3. DEVELOPING A MONITORING AND EVALUATION PLAN FOR ICT FOR EDUCATION

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Executive Summary

- This chapter provides an overview of the processes, tasks and outcomes that are needed to implement a successful M&E plan.
- The M&E process should be an integral component of any planned ICT in Education program and should be factored into planning before a project starts.
- Appropriate, realistic and measurable indicators should be selected (and not too many!) to monitor outputs and outcomes.
- All major stakeholders should be identified and involved in making M&E decisions. This will avoid possible problems with buy-in and commitment later in the process.
- M&E implementation costs should not be underestimated. We suggest that approximately 5 to 10 percent of total project costs be set aside as a reasonable target for M&E programming.

3.1 INTRODUCTION

Monitoring and evaluation (M&E) allows ongoing learning and feedback throughout the design, planning and implementation stages of a program. It includes an assessment of results at the end as related to the original objectives set for the project—but only if you plan for it in advance. Program implementers sometimes regard M&E as an externally driven and imposed 'policing' action with little perceived value, while policy makers try to understand 'what happened' after project completion. Both of these are common occurrences with M&E in ICT for education (ICT4E) projects.

Fortunately, recent trends have been moving more towards a participative, learning approach with improved local ownership of M&E efforts, and greater collaboration between policy makers, implementers and learners. This requires that sound M&E frameworks and practices be put in place at the inception stage of an implementation program or research exercise, rather than as an afterthought once implementation is well underway. The M&E framework should be fully aligned with the program design or research methodology, drawing on both quantitative and qualitative data. Ongoing M&E then becomes a project output in its own right, with the added benefits of learning from past experience. The outputs from a well-designed M&E plan can in turn influence the future directions that an ICT in education program may take, and allow levels of flexibility and adaptability to changing circumstances.

This chapter describes a number of steps that are common to virtually every M&E plan for ICT4E projects. They include how to get started with the M&E plan, how to translate the overall vision for M&E into implementation, and how to disseminate the results. The important aspect of determining the costs and benefits of M&E is covered, and the chapter concludes with some key recommendations.

3.2 WHAT IS MONITORING AND EVALUATION?

There are important similarities and differences between these two distinct components of the M&E process:

The monitoring process looks at what is being done and how it is being done. It could involve continuous tracking of activities, review of the flow of services and activities provided by the program, compliance with

laws, regulations, guidelines, etc. Much of the information desirable to monitor a program is also valuable for the evaluation component.

Evaluation looks at performance against goals. This can and should take place while the program or research project is underway, and is concerned with evaluating how the intervention is meeting its performance goals. The early aspect is called formative evaluation; it overlaps with monitoring to the extent that it uses the data gathered during monitoring that is specifically performance related. Near the end of the project, there should be an evaluation of how effective the program has been or whether the research project has met its original objectives. This is called summative evaluation.

3.3 GETTING STARTED

a) *Before you begin*. There are a number of things to look at right up front—understanding where you are going is the only way to get there. Here we include defining the overall goals and objectives, understanding the context for the study, identifying the key players, and selecting from different approaches to carrying out M&E.
b) *The overall goals and objectives*. Goals are high-level statements that provide the overall (often longer-term and less tangible) context for M&E, while objectives are concrete statements describing what the M&E project is trying to achieve (often shorter term and precise). For instance, the goals of M&E in an ICT4E program might include broad confirmation that a new ICT curriculum is workable and acceptable to the majority of teachers who will be affected. The objectives of the M&E program might be to gather quantitative data from at least a hundred teachers at two different grade levels in twenty different schools over a period of three months.
c) *The context*. No project takes place in isolation—it is important to understand the influences of existing national and local policies and strategies, and the political and administrative structures that affect implementation. Any information that can be gathered prior to the start of M&E, such as baseline data, previous studies, reports, proposals and project plans, will provided a better basis for understanding what the project or program is setting out to achieve. It is important to give some thought to whether there are any risks associated with the successful implementation of the M&E. For example: Will key players (such as those described below) cooperate? Will there be difficulties in collecting data?

BOX 3.1 Namibia: Large-scale Implementation of Computers in Schools

Beginning in February 2000, SchoolNet Namibia set up computer laboratories in some 112 schools, launched an ISP and successfully connected the schools to it. It showed how this could be done in rural and disadvantaged areas where there were neither telephone lines nor connections to the power grid. Through mentoring and training, SchoolNet had become a test bed and demonstrator for technical solutions that challenged more widely used proprietary operating systems.

The formal SIDA evaluation report noted that, in terms of the original project objectives, the project had clearly succeeded in "*installing basic (Internet connected) LANs in secondary schools*" although it was far away from the original objective of connecting 500 schools, or the revised figure of 350. There was evidence indicating that some schools connected by SchoolNet were "*reaching a high level of Internet usage by learners and teachers.*" But there was only anecdotal evidence that SchoolNet efforts were "enhancing basic computer skills of learners and teachers." SchoolNet was helping to "*create a recruitment pool for IT technicians and professionals,*" though not in the way envisaged in the original log frame analysis. As for the development goal to "*improve the preconditions for education and for the gathering of knowledge and participation in a democracy for the country's youth through broadened horizons and a higher level of knowledge by using the possibilities of cheap and simple communication that ICT offers,*" the report noted the rather vague phrasing and the lack of clearly defined indicators, which made it difficult to draw concrete conclusions. It also criticized the lack of quantitative data to monitor project performance and enable objective evaluation. The formal assessment had to rely on subjective commentary from users. The database on the progress and results of the various activities was incomplete and, when available, it was not easy to access and query. The SIDA evaluation report is a rich source of information and perspectives on shaping, monitoring and evaluating ICT projects. It highlights that large-scale project objectives are on shifting sands. What makes sense early on may well change in positive or negative ways as schools, teachers and learners appropriate new technologies and attempt to extract real value.

See www.schoolnet.na and www.sida.se.

d) *The key players*
   - The stakeholders. Those who wanted the project in the first place, such as policy makers, national/local authorities, community associations, etc. as well as others who were brought into the project along the way and who need to be kept informed or involved more actively. In each case it is necessary to understand their specific interests and concerns in an M&E activity.
   - The implementers. These include the program or project manager and staff. The M&E personnel should ideally be brought on board from the early stages of the project. Also, it is essential that the implementers have the right skills to carry out M&E, otherwise there will be concerns about credibility when the results are made available.
   - The beneficiaries. Those who are supposed to benefit from the project (e.g., learners and teachers), and who might be longer-term beneficiaries (e.g., employers).

e) *Approaches to carrying out M&E.* One of the major challenges facing implementers is how to integrate M&E into the planning and implementation of ICT4E projects. There are several well-known methods that are commonly used, including Outcome Mapping (OM)[1] and Logical Framework Analysis (LFA)[2]. There are a number of common elements that run through most methods—including the need for the identification and involvement of key stakeholders; the need for well-defined outputs; and the need for ongoing monitoring and evaluation. See Box 3.1 for an example of the OM approach.

BOX 3.2. Kenya: Integrating Monitoring and Evaluation into a National ICT in Education Plan

The Ministry of Education, Science and Technology of the Government of Kenya is putting plans in place to introduce ICTs into Education to improve the quality of formal and non-formal education. A draft Options Paper was produced in June 2005 which addresses the requirements as spelled out in the Kenya Education Sector Support Program for 2005—2010. Included in the Options Paper are a number of proposed interventions—interactive radio instruction, ICTs in schools and teacher training colleges, ICT infrastructure development, computer refurbishment, open and distance learning, community ICT learning centers, educational management information systems (EMIS) and e-content.

An integral part of the Options Paper is the inclusion of monitoring and evaluation as part of the overall plan. The paper specifically addresses the need to develop appropriate indicators for measuring progress and impacts during implementation. Three key areas have been identified: 1) Infrastructure and Access; 2) Training and Usage and 3) Impacts. Data collection for 1) and 2) will be done nationally whereas impacts will most probably be carried out through the use of in-depth case studies. The paper also recommends that data collection be disaggregated by gender and communities.

The types of indicators that are being considered for Kenya are:

a. Infrastructure: number of types of hardware, software, connectivity, technical support, number of ICT projects, etc.
b Training & Usage: types of training—technical support, ICT literacy; usage by learner, institutions, student, teacher and officer, etc.
c. Impacts: e.g. skill and knowledge improvements—ICT literacy, technical expertise, subject- area expertise; attitude and value changes.

Adapted from AED[3].

3.4 DESIGNING THE M&E PLAN

Once there is a clear picture of the context and key players, the overall goals and objectives of the M&E plan are defined, and the broad approach is selected (or dictated), it is time to get down to the detailed design of the implementation plan. For one recent national planning model for M&E, see Box 3.2.

1 OM focuses on the desired changes that a project or program wishes to bring about with stakeholders (e.g., officials, teachers, or parents of school children), rather than assessing the products (e.g., curricula, teacher training programs, educational software). OM is based on the belief that the power for change comes from the stakeholders, and that embedding the power and responsibility for change in the people, groups and institutions directly working with a development project will result in a higher likelihood of success. It emphasizes a participatory approach coupled with ongoing data collection, assessment and learning. See Earl, Carden and Smutylo, 2001.
2 The LFA method comprises the common elements described in the main text and calls for the development of a 5x4 logframe matrix. The matrix distinguishes between: the Goal, or broader development impact to which the project contributes - at a national and sectoral level; the Purpose, or the development outcome expected at the end of the project; all project elements will contribute to this; the objectives, or the expected outcomes of producing each of the outputs; the outputs, or the direct measurable results (products and services) of the project which are largely under project management's control; and the activities, or the tasks carried out to implement the project and deliver the identified outputs. See Lewis Grant (n.d.)
3 http://ict.aed.org/kenya

In this section we focus on different methods of study, selecting indicators of performance and how to gather that information. Guidelines are provided to help ensure objective interpretation of the results and the drawing of credible conclusions.

a) *Choosing the Method of Study.* There remains a severe lack of good qualitative and quantitative data on the impacts of ICT on education. It has still not been possible, for instance, to prove the benefits of including ICT in formal primary and secondary education settings. There has been general agreement though that ICT has benefited aspects such as teacher education, access to content for both teachers and learners, and development of vocational skills and knowledge. One of the reasons for this lack of conclusive evidence is the difficulty of carrying out scientific studies in the messy world of schools, teachers, learners and subjects. The interplay between so many variables that have to be controlled or tested, the social and political realities of education systems, the limited availability of program and research funding, and the shortage of research capacity in developing countries makes the conduct of rigorous "*controlled experiments*" difficult if not impossible.

What planners and researchers can do is carry out "design experiments", where they craft and implement a new design for a particular learning environment. For instance, a teacher might work closely with a research team to incorporate computer simulations into the learning process, jointly design a series of exercises to introduce novel procedures, and carefully monitor and assess the impact of the innovation on the learners, the teacher and the interaction between them.[4]

In larger scale studies, *sample surveys* can provide descriptive information on the status of learning processes, perceptions, or attitudes. They may also directly measure skills levels (see Chapter 2). Sample surveys rely primarily on quantitative techniques and are designed using carefully constructed rules for sampling, data collection, and analysis.

At the other end of the scale lie *case studies*: intensive, qualitative studies of specific situations in a classroom, school, school district, or schools in a country or region. Researchers have used the case study method for many years to examine contemporary real-life situations issues, and problems.

b) *Selecting M&E Indicators.* Underpinning all M&E activities is the need to determine what it is that is being measured, and for what purpose. The identification, selection and prioritization (in some cases) of both quantitative and qualitative indicators are therefore critical before M&E can be undertaken. The need for specific indicators may also evolve and change over time, as circumstances change. Chapter 2 of this volume has provided a broad overview of core indicators and suggested that their selection may be based on inputs, outcomes, national contexts and costs. **On a practical planning level, the context and process in which indicators are selected need to be taken into consideration**. A variety of questions therefore need to be asked at the start of any M&E intervention, as shown in Box 3.3.

BOX 3.3. Key questions to ask about the selection of performance indicators[5]

- Have any indicators been defined in policy and strategy documents, and implementation plans—at various levels (national, district, school level)?
- What are these indicators? Are there too many / too few? Should they be prioritized?
- How were they chosen?
- Who was involved in the final selection of indicators?
- What specific inputs / outcomes / impacts will they measure?
- Are the indicators realistic, measurable, and useful? Are they accepted by key decision makers and stakeholders who will use the results of the M&E?
- Are there enough resources (financial and human) to monitor all the indicators? If not, is there a prioritization process in place?
- What will be done with the data gathered on the selected indicators?
- How do the indicators support decision-making—in the project, the program, within various levels of government?

4 Collins, 1999
5 UNESCO, Bangkok's website is an excellent resource

BOX 3.4. Types of Data Collection and Their Appropriate Use

Data Collection Types	Description	Appropriate Use	Advantages	Disadvantages
Questionnaires	A pre-determined list of questions which can consist of structured and / or open-ended questions: Can be printed or electronic versions	Large sample size Geographically dispersed samples Useful if sample has e-mail access and is comfortable with online surveys	Can reach many in a short time Relatively cheap if Internet is available Can save time Allows analysis of large sets of results	Generally a low return rate Long delays in returns of questionnaires Unreliable mailing systems ICT access could be limited
Face-to-face interviews	Interview generally conducted generally one-on-one. Generally tends to be more open-ended to allow for flow of ideas from key stakeholders	Small sample size Where more in-depth information is required With key stakeholders unlikely to complete a questionnaire	Generally a wealth of additional information that can inform more structured approaches e.g. audits, checklists, questionnaires	Time-intensive Analysis of the responses may be more complex Needs experienced interviewers
Telephonic interviews	Interviews conducted over the telephone. May include conference calling with more than one person	Geographically dispersed samples ICTs readily available and affordable	Can save time where extensive travel may be involved Can work well with more experienced interviewers	Can be expensive / difficult where telecommunications costs are high and lines unreliable 'Cold-calling' is not always conducive to good interviews
Workshops / Focus groups	Generally a facilitated discussion with several stakeholders A separate record-keeper / observer is ideal Generally a small number of focused topics	Good facilitators are required, particularly if the group is diverse in background, power positions, education levels, etc. Requires good record-keeping	A well-facilitated group can provide rich inputs	Underlying differences, even hostilities and mistrust, need to be understood and could be disruptive without good facilitation
Content analysis of materials	Analysis of key program documentation - electronic and/or hardcopy	Typical content includes curriculum materials, policies, strategies, teaching resources, websites, lesson plans, project and program plans, progress reports	Can provide useful background for any M&E activities.	Could be unreliable due to subjective analysis Documentation may not always be available or accessible
Infrastructure audits	Assess the levels of ICT infrastructure, access and availability - hardware, software and telecommunications	Useful to determine the status of ICT availability	Useful to assess ICT infrastructural needs	M&E may be seen to include only infrastructure and other factors in the use of ICT in education may be ignored / not measured
Checklists	A pre-prepared list of items which can be used to assess numerous activities rapidly. Requires completion of 'boxes'—hardcopy / electronic	Can be used for self-assessment, audit purposes, classroom observations, online surveys	Useful when quick responses are required and/or when the evaluator is not able to spend time writing	Can be analyzed quickly Can be relatively superficial, and reflect the evaluators' biases

(continued on next page)

BOX 3.4. Types of Data Collection and Their Appropriate Use

Data Collection Types	Description	Appropriate Use	Advantages	Disadvantages
Software analysis	Analysis of the content and functionality of education software	To assess the appropriateness of software for educational purposes, e.g., teacher education, school administration, etc.	Could be a basic requirement for M&E involving educational software	Could be unreliable due to subjective analysis
Self-assessment reports	Widely used as an assessment tool in M&E in education	Assess self-perceived levels of proficiency, attitudes and perceptions, etc	Can be applied to large numbers of learners and teachers	Can result in bias due to self-reporting Time intensive to analyze
Work sample analysis	Analysis of work produced by learners, teachers, administrators	Tests productivity and proficiency levels, e.g., ICT literacy skills, presentation skills, administrative skills	Can provide a quick snapshot of skills levels	Could be relatively superficial and more appropriate for testing low-level skills Time intensive
Activity Logs	Records are kept by learners / teachers/administrators of specific activities	Monitoring of computer access, levels of learning achieved (self-assessment)	A useful indicator of levels of activity and productivity	Self-reporting can be biased
Classroom observations	Assess teaching	Assessment of classroom layouts, instructional practices, learner-teacher interactions, learner behavior, integration of ICTs, etc	Allows a hands-on assessment of classroom practices	Time intensive Inherent bias in that learner-teacher behavior may be 'rehearsed' for the sake of a good result from the observation

3.5 IMPLEMENTING THE M&E PLAN

a) *Collecting the data.* There are numerous methods of collecting data. The choices that are made will largely depend on: (i) the availability of budget; (ii) the appropriateness for the objectives to be achieved through M&E; (iii) the availability of skills to carry out M&E; and (iv) the geographic distribution of the places where data is to be collected. Some choices will be dictated by the contextual environment in which the study is taking place. Box 3.4 provides a summary of various data collection tools that could be used, along with comments about each.

b) *Analyzing and interpreting the data and developing credible conclusions.* Built into an M&E plan should be a method of gathering data that allows rigorous analysis leading to objective and unbiased conclusions. This is particularly important to ensure that the results of M&E will be accepted and regarded as credible by key players and decision makers. Typically this would involve selecting a *random sample* of units of interest, such as students, teachers, or schools. This means that if, for instance, you are creating a random sample of learners, every learner should have an equal chance of being selected for evaluation. Pulling names from a hat would be an acceptable way of ensuring a random sample in this case. In other cases, computer-generated random numbers could be used. If comparison is across grades, then a so-called "stratified" random sample would be appropriate—making sure equal numbers are chosen from each grade level for instance.

If at all possible, comparisons of outcomes should be made with a control group matched in defined ways to the experimental group. For instance, in the Khanya evaluation (see Box 3.5), a random sample of experimental schools was selected and compared with a random sample of schools with similar demographic characteristics, but outside the Khanya program.

To facilitate data analysis, the data should, as much as possible, be quantitative (or quantifiable from case or qualitative approaches), and allow the application of well-accepted statistical techniques. The selection of

BOX 3.5. South Africa: The Khanya Project of Computer-Supported Learning in Schools

In the Khanya project, the Provincial Education Department in the Western Cape Province of South Africa has been rolling out computers and connectivity to enhance the delivery of curriculum throughout the province. Since 2000, Khanya has deployed some 12,000 computers across nearly 600 schools out of the 1500 in the province. About 9,000 teachers and 300,000 learners are being touched by the project so far. While deployment of computers and software, creation of LANs and connections to the Internet are critical components, the core objective of Khanya is to use ICT in the delivery of curriculum—to teach mathematics, science and other learning areas in secondary schools, and literacy and numeracy in primary schools. The intention is to empower teachers and learners to develop their own material, gain planning and organizational skills through lesson planning, enhance the delivery of curricula and to put learners in township and rural schools in touch with the rest of the world through the Internet and email.

About 50 staff run the Khanya project and engage in continuous internal monitoring and evaluation. In addition, since 2002 there has been a regular process of external evaluation by a team from the University of Cape Town in South Africa. The evaluation addresses appropriate ICT provisioning, teacher effectiveness in the use of technology for curriculum delivery and learner performance. Regular assessment reports are issued.

Of special interest is the recent and careful statistical analysis of the relationship between use of the ICT-based Master Maths program and mathematics scores on standardized tests. Two kinds of post facto analyses were done by the evaluation team—comparisons between a random sample of "experimental" schools paired with "control" schools, and a longitudinal (over time) analysis of mathematics scores for the three successive graduating classes in a random sample of experimental schools. In both analyses, controlling for several other variables, there is evidence that the mathematics scores for learners on the ICT-based maths programs were significantly better. The evaluation offers a good example of a significant attempt to carry out an objective analysis of the impact of ICT on specific learning outcomes, and at the same time illustrates a multitude of possible confounding variables and practical matters that make large-scale ICT interventions difficult to design, implement and evaluate.

Adapted from Khanya[6]

6 See: http://www.khanya.co.za

indicators and sample sizes in the design of the M&E plan must take into account whether the data will be normally distributed (i.e. following the well-known *bell-shaped curve*), what kinds of statistical techniques will be applied, and the desired *effect size* (e.g. the percentage improvement in test scores). There are several techniques of data analysis that can be applied under these conditions, such as analysis of variance, covariance analysis, multifactorial statistical analysis, multiple regression techniques including multi-level regression, and structural equation modeling.[7] Even if the nature of the data is not expected to lend itself to such tests, there are other tests such as cluster analysis, analysis of ranks, etc., which can be applied. It is vital that the design of the intervention take into account *in advance* how the data will be collected and analyzed. Researchers sometimes end up with large quantities of data that they are not able to analyze in an effective way.[8]

3.6 DISSEMINATING THE RESULTS OF M&E

When an M&E plan is formulated, it is important to consider how to manage interactions with the people who will be involved in the process. These people could be decision makers, teachers, government officials or learners, and each will require some form of interaction with the M&E team. In particular, there may be formal steering committees, user groups and program committees to consider. A number of factors will need consideration:

a) The *identification of the key stakeholders and stakeholder committees* who need to be involved, either directly or indirectly;
b) The *levels of participation* that will be required from different players. For example, how often will key stakeholders meet? And will this be through group meetings, personal discussions, through information sharing in presentations or through the circulation of the final reports?
c) The *formality of participation.* Are formal meetings with a minute-taker required and, if so, how often? Should such meetings be at regular intervals or to mark milestone events in the project (or both)?
d) The *levels of transparency* about the results of the M&E, as well as during the M&E process. For example, if there are very negative criticisms that emerge during the M&E, with whom will the outcomes be discussed?
e) The *dissemination* of the M&E results. A dissemination strategy is required that spells out exactly how to deal with the outcomes of the M&E activity, how widely the results will be circulated and to whom. This is particularly important if M&E is to be regarded as a potential means of increasing knowledge and improving the outcomes of existing and future projects. A matrix such as the one below (see Box 3.6), which spells out how to communicate with different stakeholders, may be helpful.

BOX 3.6 Matrix outlining intended dissemination approaches to various stakeholders

	Personal meetings	Presentations	Small Discussion Groups	Website	Summary Report	Full report	E-mail lists
All Stakeholders					✓		
Teachers			✓	Closed website	✓		✓
Minister of Education	✓				✓	✓	
Parents		✓		✓	✓		
Etc.							

7 Kremer, 2003
8 In some cases scientific rigor may have to be compromised, and convenience samples may be chosen in light of local conditions (e.g., if the project budget allows only nearby schools to be part of an experiment). While such convenience samples may raise questions as to the scientific validity of the results, avoiding bias will always help to provide a more persuasive set of conclusions.

3.7 ANALYZING THE COSTS (AND BENEFITS) OF IMPLEMENTING AN M&E STRATEGY

The fiscal dimension of ICTs in education development is often seen in terms of capital investments, ongoing maintenance costs, regular costs of connectivity, and training costs. Some of these costs may be difficult to estimate in advance, including the cost of doing M&E. The scarcity of funding for any type of development initiative means, however, that its potential cost-effectiveness will be considered as a critical factor. When ICTs are involved in any initiative, the perception that they are costly further amplifies the requirement for clear budgeting for M&E as a component of the costs of 'doing business' in ICT4E. In countries that are at risk of failing to reach Millennium Development Goal (MDG) targets, the issue of cost is especially acute. Considering costs in M&E is not simple, as there are many and varied direct and indirect costs depending on the level of data gathering and analysis required.[9]

The Costs of an M&E strategy. Each of the elements of an M&E plan will add additional costs to the overall program or project, and these must be dealt with up front, including those shown in Box 3.7. Exactly what the costs will be depends on the nature of the intervention, whether local or international personnel are used, and so forth. For instance, small stand-alone projects such as technology implementations (e.g. single school computer labs) that focus on tangible outputs and outcomes, may require little data gathering other than data generated by the project itself. M&E of large-scale multinational multi-year programmes based on implementation of national policies may call for substantial investments in time and effort on the part of many professional evaluators, and greater levels of inputs of other kinds.

In its survey of well-known methods of monitoring and evaluation, the World Bank offers rough cost data for each method in terms of low, medium, or high investment, and suggests that each calculation depends on a whole host of factors, but with a cost factor that matches the usually large size of Bank loans and grants.[10] We take the position that an M&E budget should not divert program resources to the extent that operational activities are impaired. At the same time, the M&E budget should not be so small as to compromise the reliability and credibility of the results. In the end, we suggest the rule of thumb frequently offered—that M&E should be in the range of 5 to 10 percent of total program costs. For example, a $1M project should allocate $50,000 to $100,000 for M&E costs so as to assure that the impact of investment is measured and evaluated.

The Benefits of M&E. Complex as it is to estimate the costs of engaging in M&E, the benefits are even more difficult to state in financial terms. Some benefits do not lend themselves to easy quantification. For example, how can one measure the fiscal benefit of knowing that one type of implementation is better than another? We might know which implementation strategy to pick the next time, but we might not easily know whether the level of investment in M&E was too much or too little or just right. As with many "returns on investment" (ROI), only certain kinds of benefit lend themselves to measurement of this sort. The non-tangible benefits, such as the

BOX 3.7 Some principal costs of M&E, in measurable fiscal terms

- Technical assistance to determine and advise on the most effective M&E activities for the particular intervention
- Technical assistance to carry out the recommended ongoing monitoring and formative evaluations, and the concluding summative evaluation. This may involve continuing M&E of longer term outcomes and impacts.
- Defining performance goals related to activities, outputs, outcomes and impacts: for formative and summative evaluation
- Designing proper experimental or survey procedures, sample sizing and selection schemes, control groups, etc.
- Where needed, implementing increased sample sizes, numbers of enumerators, additional levels of treatment etc., to ensure a given level of accuracy in statistical analysis and providing conclusive results for a chosen effect size etc.
- Proper monitoring of the tasks being carried out to implement the project and deliver the identified outputs (observation, data gathering, analysis and reporting)
- Formative and summative evaluation of quantity and quality of outputs and the timing of their delivery
- Undertaking statistical analysis and interpretation of the data emerging from monitoring and evaluation
- Implementing management information systems (MIS) and procedures where recommended for more effective M&E

9 Perraton & Creed, 2000; Haertel and Means, 2003
10 World Bank, 2004

policy maker's satisfaction, or ICT interventions *not* to make the next time around, are important—or even crucial!—but may be difficult to put in monetary terms.

In sum, the benefits of engaging in M&E may be seen in the increased confidence of donors or sponsors to invest in a particular ICT for education initiative. In the policy domain, M&E results can strengthen the case for a budgetary shift in a particular direction or not; and in the social arena, M&E results can persuade teachers and principals that it is safe and beneficial to adopt ICT-related methods.

3.8 CONCLUSIONS

"Not everything that can be counted counts, and not everything that counts can be counted."
Attributed to Albert Einstein

This chapter has tried to provide an overview of the processes, tasks and outcomes that are needed to implement a successful M&E plan. In conclusion, we provide a list of pointers specific to the M&E implementation plan that will assist in focusing attention on the key elements that should not be ignored.

- **The M&E process should be an integral component of any planned ICT in Education program** and should be factored into planning before a project starts. This means that local ownership and accountability are crucial if learning is to be gained and built on for future activities. Disseminating the insights gained from M&E should form part of the learning process.
- Appropriate, realistic and measurable indicators should be selected (and not too many) to monitor outputs and outcomes. The data collected should be relevant and there should be a clear understanding of what will be done with it once it has been collected.
- Monitoring activities should be clearly distinguished from the formative and summative evaluations of performance criteria—they support different functions.
- All major stakeholders should be identified and involved in making M&E decisions. This will avoid possible problems with buy-in and commitment later in the process.
- Adequate thought must be given to who the key target groups will be in implementation - and what expected outcomes are desired for each group.
- Finally, M&E costs should not be underestimated. If the outcomes of M&E are seen as useful and add to the future improvement of implementation, the allocated funds will be well-spent and are likely to provide major benefits in terms of better outcomes and impacts. We suggest that approximately 5 to 10 percent of total project costs be set aside as a reasonable target for M&E programming.

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