous World Forums (held in November 2004 and June 2007) and the “Istanbul Declaration” signed by a wide range of international, regional and national organisations. See also http://www.measuringprogress.org.

17th Commonwealth Conference Education Ministers (17CCEM)
The Regional Coordinator of ERNWACA attended the 17th Commonwealth Conference Education Ministers (17CCEM) held in Kuala Lumpur, Malaysia from June 15 to 19, 2009. During the Conference, she presented the project PanAf in the panel entitled: “The ICT imperative: Innovation for Education”.

Bamako + 5 Conference
The Regional Coordinator of ERNWACA participated to the Bamako + 5 Conference on a better management of contract teachers, held from October 27 to 29, 2009 in Bamako, Mali. Jointly organized by the Association for the Development of Education in Africa (ADEA), the World Bank, Education International and the Malian Ministry of Education, Literacy
and National Languages, the conference placed special emphasis on the need to integrate ICTs in the training of contract teacher.

During the conference, Unesco/Breda held a side meeting where Prof. Dr. Djénéba Traore presented a paper on the pedagogical integration of ICT in education in Mali.

Open Access conference opens in Accra
The 7th Open Access Conference 2009, which aims at promoting access to communication resources on reasonable, transparent and cost-effective basis opened on Monday, November 2, in Accra. The three-day conference being hosted by the University of Ghana (UG) and the Ghana Academic Research Network (GARNET) in collaboration with the Royal Swedish Institute of Technology is on the theme: “Harnessing the rapid growth of fibre infrastructure for socio-economic development.”

The PanAf network was represented by Prof. Moses Mbangwana. The conference was preceded by a preliminary meeting, which focused on Regional Research Education Networks (RRENs).

Conference on strengthening research capacity in Africa (ICBRTECA)
The first international started on Monday, November 9, 2009 in Bamako. The theme of the conference was: “Development of research in African universities through regional networks, international research, knowledge and Information Communication and Technology (ICT).”

Following the recommendation of the World Conference on Higher Education of 2009, the Cluster Office in Bamako UNESCO has identified and adopted the issue of strengthening the capacities of researchers. In this context, a lecture series and workshops are initiated by the Cluster Office of UNESCO in Bamako. This conference took place in the context of monitoring the Consolidated Action Plan for Science and Technology which aims to implement programs of research and development of the African Union.

Online Educa Berlin Conference (OEB)
Toby Harper-Merrett attended the session on “Access to Content in the Developing World” featured several real world examples of how access to content can be provided in the developing world and how the gap between the information-overloaded urban wealthy and the knowledge-impoveryished rural poor can be bridged. Chaired by Shafika Isaacs (South Africa) the speakers highlighted the issues and challenges faced, as well as outlined several solutions, including the following presentations of Toby Harper-Merrett, Université de Montréal, Canada “Transverse Empowerment in the PanAfrican Research Agenda on the Pedagogical Integration of ICTs”
(Footnotes)

1. Escola Secundaria da Matola; Escola Secundaria de Moamba; Universidade Pegagogica.
2. Escola Secundaria Josina Machel.
3. Eldocrest Primary School; Isikhumbuzo Private School.
4. St John’s Preparatory School.
5. Senior High School; University of Tamale.
7. An obstacle hindering or negatively impacting on a person’s experience with ICTs
9. Perception of educators of the relationship between first language(s) of the learners and ICT-in-education
10. Perception of parents (or community-members) of the relationship between first language(s) of the learners and ICT-in-education
11. Shilo Bilingual Educational Centre (SBEC) Gambia
12. Educator at Escola Secundaria da Matola School, Mozambique
14. Free to download and use
17. Presidential National Commission on Information Society and Development
18. Educator at Eldocrest Primary School, South Africa
19. Concurrent use of more than one language in a conversation
20. Educator at Isikhumbuzo Private School, South Africa

For more information, visit the PanAf Observatory at: www.observatoiretic.org and the PanAf Webportal at: www.panaf-edu.org

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