

OVERVIEW

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One of the Millennium Development Goals (MDGs) is achievement of universal primary education by 2015. We must ensure that information and communication technologies (ICTs) are used to help unlock the door to education. Kofi Annan (2005).¹

MDGS, ICT, AND EVALUATION AS KNOWLEDGE: WHY THIS HANDBOOK?

The Millennium Development Goals (MDGs) have been adopted by the United Nations as the key development targets for the first part of the 21st century. Among the most prominent of these goals are those related to education—namely, to achieve universal primary education and promote gender equality, and empower women by eliminating gender disparity at all education levels. These build upon the Education For All (EFA) initiative begun in Jomtien (Thailand) in 1990, and reaffirmed at a second EFA meeting in Dakar in 2000.² The MDGs also set as a target to, “in cooperation with the private sector, make available the benefits of new technologies, especially information and communications.” This item is a reference to a growing and increasingly important area that has seen huge growth over the past decade, namely Information and Communications Technology (ICT) for education.

MDG-relevant ICT investments have grown significantly in recent years.³ As noted by the UN Secretary-General Kofi Annan, ICT has the power to “unlock” doors in education. The irony, however, is that ICT may also lead, literally, to “locked” doors, as school directors try to ensure the security of equipment from one day to the next. While there is clearly much promise in the use of ICT for education, there is, at the same time, a widespread ignorance of the specific impact of ICT on education goals and targets.

KEY POINTS

- Improvements in education and increased access to ICT are two prominent objectives of the internationally supported Millennium Development Goals.
- Much hope has been invested in the expanded use of ICTs for education (ICT4E), but there is also a well-known ignorance of the consequences or impact of ICTs on education goals and targets.
- A relevant and credible knowledge base is essential to helping policy makers make effective decisions about ICT4E.
- This handbook presents a conceptual framework that takes into account not only a variety of broad development concerns, but also the many context-sensitive issues related to ICT4E.
- A stronger knowledge base through improved monitoring and evaluation is likely to lead to increased support for ICT4E innovations and investments.

WHAT IS ICT?

ICT ... consists of hardware, software, networks, and media for collection, storage, processing, transmission, and presentation of information (voice, data, text, images).
—Defined in the Information & Communication Technology Sector Strategy Paper of the World Bank Group, April 2002.

¹ <http://www.un.org/apps/news/story.asp?NewsID=13961&Cr=information&Cr1=technology>

² UNESCO (1990, 2000). In the Dakar meeting, item 69 explicitly states: “Information and communication technologies (ICT) must be harnessed to support EFA goals at an affordable cost. These technologies have great potential for knowledge dissemination, effective learning and the development of more efficient education services. This potential will not be realized unless the new technologies serve rather than drive the implementation of education strategies. To be effective, especially in developing countries, ICTs should be combined with more traditional technologies such as books and radios, and be more extensively applied to the training of teachers.” http://www.unesco.org/education/efa/ed_for_all/dakfram_eng.shtml (accessed October 2005)

³ World Bank, 2003

The issue is not whether ICT is “good” or “bad”, rather it is how to choose wisely from the large menu of ICT4E options. This is, simply put, a cost-benefit analysis. Creating a relevant and actionable knowledge base is a first step in trying to help policy makers make effective decisions. This is essential in the case of ICT4E for which—unlike, say, improved literacy primers—there are high entry costs (such as investments in new infrastructure), significant recurrent costs (maintenance and training), and opportunities for knowledge distortions due to the high profile (and political) aspects of large ICT interventions.

BUILDING THE ICT4E KNOWLEDGE BASE: ROLE OF MONITORING AND EVALUATION

Monitoring and evaluation (M&E) of development activities provides government officials, development managers, and civil society with better means for learning from past experience, improving service delivery, planning and allocating resources, and demonstrating results as part of accountability to key stakeholders. World Bank, 2004.⁴

It has been said: “If you think education is expensive, try ignorance” (attributed to Derek Bok⁵). This same ignorance can be, and has been, very expensive in the domain of ICT4E. Anything that can be known to reduce the level of errors in planning is a potentially valuable knowledge commodity. In some countries, even those with a rather large amount of ICT4E investment, relatively little monitoring and evaluation has been done (see, for example, Box1)

Numerous international and national agencies, along with professionals, specialists and program developers in the field, have promoted ICT use in education, believing it will lead to a breakthrough in learning, and allow one to “leapfrog” in terms of social change and economic development.⁶ Yet the empirical support for a wide variety of claims concerning development (at individual, institutional, and national levels) is without concrete and credible data to support them, and many key development questions remain largely unanswered (see box 2).

BOX 1 Senegal: In need of monitoring and evaluation studies

The majority of governments in Francophone West Africa now recognize ICT as being necessary to achieve “Education For All” goals, and the region has implemented a multitude of new ICT4E projects. However these have few clearly defined objectives; are not connected with national education strategies; and do not include many substantial Monitoring and Evaluation studies.

The evaluation of the impact of ICT in the education sector remains subjective and is often based on what is deemed “common sense” as well as testimonies of key actors (learners, professors and administration). In spite of (or perhaps because of?) this, the general public perception of the impact of ICT4E remains vaguely positive.

In Senegal, for example, one of the more economically advanced Francophone countries in this field, parents of pupils do not hesitate to pay the costs related to connection of schools and allowing their children access computer rooms; moreover, even school teachers often oppose going to work in schools with insufficient ICT support. In sum, there is a belief – even without scientific data – that ICT is good for a school’s overall ‘health.’

Yet there is recognition among specialists in Senegal that in-depth research on the impact of ICT4E has yet to be done, especially for secondary schools (where most investments have been made to date). In such secondary schools, ICT already serves as a complement to or has even been integrated into the traditional curriculum. Thus, it seems important to analyze the performance of these schools and to compare them with those that are not equipped with computers (the majority). Also, there appears to be some evidence that many teachers, at present, explicitly reject the use of ICT as a tool for improving their own teaching, or at least are not sure of the relevance of ICT. Interest in such work could include all of Francophone Africa, since there is a common educational system across the region.

Adapted from Boubakar Barry, personal communication.⁷

⁴ <http://www.worldbank.org/oed/eed/>

⁵ http://en.thinkexist.com/quotes/derek_bok/

⁶ Haddad & Draxler, 2002; Ranis, 2004; UNDP, 2001; Unwin, 2004; Wagner & Kozma, 2005; Wolfensohn, 1999.

⁷ Boubakar Barry, Université Cheikh Anta Diop, personal communication, August 2005

BOX 2 Examples of key development questions related to ICT4E

- What is the impact of ICTs on secondary school achievement in developing countries?
- What are the factors that lead to 'success' in an ICT4E intervention program?
- How do ICT interventions compare to other types of interventions?
- How are different populations (e.g., such as boys vs. girls or first vs. second language speakers of a national language) affected differentially by ICT4E interventions?
- How should this impact be measured, and what are the related issues, especially as they relate to Education For All and other Millennium Development Goals?
- How should monitoring and evaluation studies of the impact of ICT in education be conducted?
- What would a "cost-effective" ICT4E program look like? And could it be "transferred" from country X to country Y?

These and other key development questions must be answered within a broad development context in each country, and sometimes regionally within and across countries. From a policy maker's perspective, these results can be thought of as an *impact evaluation* (see Box 3, which is part of the broader *monitoring and evaluation process*).

A CONCEPTUAL FRAMEWORK FOR MONITORING AND EVALUATION

In this *Handbook*, we have tried to adhere to a conceptual framework that takes into account not only a variety of broad development concerns, but also the many context-sensitive issues related to ICT use for educational development. Current development thinking posits that to foster sustainable development, policies must go beyond supporting economic growth, and provide the human and social infrastructure for economic growth and development in the long term. Thus development policies should minimize distributional inequities, provide resources for the development of physical infrastructure and human capital, and develop the society's capacity to create, absorb, and adapt to new knowledge, including the reform of its education system and R&D capacity.

Within education, reform is needed to revise the curriculum, improve pedagogy, reinforce assessment, develop teachers, and to bring the education system into alignment with economic and social development policy goals. The use of ICT—and ICT impact—must be considered within this broad development context. Some countries have developed ICT master plans that specify the ways in which ICT can support education reform and contribute to development, but many have not. The Handbook provides, we believe, a useful conceptual framework for any specific ICT intervention *context*, which takes into account the layers and interactions of a number of inputs into the development process.

Once this context is established and the role of ICT is specified, then a plan for monitoring and evaluation can be designed. Such a plan would describe the components of the intervention, the role of ICT and how it is integrated into the curriculum, the pedagogy, and assessment. It must also describe the required infrastructure—the equipment, software, communications and networking—that would be required to implement the intervention.

BOX 3 Impact Evaluation: What is it?

Impact evaluation is the systematic identification of the effects – positive or negative, intended or not – on individual households, institutions, and the environment caused by a given development activity. Impact evaluation helps us better understand the extent to which activities reach the poor and the magnitude of their effects on people's welfare. They can range from large-scale sample surveys in which project populations and control groups are compared before and after, and possibly at several points during program intervention; to small-scale rapid assessment and participatory appraisals where estimates of impact are obtained from combining group interviews, key informants, case studies and available secondary data.

Adapted from World Bank (2004).⁸

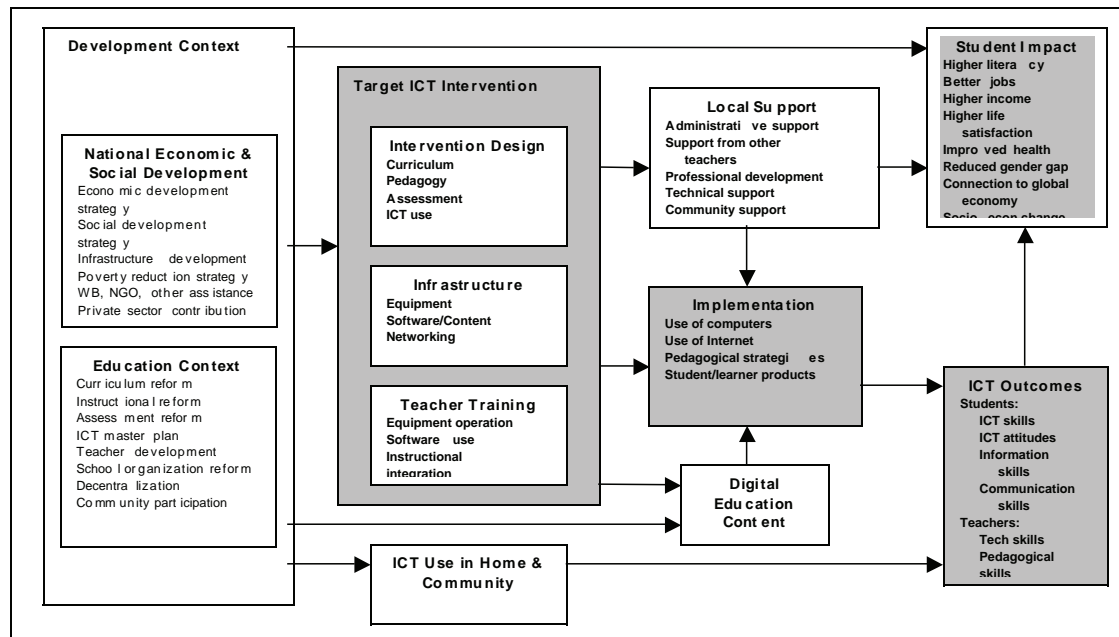
The plan for M&E must also indicate the human resources required (such as teacher training) that are needed, including training in equipment operation, software use, and instructional integration. It would not make sense to evaluate the outcomes of the intervention without first assessing the extent to which these intervention components were implemented.

The first step of the monitoring and evaluation (M&E) process should specify a plan to measure the *implementation fidelity* of the intervention. The M&E plan should then design measures of the *intended outcomes*, with a notion of how they might feed into the more “downstream,” and less easily measurable, but desirable long-term development goals. Also, the design of the M&E plan should specify the analyses that would account for—either experimentally or statistically—the other *moderating factors* that would influence the success of the intervention, such as the level of community support, the availability of digital content in the appropriate language, and the extent to which ICTs are also available in the home or community. One way to conceive of these factors may be seen in Figure 1.

Based on this conceptual framework, operational definitions—both rigorous and measurable—are needed for desired learning outcomes (skills and attitudes), as well as acceptable methodologies and indicators that can be used (after likely adaptation) to consider the impact of ICTs in education. There is also a need, we believe, to expand current definitions of basic skills to account for what we term the notion of a ‘broader literacy’, that would include, where appropriate, information literacy and numeracy skills (e.g., information analytical and search skills, statistical reasoning, and so forth), as well as desired social and economic outcomes.

Finally, and perhaps most importantly, it needs to be understood that M&E is an imperfect science, but like any scientific endeavor, one builds on the accumulated knowledge (and yes, mistakes) of one’s forebears. Thus, this *Handbook*, as detailed in the next section, will begin with an historical review of M&E impact studies—and then consider the key issues of M&E in ICT for education today and tomorrow.

FIGURE 1 Conceptual Framework for ICT



AUDIENCE AND PURPOSE

The primary audience for this *Handbook* is expected to include policy makers, program implementers and evaluation specialists. However, the exploration of issues herein is related to the effective use of ICTs in education more generally, and will hopefully be of interest to a broader audience including officials in a variety of ministries, agencies and higher education institutions around the world.

Our goal—and principal priority—is to provide pathways (there is no singular in this business) toward contributing to a credible evidence-based future of ICT for education in the development process. While our focus is on less developed countries (LDCs)—and particularly the most challenging and poor populations in the world—we hope that the concepts, methods and tools mentioned in the *Handbook* will be of value in *any* country where ICT4E is a serious matter of consideration and policy planning.

It must also be said that this is a brief *Handbook*, not a fully comprehensive one. Our goal was to cover enough of the territory to get key people moving in the right directions. But we have not covered all directions. Indeed, in the fast changing domain of ICTs, providing an ‘up-to-date’ comprehensive volume would be nearly impossible—it would be out-of-date by the time it was published! Nonetheless, the interested reader should look at the Key References at the end of each chapter, as well as the Annex, as both contain useful website URLs that connect to further information, some of which is likely to have very current information that was not available at the time we worked on the *Handbook*.

KEY REFERENCES

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