

4. CAPACITY BUILDING AND MANAGEMENT IN ICT FOR EDUCATION

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Executive Summary

- Good management is essential for the successful implementation of monitoring and evaluation activities in the field of ICT4E.
- Monitoring and evaluation activities themselves also have a significant influence on educational management and enhanced capacity building in poor countries.
- These intertwined themes need to be carefully understood and negotiated if ICT4E programs are to be implemented successfully.
- Above all, it is essential for all those involved in teaching and learning to adopt appropriate monitoring and evaluation processes to ensure the successful delivery of their aspirations.

The relationships between ‘monitoring and evaluation’ and ‘capacity building and management’ are crucial for the successful implementation of technology-enhanced learning programs in three specific ways.

First, it is essential for monitoring and evaluation activities to be well-managed and led so that they can be used effectively for the improvement of technology-enhanced educational programs. Those involved in monitoring and evaluation likewise need to be well trained so that they can deliver sensitive and appropriate recommendations.

Second, monitoring and evaluation have a direct impact on capacity building and management. Used effectively, monitoring and evaluation provide a key mechanism to enable those involved in both formal and informal educational systems to improve their practices.

Third, capacity building and management activities themselves need to be monitored, so that their role in delivering technology enhanced learning can be better understood and enhanced.

Despite this importance, policy makers and practitioners have rarely sufficiently considered the complexities associated with the interactions between these core elements of e-learning strategies. Academic studies have been little better. Cox *et al.* in their comprehensive review of the research literature on ICT and attainment thus only mention ‘management’ twice, and fail to mention capacity building at all!¹ This chapter therefore provides a practical overview of the key aspects of capacity building and management that should be taken into consideration in the monitoring and evaluation aspects of any ICT for education activities. Above all, this chapter advocates a virtuous cycle of quality enhancement, through which all those involved in technology-enhanced educational activities can work to improve their organizations and activities by being self-critical and engaging regularly in monitoring and evaluation.

4.1 KEY ISSUES

4.1.1 *The central role of capacity building and management*

The introduction of ICTs into learning environments, be they in schools, universities, adult learning centers or the workplace, requires inspirational leadership and skillful change management expertise. This is not just a matter of head teachers or Chief Executive Officers (CEOs) being committed to the process, but rather reflects a need for everyone involved to understand the implications of the changes being made, and to feel able to contribute to the processes. Capacity building and management go hand in hand; everyone needs to

¹ Cox *et al.*, 2003

be trained appropriately, and the processes require careful management. In particular, it is important that those charged with undertaking formal monitoring and evaluation activities as proposed in this handbook are able to develop the appropriate skills to deliver these programs appropriately and effectively.

4.1.2 *Understanding the role of ICT*

Appropriate management skills are insufficient by themselves to deliver effective e-learning programs. It is essential for everyone involved to understand the true potential of ICT to transform learning experiences. Far too often, computers have been put into schools with insufficient attention paid to the ways in which teachers will use them.² One of the fundamental lessons to be learnt from European, North American and Australian experiences over the last 20 years has been that those responsible for helping people learn must be confident in the appropriate use of new technologies if the process is to be successful.³ Introducing new technologies into places of learning should involve a fundamental shift whereby the role of teachers becomes less didactic and more that of facilitating individual learning processes.⁴

4.1.3 *The involvement of all*

For monitoring and evaluation to be effective, all participants in the learning process need to be involved. Measuring the impact of change can be seen by *teachers* as being very threatening, and it often alters the relationships between them and *learners*. It is therefore critically important that monitoring and evaluation are seen as a shared activity in which everyone learns how they can achieve better and more through the introduction of new technologies. It is often, for example, the case that pupils adapt to the use of new technologies more swiftly than teachers, and teachers need to be open to the possibility of learning new skills from their pupils.

4.1.4 *Measuring the impact on what?*

The use of new technologies in learning has far more fundamental influences on people's lives than can be measured simply in terms of traditionally defined educational attainment targets.⁵ It is therefore difficult to design comprehensive 'measurement' procedures to evaluate the 'effectiveness' of such initiatives. This is a point that has been stressed throughout this handbook, and it is therefore very important that managers involved in such programs think carefully about the most appropriate and cost-effective procedures that should be adopted in their specific contexts. Moreover, even on the educational front, changes in performance levels in schools resulting from the use of ICTs might simply reflect the fact that pupils and teachers feel valued from the emphasis being placed on education through such programs rather than any actual changes in the way that people learn. It is fundamentally important, therefore, that managers identify exactly what it is that they want to measure in any such program, and also that they are open to considering a far wider diversity of influences than they might envisage simply from an 'educational' perspective.

4.2 THE CONTEXT AND IMPORTANCE OF CAPACITY BUILDING AND MANAGEMENT

4.2.1 *Defining capacity building*

What do we mean by capacity building? Different organizations adopt varied interpretations of 'capacity building', but ever since the Agenda 21 plan of action following the United Nations Conference on Environment and Development in 1992⁶ the concept has gained increasing acceptance as being of fundamental importance to the delivery of 'development' objectives. Significantly, the Agenda 21 definition⁷ not

2 Farrell, 2004; Unwin, 2005.

3 Harrison et al., 2002; Zemsky & Massy, 2004

4 Bruner, 1996; UNESCO, 2002.

5 Watson, 1993; Cox et al., 2003; Pittard et al., 2003.

6 <http://www.un.org/esa/sustdev/documents/agenda21/index.htm>.

7 Chapter 37.1

only notes that ‘capacity building encompasses the country’s human, scientific, technological, organizational, institutional and resource capabilities’, but also that one of its fundamental goals is ‘to enhance the ability to evaluate and address the crucial questions related to policy choices and modes of implementation’.⁸ At the heart of discussions about capacity building is therefore the notion of its role in measuring and evaluating. This theme has been central to the work of organizations such as the International Institute for Communication and Development⁹ in the Netherlands and the German Internationale Weiterbildung und Entwicklung GmbH,¹⁰ both of which have developed particular expertise at the interface between capacity building, ICT and evaluation.

4.2.2 The key participants

All too often broad definitions of capacity building tend to get reduced in practice to mean enhancing the skills of a particular cadre of people, and in education systems this usually means the teachers and administrators. However, if successful change management programs involving new technologies are to be introduced, it is of critical importance that all of the key participants are involved. Different cultures vary in their approach to education, and this handbook therefore recommends that a variety of groups of ‘stakeholders’ should be involved in the design and implementation of monitoring and evaluation studies (see box 4.1):

4.2.3 Sharing expertise and understanding: a dynamic of continued enhancement

One assumption behind the inclusion of such a wide range of stakeholders in the conceptualization of monitoring and evaluation processes, is that it takes the significance of education far beyond simply the school, college or university. It is about measuring the fundamental impacts of learning across many aspects of people’s lives. For this to be effective, it is important that all those involved in monitoring and evaluation seek to adopt a collaborative attitude in developing shared expertise and understanding. The introduction of ICT into education is not a one-off process, but is instead the setting in motion of an entirely different modality of learning; one in which those involved seek to put in place a continued dynamic of enhancement. Striving for excellence, pushing the barriers back beyond traditionally accepted norms, lies at the heart of what monitoring and evaluation is about. If we were not interested in enhancing learning, making it more readily available to people from different backgrounds and with a range of abilities and disabilities, there would be little point in seeking to measure the effects of changes in educational methods, systems

BOX 4.1. Stakeholders in monitoring and evaluation planning

- *learners*—usually pupils in the school environment, but also adult learners and those in a diversity of workplaces; everyone is, in reality, a lifelong-learner
- *teachers and facilitators*—those on the frontlines, helping people to learn, including both trained and untrained teachers, classroom assistants, and workplace trainers
- *technicians*—most ICT enhanced learning experiences require expertise beyond that usually possessed by teachers; technical support staff are therefore often needed in such programs
- *parents*—parental involvement in education goes beyond concerns over what exactly is ‘taught’ in schools, and parents are themselves learners
- *curriculum developers*—the introduction of ICTs into the classroom requires fundamental changes in the curriculum; curriculum developers must therefore be involved in designing, implementing and monitoring change
- *teacher trainers*—teacher training is sometimes ignored in the early stages of ICT-enhanced learning programs which tend to focus excessively on delivering ‘technology drops’ rather than enhanced means of sharing information and communication
- *administrators*—educational administrators—be they office staff or managers in educational establishment—have a fundamental role in delivering programs of learning, and must be central to the monitoring and evaluation processes
- *education ministry officials*—with their responsibility for overall policy, target setting and budgets, it is important that ministry staff not only take an interest in measuring change, but are also actively involved in the learning processes resulting from such measurement
- *employers*—education in part serves interests beyond those of the individual learner, and it is important that educational systems therefore serve the wider needs of nations and peoples; such interests can be incorporated by involving a diversity of employers in the evaluation of ICT enhanced educational change.

8 <http://www.un.org/esa/sustdev/documents/agenda21/english/agenda21chapter37.htm> accessed 6th May 2005.

9 <http://www.iicd.org>, accessed 23rd May 2005.

10 InWEnt, <http://www.inwent.org>, accessed 23rd May 2005.

and content. All those involved in measuring these effects must therefore seek to work together supportively and creatively in designing systems that enable the lessons learnt to be introduced swiftly and efficiently back into the learning environment, so that good practices can be shared more widely and learners consequently benefit more effectively from the monitoring process. In effect, we need to create a virtuous cycle of learning enhancement, where everyone is able to benefit from being involved in the monitoring processes.

4.2.4 Practicalities of professional development and training

From the previous section, it should be evident that strong leadership and the committed involvement of professionals are required for any systemic change, large or small. One major limitation for change in ICT and education is that many of those involved in helping people to learn in both formal and non-formal contexts have little or no skills in the appropriate use of new technologies. This is particularly so in poorer countries, and most notably in Africa. Furthermore, there have to date been rather few effective and sustainable schemes designed to enhance ICT4E literacy among teachers. To be sure, there are numerous projects that have sought to provide teachers with ICT skills, but many of these have been developed externally, often in the private sector, to develop skills that are relevant primarily in office environments. These are not necessarily those skills of most relevance in the classroom.

Knowing how a set of blended learning solutions, involving text, sound, imagery, touch and even taste and smell, can contribute to someone's learning is of much more value than simply giving teachers an ability to use word processing or database management skills (Unwin, 2005)! Tactile keyboards, for example, bring the Internet to life for blind people; audio cassettes transform learning for those who have difficulty seeing; the visual use of sign language opens up communication for the deaf and those with hearing disabilities.¹¹ There is, therefore, a profound need to develop systems and capacities that enable policy makers, administrators, teachers, and tutors to engage in professional staff training and development as an ongoing process within programs and to link staff development more closely with service improvement and evaluation/monitoring. Teachers and administrators must also have more opportunities to understand and learn from local problems and to invent local solutions. Increasing the proportion of well-trained ICT-literacy teachers and/or full-time ICT instructors is an essential element of enhanced human capacity development.

In recent years China has initiated several major ICT-supported programs to enhance teacher training in its poorer Western provinces. These include the EU-China Gansu Basic Education Project,¹² the UNDP and DFID supported program in Gansu, Sichuan and Yunnan,¹³ and the Asian Development Bank's program in Hunan. Monitoring and evaluation are key components of these initiatives, as indicated in Box 4.2 below.

4.2.5 Building the capacity of evaluators

In addition to service providers, there is also a need for the building of human capacity in the monitoring and evaluation sector. Many of those involved in monitoring and evaluation, particularly in poor countries, have little experience of such work, and it is crucial that simple but effective schemes are developed to enable them to contribute to, and benefit from, such activities. Chapters 2, 3 and 6 of this handbook provide ready-to-use guidelines for such users, but the principles and examples of good practice outlined below should also help to build up familiarity with the concepts and approaches involved. This may initially require the involvement of external people, but it is essential that all those involved in formal monitoring and evaluation procedures should be trained effectively in their management and implementation. It would therefore be highly desirable for specialist centers of excellence in such processes to be developed at a national or regional level.

¹¹ Casely-Hayford & Lynch, 2004; see also Chapter 6.

¹² <http://www.eugs.net/en/index.asp>.

¹³ <http://www.cicete.org/english/news/11.htm>

4.2.6 The funding of evaluation

This chapter emphasizes the importance of a continual cycle of educational enhancement in which monitoring and evaluation play a dialectic role in capacity building and improved educational management. These should not be seen as separate entities, but rather as intimate partners in leading to improved systems of formal education and lifelong informal learning. However, the practical reality in most educational systems is that monitoring and evaluation, alongside measuring performance against targets, are frequently treated as separate and distinct activities, often undertaken by external reviewers or evaluators. In many African countries, where over 90 percent of Ministry of Education budgets are spent on teachers' salaries, governments and donors frequently see such external monitoring and evaluation as being less important than the actual delivery of education on the ground. This suggests that involving all participants in the education system in ongoing monitoring and evaluation as an integral part of their jobs would bring significant benefits. It will be particularly important to integrate detailed monitoring and evaluation processes in the strategies being developed in the countries participating in the Fast Track Initiative.¹⁴ Of these, several countries such as Ethiopia, Ghana, Mozambique and Vietnam, also have ambitious plans to use ICT in transforming their education sectors, and it is therefore all the more important that the additional funding available is used in part to develop and implement procedures as recommended in this handbook.

4.3 GOOD PRACTICES IN CAPACITY BUILDING AND MANAGEMENT

Much can be learnt from past experiences in incorporating effective monitoring and evaluation into ICT for education initiatives. Two case studies have been chosen, each from different continents and each reflecting very different aims and objectives, to highlight some of the themes and principles addressed in this chapter. Although Singapore and Chile are far from poor, as many of the countries embarking on technology enhanced learning programs discussed elsewhere in this handbook, the lessons drawn from their experiences in the field of monitoring and evaluation provide invaluable insights for those seeking to develop their own programs in this area.

BOX 4.2. China: *Chuan Xin Xie Zou Lao Lu* (Walking the old road but just wearing new shoes): A Focus on Teacher Capacity Building

Since 1990, the People's Republic of China has made impressive progress toward achieving universal compulsory education. In addition, China has attached considerable importance to improving education via the use of information and communication technologies (ICT). In one important recent project, with the assistance of the Asian Development Bank, the government has focused on the key area of teacher quality and teacher training using ICT. The project is located in Fenghuang County in Hunan province, a high poverty area where the government has already opted for large-scale hardware procurement.

However, China determined that increased hardware infrastructure in schools will not be effective without appropriate professional development and sustained support for teaching practice. There was a worry that simple infrastructural improvements would amount to *Chuan Xin Xie Zou Lao Lu* "walking the old road but just wearing new shoes." That is, new multimedia classrooms would merely be used as another (and more expensive) blackboard for teacher lectures.

The China technical assistance project places particular emphasis on soft components—i.e., educational content and materials, training of teachers to use new ICT tools for innovative teaching, peer support networks, and monitoring and evaluation—to add value to existing ICT facilities and capacity. Professional development and capacity building has been built into the project design, including: (1) Equipping local teachers of English and Science in grades 7-8 with skills and tools to adopt new pedagogies of student-centered instruction (SCI)—particularly inquiry-based and collaborative learning—to nurture pupil creativity, flexible knowledge mastery, and problem-solving ability; and (2) Building effective networking mechanisms. This will include teacher peer networks (e.g., for sharing of lesson plans, and more broadly acting as "communities of practice" to spur grassroots-level innovation), support from head teachers and local educational officials, and an enhanced role of township-level host schools in supporting village-level primary schools.

Box prepared for the Asian Development Bank.¹⁵

¹⁴ World Bank, 2005.

¹⁵ Prepared by Meng Hongwei for the Asian Development Bank. See URL: http://www.adb.org/Documents/TARs/PRC/tar_prc36518.pdf

4.3.1 Singapore

Management priorities were central to Singapore's *Masterplan for IT in Education* (MPITE; Box 4.3), with the intention being to use IT to 'promote greater efficiency in administration and communication, thereby supporting more effective educational management'.¹⁶ Moreover, one of the four key elements of the plan specifically addressed human resource development through training teachers in the purposeful use of IT in teaching, equipping them with core skills in teaching with IT, and involving partners from industry and institutions of higher learning in schools. Between 1997 and 2000, most teachers in primary and secondary schools completed 8 to 10 core modules over 30 to 50 training hours, covering topics such as involving IT in pupil project work, appropriate teaching and learning strategies, and how to evaluate IT resources for their teaching.¹⁷ This program was implemented through face-to-face workshops for core subjects, shared sessions for non-core subjects and dialogue sessions for the exchange of ideas and experiences amongst heads of departments. As a result, the MPITE evaluation report in 2001, suggested that 78 percent of teachers surveyed felt that the use of IT as a teaching tool had helped them to implement more learner-centered activities.

4.3.2 Chile

Realizing the potential that new technologies have to transform education in a relatively poor country, the Chilean government initiated the Enlaces program in 1990 (Box 4.4).¹⁸ One of the key findings from this has been that 'well-trained and motivated teachers can improve the learning *conditions* with ICT, and can acquire ICT skills together with their students, thus preparing them more properly for the emerging knowledge society'.¹⁹ Fundamentally, Hepp *et al.* note in reviewing this program that 'introducing ICT into the schools, without a proper *staff development* plan and without a pedagogical perspective, is a low-return investment'.²⁰ Where resources are limited, as across much of the African continent, this is a lesson that really must be learnt quickly. Far too many programs are still beginning with the technology rather than the teachers. Another important feature noted from the Enlaces work has been the significance that motivated and competent management play in the delivery of such initiatives: 'In our experience, it is advisable to assemble a team with solid educational and technical background and also one with strong leadership and political backing so as to remain relatively unhindered in the face of continuous political change'.²¹ These observations stress the key significance of both capacity building and management, but they also emphasize the need for effective evaluation: 'if evaluation is not an

BOX 4.3. Singapore: Masterplan for IT in Education

In 1997, Singapore launched a Masterplan for IT in Education (MPITE) was initiated to:

- enhance linkages between schools and the surrounding world
- generate innovative processes in education
- enhance creative thinking, lifelong learning and social responsibility
- promote management excellence in the education system.

This has led to a highly successful and innovative ICT for Education program, based on four key dimensions:

1. Curriculum and Assessment

Focusing on achieving a better balance between skills and knowledge, encouraging pupils to engage in independent learning, and including assessment modes that include information, thinking and communication.

2. Learning Resources

Emphasizing the development of appropriate educational software, facilitating use of relevant Internet resources, and providing effective procurement systems.

3. Human Resource Development

Training every teacher and trainee teacher in the appropriate use of ICT, and involving partnerships with industry and institutions of higher learning.

4. Physical and technological infrastructure

Providing access to IT in all learning areas of schools, with school-wide networks, a pupil: computer ratio of 2:1 and a teacher:computer ratio of 2:1.

See <http://www.moe.gov.sg/edumall/mpite/overview/index.html>, accessed 6th May 2005.

16 <http://www.moe.gov.sg/edumall/mpite/overview/index.html> - accessed 6th May 2005.

17 <http://www.moe.gov.sg/edumall/mpite/professional/index.html> - accessed 6th May 2005.

18 <http://www.enlaces.cl/> - accessed 6th May 2005.

19 Hepp *et al.*, 2004, p.iv.

20 Hepp *et al.*, 2004, p.iv.

21 Hepp *et al.*, 2004, p.7.

integral part of each major decision, it will be difficult to reach sound and reliable conclusions about the effectiveness of the program and to decide whether or not there is need for adjustments and change'.²²

4.4 CONCLUSIONS: FIVE KEY PRINCIPLES

This chapter has outlined some of the interwoven complexity of the interactions between capacity building, management, and measuring the effects of the use of ICT in education. If there is one over-riding lesson to be learned, it is that these interactions are complex and as yet imperfectly understood. However, there are five key principles that underlie many of the chapter's arguments:

1. *The importance of including a diversity of participants in the monitoring and evaluation procedures at the earliest stages of the implementation of ICT4E programs.* The introduction of new technologies and methods into learning environments provides an opportunity to open up education to a range of other innovations. ICTs are technologies designed to enhance the flow of information and communication; they are not ends in themselves. This therefore opens up education more widely, and creates a valuable opportunity for all those involved in education to reconsider their practices, and in so doing to develop a more reflective approach to their activities. At the very least, learners, teachers, administrators, government officials and external agents such as employers need to be involved in designing and implementing effective monitoring and evaluating procedures.
2. *Evaluation as a non-threatening process.* All too often, punitive systems of monitoring and evaluation are put in place, and failure is seen as being something which brings shame. In many cultures, loss of face is something to be avoided at all cost. Therefore tricky issues to be negotiated in measuring the effects of ICT initiatives in education. However much we might wish to think otherwise, there is unfortunately almost always likely to be an element of coercion and control in the use of monitoring and evaluation. Nevertheless, it is of fundamental importance that all those involved should see such evaluations as part of a learning process, whereby people will not only become better educators and learners, but will also be more fulfilled in so doing. We often learn more from our mistakes than we do from our successes.

BOX 4.4. Chile: The Enlaces Evaluation System

Enlaces (links), the Chilean ICT in education initiative, was begun in 1992 with the aim of integrating ICT as learning and teaching resources for all students and teachers in the ten thousand Chilean public schools. By the year 2005, 88 percent of primary and 85 percent of secondary schools participated in *Enlaces*, covering 93 percent of the student population. During its implementation, *Enlaces* developed a variety of initiatives to evaluate and monitor the on going activities of the project as well as its products and (possible) impact.

Regarding monitoring, *Enlaces* developed web based systems that enabled schools and service providers to directly register the provision, reception, installation and configuration of the computer networks, annotate technical support visits and training activities developed in the schools. Using these systems, the national coordination of the program was able to follow up the status of the main activities of the project at any time and decide, for example, whether the services were accomplished and due to payment.

Concerning the evaluation of the quality of the services provided to the schools, *Enlaces* applied a periodic survey that was answered by the teachers and principals of the schools. This survey asked for teachers' and principals' perceptions about the quality of the technical support, training, and equipment provided to the schools. This information was then used to negotiate the contents and quality of the services to provide in the following period with the institutions working for the project.

In terms of its goals and aims, several surveys were used with principals, teachers, computer lab coordinators and students, concerning the ICT infrastructure present in schools, ICT related activities, time of use of ICT infrastructure, teacher professional development, ICT related policies at school level, self-perception of ICT skills and obstacles for ICT uptake. Aimed at comparing these results, surveys were designed and implemented following international guidelines (www.iea.org, www.unescobkk.org). Significant results included: the extensive time that computer labs were used for pedagogic and non-pedagogy related activities, and the enormous impact that the project has had in providing access to ICT to low income students. Additionally, several case studies were carried out concerning innovative pedagogical practices, which showed that there was no clear evidence of the impact of ICT on students' learning achievement as defined in the national curriculum and measured by the national students' assessment tests. However, the studies did show that teachers and students using ICT gained competencies about students' conception of the world and social relations beyond the school.

Adapted from Hinojosa et al.²³

²² Hepp et al., 2004, p.50.

²³ Hinojosa et al. (2002; 2003). see also, www.enlaces.cl/libro/libro.pdf

3. *Successful programs cannot be achieved overnight.* The experiences of Enlaces emphasize with great clarity that it can take at least a decade of dedicated hard work to implement effective nationwide programs that use ICT appropriately in education. Initiatives require careful planning and considerable foresight if they are to be successful. Their management is of great importance, and central to this must be a program of appropriate monitoring and evaluation, through which lessons learnt in one phase can be implemented in the next.
4. *Charismatic leadership.* Successful monitoring and evaluation activities require a range of conditions to be in place, but paramount in the process is the quality of leadership and management. Some are cautious in drawing firm conclusions, and suggest that 'It may be, therefore, that quality of leadership can account for ICT-related performance'... 'School leadership influences the relationship between ICT learning opportunities and pupil attainment'.²⁴ Using effective monitoring and evaluation procedures to learn what exactly it is about leadership that makes such a difference is therefore important. Equally, leaders and managers are essential to the successful implementation of the sorts of supportive evaluative mechanisms discussed in this chapter.
5. *Starting with the teachers.* There is a growing consensus that training teachers in the appropriate use of new technologies as part of a blended learning environment is one of the most important places to start in delivering effective ICT4E programs.²⁵ As a first step, teachers need to be enabled and empowered to evaluate the effects of using new technologies in the classroom, and then to begin to develop their own communities of practice to assist them more effectively in enabling people of all ages to enhance their learning opportunities.

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²⁴ See Pittard et al. (2003).

²⁵ (Commonwealth of Learning et al, 2004)