

## **THE PANAF RESEARCH AGENDA ON THE PEDAGOGICAL INTEGRATION OF ICTS: PHASE 1**

Pr. Thierry KARSENTI [thierry.karsenti@umontreal.ca](mailto:thierry.karsenti@umontreal.ca)  
Pr. Djénéba TRAORÉ\* [dtraore@rocare.org](mailto:dtraore@rocare.org)  
Dr. Moses MBANGWANA [mmbangwana@rocare.org](mailto:mmbangwana@rocare.org)  
Mr. Toby HARPER-MERRETT [toby.harper-merrett@umontreal.ca](mailto:toby.harper-merrett@umontreal.ca)

**Final Report\*\***

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**Pan-African Research Agenda on the Integration of ICTs in Education**

**Sénégal, The Gambia, Mali, Côte d'Ivoire, Ghana, Cameroun, République du Congo, République centrafricaine, South Africa, Mozambique, Kenya, Uganda**

**Educational Research Network for West and Central Africa [www.rocare.org](http://www.rocare.org)  
Université de Montréal [www.crifpe.ca](http://www.crifpe.ca)**

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## **ABSTRACT**

The first phase of the PanAf project consisted of African ICT in education experts going into the field to collect mixed quantitative and qualitative data on the pedagogical integration of ICTs at the school-scale. These teams upload their work to [www.observatoireict.org](http://www.observatoireict.org) where their summary analyses and accompanying raw data are freely accessible to PanAf network peers in other African countries as well as stakeholders around the world. PanAf Phase 1 collected and shared an unprecedented baseline of approximately 20,000 data points from over 100 schools across the networks countries. The added value of these indicators lies primarily in enhanced knowledge of ICT access, use and impact self-reported by educators and learners, in support of scientific, practical and policy-oriented dissemination. PanAf Phase 1 also featured capacity building objectives for the researchers involved, focused primarily on the application of mixed methodology in the field and on use of the Observatory as a living resource for research indicators and supporting evidence. The results of the first phase of PanAf's research point to significant disparity in access and use of ICTs in schools based on the public/private, and rural/urban divides, and highlight the need for comparative analysis of the use and impact of ICTs to draw out lessons regarding "teaching computers" versus "teaching through computers".

## ***Keywords***

Africa, education, pedagogy, ICTs, qualitative methodology, policy dialogue

## **i) GENERAL INFORMATION ABOUT THE PROJECT**

The objective of Phase 1 of the PanAfrican Research Agenda on the Pedagogical Integration of Technologies (PanAf) was to better understand how the pedagogical integration of ICT can improve the quality of teaching and learning in Africa through mixed methodology research conducted at the school-scale by African researchers across the continent. The main activity in the initial two-year phase was the development of an Observatory on ICT in African education, modelled on observatories in other research disciplines, such as oceanography, which have successfully gathered, organized and updated data for researchers and practitioners in specific fields. The PanAf indicators were developed through a highly participatory process involving researchers—male and female—from universities in 11 countries in different parts of the African continent at a workshop held in Dakar in September 2006. The approximately 180 indicators ensuing monitor ICT in education policies, access, teacher training, ICT use, impact, management, and issues such as gender, language etc. Both qualitative and quantitative research methods were used to gather Observatory data.

Data on several of the indicators currently exist in some of the countries or on the Internet, but rarely in peer-reviewed international academic journals. Brought together in one place, and made freely available, by PanAf's African research network, unprecedented new data now provide a baseline for future research and collaborative efforts on the pedagogical integration of ICT in Africa. Observatory data is intended to support policy development initiatives, particularly those related to teacher training, as well as scientific and practical publications. Over the course of PanAf Phase 1, partnership agreements were signed with organisations including the World Bank's Infodev and UNESCO's UIS, to collaborate and contribute towards the project's objectives. Besides producing enriching information and organizing it via a user-friendly interface, the research process contributed to capacity building in African higher educational institutions, with a particular focus on research methodology as well as the pedagogical integration of ICT, a sector that can advance educational change in the 21st century.

A newsletter was created for the network to report on PanAf activities. Special mechanisms were put in place to encourage all participating researchers to contribute to the newsletter content and to work towards preparing scientific articles for publication, based on knowledge and analyses generated by project fieldwork. Under the communication strategy each participating country held a policy dialogue workshop.

The PanAf network consists of national research teams based at education faculties in twelve countries across West, Central, East and Southern Africa: Cameroon, Central African Republic, Congo, Ghana, The Gambia, Kenya, Mali, Mozambique, the Republic of South Africa, Senegal and Uganda. A management team based at the Educational Research Network for West and Central Africa (ERNWACA) and the Université de Montréal ([www.crifpe.ca](http://www.crifpe.ca)) were responsible for continent-wide scientific, technical and administrative coordination. National Committees took responsibility for content uploaded to the Observatory content, and an International Scientific Committee is responsible for the overall rigour of the PanAf network's research. The Observatory was assessed in part by a statistical analysis of Internet data and an online survey. Lessons learned were documented and continuously incorporated as the project evolved.

### ***Partners***

#### **Research**

- South Africa: School of Education, University of the Witwatersrand
- Côte-d'Ivoire: Ecole Normale Supérieure, Abidjan
- Congo: École Normale Supérieure, Brazzaville
- Kenya: School of Continuing and Distance Education, University of Nairobi
- Cameroun: Département de Sciences de l'Éducation, Ecole Normale Supérieure, Université de Yaoundé
- Ghana: University College of Education, Winneba
- Mali: Département des Sciences de l'Éducation, Institut Supérieur de Formation et de Recherche Appliquée, Bamako
- Mozambique: Department of Evaluation & Research, National Institute for Education Development, Maputo
- Uganda: School of Adult Education & Communication Studies, Makerere University, Kampala

- République Centrafricaine: École Normale Supérieure, Bangui
- Sénégal: Faculté des Sciences et Technologies de l'Éducation et de la Formation, Université Cheikh Anta Diop de Dakar
- The Gambia: Science and Technology Department of the University of the Gambia, Banjul

### **Coordination**

- Educational Research Network for West and Central Africa (Bamako) [www.ernwaca.org](http://www.ernwaca.org)
- Université de Montréal [www.crifpe.ca](http://www.crifpe.ca)

### **External**

- infoDev (World Bank) [www.infodev.org](http://www.infodev.org)
- UNESCO Institute for Statistics [www.uis.unesco.org](http://www.uis.unesco.org)

### **International Scientific Committee**

- Dr. Nancy Hafkin [nhafkin@comcast.net](mailto:nhafkin@comcast.net)
- Pr. Thèrese Tchombe [tmtchombe@yahoo.co.uk](mailto:tmtchombe@yahoo.co.uk)
- Dr. Abdoulaye Barry [a.barry@unesco.org](mailto:a.barry@unesco.org)

### ***PanAf Map of partners***

## II) RESEARCH PROBLEM AT THE CENTRE OF THE PROJECT

The challenge presented to PanAf Phase 1 can be summarized in three basic points:

- The depth of previous research on the pedagogical integration of ICTs in Africa does not reflect the demonstrated importance of the issue
- Results of past studies have lacked a harmonized communication facility
- African education researchers would benefit from methodological and dissemination capacity building

There has never before been a comprehensive PanAfrican study of ICTs in education. To enhance learning and develop education systems through ICTs required a baseline study of use and impact was required in order to facilitate the application of best educational practices, according to the principles proposed by Chickering and Gamson (2004):

- encourages contact between students and faculty,
- develops reciprocity and cooperation among students,
- encourages active learning,
- gives prompt feedback,
- emphasizes time on task,
- communicates high expectations, and
- respects diverse talents and ways of learning.

PanAf Phase 1 research shed light on the pedagogical uses of ICTs in varied African learning settings and areas such as student learning, programmes and pedagogy, online education (e-education), professional development, evaluation, etc. Results of both the trans-national research project on ICTs integration in African ICTs pioneer schools (see Karsenti et al., 2005), and PanAf Phase 1 clearly demonstrate that ICTs usage in Africa has been inadequately documented compared to other parts of the world. This view is supported by UNESCO (2004):

*[...] monitoring and evaluation are the weakest components in most ICTs in education programs. While a number of stocktaking research studies have been conducted on ICTs infrastructure penetration and access in schools, there have been minimal monitoring and evaluation of ICTs integration and its impact on teaching and learning. Evaluation is an important phase in the formulation and implementation of an ICTs in education program. Evaluation, both formative and summative, means that policies, practices, and activities are documented, interpreted and analyzed (p. 135).*

Pedagogical ICTs integration initiatives have involved a variety of situations such as visual projection, preparation of class notes, and distance self-learning. A promising research approach was an attempt to provide an overview of the diverse experimental uses of ICTs in learning. Long-term ICTs initiatives, national and continental, have not yet been clearly monitored or evaluated.

It would also seem urgent to reflect on the pedagogical integration of ICTs into teaching in particular African localities where learning with these tools is a very chaotic process. ICTs themselves do not encourage students to be creative or to grasp the scientific approach. That requires a pedagogical framework within which technology can facilitate the use, processing and production of relevant information, among others. No matter how powerful the hardware, it serves no educational purpose if it is not used for appropriate purposes. Hence, education research has a duty to shine a scientific spotlight on training in the pedagogical uses of ICTs, a societal issue of enormous import.

As a continent that lags far behind in ICTs adoption, use and innovation, Africa is not at the point where it can use educational ICTs to provide its people with a better education or to take advantage of the investment potential and opportunities it offers. Nevertheless, several countries are convinced that ICTs use is an undeniably sound economic development strategy when viewed as an investment in the future. This raises possibilities of ICTs utilization for African development and a restructuring of knowledge based on a consideration of local African realities.

### III) RESEARCH OBJECTIVES

In response to the challenges above, PanAf Phase 1 aimed to:

- Collect new school-scale data, using mixed methodologies
- Create innovative opportunities for knowledge sharing
- Provide learning opportunities for those involved

#### ***Main research question***

*How can the pedagogical integration of ICT into African education systems improve the quality of teaching and learning?*

This question is entirely consistent with the IDRC mission, which is embodied by the five-year Acacia program to support research leading to recommendations for concrete improvements in the quality of teaching and learning, and was central to PanAf Phase 1.

#### ***Secondary research questions***

- Several sub-questions related to the main study question were addressed:
- What ICT usage policies are in force in African education systems?
- What is the state of connectivity, equipment and its management in African education institutions?
- How are African teachers trained in the pedagogical uses of ICT?
- How are students trained in the use of ICT for learning?
- What is the ICT usage profile across the education systems?
- How does ICT impact the various teaching/learning levels in Africa?
- What is the role of administration in the ICT integration process?
- What strategies could be used to promote relative gender equity in ICT use in African education systems?

#### ***Overall research objective***

*To better understand how the pedagogical integration of ICT can improve the quality of teaching and learning in Africa.*

This overall research objective, stemming directly from the research question, as recommended by most research methodology experts (see Huberman & Miles, 1994), was accompanied by specific research objectives that were set to promote research development on the pedagogical integration of ICT in Africa.

#### ***Specific study objectives***

- Appraise ICT policies in African education systems
- Report on the state of connectivity and equipment and its management in African institutions
- Describe African teacher training systems in the pedagogical uses of ICT
- Draw a portrait of ICT use in African educational institutions
- Better understand the impacts of ICT on education
- Better understand the roles of school principals, administrative staff and the community in ICT integration
- Identify guarantor strategies for the equitable use of ICT in education.

The above-listed objectives were the cornerstone for more specifically targeted examinations of the pedagogical integration of ICT into African teaching systems. These objectives were combined, depending on the education stakeholders addressed (principals, teachers, students, parents, governments, etc.) as part of the empirical research carried out under this project. Achievement of these research objectives gave an overall understanding of the educational potential of ICT in a range

of African contexts. This in turn shed light on existing usage in the different pedagogical fields and promoted mutualisation.



## IV) METHODOLOGY

There are at least four important methodological issues to keep in mind with regard to PanAf Phase 1:

1. The research fieldwork was undertaken via school-scale questionnaires and recorded interviews with educators and learners. The project indicators are both quantitative and qualitative, and therefore the fieldwork instruments required both numerical and text-based responses.
2. Summary analyses of the qualitative responses are uploaded in real-time to [www.observatoiretic.org](http://www.observatoiretic.org) by network's national experts. These analyses are accompanied by the "raw" data (mp3 files of recorded interviews, scanned completed questionnaires, etc.), and are updated in an ongoing fashion as new information is gathered (data points on the Observatory are clearly time-stamped).
3. In no way did PanAf Phase 1 aim to be nationally "representative" in its selection of schools (explained below). Rather, the research aimed to share real examples of leadership, best practices and challenges in a selection of African schools that already have and are using computers. The Observatory indicators are concentrated at the school ("institutional") scale, while national data are simply compilations of the results from the selected schools – at a national scale there are complimentary direct links to infoDev and UIS data.
4. While we realize that mobile handsets, DVD players, television and radio play various roles in technology enhanced learning in Africa, PanAf Phase 1's definition of ICTs in education was purposefully limited to "computer use in schools" for reasons of inter-institutional and international comparability.

*"It was an ambitious and presumptuous, a vain and envious brain that tries to persuade others that there is but a single path to investigate and grasp the knowledge of nature. And it is a foolish and gullible man who chooses to believe in it himself. Therefore, although the steadiest and firmest path, the most contemplative and distinct, the highest reflective mode, must always be preferred, and honoured and cultivated as well, we nevertheless must not find fault with another path that is not without fruition, even though the fruits do not come from the same tree". (Giordano Bruno, 1548-1600, free translation).*

Methodological approach: the mixed method era. It is noteworthy that, for the last 20 years, many researchers have adopted one of two main methodologies or paradigms for education sciences research (see Krathwohl, 1998). These methods are considered as different as to be diametrically opposed: quantitative and qualitative research. Proponents of the quantitative approach contend that research in the education sciences must be objective, free of bias and broadly applicable. At first glance, this is the approach advocated by the Canadian Council on Learning (CCL), which supports research on learning based on a useful base of evidence.

Enthusiasts of the qualitative approach (see Lincoln & Guba, 1985), for their part, have rejected the idea of objectivity as the sine qua non for research in the social sciences. For the more orthodox, objectivity and generalization in the social sciences are both impossible and undesirable. In contrast, qualitative research is characterized by an inductive focus, extensive descriptions, etc. These two epistemologically incompatible positions have often evoked what Howe (1988) calls the "quantitative-qualitative incompatibility thesis" in support of the research methods and data collection methods inherent in these two incompatible approaches. Consequently, for the past 20 years, most researchers in the education sciences have felt they had to choose between the qualitative and quantitative approach. Why did the education sciences advocate this methodological dichotomy, which does not seem to account for the complexity of real-life situations? Why did they not seek a compromise between these "two solitudes"? Note that although for a long time social science researchers felt they had to choose between qualitative and quantitative approaches, in 1986 this was considered progress compared to the previous mindset. Let us recall that education research used to be dominated by the so-called quantitative method, which directed researchers to begin their studies with hypotheses and seek to prove or disprove them. An additional option was then introduced whereby researchers could choose between the quantitative and qualitative approaches, an option that became increasingly popular after the mid 1980s (see Erickson, 1986). These days, the methodology of choice in the education sciences is a mixed methodology, also known as mixed methods research. This is a natural and particularly pragmatic outcome of both the traditional quantitative and qualitative methods. Mixed methods research is actually a kind of methodological eclecticism that strategically marries qualitative and quantitative data into a coherent

and harmonious union. Consequently, the research results are enriched. This mixed approach borrows from diverse methodologies, both qualitative and quantitative, depending on the research objective. The result is a kind of methodological pluralism. Moreover, a mixed research methodology facilitates the triangulation of research results.

In fact, the use of diverse methods to ensure that rigorous conclusions are drawn based on a range of research data is a highly promising research direction. Johnson and Onwuegbuzie (2004) also noted that mixed-method research usually generates superior results to those of single-method research. What is more, regardless of student preferences, a good number of universities still offer courses whose structures reflect this dichotomy. Students must sign up for either qualitative or quantitative research. Also called mixed research. It is only quite recently that the mixed research methodology has gained in use and recognition in education sciences circles, despite the fact that several authors have defended this union for almost 20 years. Indeed, the works of Mark and Shotland (1987), Reichardt and Gollob (1987), Brewer and Hunter (1989), Caracelli and Greene (1993), Van der Maren (1995), Behrens and Smith (1996), and Krathwohl (1998) all point out that the two approaches are usually opposed, when they could just as well be complementary (Van der Maren, 1995), allowing a more complete and thorough understanding of the phenomenon studied (Moss, 1996, p. 22). Krathwohl (1998) stressed the importance of combining different methods as a way to better "attack" the research problem (p. 618). He also stressed the importance of creative combinations of the diverse methodological elements in a coherent and organized manner so as to better address the research question. In addition, he felt that the only limits on researchers were their imaginations, and that research findings must be presented in a convincing manner (p. 27). Indeed, by choosing one particular method over another, certain benefits are lost while others are gained. Thus, Brewer and Hunter (1989) argue that each method has its own particular drawbacks, but fortunately, the drawbacks usually differ. They add that researchers can use a variety of imperfect research methods to combine their strengths while compensating for their respective drawbacks and limitations (p. 16-17). Johnson and Onwuegbuzie (2004) have gone further by proposing three major research paradigms: quantitative, qualitative and mixed research.

Our original proposal for a Panafrican Research Agenda on the Pedagogical Integration of ICT definitely called for this new research methodology. It would not be a question of imposing a mixed methodology on this important project. Instead, we could choose from an eclectic assortment of data collection methods to address the research questions and objectives. In some cases, a single quantitative approach might be best; in other cases, the qualitative approach might be preferable. In any case, a mixed methodology could be used as well. Clearly, however, the methodology must be rigorously, rationally, coherently and harmoniously articulated. It must also be consistent with the overall research objective. Thus, by adopting the mixed research method, we would carry out both qualitative and quantitative methodologies and apply twice the rigor.

Case and multi-case studies: the main methodological approach. This study aims to better understand how the pedagogical integration of ICT can improve the quality of teaching and learning in Africa. Thus, the aim is to demonstrate the interactions (relations between ICT and teaching/learning) while seeking to better understand and explain them. With the objectives providing a starting point for the study, the methodological approach retained is the multi-case study, as described by Yin (2000) and Stake (1996). Contandriopoulos and colleagues (1991: 37) have also called this type of research investigation a case synthesis.

Case synthesis or case study research is a strategy whereby the researcher decides to work on an analysis unit (or a very limited number of them). Observations are made within the case. Yin (1994) defines the multi-case study as distinct from the single-case study; it aims to reveal the convergences between several cases while examining the particularities of each case. However, note that this method requires a certain rigor as well as similar investigative procedures applied to different situations in order to compare the different case studies. Merriam (1988), and Miles and Huberman (1984) point out the undeniable advantages of the multi-case study over the single-case study: If time, money, and feasibility permit, a researcher might want to study several cases. In so doing, one increases the potential for generalizing beyond the particular case. An interpretation based on evidence from several cases can be more compelling to a reader than results based on a single instance (Merriam, 1988: 154). By comparing sites or cases, one can establish the range of generality of a finding or explanation, and at the same time, pin down the conditions under which that finding will occur [...]. The researcher attempts to see processes and outcomes that occur across many cases or sites and to understand how such processes are bent by specific local contextual variables (Miles & Huberman, 1984: 151). This method would appear to be particularly suited for the present study; specific cases liable to demonstrate the interactions studied (ICT and education) could be selected. The multi-case comparison (Yin, 2000) would also be suitable for the proposed study because it would

facilitate an understanding of the dynamic relations between ICT, learning, teaching, educational administration, etc. The multi-case study approach would incorporate multiple data collections and results derived from similar indicators. The particular relevance of this method stems from the case study criteria defined by Yin (2000: 23), which correspond to the methodological features of the present study.

Case study criteria according to Yin (2000) and features of this research project Yin's (1994) criteria for the case study Features of the present research project 1) The case study investigates a Real-life phenomenon (pedagogical contemporary phenomenon within its integration of ICT) studied in a real-life real-life context. The boundaries between To date, little is known about the phenomenon and context are not impacts of ICT on teaching and learning clearly evident in Africa. 3) Multiple sources of evidence Researchers will use multiple sources of are used. Data and information to better understand the impacts of ICT on teaching and learning. Miles and Huberman (1991) also pointed out the indisputable advantages of the multi-case study over the single-case study. Nevertheless, we are aware of certain methodological limitations in this study, and precautions, such as data triangulation (Huberman and Miles, 1994), wastaken to ensure validity.

### ***Strengths of the study***

A key strength of the study is undoubtedly the research methodology retained. Multi-case studies are rarely encountered in the education research field. And yet, this approach is well suited to the issues, research question and objectives of the proposed Panafrican Research Agenda on the Pedagogical Integration of ICT. The originality of Yin's (2000) multicase study is certainly an asset that could facilitate the uncovering of basic convergences between ICT and teaching/learning in widely varying contexts, on the one hand, and distinguish innovations particular to each context on the other. Thus, according to Merriam (1988), an investigation conducted in different settings would obtain a more global, complete and extensive perspective on this phenomenon. Similarly, Van der Maren (1993: 17) emphasizes that the great advantage of the case study is that it reveals general, if not universal, features based on a detailed and thorough study of one or more cases. Contandriopoulos and colleagues (1991: 37) also state that: The explanatory strength of this strategy [the case study] rests in the structural coherence of the relations between the case components and the coherence of the variations of these relations with time. The explanatory strength therefore derives from the depth of the case analysis and not the number of analysis units studied.

### ***Triangulation as a methodological precaution***

An important element in all education research is triangulation, which means viewing research results from diverse perspectives. The mixed approach can be incorporated as a very valuable element in the triangulation procedure. According to Bogdan and Biklen (1992), research validity resides primarily in determining whether the data collected by the researcher actually correspond to the phenomenon studied. Triangulation is a common, practical and relevant method to offset validity bias. Thus, triangulation validates the researcher's hypothesis through diverse verification methods. Methodological triangulation combines dissimilar methods such as interviews, observations, and physical evidence to study the same unit (Merriam, 1988: 69). The rationale for this strategy is that the flaws of one method are often the strengths of another, and by combining methods, observers can achieve the best of each, while overcoming their unique deficiencies (Denzin, 1970: 308). The achievement of useful hypothetically realistic constructs in a science requires multiple methods focused on the diagnosis of the same construct from independent points of observation through a kind of triangulation (Campbell and Fiske, 1959: 81). According to Stake (1995), aside from the use of different methods, an excellent way to triangulate research results is to review the phenomenon in light of the collected results to ensure good correspondence with the perception of the phenomenon. Therefore, all the researchers under this project would adopt this method for a given indicator. The methodology workshops would also be very useful, since they would set the methodological guidelines and foster complementary methods used between different researchers, as appropriate. This is because the methods would change according to the different indicators. Consequently, all the researchers would use the same methods for a given indicator, but overall, diverse methods was used to achieve our indicators.

## ***Main data collection instruments***

In addition, as suggested by Yin (2000), the investigative methods used in a multi-case study must be standardized to a certain extent. It would therefore be important for the researchers to use similar data collection instruments as far as possible. The research program that we are undertaking would include four main data collection instruments:

- Survey questionnaires
- Interviews (individual and group)
- Discussion groups with learners
- Collection of supporting documents, products and publications

As explained by Krathwohl (1998) and Van der Maren, the survey questionnaire has the advantage of achieving rapid contact with a large number of people. It was very useful for our research project, particularly to obtain responses on the diverse indicators requiring consultations with specific populations (students, educators, etc.). For example, to obtain responses on an indicator showing learner and educator ICT usage, national teams could administer the survey questionnaires to reach a substantial number of subjects relatively rapidly and easily. Goyette (1994) describes the interview procedure as highlighting the research process through an informal conversation. He further explains that the interview procedure facilitates the planning, conduct, and even the analysis of the interview. Mishler (1986) stresses the need for properly trained interviewers.

A well-prepared interview is more likely to obtain more accurate and relevant information on the research topic in question. On the other hand, a badly prepared or inexperienced interviewer was less likely to obtain meaningful research data (Mishler, 1986). During the interview, the subject should always be encouraged to speak on the issue at hand. According to Mishler (1986), it is essential to keep the subject directly on topic. Finally, the conclusion is the last step of the interview (Mishler, 1986). At this point, the interviewer should ensure that he/ she has truly understood what the respondent wanted to say by summing up the responses for the interviewee's corroboration. This constitutes a form of triangulation (Stake, 1995), since the subject is "confronted" (Huberman & Miles, 1994) with the collected data. As part of this research project, we would draw up an interview guide so that the interviews were semi-structured (Sedlack & Stanley). For instance, the interviews were structured to enable the national teams to better understand the difficulties that teachers encounter in the pedagogical integration of ICT in Africa. Aside from providing information on the general use of the methodological approach, the methodology workshop was a forum to train researchers on how to conduct the interviews.

The compendium of textual data primarily gathered, organized, analyzed and synthesized diverse documents that are closely related to the Observatory indicators. The scientific coordinator of the project, compiled all ICT policies in African countries.

## ***Determination of the indicators***

The indicators were the main activities to the ICT Observatory. An indicator is a category of information that is collected and stored in an observatory from where it may be retrieved. In this case, it consisted of a reliable qualitative or quantitative variable to measure and evaluate conditions and equipment over time in order to monitor the pedagogical uses of ICT. The ICT indicator was an index of the quantity or quality evidenced by a specific aspect of ICT integration. This would allow the actual performance and effectiveness of each study objective to be assessed, thereby simplifying the data collection process. The indicators would play an integral part in determining the effectiveness of the pedagogical uses of ICT and their impacts on the entire learning process. To achieve the study objectives, the research employed clearly defined and consistently applied indicators to better assess the conditions for optimum ICT use in the learning process. To define the indicators, we have drawn from the scientific literature on the pedagogical integration of ICT as well as real-life situations. Thus, to supplement the literature review, we held a Project Development Workshop under the auspices of the IDRC in Dakar in September 2006, where we consulted with 35 experts in the field of ICT in education and drew up the indicators. We classified the indicators into twelve main categories:

Main indicator categories:

1. National education and ICT policy
2. Equipment, connectivity and access
3. Teacher-training
4. ICT use

5. Impact on educators and teaching
6. Impact of ICT on learners and learning
7. Institution management and ICT
8. Policy related to equity
9. Gender
10. Cultural and content sensitivity
11. Special education
12. Language

### ***Data collection strategy***

The first step in the data collection strategy—and one of the most important steps in the study—was to gather, analyze and synthesize the data for uploading to the online Observatory. This necessary and crucial phase started in January 2007 to June 2009 on gathering data for approximately 90% of the indicators. The first step in the uploading of the ICT Observatory indicators compiled all the available data on ICT in African education systems onto this platform.

The qualitative data analysis strategy was derived from the approaches proposed by L'Écuyer (1990), and Huberman and Miles (1991, 1994). We have adopted the content analysis approach (see Table 2). According to Sedlack and Stanley (1992), and L'Écuyer (1990), content analysis is a classification method whereby the diverse elements of the material analyzed are coded to allow a better understanding of the characteristics and meanings (L'Écuyer, 1990; p. 9).

General model for the content analysis procedure (adapted from L'Écuyer, 1990)

Step Characteristics:

- I. Reading of the collected data
- II. Definition of the classification categories for the collected data
- III. Categorization of the collected data
- IV. Quantification and statistical data treatment
- V. Scientific description of the studied cases
- VI. Interpretation of results from step V.

### ***Selection of partner countries***

The selection of partner countries began prior to the Project Development Workshop held in Dakar in September 2006. We looked for countries where ICT were present in educational institutions so as to maximize the participation of people with experience in the educational uses of ICT. The IDRC has supported and continues to support projects in this area. At the same time, we did not want to exclude countries such as the Central African Republic and Congo, where ICT use in education is less common but the same challenges to its use prevail. In addition, we decided to adopt an adaptative approach towards the countries identified as main Observatory partners. The research teams from these countries played a key role in constructing and managing the Observatory.

Research Agenda, the 11 following countries were approached and they expressed their intentions to participate in the project:

1. South Africa
2. Cameroon
3. Congo
4. Egypt
5. Kenya
6. Mali
7. Morocco
8. Mozambique
9. Uganda
10. Central African Republic
11. Senegal

In the course of the project, Morocco dropped out and they were replaced by Côte d'Ivoire. Later on Egypt also dropped. Two ERNWACA members (Ghana and Gambia) indicated their intention to join the project and they were accepted in November 2008.

To participate in the Observatory, the research teams from these countries gathered data from various pre-school, primary, secondary, higher level and professional and technical schools.

## **v) PROJECT ACTIVITIES (2007 - 2009)**

The majority of PanAf Phase 1 resources were invested in remuneration of national research teams for their data collection, summary analysis, and sharing via the Observatory. Other investments included capacity building workshops (for research methodology as well as scientific writing), and communication via publications and conferences, as well as country visits to support national team fieldwork. The timeline of the project, from late 2006, to mid 2009 included three “blocks” of data collection, roughly divided into:

- national scale Policy data and selection of target schools
- resource and Access (quantitative) data
- Use, Impact and sustainability (qualitative) data

Parallel to these national scale activities, the management team at ERNWACA in Bamako and Université de Montréal in Montreal, reinforced scientific (indicators and instruments), technical (communication), and administrative (institutional partnership) structures to support the research.

With regard to implementation of the project’s activities, a relatively innovative style of management was adopted, with overall success. Aspects that proved particularly important to the success of the project’s activities include:

- Adaptive co-management of scientific, technical and administrative coordination and implementation shared between Programme Managers at ERNWACA (Moses MBANGWANA) and Université de Montréal (Toby HARPER-MERRETT);
- Decentralized research activities, undertaken by 11 research teams, using their expertise to apply a common (PanAfrican) methodology and instruments to their national context, and sharing their results via a common platform;
- Open-access to mixed (quantitative and qualitative) data, at the user (school) scale, accompanied by downloadable Auxiliary files including émp3 recorded interviews, scanned questionnaires, policy documents, and examples of ICT-based productions by educators and learners.
- Production-based remuneration - to encourage consistent, high-quality research, each indicator was assigned a value and research funds were transferred directly based on fieldwork undertaken.

### ***Difficulties encountered in managing the project***

A project managed by two centres cannot be done without difficulties. The following have been noticed:

- Decision taking sometimes can be slow because there need to be a consultation between the Research Manager, the Regional Coordinator of ERNWACA and the Montreal team. For instance, planning school visits and workshops needs to be carefully done in such a way that the 2 partners have to be aware quite in advance in order to adjust their time tables or schedules of work.
- Language barrier from the beginning was a problem in that messages were sent out to two different lists. The Francophone members complained of messages in English, while the Anglophones complained when messages were sent in French. The other major language problem is that Mozambique has Portuguese as the official language, and it takes them time to get messages in another language translated.
- The workshop in South Africa where all the participants from the 11 countries were present, proved to be very costly because of translation. Even though there was translation, one could still hear participants complaining because the interpretation was not below expectation.
- Members from the beginning did not know how to use the Observatory because of technical difficulties.
- Money transfer to participating countries has been our biggest headaches since it takes about 2 months for the researchers to receive the money. The banks take time for transfer and when the money goes into university accounts, it is very often difficult to trace. Central African Republic and Congo Brazzaville did not succeed in getting the start up funds after 6 months and we had to send it through Western Union.

- Many of the researchers sometimes do not reply to emails as early as we expect. This probably may be due to poor Internet connections and/or low Internet use.

### **Successes registered:**

- ERNWACA and the University of Montreal have successfully built a working relationship that is based on flexibility and synergy.
- There is an increase in network development of African expertise.
- Capacity building at multilevel has been achieved with the help of workshops and conferences.
- The Observatory, PanAf website, booklets, flyers and PanAf newsletters have greatly increased the visibility of both ERNWACA and the University of Montreal.
- The researchers have some financial compensation even though not much, but most of them are happy.
- Many researchers are now writing articles and having easy access to publishing.
- Some researchers will in the long run change grades from Assistant lecturers to lecturers, and from Lecturers to Associate professors.

Overall project challenges and successes, as outlined by members of the national research teams in a survey at the end of 2008, included:

#### **Phase 1**

##### **Challenges**

- |          |  |
|----------|--|
| Internal | <ul style="list-style-type: none"> <li>lack of cohesion within national research team</li> <li>travel to field to collect data and be compensated later</li> <li>entering and uploading data was time consuming</li> <li>writing publishable articles</li> </ul>   |
| External | <ul style="list-style-type: none"> <li>convince managers and educators to respond to questionnaires and interviews</li> <li>availability of respondents</li> <li>participation of managers and educators, especially more senior ones</li> <li>educators disliked questionnaires, preferred interviews</li> <li>compensation expectation for participating institutions</li> </ul> |

##### **Successes**

- |          |   |
|----------|---|
| Internal | <ul style="list-style-type: none"> <li>brings together researchers from all parts of Africa, potential for collaborations</li> <li>presentation of the project at eLearning-Africa in Ghana</li> <li>sharing experiences with other researchers during workshops and conferences</li> <li>collection of mixed-methodology data from institutions, uploading it to the Observatory, built in quality controls</li> </ul>                                 |
| External | <ul style="list-style-type: none"> <li>first Pan-African research project on the pedagogical integration of ICTs, critical data has been collected</li> <li>better knowledge of what is happening in the schools, open access to data for comparison with other countries</li> <li>interest and participation by managers, educators and learners, appreciating the importance of the issue</li> <li>access to national ICT policy documents</li> </ul> |

### **Workshops**

The first methodology workshop was held on the 6-7th September 2007 after the start of the data collection in Bamako for the Francophone countries. The second was held from the 24-25 September for the Anglophone countries. The main purpose of these two workshops was to better prepare the researchers to carry out the field tasks. By bringing together researchers from the various participating countries, the workshop constituted an oversight group that could explain the methodological



approach adopted for the study. Aside from sharing and evaluating the information collected in the first three months, the workshops provided ideal opportunities for preparing the researchers for a much more extensive field data collection. During the workshops the researchers had the opportunity for the first stocktaking of progress by means of summaries of the types of information gathered and made available online and the potential problems identified. At the same time, it was an opportunity for the participants to check the consistency of their methodological approaches and fine-tune their procedures. Aside from providing information on the general use of the methodological approach, the methodology workshops were used to train researchers to conduct the interviews.

There was a scientific training workshop that took place in South Africa from the 11-12 February 2008. The main objectives were:

- Reinforce importance of data analysis, writing, and scientific publication within PanAf project
- Work systematically with peers and resource persons to review steps of writing process
- Develop paper outlines for papers to be presented at May 2008 e-learning conference in Ghana and for submission to journals

### ***Fieldwork***

Following the methodology workshop, the third step was the field data collection, which was ongoing for 20 months. This procedure would require a lengthy duration to enable the researchers to observe as much as possible and gather the most accurate information. Complete observation of certain types of information might require the setting of minimum durations.

This initial step of the investigation was aimed at compiling a maximum amount of information and to make it available on the project Website. A 3-month period was enough for field researchers to gather as many data as possible. Prior to the data collection, a meeting was held to set up partnerships with the institutions and projects willing to share their document and data resources with the Observatory.

### ***School visits***

During the phase I, the management team carried out school visits in ten countries covering 20 schools [compiled trip reports attached]. Since Ghana and The Gambia joined the project late it was not to carried out any school visits there.

### **Objectives of the visits:**

- To grow methodological and publication capacity.
- To provide the coordination team with an overview of the fieldwork participating countries/institutions.
- To allow the national teams to present their preliminary findings, and to raise issues regarding the ongoing project.
- To allow the coordination team to visit two schools from the project.

### **Activities before/during the visits:**

- Draft versions of publications of national team members must be submitted to visiting team one week before the visits take place.
- During the stay, visit to two schools:
  - meet school management (director, principal etc.)
  - meet educators (teachers, trainers etc.)
  - meet students
  - visit ICT facilities
- During the stay, meeting with members of the national teams during teams during an informal meal, to get to know each other, and also to share lessons learned, challenges, opportunities and expectations with regard to the PanAf project.
- Formal feedback session on publications submitted (the goal of the session is to support the national team members to publish their work in peer-reviewed and other professional journals).

## ***Policy dialogue***

Toward the end of the project the various teams organised national workshops to present project results to all concerned, particularly the schools, partners, policymakers and local and national elected representatives. Out of the twelve countries participating in the project, ten countries (Cameroon, Côte d'Ivoire, Central African Republic, Ghana, Kenya, Mali, Mozambique, Republic of Congo, Senegal, South Africa and Uganda) presented their country reports and also shared the recommendations brought forth during their national policy dialogue workshops. The Republic of Congo could not organise a national policy dialogue workshop. Gambia did not produce a country report or a policy dialogue workshop.

## ***eLearning-Africa (2008, 2009) / other conferences***

As an opportunity for knowledge sharing, networking and capacity building, the eLearning-Africa conference is unsurpassed in the domain. Officially called the International conference on ICT for Development, Education and Training, it took place this year from the 27th to 30th of May in Accra, Ghana. The PanAf Observatory project was represented by researchers from each of the participating countries, members of the management team, and associated partners – of note, IDRC supported the participation of 19 individuals from 12 countries.

A highlight of the conference was a special session dedicated to the presentation of the Observatory. In the main conference hall, after a brief introduction to the overall project, PanAf researchers (from Kenya, Central African Republic, Congo and Mali) presented recent papers grounded in data available publicly online via the Observatory.

PanAf Observatory team members also took the eLearning conference as an opportunity to forge new connections, begin or continue discussions with new partners, and generally advance the study of the pedagogical integration of technologies in African education systems, with their peers from around the world.

The participation of IDRC's PanAfrican Research Agenda on the Pedagogical Integration of ICTs (PanAf) at the annual International Conference on ICT for Development, Education and Training (eLearning-Africa) provides opportunities for dissemination of research results, capacity building through exposure to leading work on ICT4ED, and dynamic growth of the network through new collaborations and international partnerships. With IDRC's support, two dozen members (50% female) of the PanAf network participated in eLearning-Africa 2009 in Dakar, Senegal; half of these participants presented papers drawing directly on PanAf research. In addition, the conference included two special sessions dedicated to PanAf (one in English, one in French) where national reports were delivered, and PanAf was spotlighted in a keynote presentation on Gender inclusion by Dr. Nancy Hafkin (member of the PanAf international scientific committee) in a plenary session attended by hundreds of conference participants. The depth and impact of PanAf's presence at eLearning-Africa - "the most comprehensive conference on ICT for development, education and training on the Continent" - has grown from Accra in 2008, through Dakar in 2009, and must continue in Lusaka, Zambia in 2010.

In accordance with PanAf's capacity-building objectives, programme manager Dr. Moses Mbangwana and Kenyan researcher Dr. Harriet Kidombo represented the project by participating in a "Gender Awareness Workshop" organised by IDRC October 11th and 12th, 2008 in Johannesburg South Africa.

In accord with dissemination goals, from the 21st to 24th of October 2008, PanAf programme manager Moses Mbangwana attended USAID's Regional Higher education Summit in Kigali, Rwanda. There he presented the project, its partners, and some preliminary results related to the pedagogical integrations of ICTs in participating higher education institutions.

The workshop provided an opportunity to assess and reinforce the PanAf Observatory's targeted and integrated approach to crosscutting development issues including gender, as well as providing a forum for awareness-building, reflection and exchange for attendees.

Many present noted that the Observatory has succeeded, where many other projects have not, in putting gender at the fore of its research activities.

The project management team welcomed an invitation from IDRC in Ottawa to present the PanAf Observatory at one of their regular “brown bag” lunches. On May 16, 2008, directors Kathryn Toure, Professor Thierry Karsenti and programme manager Toby Harper-Merrett discussed the project with about a dozen IDRC Ottawa staff persons from different units and covering different world regions.

(conference outputs and outcomes are further discussed below)

## Meetings

One on one communication being crucial to create personal rapport, and to share more complex learning opportunities, the project teams meet occasionally as a group:

- Indicator development workshop, Dakar, September 2006
- Management team workshop, Bamako, February 2007
- Coordination team leaders meeting, Ouagadougou, December 2007
- Methodology workshop in French, Bamako, September 2007
- Methodology workshop in English, Nairobi, September 2007
- Congo team meeting, Brazzaville, October 2007
- Scientific Writing Workshop in Johannesburg, February 2008
- Country/school visits to South Africa and Mozambique, February 2008
- A management team meeting in Bamako, April 2008
- Country/school visits to Mali and Senegal, April 2008
- “” to Congo “”
- international scientific committee, in Bamako, September, 2008
- Kenyan and Ugandan country teams and school visits, in Nairobi and Kampala, October 2008

## International Forum on Panafican Research on the Pedagogical Integration of ICT

To close the first project phase, a two-day scientific forum to present the overall results of the study was organized (in Dakar, April 22<sup>nd</sup> and 23<sup>rd</sup>, 2009). The participating countries were invited to present their main research findings to a general audience. Themes of the practical application of ICT, constraints, potential uses, opportunities offered, etc. were addressed, as predetermined by the International Scientific Committee.

Indeed, it is not enough to collect, document and analyze data to produce ideas and results. There remains the additional and substantial challenge of conveying the message. Thus, the promotion, distribution, and operationalisation of research results at forums and seminars is a strategic approach that gives rise to multiple publication possibilities. Moreover, the international forum was an opportunity to globally evaluate the activities carried out. It would also allow an exploration of future directions, including program exchanges, institutional strengthening, the development and implementation of policies and projects for the pedagogical integration of ICT, etc.

Calendars of activities, as planned and outlined in interim technical reports are provided below (note deviations):

1.

Dates	Task
• July- September 2007	<ul style="list-style-type: none"> <li>• End of data input for the 12 first indicators (<i>Block 1</i>)</li> <li>• Finalisation of the selection of the 10 institutions (according to the criteria)</li> </ul>
• October – November –December 15 <sup>th</sup>	<ul style="list-style-type: none"> <li>• Forms for the 10 institutions</li> <li>• Form for the country</li> <li>• Questionnaires for the <i>Managers</i> (same for teacher-training inst.) (<i>Block 2</i>)</li> </ul>
• December 15 <sup>th</sup> –	• data verification (coordination)

January 15 <sup>th</sup>	team)
• December 15 <sup>th</sup> – February 15 <sup>th</sup> 2008	• Questionnaires for the <i>Educators</i> (same for teacher-training inst.)
• February 11 <sup>th</sup> -12 <sup>th</sup> 2008	• Workshop on scientific writing
• February – May 2008	• Visit of national teams (coordination team)
• March – May 15 <sup>th</sup> 2008	• discussion group with the <i>Learners</i> • Interview with the <i>Educators (Block 3)</i>
• May 28 <sup>th</sup> – 30 <sup>th</sup>	• eLearning Africa, Accra
• May 15 <sup>th</sup> – 31 <sup>st</sup> 2008	• data verification (coordination team)
• June – August 15 <sup>th</sup> 2008	• Follow-up work, etc.
• August 15 <sup>th</sup> – September 15 <sup>th</sup> 2008	• data verification (coordination team)

2.

Dates	Task
• September 2008	• End of data input for all indicators ( <i>Blocks 1-3</i> ) • Planning of Phase 2
• October–December 2008	• New publications, including “100 Schools” book and thematic articles • Remaining country/school visits by project management team • Quality review of all data by international scientific committee
• January-May 2009	• Phase 1 extension period expected to re-synchronize management team partner institution budget cycles
• May 2009	• Beginning of Phase 2

3.

Dates	Task
• November-December 2008	• End of data input and quality checks for all indicators ( <i>Blocks 1-3</i> ) • Planning of Phase 2 • New publications, including “100 Schools” book and thematic articles
• January-May 2009	• Remaining country/school visits by project management team (cm, ci, cf, gh, gb) • Phase 1 extension period expected to re-synchronize management team partner institution budget cycles
• May 2009	• Beginning of Phase 2 • eLearning-Africa conference (Dakar)

## V.a) PANAF PHASE 1 OBJECTIVE ATTAINMENT

### **Specific study objectives (as they appear in Application for Funding, December 2006) :**

1. Appraise ICT policies in African education systems
2. Report on the state of connectivity and equipment and its management in African institutions
3. Describe African teacher training systems in the pedagogical uses of ICT
4. Draw a portrait of ICT use in African educational institutions
5. Better understand the impacts of ICT on education
6. Better understand the roles of school principals, administrative staff and the community in ICT integration
7. Identify guarantor strategies for the equitable use of ICT in education.

### **Objective attainment**

1. Rank\* 4 - All existing national ICT policies across Africa (approx. 38 countries) were for the first time collected and made publicly available from a single source ([www.observatoireict.org](http://www.observatoireict.org)), through ongoing collaboration with the UNECA NICI programme and other partners.
2. Rank 3 – Connectivity and equipment data collected and shared for over 100 African institutions, representing nearly 250,000 learners, in 12 countries. Infrastructure/resources a heavy focus of Phase 1 national research reports.
3. Rank 3 - Summary analysis of 56 teacher-training-specific indicators from 20 teacher-training institutions in 12 African countries was conducted; expansion of the network to encompass the major, public teacher-training institution from each (40 additional) African country is expected in Phase 2.
4. Rank 4 – An unprecedented snapshot of ICT in African education was drawn, using over 150 indicators, both qualitative and quantitative, surveying public, private, rural, urban, mixed, single-sex, general and vocational institutions.
5. Rank 3 – A limited analysis was done of impacts, primarily through 11 qualitative indicators drawn from interviews and discussions with educators and learners. Further analysis is necessary to nuance our understand of the direct and indirect impacts of ICTs on learning and livelihoods.
6. Rank 4 – Both through questionnaires targeted at school managers, visits to school sites, and crossreferencing of results from educator interviews, a much clearer picture was drawn of the role of school leaders in the pedagogical integration of ICTs.
7. Rank 2 – While otherwise unavailable gender disaggregated data on ICTs in education in Africa was made available through PanAf 1, deeper analysis is required to draw out strategies to encourage equity in ICT use in schools.

- \*  
objective fully attained (between 5 and 4)  
objective partially attained (between 3 and 2)  
objective not attained (0)

## VI) OUTPUTS

The production of new data on the pedagogical integration of ICTs in Africa is the most significant output of PanAf Phase 1.

Open access to these newly collected narratives from the field is an unprecedented ICT4ED resource, and an example of great leadership by African researchers. From a scientific perspective, Phase 1 of the project has contributed enormously by making available gender-disaggregated data on the pedagogical integration of ICTs in African schools – as noted by Dr. Nancy Hafkin (retired director of UNECA ISTD, an ICT4ED pioneer, and member of the project's international scientific committee: *“The PanAf Observatory is to be congratulated for its commitment to the collection of sex-disaggregated data [...] Researchers participating in this project may not be aware of the uniqueness of this [...] but what they are doing by collecting sex-disaggregated data is still the rare case...”*

Of particular interest to African researchers, graduate students, education and development practitioners, and policy decision-makers are the qualitative responses from educators and learners regarding use and impact of computers for teaching and learning in the participating schools. Among these, perhaps the most important are educators' and learners' reflections on the impact of ICTs on their lesson planning and access to knowledge.

To reiterate, the principal objectives of the project are first to collect, analyze and share high quality data on the pedagogical integration of technology at schools across Africa, and second to build capacity in the individuals and institutions involved. Investment is also made in appropriate dissemination strategies - to ensure the Observatory sees use and that stakeholders (see Figure 2, p. 22, for a mapping of the stakeholders targeted by PanAf Phase 2) recognize its importance as a resource. International researchers, for example, simply need to be made aware of the data available on the Observatory, while development practitioners, school managers, educators and national policy decision-makers generally require appropriately packaged knowledge products based in rigorous research results.

It is essential that the project continue as planned into a second phase - moving towards better understanding of the pedagogical integration ICTs in African schools, and enhancements in teaching and learning based on this understanding. All Phase 2 activities will aim beyond issues of “connectivity” and “access”, to address the integration of technologies into learning per se, as upheld by both theoretical and practical approaches.

It is important to note that this research focus is entirely consistent with the IDRC mission, which is embodied in the five-year Acacia program to support research leading to recommendations for concrete improvements in the quality of teaching and learning. Moreover, greater knowledge of the realities of teaching and learning with ICTs in African institutions will help improve its contribution to national or international development. In today's globalized world, it is not only a necessary tool for learners but also an entry ticket into the knowledge society. This must also be combined with national policy that recognizes its importance. IDRC has explored in depth the role of research for policy-making and maintains that making informed decisions can lead to effective change, even if it may take time.

In the medium and long term the research undertaken by members of the PanAf network and work grounded in data available on the Observatory can have a significant and broader ICT4ED impact on the continent. A better understanding of successes and challenges in the pedagogical integration of ICTs should be applied to improved practice and evidence-based policy.

### ***Dissemination strategies***

Following the collection, summary analysis and sharing of indicator data, various forms of results dissemination are paramount outputs of PanAf Phase 1. The diffusion of research results have taken various forms:

- Interim reports produced by the participating countries
- Overall results presentation in a collective work of compiled national reports

- Exchanges and collaborations with project partners and stakeholders
- Results, activity reports and opinion pieces presented in newsletter articles
- Presentations in meetings and conferences
- Results presentation at a forum organized by the IDRC to provide closure for the first two years of the project

As planned, the results communication process has produced following mechanisms, outcomes and supports:

- Oral communication
- Regular communication between the National Committees and the appropriate ministry officials
- Meetings
- Organization of national workshops to present project results to all concerned, particularly the schools, partners, policymakers and local and national elected representatives

### **Written communication**

Perhaps the single greatest challenge, and departure from PanAf Phase 1's intended objectives, has been the publication of scientific articles in peer-reviewed international journals by the participating African researchers, based in the new data they have collected and shared. It was overly ambitious to expect that the network's researchers could simultaneously undertake the three blocks of fieldwork and write up article plans, while continuing with their regular teaching and administrative responsibilities. Scientific publications, in the spirit of Action Research, should emerge throughout project cycles (rather than exclusively at the end) so as to remain relevant to academic debate, and in this case to education practice and development policy-making. However, the realities of education research in the African national contexts of the PanAf project include an intense shortage of resources and an enormous burden of work for the experts involved. While glimmers of academic writing did emerge from PanAf Phase 1, Phase 2 has been conceived to support publication through intense capacity building workshops and small-ratio support for the development and submission of drafts.

### **Newsletters**

A Compendium of PanAf newsletter is available [attached]. There were four issues of the newsletters put together and can be found in the PanAf website. There are twenty-two articles and four editorials in the booklet and the representation of the contributions per country is as follows:

CountryN° of Articles:

- Cameroun 4
- Congo 3
- Côte d'Ivoire 1
- Egypt 1
- Kenya 2
- Mali 4
- South Africa 2

The only output planned but still incomplete output from PanAf Phase 1 a book called "*Successes and Challenges of ICTs in teaching and learning: 100 African schools*". The book brings together summary data from the institutions participating in the project, bracketed by analysis from the international scientific committee and project director Professor Thierry Karsenti, and is expected in August 2009.

### **PanAf website**

This is a bilingual website that reports on the PanAf activities and ICTs in general available at [www.panaf-edu.org](http://www.panaf-edu.org). An example of the use of this portal is presented in the following "page-view"

analysis:

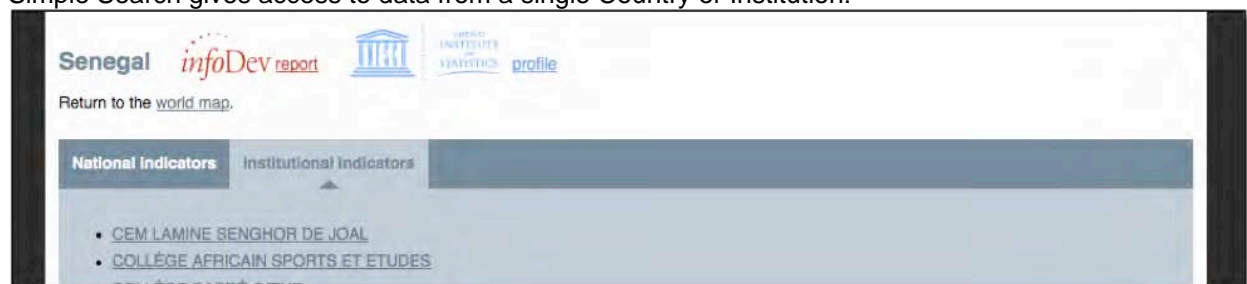
### ***The Observatory***

The Observatory for data sharing at [www.observatoireict.org](http://www.observatoireict.org) is itself the principal output of PanAf Phase 1 – an unprecedented knowledge product owned and updated by researchers in the field - however it is important to view it not simply as a product of participating researchers efforts but rather a structure central to the project, which houses the results of their work. ERNWACA’s [www.panaf-edu.org](http://www.panaf-edu.org) serves as a portal for ICT for education from across Africa and around the world.

The Observatory includes a variety of features that enhance access and usability of the collected data, including three search functions and links to resources from external partners.



Simple Search gives access to data from a single Country or Institution:





Including both quantitative and qualitative (below) indicators:

6.2.2 Impact des TIC (indiqués par les éducateurs) sur l'accès à la connaissance (150 mots)

parce que souvent elles ne savent pas traiter les informations. Si elles recherchent sur le net généralement c'est des sujets d'exposés qu'un professeur leur donne, le professeur ne prend même pas la peine de savoir si les élèves savent rechercher etc, elles nous les balancent, nous essayons de les encadrer mais nous remarquons qu'une fois que les élèves ont ouvert les sites elles copient simplement, elles collent et elles ramènent ça. Donc ça n'a aucun intérêt parce que les élèves ne tirent pas de connaissance véritablement de ça. - L'outil informatique crée les conditions d'une démocratisation du savoir, donc l'enseignant n'est plus détenteur d'un savoir qu'il communique etc. mais le savoir est à la disposition de tout le monde, mais ce que ça impose aussi c'est que, il faut que l'enseignant se mette dans une posture ou il devient facilitateur et ou il aide l'élève à savoir identifier les bons sites dans certains cas, et leur faire comprendre que tout ce qui est sur Internet n'est pas forcément vrai ou bon et qu'il est important de croiser les informations pour avoir des données assez justes.

2009-01-15

6.3 Documentation produite par les apprenants en utilisant les TIC

6.3.1 Impacts des Avec l'utilisation de l'ordinateur, l'Internet facilite les recherches pour faire des exposés de PC,

Advanced Search allows users access to results from multiple locations:

Secondary  
 Tertiary

**Institution details**  
Only institutions qualifying for these characteristics will be shown.

Vocational  Non-vocational  
 Trains teachers  Does not train teachers  
 Public  Private  
 Urban  Semi-urban  Non-urban

**Students' gender**  
 Mixed

For multiple indicators:

1. Category: 7 Institution management and ICT  
Subcategory: 7.1 The number of institutions with ICT integration plans  
Indicator: 7.1.1 Institution has ICT integration plan?   
[ Delete this row ]

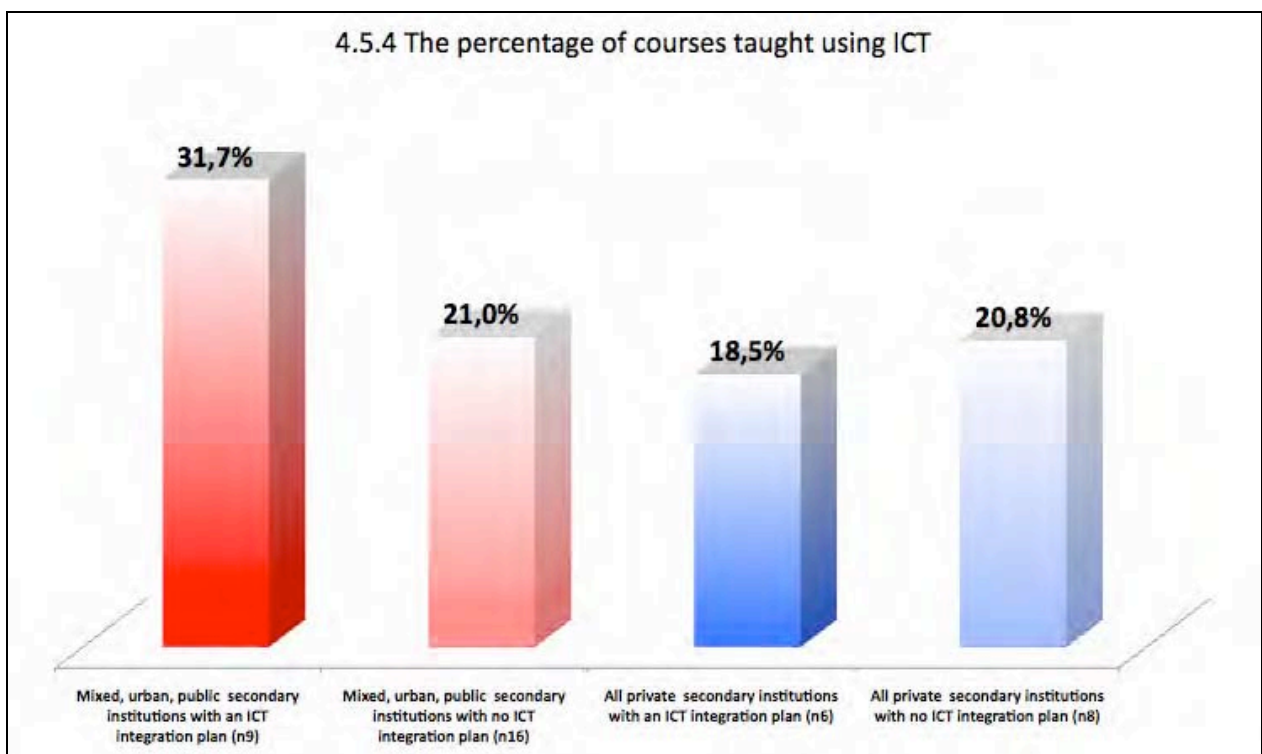
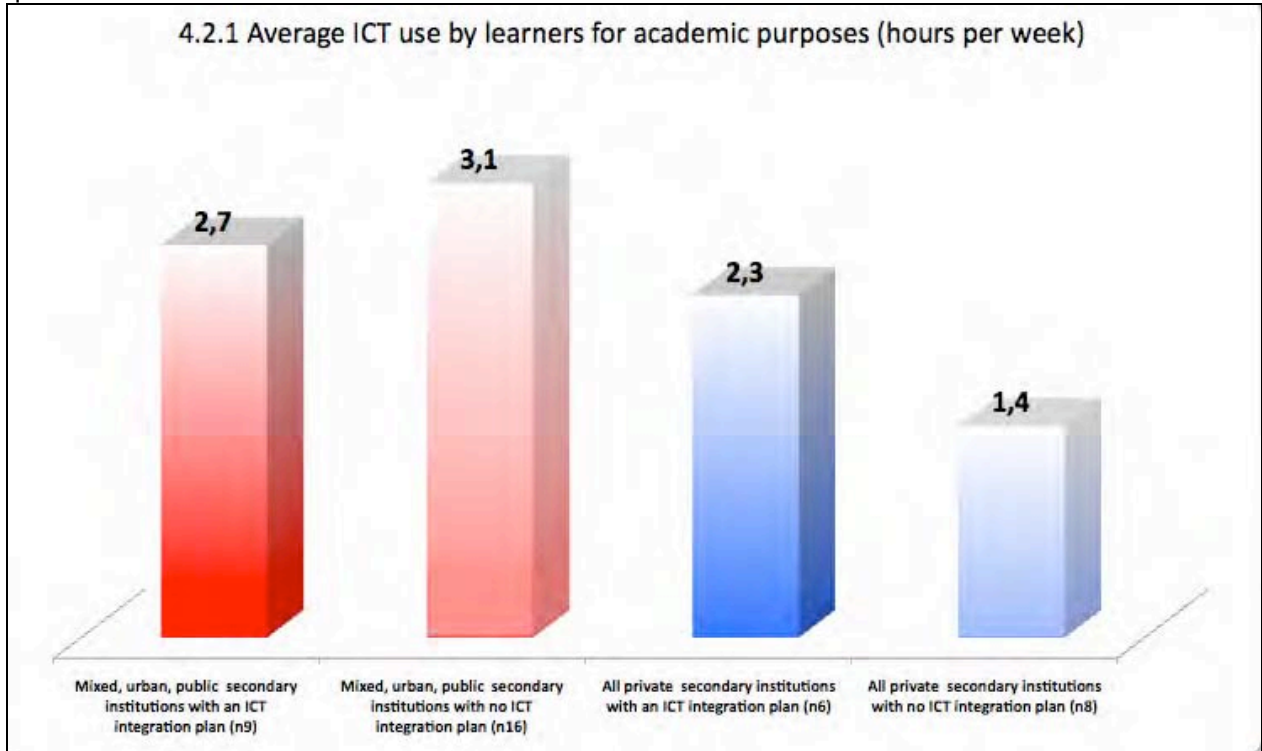
2. Category: 4 ICT use  
Subcategory: 4.5 The percentage of courses taught using ICT  
Indicator: 4.5.4 The percentage of courses taught using ICT   
[ Delete this row ]

3. Category: 4 ICT use  
Subcategory: 4.2 The frequency of ICT use by learners for academic purposes  
Indicator: 4.2.1 Average ICT use by learners for academic purposes (hours per week)   
[ Delete this row ]

Producing data tables that can be exported in .xls format:

Continent	Region	Country	Institution	4.2 The frequency of ICT use by learners for academic purposes	4.5 The percentage of courses taught using ICT	7.1 The number of institutions with ICT integration plans
				4.2.1 Average ICT use by learners for academic purposes (hours per week)	4.5.4 The percentage of courses taught using ICT	7.1.1 Institution has ICT integration plan?
Africa	Central Africa	<a href="#">Cameroon</a>	<a href="#">Lycée Bilingue de Yaounde</a>	1.5	45.45 % (10 / 22)	Yes
Africa	Central Africa	<a href="#">Cameroon</a>	<a href="#">Lycée Général Leclerc</a>	2.0	64.71 % (11 / 17)	No
Africa	Central Africa	<a href="#">Cameroon</a>	<a href="#">Lycée Joss</a>	Data not available	100.00 % (22 / 22)	Yes

To exemplify the unprecedented new data made available by PanAf Phase 1 researchers via the Observatory, the following illustrations show outputs ready for analysis and publication, both quantitative:

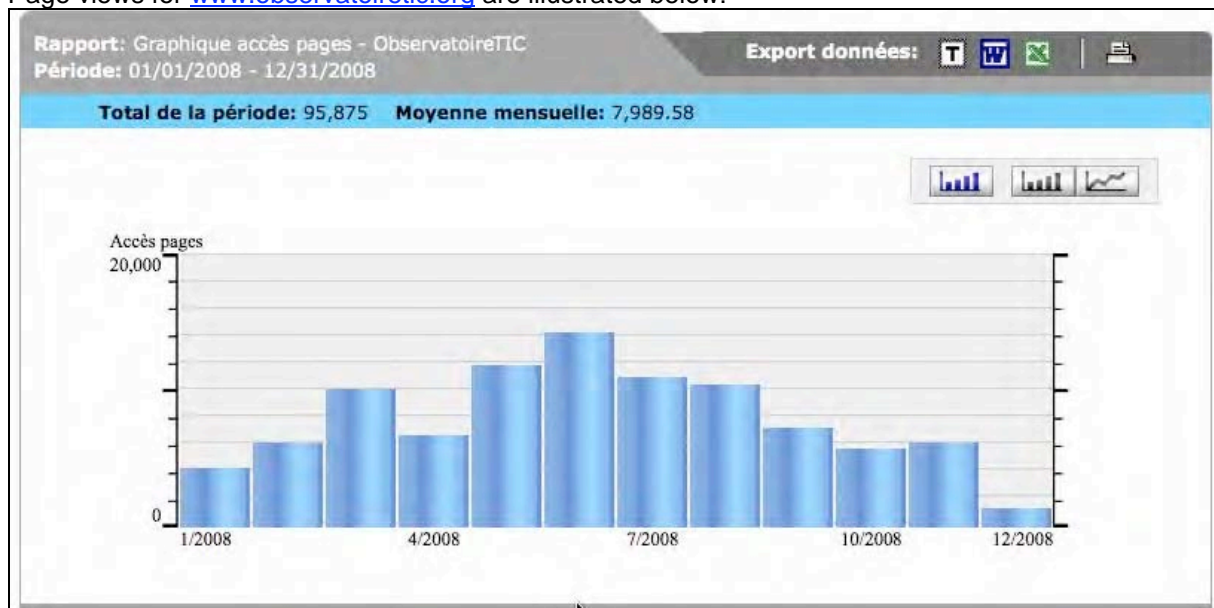


And qualitative:

- Stated factors (by learners) that are challenges to ICT use
  - *“The students lamented that if one does not take computer option then he/she has no access to the computers.”*

- "...no time given to us for practice yet computer is a practical subject, restrictions to access the computer lab which even discourage students from using it even when they have some free time..."
- "The main barrier in the use of ICT is the computer room fee charge."
- Stated impact (by educators) of ICT on (learners') access to knowledge
  - "...as a result of the presence of the Internet. They can ably now surf new information [...] they can read for themselves new information, compare what they have been taught..."

Page views for [www.observatoiretic.org](http://www.observatoiretic.org) are illustrated below:



To reiterate, the principal objectives, and thus the principle outputs and outcomes of the project were first to collect, analyse and share high quality data on the pedagogical integration of technology at schools across Africa, and second to build capacity in the individuals and institutions involved. To ensure the Observatory sees use and stakeholders recognize its importance as a resource, investment is also made in appropriate dissemination strategies. International researchers, for example, simply need to be made aware of the data available on the Observatory, while development practitioners, school managers, educators and national policy decision-makers generally require appropriately packaged knowledge products based in research results.

## VII) EVIDENCE-BASED OUTCOMES

The main outcomes of PanAf Phase 1 flow successfully from its initial objectives. The first two years of the project have resulted in:

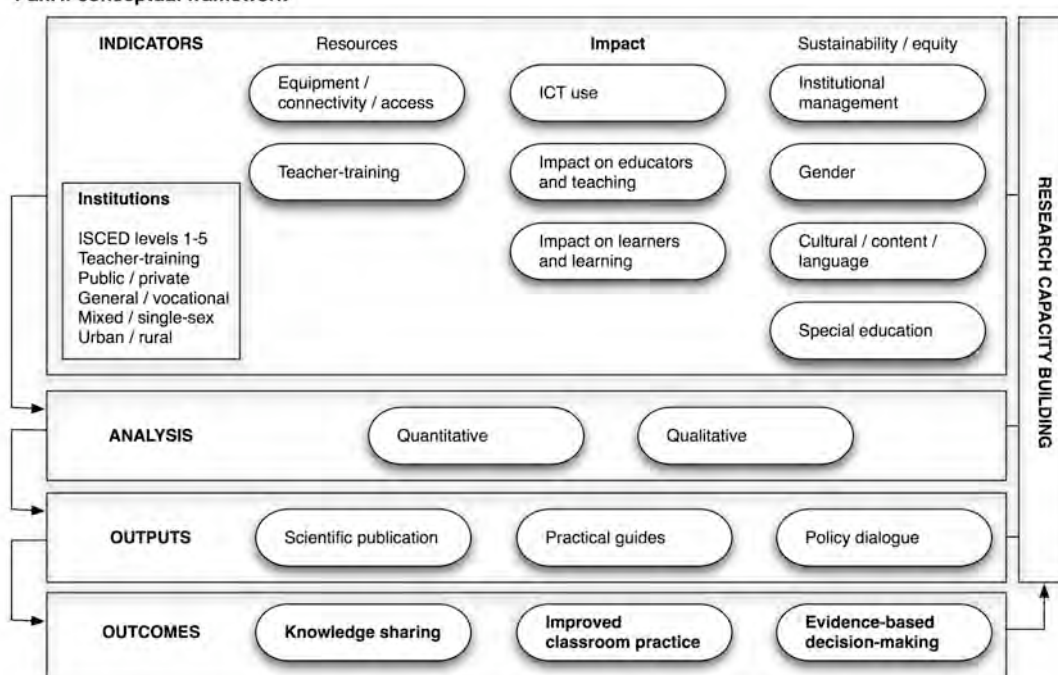
- An exceptional leap in our understanding of the role of ICTs in education systems across Africa, particularly noteworthy and valuable to the balance of PanAfrican methodology with national context expertise
- Analysis, dissemination, and publication of research results, including 12 national multi-stakeholder policy dialogue sessions to link research to recommendations
- Enhanced research capacity in partner institutions

With regard to innovation, both the open, decentralized style of the Observatory, and the mixed-methodology perspective of the indicators have proven themselves valuable. Researchers involved have appreciated the learning opportunities provided and the new skills practiced. The PanAf Phase 1 network has also successfully encompassed end-users including the managers of participating schools and policy decision-makers at the national scale in communication of research results. As noted above, the process-focused, innovative style of the PanAf project has itself been impactful, from both broad knowledge-mapping and individual capacity-building perspectives.

A detailed synthesis of the principal outcomes of PanAf Phase 1 is underway and is expected summer 2009. Based in the national reports and initial analysis done by the research teams, the synthesis will present, in a detailed fashion, the evidence-based outcomes of this substantial project with the aim of improving classroom practice and supporting evidence-based decision-making.

Project outcomes largely fall into the outline of PanAf Phase 1's conceptual framework illustrated below:

**PanAf conceptual framework**



### **Knowledge sharing**

The breadth of reach of project outcomes thus far is substantial: putting individual African institutions "on the map" - their user-scaled data immediately available online. A good example might be made of the newfound international research presence of Lycée Barthélémy Boganda in Bangui, one of the République centrafricaine's oldest secondary institutions, named for the founder of the republic. The space created on the Observatory for this, and other, unique examples of the challenges and

opportunities that African institutions are experiencing with the pedagogical integration of ICT, grows daily, and is immediately available to all. The otherwise marginalized voices of these institutions, and their female educators and learners specifically, have gained unprecedented reach through the work of the PanAf national research teams, and the venue of the online Observatory.

The depth of impact that knowledge shared through the PanAf project has had, even in this initial phase, is anecdotal yet positive. Ministry of education employees responsible for implementing ICT policy reform in contexts as varied as Senegal and Mozambique, have reported that access to the Observatory is informing their decision-making. This is particularly encouraging with regard to the teacher-training processes so crucial to multi-sectoral development.

The overall impacts of the PanAf Observatory project could be summarized as follows:

- A direct, exponential, increase in research on the pedagogical integration of ICTs in Africa
- A global leadership opportunity for African researchers (the Observatory as an innovative flagship project)
- A source of data for African graduate students, academics, development practitioners, and policy makers
- Increased knowledge-networking between African institutions, between countries, and also between the PanAf project participants and other ICT for development projects



**TABLE 1: PanAf Outcomes for Phase I**

PARTNERS	OUTCOMES
Researchers, Universities	<ul style="list-style-type: none"> <li>• The PanAf network has raised the awareness and increased the analyses/reflections of researchers and universities on <b>the importance of ICT4ED research ( pedagogical integration and use of ICTs)</b>.</li> <li>• This project has made available to the researchers <b>a large number of data to be used in their research activities</b> (publications in scientific reviewed journals, books and newsletter).</li> <li>• This project has promoted the <b>south-south cooperation between African universities and researchers</b> in sharing research outputs and experiences in the field of ICTs issues in Africa (policy, integration, use, durability).</li> <li>• This project has built the <b>capacity of researchers in scientific writing and policy dialogue</b> (i.e.: researchers of Cameroon contributed to the writing of a booklet on how to better use ICTs in Education in Cameroon).</li> <li>• This project has promoted gender equity, in the field of educational research on information and communication technology.</li> <li>• This project has increased the number of scientific communications, in international conferences, by African researchers.</li> </ul>
Policymakers, Educationalists, Planners etc.	<ul style="list-style-type: none"> <li>• This project has promoted the establishment of a <b>strong and constructive dialogue</b> between policy-makers, educationalists and researchers to <b>raise their awareness on the importance and for a better use of ICTs in African education systems in order to improve the quality of teaching and learning</b> (i.e. policy dialog workshops, PanAf international meetings).</li> </ul>
Resource providers (infoDev, SchoolNet Africa, UIS, ICBA, AAU, AVU, GeSCI) etc.	<ul style="list-style-type: none"> <li>• This project has promoted the establishment of partnerships with the World Bank (InfoDev), UNESCO (UIS), SchoolNet Africa, NEPAD eSchools etc. in order to <b>exchange/share data and experiences and to collaborate</b> in the field of ICT4ED. This is an exceptional partnership between an IDRC project and such valued partners.</li> </ul>
Participating Schools (primary, secondary, tertiary schools in 12 countries)	<ul style="list-style-type: none"> <li>• This project has provided <b>international presence and visibility to the participating schools</b> and has contributed in <b>putting these schools on the map</b> - which is a strong source of motivation for all the school stakeholders.</li> </ul>
ERNWACA/ROCARE, University of Montreal	<ul style="list-style-type: none"> <li>• The network has <b>reinforced the visibility of the expertise of UdeM and ERNWACA in the field of ICTs-Research.</b></li> <li>• It has also promoted a <b>strong North-South cooperation between UdeM and ERNWACA, based on synergy and complicity.</b></li> </ul>

**Capacity building:**

The PanAf Phase 1 network was comprised of approximately 60 researchers, who took part in fieldwork, analysis and data sharing in the context of their national teams, and who participated in capacity building exercises and conferences at a regional and global scale.

For participants and their national teams, the methodology and writing workshops, as well as participation in meetings and conferences (in particular eLearning-Africa) represent the most significant capacity building milestones of PanAf Phase 1. Also to note, some of the researchers had the opportunities to engage their students in Observatory activities, a rare occurrence in African research institutions where opportunities and resources are constrained. For the coordination team, the initial human resource development at ERNWACA, as well as the ongoing learning that the project's adaptive management style encouraged were also significant.

## **Gender**

ICT4ED in Africa pioneer, and PanAf international scientific committee member, Dr. Nancy Hafkin has been instrumental in shaping the project's gender integration. She notes the importance of gender analysis of the pedagogical use of ICT in the research, identifying the 17 sets of indicators with sex-disaggregated data. The PanAf research is unique in that a gender focus has been part of the project from the beginning, while collecting sex-disaggregated data is still the rare case in other studies. The PanAf approach is very much in line with international standards being established, in particular by the Partnership on Measuring ICT for Development ([www.itu.int/ITU-D/ict/partnership/](http://www.itu.int/ITU-D/ict/partnership/)).

Gender analysis essentially means separating gender as a category and examining a given phenomenon to see if the results are different for men or for women. Given that the first phase of data collection for the PanAf Observatory project is complete, we can undertake a preliminary gender analysis of the data from some of the sex-disaggregated indicators.

Indicators that are important for looking at gender equality in access to ICTs include both the gender category 9 indicators (targeted) of whether teachers and students have access to computers, and other sex-disaggregated indicators (transverse, or integrated) related to ICT usage for which data collection is still underway, such as: teachers' computer-literacy (as indicated by the proxy of their having email addresses), whether they are using computers in their teaching. If there are significant gender differences in the statistics on any of these indicators, it means less than maximum utilization of a country's human resources for economic and social development. At the individual level it means barriers to entering the information/knowledge society.

Examining Phase I findings through a gender lens illustrates that the crux of gender analysis is identifying differentials in impact of results on the basis of gender. The basic question being asked is given the same variables, are the results different for men and women? Gender analysis is not an attempt to identify discrimination against women, but rather to see if there are differences in results on the basis of gender. Sometimes the results show women to be disadvantaged, but at other times it can be men in that situation.

The conclusion we have begun to draw from this preliminary look at quantitative data currently available on the Observatory is that there do seem to be gender differences in access to computers in schools by learners and educators. This statistical data in itself may not reveal the full extent of gender differentials. In Phase II, Qualitative research, such as that currently underway to inform PanAf indicators in categories 4, 5 and 6 will enrich the knowledge available on the Observatory through the analysis of responses to questionnaires and recorded interviews undertaken by expert researchers in the field. Throughout their analysis of questionnaires and recorded interviews in the remaining data collection, researchers are advised to keep their gender lens open, always looking for gender differences and the reasons therefore.

In conclusion, aware of the lack of presence of female researchers studying ICT in education in Africa, women in the project have been a priority from the start. National teams have been encouraged to include female researchers in leadership roles, and this has been demonstrated in a majority of cases.

The capacity-building impact of the Panafrican Research Agenda on the Pedagogical Integration of ICTs has been substantial, and the project should be recognized as a current example of IDRC's continuing investment in creating new opportunities for African education researchers.

Formal capacity-building opportunities for those involved began with the indicator development process, and have continued through methodology and scientific writing workshops. However, perhaps the greatest constructivist opportunity for participants is the innovative style of the project itself. The dynamic knowledge-sharing space created by the Observatory demands that the research

teams invest in learning new methods and technologies (direct-to-mp3 recording of interviews on project-purchased iPods, for example), and the application of an open Creative Commons licence to Observatory content ensures that examples of this new knowledge are available to all.

As per the “communication” section above, it should be noted that, with hope of maximum efficiency and learning, an open and informal style of exchange is encouraged within the team.

### ***Policy and practice***

The policy dialogue workshops held at the end of PanAf Phase 1 were exceptionally successful in bring together ICT in education end-users and stakeholders to share and discuss the results of the research and to develop recommendations for policy and practice at a national scale. There has been anecdotal evidence of the integration of these new practices and policy perspectives in several schools and the ministries of education in Mozambique, Sénégal, Uganda and the République centrafricaine.

While the PanAf project did not hold as an objective to update or promote any specific new technologies, discussions with school manager and educators throughout Phase 1 have yielded new ideas for classroom technique and school organization – the idea for example of shifting focus away from teaching computer skills towards teaching other skills through computers.



## VIII) SUMMARY AND RECOMMENDATIONS

PanAf Phase 1 collected unprecedented data on the pedagogical integration of ICTs in African primary, secondary and tertiary teacher-training institutions. Access to these indicators can now inform changes to policy and practice that will improve educational quality.

As described in the recently submitted proposal for PanAf Phase 2, opportunities now exist for:

- Further capacity building
- Scientific publication
- Evidence-based policy decision-making
- Practical guides for implementation in schools
- Improved educational outcomes

Therein we recommend that IDRC help guide the project to:

- the participation of additional national research teams
- expand the number of participating schools per country
- add indicators, targeting best practices in the pedagogical integration of ICTs
- continue to encourage scientific publication based on Observatory data
- produce practical publications to support teacher-training, and policy decision-makers
- add international partners, creating new links with complementary projects and organisations

With regard to what should be done differently in the continuing project and other relevant future initiatives:

- Language continues to be a challenge for PanAfrican initiatives, while French-English bilingualism simply adds complexity and cost to the project, it does reflect both IDRC's mandate and the majority of African country contexts. Trilingualism (with the addition of Portuguese) becomes unwieldy – note that in PanAf Phase 1, the translation of Portuguese data to English was the responsibility of the Mozambican national team – in terms of resources for both managers and researchers. Simultaneous translation in international meetings is also an exceptionally challenging and costly endeavour, which was, for example, not successful in the case of PanAf Phase 1's South African writing workshop, but was in the case of the international meeting in Dakar at the end of the Phase. The quality of interpreters and their equipment must be closely monitored.
- The transfer of funds between African countries remains the biggest administrative challenge to the project's operations. The barriers presented by the banking system, as well as the complexities of institutional (university research partner) accounts are difficult to navigate. Opening separate in-country accounts for the national research teams makes tracing the funds much easier, but is not often possible – in the case of countries where the ERNWACA network is present, and attempt will be made to channel PanAf Phase 2 funds to ERNWACA National Coordination accounts.
- Thirdly, internal communication is perhaps the great overall channel to any project. The international breadth of the PanAf network, in addition to limited Internet access and bandwidth and other infrastructure issues, compounded by interpersonal, interinstitutional and intercultural idiosyncrasies, made for inconsistent communication. The lesson learned is certainly to outline expectations of frequency and volume of research team reporting within the initial project methodology, if not the terms of reference of the research contracts.

In summary, PanAf Phase 1 attained its objectives, successfully partnering a Canadian research institution (CRIFPE / Université de Montréal) with an African one (ERNWACA in Bamako) as a project management unit to coordinate the collection, analysis and sharing of new knowledge on ICTs in education.

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