

FIRST DRAFT

A practical guide to working with Education Management Information Systems

Guidance for DFID Advisers

Robin Ellison
Statistical Consultant
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Background & Acknowledgements

This guide was commissioned by Policy Department to help DFID advisers working on education development in developing countries. It aims to give practical advice on how best to work with Education Management Information Systems (EMISs) and to support their development.

The information contained in this guide was originally researched as part of the work reported in '*Scoping exercise for possible work by DFID on Education Management Information Systems*' by Robin Ellison, 2004.

The assessment focuses on school EMISs - especially primary schools - and on Anglophone African countries. Some work in Asia has also been considered, however, and much of the material relates equally to other regions and sub-sectors.

The first section surveys the state of EMIS development in developing countries. Section 2 seeks to explain the underlying reasons why. Practical guidance is given in Section 3 on: good development practice synthesised from experience; the various IT systems available; promising technical developments, and further information resources. Section 4 discusses the work of the key international agencies active in the field.

This is the first draft of the guide. There is great scope for extending and improving it. Comments are welcome. Please send any comments to [CONTACT POINT IN EDUCATION PROFESSIONAL GROUP] so that a better second draft may be prepared.

I acknowledge my great debt to the many individuals who supplied information. In particular a number of education advisers provided useful material and the UNESCO Institute for Statistics was especially helpful, though I am also grateful to many people in many other organisations who responded. I also thank Annabelle Newbigging, whose '*How can DFID Education Advisors work towards the PSA gender equality targets?*' provided useful pointers for formatting this guide. Any factual or presentational shortcomings are, of course, mine alone.

Summary

Survey of EMISs

EMISs in many developing countries can still be described as poor. Data dissemination is slow. Some data are unreliable. The analysis of information and its input to developing better education policies are limited.

There has been some progress in some countries, but some regress in other countries. The substantial investments made, principally by donors, have often yielded disappointing results.

There is a range of difficulties countries face in terms of managing the collection, analysis and production of data (ie 'information supply'). Perhaps the greatest of these is attracting and retaining staff with the required technical skills. Countries need to overcome the difficulties if they are to establish robust EMISs.

Most countries appear to place a low value on having good statistical information to support policy ('information demand'). Evidence suggests it is very difficult to overcome the information supply issues where there is a lack of information demand, because the resources, emphasis and effort required to tackle them cannot be sustained.

Practical guidance for DFID advisers

The main lessons of good practice for supporting EMIS development are:

1. Focus on management and institutional issues (not IT)
2. Focus on information usage (not production)
3. Focus on speed (not comprehensiveness)
4. Evolution (not revolution)

ED*ASSIST is currently the only international EMIS IT system, though NESIS SIS and OSMIS might become available in the coming years.

Some case studies on more successful collaboration in Cambodia and The Gambia is cited, and this lesson-learning could usefully be extended, eg to Mozambique, Ethiopia, the DPEP programme in India, and Uganda.

Some fruitful areas on lesson-learning (Optical Character Recognition, School mapping / Geographical Information Systems, decentralised data processing) and development (auditing, estimation, improving private school response, and school sampling) are suggested to combat information supply problems.

As well as improving EMISs, other data sources can be exploited more fully.

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1 Survey of EMIS development

There is general agreement that EMISs in many developing countries are poor. As the UNESCO Institute for Statistics (UIS) – the UN body responsible for education statistics -puts it:

‘a large number of Member States still suffer from weak statistical capacities and cannot supply adequate information to support policy and decision-making’ (from UIS’s *Medium-Term Strategy 2002-2007*).

Surveys of EMIS development suggest that the substantial donor support over the last quarter of a century have usually achieved disappointing results.

USAID, which has invested a good deal in EMIS development in the past is now focusing on sponsoring education household surveys instead.

National Education Statistical Information Systems (NESIS) is the main programme falling under the Association of Development in Africa (ADEA)’s Working Group on Education Statistics (WGES). NESIS has been devoted to developing EMIS capacity in sub-Saharan Africa for over a decade. Perhaps naturally, NESIS / WGES’s own assessment in some of its recent material is slightly more positive assessment. However, the descriptive sections of the problems in Anglophone countries written nearly ten years ago in the NESIS Module ‘From Diagnosis to Action Plan’ seems to describe the current position reasonably accurately. Progress in some countries appears to be offset somewhat by regress elsewhere.

With some exceptions, EMISs in most developing countries can be described as poor in terms of timeliness and data quality. Even in middle-income countries significant problems remain. This is despite substantial investments from many external sources over many years.

Table 1: summary of main EMIS weaknesses

Slow data release	It takes over a year after the end of a school year to release information in one in two Anglophone African countries, according to the meta-data material posted for 13 countries on the IMF’s General Data Dissemination System (GDDS) Bulletin Board ¹ . This is despite information generally being requested early in the school year. Such delays greatly reduce the value of the data to policy making and implementation.
Inaccurate data because of technical reasons	Data may be unreliable because the system is not made to work well enough technically, for a host of reasons explored in the following section. Final data are rarely adjusted to allow for schools that have not responded. This makes key figures such as total enrolment and enrolment rates unreliable and disrupts time-series.
Distorted data because	It is frequently stated that data are deliberately distorted where

¹ Botswana, Ethiopia, The Gambia, Kenya, Malawi, Namibia, Nigeria, Sierra Leone, Swaziland, Tanzania, Uganda, Zambia and Zimbabwe.

of administrative data use	resource allocation to schools (or, sometimes, revenue collection from them) depends on the returns made.
Lack of user-friendly publications	The quality of the disseminated material is often lacking, with cumbersome abstracts designed for reference frequently being the only published outputs, despite some attempts to develop skills in preparing more targeted and easily-understood offerings.
Lack of analysis	Analysis is also often lacking: in particular analysis that draws on more than one source, where the information can be added together where data coverage is different and compared where it overlaps between exercises.
Lack of feedback to data providers	Data providers rarely see the fruits of their efforts in any form. This denies them of potentially useful comparative data and weakens their motivation to supply information in future. With the decentralisation that is taking place in many countries, information is required away from the centre to support sector management.

Annex 1 contains material on EMIS development in various countries, which broadly supports this summary. Some might argue that the picture emerging in this summary of common weaknesses is somewhat more gloomy than the reality. Certainly there are some countries with better EMISs, including some that have progressed recently, but the table describes the experience in many countries.

It should become easier to assess how good EMIS data are when a new Data Quality Assessment Framework (DQAF) for education statistics becomes available. UIS has been developing the framework with the World Bank and piloting it in some countries. When it is ready, it will be posted on the IMF GDDS website (see Table 7, p15). This will set out standards and good practice in procedures and institutional arrangements.

Conclusion

Poor EMISs cause two problems: they hamper all those seeking to manage and develop national education systems in the country concerned, and they hamper international efforts to track global progress towards education development - notably Education For All (EFA) - and to organise support for it.

2 Underlying issues affecting EMIS development

The issues affecting EMIS development can broadly be separated into ‘information demand’ and ‘information supply’ issues. The supply issues are more direct and tend to be clearly defined. Demand factors are somewhat more elusive, but appear to be even more important than production problems in constraining EMIS development.

2a. ‘Information demand’ issues

Information usage is related to attitudes to the value of information in decision-making which, in turn, reflect cultural issues. It is difficult and possibly hazardous to attempt to generalise in such matters, but unless the attempt is made the picture will be far from complete.

Table 2: shortcomings in the demand for information

<p>Statistical information is not valued at all as a useful input to developing and implementing policy</p>	<p>Not everyone believes in evidence-based policy-making: decisions may be taken according to various influences and pressures without drawing on reliable information. Furthermore, statistical information is not the only form of evidence that may feed into the policy process, and some education administrators favour others including feedback from consultative processes.</p> <p>Some might fear the spotlight quantitative data can shine on the existing situation. For example, in a country where there are great inequalities in the access and quality of education between urban and rural locations, the administration may not welcome clearly presented information on disparities in access, provision and attainment. One reviewer commented that far too often it was assumed that developing an EMIS was a neutral exercise, in other words mistakenly assuming that EMISs would not face opposition because groups’ and individuals’ vested interests would not be challenged.</p>
<p>Statistical information is valued, but not enough to establish EMISs</p>	<p>Some of those do place a value on having good statistical management information may not prize it enough to establish and sustain a satisfactory EMIS. Recurrent funds are required, as are staff with scarce skills, both of which are hard to find in most ministries in developing countries.</p> <p>The result is that there is insufficient investment made to support a satisfactory EMIS.</p>

There are two clues to the strength of ‘information culture’ within education ministries.

Table 3: clues to the prevailing ‘information culture’

Is information used?	Is the information that <i>is</i> available used? How fully? In particular, the national statistical office will collect and disseminate relevant education data from household surveys and population censuses: are the reports read? Are further analyses done on the databases?
What for?	Is the use that is made of whatever data are available solely administrative or is there an attempt to apply it to policy development. Administrative applications support direct functions – such as the allocation of teachers or funds. They usually demand covering all institutions. Policy applications may be more flexible and can draw on samples of educational institutions and household surveys.

Conclusion

Crouch 1997 suggests there are crucial differences in the context of the public sector in developing countries compared with the private sector in advanced countries, where the idea of quantitative indicators and information systems was initially developed. (Indeed, DFID and other departments in UK and other developed countries can testify to some difficulties of applying these notions to the public sector anywhere.)

2b. ‘Information supply’ issues

Table 4: information supply problems

It is hard to secure the staff needed	<p>EMISs call for skills in statistical work and IT that are often hard to secure. The statistical skills run from designing and amending data collection instruments and communicating effectively with data providers, through managing data entry and cleaning, and analysis to report-writing and other dissemination. IT skills cover maintaining and developing both software and hardware.</p> <p><i>‘a large number of Member States still suffer from weak statistical capacities and cannot supply adequate information to support policy and decision-making. There is an especial problem in relation to many line ministries since their staff are often not part of the statistical community. The fast turnover of staff and their lack of professional training and career development leaves these statisticians in a vulnerable position, often with an inadequate sense of the value of data integrity, and they can be subject to pressure to provide data which serve particular political ends.’</i> (UIS Medium-Term Strategy 2002-2007)</p> <p>Effective, well-trained, experienced staff are in demand and so prove hard to retain on many civil service salaries, even if they can</p>
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	<p>be initially attracted with project allowances. The nature of the work can make it hard to give staff a financial incentive to do it. Staff receive allowances for attending workshops and for doing fieldwork for surveys, but not for being in the office managing the EMIS. This poses difficulties in to ensure they focus on regular EMIS work. It is hard to offer attractive careers for small specialist units within line ministries, however they are organised and staffed. High staff turnover is often cited as a reason for not maintaining EMISs that have been set-up.</p>
<p>The large number of data providers and the difficulties in communicating with many of them</p>	<p>A successful EMIS requires data to be supplied from a very large number of primary school headteachers, at least some of whom may have infrequent contact even with their district offices. There is a continual need to train heads and others involved in EMIS, given staff turnover. These problems are exacerbated by the large number of information requests that a typical school faces from all quarters.</p>
<p>Poor record-keeping</p>	<p>Poor record-keeping in schools means that the raw data are often not there to compile into the returns. Central ministries' lack of accurate registers of operating schools is another key failure to maintain effective administrative databases. Without an accurate register it is impossible to reduce non-response by chasing up schools and to adjust estimates to allow for non-response.</p>
<p>Forms often try to collect too much information</p>	<p>EMISs are often ineffective because they try to collect too much information. 'Keeping it simple' plays to their strengths. Complex questions may easily be misunderstood. More sensitive exercises are better for these. A high response rate is usually more important than including extra questions. This view is common in the literature, so EMISs' over-elaborate nature may owe more to Education Ministries' influence than to the consultants who work with them.</p>
<p>Low response rates from private institutions</p>	<p>The private school sector is often significant, but response rates are generally very low.</p>
<p>Maintaining IT hardware, software and skills</p>	<p>Given the levels of project assistance on EMISs, the design and initial implementation of software and hardware has been adequately addressed in many countries. However, governments still struggle to budget for additional and replacement computers, even at the (relatively) low current prices. The equipment that is procured often fails to operate for as long as it should owing to inadequate skills and funds for maintenance.</p> <p>The difficulty of retaining civil servants with IT skills has already been mentioned. Training new staff after the end of project assistance can be difficult. IT expertise is usually available from the private sector within the country or region, though this many governments find them expensive without project funding.</p> <p>Maintaining and developing EMIS software has often proved difficult, partly due to these staffing difficulties and partly due to the nature of the software (see section 3b., p11).</p>
<p>Difficulties in trying to</p>	<p>Most national EMISs aim to provide useful information at different administration levels, as they should, especially important in the</p>

<p>meet national and sub-national information needs</p>	<p>many countries that have been decentralising. This is a complex area and the challenges are considerable. Conceptually there are different information needs at different levels, and establishing them is far from trivial. If lower levels have some real autonomy, then they should expect to set their information agenda. However, this can reduce the effectiveness of the information flow to higher levels.</p> <p>Central EMIS units have often been poor at feeding back data to data suppliers and users. Partly as a result, a number of countries have sought to decentralise data processing. This can have disadvantages as well as advantages. Some approaches to this aspect are better than others, but there are no simple, perfect solutions.</p>
<p>Lack of reliable population estimates to use with EMIS data</p>	<p>The lack of reliable up-to-date population estimates limits the effectiveness of EMISs to produce accurate Net and Gross Enrolment Rates in many countries. The main source of demographic data – the population census is rarely taken more than once a decade, and there is a certain level of error that attaches to the results. The data sources normally available between censuses make it difficult to assess the school-age population with much confidence, given the high levels of births, deaths and migration between and within countries.</p>

Problems experienced in developing a central database to be used throughout the Ministry and more widely does not imply that there is little information collected. Usually there is a good deal of information that is collected by several different parts of the Ministry. Compared with the situation where a central EMIS operates effectively, the cost is greater (because of duplicated effort supplying and processing the data) and the value is less (because the information is rarely combined or shared outside the collecting unit).

It can be very hard to contend with such views where they are widespread. Where this type of situation has held for some time, there can be a number of barriers to trying to establish an effective central operation. Understandably information users may doubt that the new unit can be relied upon to provide an equally good performance. There may also be a range of reasons for not wanting to lose control over the collection of the data and their release to others. Managers may also be reluctant to lose any staff and budgets associated with the activities.

Box: Data sharing and integration

'All too often, units gathering and managing education data are reluctant to share their information with other units. This can be attributed to one or more causes:

- The lack of value given to data integration, which is indicative of the lack of understanding and shared vision about information use in the education system.
- The perception that information is proprietary, and should not be seen or used by outsiders.
- The perception that information is a limited commodity, rather than a limitless resource, and should therefore not be shared. This point of view is particularly true in situations where control of data and information equates to power and authority.'

Hua and Herstein 2003

2c. Some general observations

In many cases the project or programme assistance to developing EMISs falls under wider support to the education sector and, as such, is managed for the development partner by the education adviser responsible for that country. This arrangement has several benefits: in particular EMISs can be developed to answer their key policy questions and tailored to the institutional framework. One drawback is that the education adviser may not be well-versed in EMIS development issues. Perhaps one of the reasons for EMIS developments not having been sustained in the past is that neither the adviser, nor the technical experts brought in to set-up the systems have grasped the necessity of fostering the institutional demand for data (see Annex 3).

There are networks for education statisticians to share experiences. The fact that the list of problems remains stubbornly similar suggests either that the problems are really intractable, or that the networks are not working very well.

The level of professional statistical input to EMIS development has been disappointing. Other fields that usually come directly under the national statistical office are generally better addressed technically by national staff, international organisations, including the UN and other development partners, and the International Association of Official Statisticians (IAOS) that provides a professional network for government statisticians.

There are many similar issues with other key social sectors, especially health. These include staffing issues, data collection from administrators, the need to meet information needs at different administrative levels, the interface with the national statistical office, for population estimates, shared GISs, etc. There is scope for common approaches and joined-up systems, where they may be forged. However, poor communication between different line ministries often poses difficulties.

2d. Conclusion

The difficulties over information production and supply mean that, unless there is a positive supporting culture for information, they cannot be overcome in a sustainable way. If such a culture is not present, the issue of whether the development of one can be stimulated becomes crucial.

3 Practical guidance for DFID advisers

3a. Good practice in EMIS development and donor support

Naturally, general guidance on good practice when seeking to support capacity-building applies to EMIS development. This guide does not attempt to summarise these. There are some specific lessons that can be drawn from experience. The following identifies four themes. They draw on three cited syntheses of EMIS development experience, which are listed and discussed in Table 8, p16.

Table 5: main lessons of good practice

1. Focus on management and institutional issues (not IT)	<p><i>'Most EMIS interventions – assessment, design, implementation - tend to focus on technical solutions created by technical teams, and tend to overlook the organizational processes and institutional incentives that drive information use.'</i></p> <p style="text-align: right;">Crouch, Mircea & Supanc, 1999</p>
2. Focus on information usage (not production)	<p><i>'Effective EMIS have specific users who demand specific data to inform decisions for which they are held accountable. . .</i></p> <p><i>Incentives in developing countries to use objective information tend to be weak. Other criteria (e.g. securing funding, rewarding supporters) may be more important in determining a manager or policymaker's success. Frequently, the absence of reliable data can be to the advantage of the potential user.</i></p> <p><i>In most cases, more information is collected than actually analyzed and applied toward decisionmaking. EMIS reform should focus first only on information that directly informs priority decisions.'</i></p> <p style="text-align: right;">Crouch, Mircea & Supanc, 1999</p>
1. & 2.	<p><i>'The development of EMIS involves nurturing a new management culture more than establishing a data and information system. The process of data collection, integration, analysis, and dissemination is important, but even more critically, it is the culture of data sharing, information use, and organizational management that leads to the effectiveness of the EMIS development. It is important to remember that EMIS development is not IT development.'</i></p> <p style="text-align: right;">Hua and Herstein 2003</p>
3. Focus on speed (not comprehensiveness)	<p><i>'EMIS systems tend to be over-designed. Systems with the highest use and down- stream adaptation tend to be simple and modest in scope. Similarly, EMIS design tends to be burdened by unrealistic expectations about the degree of precision "required" without taking into account precision's high costs.'</i></p> <p style="text-align: right;">Crouch, Mircea & Supanc, 1999</p>

4. Evolution (not revolution)	<p><i>'Effective systems tend to build-off of existing databases, taking advantage of current data collection routines. Maintaining familiarity while enhancing efficiency builds early wins for a more ambitious, long term effort.'</i></p> <p style="text-align: right;">Crouch, Mircea & Supanc, 1999</p>
3. & 4.	<p><i>'In summary, EMIS design and implementation needs to be informed by and responsive to Government ambitions for sector reform and planning processes and the status of policy and strategy development. . . Early EMIS implementation with a view to ongoing refinement, driven by sector priorities, allows for faster EMIS integration and trust building, rather than pre-implementation system perfection and delayed rollout.'</i></p> <p style="text-align: right;">Perry and Ratcliffe, 2003</p>

Simplifying the first two messages, one could say that it should be possible to establish a satisfactory EMIS in the (rare) situation where statistical data are highly valued for policy-making, whereas as it is unlikely to be so in the (common) situation where it is not. The issues of how far information demand may be stimulated and supported, and how to do it, become crucial.

Unfortunately the syntheses are less clear on this. Information demand will be promoted if the commitment to evidence-based policy-making and administration can be increased, and if the capacity to analyse and use education management information for these purposes can be expanded. For example, supporting an Education Sector Analysis that draw on EMIS and other information sources, is potentially very helpful.

Where they are in place, Sector Wide Approaches (SWAs) would appear to provide an enabling environment. They are mentioned in Perry and Ratcliffe. The sector-wide approach has also played a role in assisting development in Uganda, where it generated some co-operation support as well as putting substantial pressure on the Ministry to make sure the EMIS was able to supply indicator data to the regular reviews. Ellison 2001² found that other potential for stimulating analytical demand had not been realised at that stage, though this may have happened since. Given the prevalence of SWAs in education, the environment they create for EMISs is an important issue. PRSPs and, in some countries General Budget Support (GBS), may raise some similar and some distinct issues.

Other education data sources

Where EMIS development remains elusive, another response that may be considered is to see whether, and how far, other sources on education statistical data may be developed and exploited. Other sources include:

Table 6: other statistical data sources

² Report on visit by Robin Ellison (Statistics Adviser, DFID) to Ministry Of Education and Sports, Uganda on 6 - 8 August, 2001 to review DFID support for education statistics

Sample surveys of school quality and attainment	School sample surveys that test pupil achievement and report school quality, eg Southern Africa Consortium for Measuring Education Quality (SACMEQ), Programme for International Student Achievement (PISA) and Monitoring Learning Achievement (MLA);
General household surveys	General household surveys, eg Demographic Health Surveys (DHS), Multiple Indicator Cluster Surveys (MICS), Living Standards Measurement Surveys (LSMS), Core Welfare Indicators Questionnaire (CWIQ) and population censuses
Specific education household surveys	Specific education household surveys (EdData – a relatively new trailer survey for the DHS)

In principle, different sources have different strengths, and ultimately no other source can do everything that an EMIS can. Nevertheless, pragmatically, where EMIS development is problematic, it may be worth considering how far other sources may be able to cover the ground. In particular, household surveys are under-used by education planners and statisticians: FASAF, etc 2001 is a very useful document that discusses and promotes their use.

3b. The different IT systems

The first lesson above – to focus on management and institutional issues rather than IT – should be recalled. Having said this, different IT solutions have been developed with different approaches, with varying results, and it is worth discussing them a little.

Over the years, it has been the norm for countries to have the software custom-written. Broadly, these have the advantages of being tailored to national needs and can always be modified, but there are no automatic upgrades, support and experience-sharing that may obtain with a ready-made system.

More recently, some systems have been developed – or have begun to be developed – for more than one country. These systems are discussed briefly in the following pages.

ED*ASSIST

ED*ASSIST stands for EDucation Automated StatiStical Information Toolkit. This is the best known system, and the only one currently available to be implemented in Anglophone countries.

The system was developed by the Academy for Educational Development (AED) in Washington, which is an independent non-profit organisation. The rationale was that the various national software packages shared a large common core. In principle, this represented a substantial amount of wasted effort. Further, the custom-written software was claimed often not to represent best-practice. An opportunity for developing and maintaining one excellent system – suitably adapted to individual country needs – was thought to be being missed.

ED*ASSIST was funded by USAID Africa regional programme, and developed within the Association for Development of Education in Africa (ADEA) Working Group on Education Statistics (WGES) context. It apparently was stated that the software would be available free to countries, though this is no longer true.

The software features modules for data gathering, data processing and data utilisation. It is possible to implement modules in isolation, and some countries have done this.

The system is oriented towards getting accurate data to users quickly. It is comprehensive. It goes beyond the core data entry, processing and output to feature a Questionnaire Tracking System and to support areas such as reviewing information requirements and assessing staff workloads. The software is written in Microsoft's Access.

Benin was chosen as the initial pilot country under WGES / NESIS, and work began there in 1996. Initially, the national response appears to have been favourable: AED literature cites the Ministry of Education as saying: *'beyond what we expected... ED*ASSIST changed the pace of implementation and saved us at least a year of implementation time...produced very quickly outputs on school statistics...a model to be used by many other countries'*. Now, however, it appears that the system has been shelved. It is not clear why the system was not adopted: no evaluation is available of the pilot.

A project to implement ED*ASSIST in Uganda began in July 1999. By 2001 (the second year using the system), EMIS data were being made available within six months of data collection, and it appears a fast timetable has been maintained until now. In mid-2003, the main reservations concerned (a) the alleged restrictions in not being able to re-write the underlying code and (b) continuing ministry dependence on the national private consultants whose support was about to finish with the end of the project.

The system was adopted in Nicaragua in 1997, and is said to be in current operation. Since then, ED*ASSIST systems began to be implemented in Zambia and Lesotho in 2000. Kenya and the Philippines have also made use of parts of the system. No country appears to have begun to implement the system since 2000.

In summary, the system can be adapted to different national contexts and to support effective EMIS development (no easy goal, as the preceding sections show) though implementation has not always been successful. Apart from the comments about the difficulties in re-writing the code, the concerns voiced appear to relate to aspects of the collaboration, rather than the system itself. Some have talked about an initial 'hard sell', complete with complementary trips to Washington.

Initially it was stated that the software would be available free to countries. Now, however, annual fees are payable to AED. It appears the funding from USAID that funded the system's initial development was not extended to cover continuing maintenance and support. WGES and NESIS are not promoting ED*ASSIST in member countries.

USAID and the World Bank are the donors that have funded ED*ASSIST's installation in individual countries. It now appears USAID will no longer be doing so as it moves away from EMIS development support towards other forms of information to support education policy-making (see section 4b on p20).

The contact for ED*ASSIST is Kurt Moses, who is a Vice President of AED and the Director of the Academy's Systems Services Centre (kmoses@aed.org). The website (<http://edassist.aed.org/>) has not been updated since 1997, so while it has further information on the system's design, it is hard to gauge current developments.

NESIS SIS

NESIS is currently developing its Statistical Information System (SIS) for potential implementation in Anglophone countries.

NESIS SIS was originally developed by the Dakar node, and piloting began in Senegal and Burkina Faso around 2001 / 2002. (Another system – the Education Indicators Information System [EDIIS] – was developed in Harare under NESIS, but it was decided not to develop this further for implementation in other countries.) The system has three elements: data collection, data capture ('StatEduc' in French), data reporting ('Annuaire' – to produce an annual abstract) and data exploration ('Exploram'). A GIS module to support school mapping is being developed. The code is written in Visual Basic.

UIS's assessment of the software is positive: in particular it seems highly adaptable to different national contexts, though its design is quite complex to facilitate this flexibility. The Institute is therefore directing NESIS to press ahead with supporting implementation in a number of other Francophone countries in West Africa, writing manuals and training materials and developing an English version. UIS's support takes over from French Co-operation funding, which is no longer available as part of a wider decision not to support ADEA programmes at Working Group level.

If UIS is successful in obtaining funds to continue this work, and if NESIS successfully addresses the various challenges of establishing and supporting the software, NESIS SIS could become a potential option for English-speaking countries in the next year or two. The intention is that no charge would be made to use the software.

Information should become available on the NESIS website (<http://nesis.easynet.fr/>), though it is not at the time of writing. NESIS can be e-mailed at nesis.unesco.org.

OSMIS

OSMIS (Open School Management Information System) is currently being developed, with funding from IMFUNDO. The system is primarily designed to support schools administration, but the development of it to include district and national level collation and reporting is a potential secondary aim. IMFUNDO has other experience of sub-national EMISs from DFID-funded work in Eastern Cape and – more recently – Limpopo Province in South Africa.

The software will be released under an Open Source license, so it will be free to users who will be able to modify the code. OSMIS will run on ‘all popular computing platforms’ according to the project overview.

CSIR’s icomtek, Wits University and Kgatelopele Technologies are project partners, and OSMIS will be piloted in South Africa. One of IMFUNDO’s main aims is to facilitate the development of the private IT sector in sub-Saharan Africa, and the intention would be to make it easy and relatively cost-effective for consulting companies to support national EMISs.

The project began in mid-2003, so the software will not become an option to consider immediately.

The website is <http://osmis.sourceforge.net/> and the e-mail contact ossms@cs.wits.ac.za. Alternatively try www.imfundo.org or e-mail Bas Kotterink at b-kotterink@dfid.gov.uk.

3c. Promising technical developments

While the syntheses of country experiences emphasise the importance of addressing information demand and the institutional environment at the expense of technical aspects, they should not be read as suggesting that technical solutions are immaterial. There are various areas where improved practice may be possible, either through sharing current experience from some countries or through development through research.

Some suggested areas are listed here. They are discussed briefly in Annex 3.

- Optical Character Recognition (OCR) for data entry
- Geographic Information Systems (GISs) to support planning provision
- Decentralising data processing
- Auditing the data
- Estimating the effect of non-response

- Improving response rates from private schools
- School sampling

3d. References to documents and websites for detailed information

There is no one source where thinking is shared. Papers are contributed to various professional journals, but there is no central clearing house. NESIS already has the beginnings of a useful repository, though it contains little material other than its own and focuses on SSA.

Table 7: where to go for help

NESIS	<p>http://nesis.easynet.fr/</p> <p>Technical modules on all aspects of developing EMISs in Africa, relevant background information. Also an occasional assessment of EMIS development in all countries, and information on training and country assistance in the region, etc.</p>
UIS	<p>http://www.uis.unesco.org</p> <p>Currently the link to NESIS website (under Core theme – Education; projects) is the main relevant link. In future though, there could be more information on NESIS in other regions (Asia and Latin America) as the programme is expanded globally, as well as other Statistical Capacity Building activities as and when UIS develops them.</p>
IIEP	<p>http://www.unesco.org/iiep/</p> <p>All IIEP publications, news on IIEP training and support to individual countries.</p>
IMF's GDDS Metadata	<p>http://dsbb.imf.org/Applications/web/gdds/gddscategorycountrypage/?strcat=EDUC0&strcatname=Education</p> <p>GDDS member states' assessment of the strengths and weaknesses of their education data sources, together with the plans to improve them. The Data Quality Assessment Framework (DQAF) for education data should also be available on this website, once it is finalised by UIS.</p>

Note: more information on these organisations is given in section 4.

Table 8: useful documents

Discussion of good practice in EMIS development, drawing on country case studies . . .	
Huan and Herstein 2003	<i>Education and Management Information System (EMIS): Integrated data and information systems and their implications in education management</i> , (paper presented at the Annual Conference of Comparative and International Education Society, New Orleans, LA, USA) by Haiyan Hua and Jon Herstein, Harvard University, Graduate School of Education, March 2003
Crouch, Enache & Supanc, 1999	<i>Education Management Information Systems: guidelines and references for putting information systems to work in education</i> , by Luis Crouch, Mircea Enache and Patrick Supanc, World Bank Education Advisory Service, June 1999
Crouch 1997	<i>Sustainable EMISs: who is accountable?</i> , by Luis Crouch, in Chapman, Mählick and Smulders (Ed.) 1997
Perry and Ratcliffe 2003	<i>EMIS Case Studies; Cambodia and The Gambia</i> , by Chris Perry and Mike Ratcliffe, 2003 – attached at Annex 2
IIEP publications on EMISs and their application to policy development	
Ross and Mählick (Ed.), 1990	<i>Planning the quality of education: the collection and use of data for informed decision-making</i> , ed. By Ross and Mählick, UNESCO IIEP, Paris 1990
Ross and Mählick (Ed.), 1993	<i>From data to action: information systems in educational planning</i> , ed. By Ross and Mählick, UNESCO IIEP, Paris 1993
Chapman, Mählick and Smulders (Ed.), 1997	<i>From planning to action: government initiatives for improving school-level practice</i> , ed. by Chapman, Mählick and Smulders, UNESCO 1997, ISBN 92-803-1163-8
McMahon 1993	<i>An efficiency-based management information system</i> , by Walter McMahon, UNESCO IIEP, 1993
Mendelsohn 1996	<i>Education Planning and Management, and the use of Geographical Information Systems</i> , by John M. Mendelsohn, UNESCO IIEP, 1996
Advice on using sources of data <i>other than</i> EMISs for education analysis	
FASAF, etc. 2002	<i>Guide to the analysis and use of household survey and census education data</i> , FASAF [Network on family and schooling in Africa], UNESCO, UNICEF, USAID, ORC Macro, May 2002, published by UIS, Montreal

4 Overview of donors and agencies

There has been a good deal of international co-operation to support EMIS development, and this is continuing.

4a. Regional and global co-operation

IIEP (International Institute for Education Planning)

UNESCO's IIEP has had a leading role in supporting national EMIS development. Apart from some elements of direct capacity-building co-operation with some countries, IIEP has supported EMISs through publications and training.

The IIEP publications tabulated in Table 8, p16 contain a good deal of useful information for education planners and EMIS developers. However, there is much that is left unsaid, especially in the area of practical guidance: certainly none of them is intended to be a handbook. Also, there has been nothing published in the last five or six years.

IIEP trains many education planners, chiefly through its Advanced Training Programme, which includes training on EMISs. The nature of the training material is not clear: there is nothing on the Institute's website.

The Institute's *Medium Term Plan 2002 – 2007* (available on its website) allows for direct country collaboration to continue. Intriguingly the activity is placed in the Research section, though it is unclear whether there are any intentions for conceptual or methodological development.

UIS (UNESCO Institute for Statistics)

UNESCO's Institute for Statistics also has a brief for supporting capacity-building in education statistics, as set out in its *Medium Term Strategy 2002 – 2007* (available on its website). This is a new function that its predecessor, the Statistics Department, did not have. UIS has begun to attract funding (there is no core funding) and grow into this new role. At present there are two main elements.

First, EU is providing UIS with 3.5m € over three years to support SIS³ development in 11 countries⁴. The approach is to provide technical assistance initially on diagnosis and later on methods and systems. The level of funding is

³ UIS always refers to Statistical Information Systems rather than EMISs, though it is not clear whether this makes a substantive difference.

⁴ Ethiopia, Ghana, Tanzania, Uganda, Guinea, Mauritania, Niger, Bangladesh, Pakistan, Vietnam and Honduras. EU and UIS are negotiating the extension of the project to other countries.

not sufficient to cover the main costs of implementing any action plans such as training and equipment beyond UIS inputs (except in pilot countries).

Second, the UIS is the coordinating agency for the WGES and hence NESIS (see below). The Institute contributes three staff to the programme, and is responsible for the scientific direction of the WGES.

The regional workshops that UIS has run to improve communications with countries in regions may also develop a training element in future.

ADEA WGES and NESIS

The Association for the Development of Education in Africa (ADEA) established its Working Group on Education Statistics (WGES) in 1989. The NESIS (strengthening National Education Statistical Information Systems) programme began in 1992. Since then, NESIS has constituted the bulk of WGES's operations, to the extent that they are often considered synonymous.

Last year saw something of a hiatus in NESIS activities, owing to long vacancies in the key posts provided by UIS and the switch in the lead funding agency from Sweden to the Netherlands.

Some attention was devoted to considering the future organisational set-up, which may have detracted temporarily from other objectives. A key issue appears to be how facilitate the permanent collaboration through the established network of national experts which is at odds with the time-limited set-up. (Indeed, there is some thought that NESIS could be made to stand for the Network of Education Statisticians and Information Specialists to signal the shift in emphasis.)

NESIS has two nodes in the region: NESIS (Harare) for Anglophone countries and NESIS (Dakar)⁵ for Francophone ones. The two arms of the operations have not historically worked closely together though UIS is seeking to improve their collaboration.

Technical manuals have been developed, following pilot work in various countries, with the following titles:

- 'From Diagnosis to Action Plan
- Records Management
- Data Collection
- Education Indicators
- Database
- Expenditure in Education'

These manuals appear to have a low profile with their target audience, despite the fact that they contain some useful material.

⁵ SISED is the French Acronym.

ADEA WGES's Medium Term Plan 2002 – 2004 sets out the following programme areas:

- “Develop strategy to transform the WGES into a permanent form of collaboration,
- Consolidate regional coordination center and sub-regional network nodes
- Network organization of African institutions and specialists,
- Sub-regional technical working groups (pilot projects) in priority areas,
- Capacity building and training programs with African training institutions,
- Technical assistance to national implementation with agencies,
- Collaborate with EFA Regional Forum in the use of EFA indicators for EFA, SWAP, Poverty Reduction Programs, etc.
- Internet/Web facilities for MOE's statistical publications and training,
- Integration of information systems for strategic planning and management,
- Publications, information services, clearing house, exchange forum, etc.”

The plan also listed the following pilot projects as being in progress:

- “integrated core data module -- data collection, processing and analysis
- use of population census and household survey
- statistics on textbooks and learning materials
- statistical publications and information services, including Internet Web publication
- teachers and personnel information system
- training in education statistics for education journalists. “

The document listed the following new areas to be initiated:

- “methodology of assessment of HIV/AIDS impact on education
- statistical analysis, forecasting and simulations
- Non-Formal Education Statistics and Information systems
- financial statistics: school-level revenue and expenditure data
- Early Childhood Care and Education Statistics and Information systems
- School mapping for optimal location of schools/education centres
- Organizational development and management of NESIS/EMIS”

NESIS (Bangkok) and NESIS (Santiago) have recently been established to carry out similar work in Asia and Latin America respectively, though little is known about their plans.

The World Bank

The World Bank is managing a DFID-funded project to provide TA to support socio-demographic statistics – including education – in GDDS member states in

Anglophone Africa⁶. The main aim is to assist countries to implement the plans for developing statistics that they have identified in the GDDS meta-data. Only consultancy inputs are funded.

4b. Country-level co-operation

Many organisations have been involved at national and sub-national levels to develop EMISs, including the World Bank, USAID, SIDA, EU, GTZ, DFID, IIEP and French Co-operation. Of these, the Bank has been the most active. The table in Annex 1 shows their involvement in a selection of countries.

USAID

USAID has been one of the more active development partners. It is noteworthy, then, that the agency's emphasis is now moving away from trying to develop national government capacity to run EMISs. Their approach now has a greater emphasis on other types of data source, notably conducting household surveys on education, instead. In terms of EMISs, USAID is considering radical alternatives such as privatising much of the function, or establishing regional centres that could provide a service to countries. This thinking reflects a serious disenchantment with traditional approaches over the years, and the thought that the impact of HIV/AIDS on public services in many countries will make it even harder to develop sustained capacity.

USAID has established EQUIP 2, which focuses on 'educational policies, systems development and management'. Greg Loos describes this as 'a funded partnership. . . with several of our major NGO, academic and business associates, a primary focus of which is the advancement of education data (e.g., capacity, resources, research and analytic agenda, international and in-country systems development, etc), including consideration of EMIS' (personal e-mail).

The website (www.usaid.org) says this is one of three 'cooperative agreements under the umbrella heading "Educational Quality Improvement Program" (EQUIP) [that] form the basis for integrative activities in support of the development of educational quality. . . Each EQUIP award has the capacity to assist at various points in the education, training and skill development systems at the school, workplace, community, and at regional and national levels. All awards can respond to a variety of training and technical assistance needs, and to develop innovative and effective approaches and analytic tools. Research, dissemination, and networking capacity are the strengths of the EQUIP partnerships.'

⁶ Botswana, Ethiopia, Gambia, Kenya, Malawi, Namibia, Nigeria, Swaziland, Tanzania, Uganda, Zambia, Zimbabwe, Sierra Leone and Sudan working_with_Edu_Mgmt_Systms.doc 20

EMIS developments in various countries

This Annex presents a short discussion of developments in various countries. It is not intended to be comprehensive in any sense.

Africa

Nigeria takes three years after the end of the relevant school year to publish its annual abstract. Sierra Leone has not published one for many years. Neither has Kenya – except for one year when external funds were found. (While some figures are routinely published in the Central Bureau of Statistics general abstract, the coverage is limited and the document is not widely accessed by the education system.) Ghana's Abstract has recently been known to be two years out of date.

Namibia is one of the three GDDS countries that release data within the school year. However, there are concerns that the recent resignation from the public service of the two key EMIS staff threatens future operations. Zimbabwe has had one of the better-run EMISs, but again recent sudden departures by key members of staff, allied to other national difficulties, will make it hard to maintain the system as it has been.

One would expect South Africa to be better placed, with the greater level of resources at its disposal and the larger pool of relevant skills to call upon. Even here, though, at least some of the provinces have systems that are slow, weak or fragile. DFID has been supporting the EMIS in Eastern Cape as part of a SWAp for some time and has recently started a similar collaboration with Limpopo (formerly Northern Province).

More positively, Ethiopia and Mozambique have had stronger EMISs for some years now, while the EMIS in Uganda has been improving in recent years. The EMIS was developed in Ethiopia in the early 90s with support from NESIS and SIDA. According to Riddell 2002⁷, Mozambique 'has a functioning and productive planning directorate, and statistics needed for planning and policy analysis are available'.

Asia

The situation in India and Pakistan is greatly influenced by the Federal nature of their government. Different States / Provinces have developed different systems at different rates. The picture is complex, and the national EMIS is largely constrained by the slowness and weaknesses of the poorest feeder systems.

⁷ *Sector-wide approaches in education: issues for donor agencies arising from case studies of Zambia and Mozambique*, for November 2001 meeting in Lisbon of the International Working Group on Education (IWGE), by Abby Riddell, UNESCO 2002, ISBN: 92-803-1216-2

In India, it takes three years to publish national EMIS data, and there are strong concerns over data quality. DFID has been supporting EMISs as part of the DPEP programme in an increasing number of states and districts for many years, which has achieved results in terms of better, faster data. The Government has decided to extend the approach to the rest of the country.

In Pakistan, the situation – and the parallels with other countries – can be summarised by the following quote from Shoobridge 2002⁸.

‘There were other issues that were reported consistently with respect to the operation of EMIS in the provinces and districts. These included:

- A low staff retention particularly with regards to the higher technical level staff posts. The reasons reported were low promotional prospects, low recognition and low pay as compared to commensurate commercial jobs in information technology.
- A low level of management support for EMIS by senior management was reported by EMIS staff. The principal reasons were a low level of understanding by management as to the function and use of EMIS cells and EMIS data.
- A low level of support from the provinces to the districts. It was reported in some regions that EMIS staff felt that the districts were responsible for maintaining their own systems.
- A lack of sustainable indicators such as proper maintenance and support budgets and documented systems and standards. This was more severe in some provinces and districts than in others.’

The report also refers to poor response from private schools, low use of data in regions, non-functioning or unused GISs, unsustainable projects, and either the inadequacy or absence of data auditing.

There are said to have been ten EMIS systems in the Philippines in the last twenty years. This suggests that progress has been very difficult, and that co-operation efforts have been unsuccessful.

Summary of co-operating organisations and systems in use

The table below summarises known information about organisations and systems in various countries.

⁸ *A review of present status of EMIS and Education GIS in Pakistan – a summary report by the British Council for DFID and partners*, Jim Shoobridge, British Council, version 1.03, 15 October 2002

Table A1.1: Development partners and IT systems

Country	Funders	Software (and contractors)
Sub-Saharan Africa		
Botswana	None / not known	Custom-written in IMPS
Ethiopia	SIDA / NESIS	Custom-written
Ghana	World Bank	(Harvard)
The Gambia	DFID	
Kenya	World Bank	Custom-written in Access
Malawi – some districts	DFID	
Mozambique	GTZ & The Netherlands	
Nigeria	World Bank, EU	
South Africa		
- Eastern Cape Province	DFID	(IMFUNDO, Arcadis)
- Limpopo Province	USAID (formerly) & DFID (now)	OSMIS (IMFUNDO, Arcadis)
Sudan	IIEP	
Tanzania	World Bank	
Uganda	World Bank & DFID	ED*ASSIST (AED,Africon)
Zambia	NESIS (previously) & USAID (now)	ED*ASSIST (AED)
Zimbabwe	NESIS	
Others		
India – many Provinces in DPEP	DFID	Custom-written - DISE, (NIEPA, Arcadis)
Pakistan		
- nationally	UNDP, UNESCO, USAID	
- Sindh, the Northern Areas and NWFP	DFID, GTZ	British Council

EMIS Case Studies; Cambodia and The Gambia

By

Chris Perry, Education MIS and Planning Advisor; The Gambia and Cambodia

Mike Ratcliffe, Senior Policy Advisor; The Gambia and Cambodia

EMIS Case Studies; Cambodia and The Gambia

Introduction

In The Gambia, DFID supported EMIS development as part of broader sector performance planning and monitoring. In Cambodia, UNICEF/Sida support for EMIS development in the late 90's was complimented by other donor support (e.g. AsDB, EC, UNESCO) for sector performance management and monitoring. These case studies will suggest that a focus on reaching consensus with users on the primary purpose of EMIS influences EMIS design and implementation strategy.

The Gambia

As part the DFID supported Education Management Project (EMP) the main objectives of EMIS development can be summarized as follows:

- To more broadly and effectively disseminate sector performance indicators, including at central, provincial and school levels, in order to influence education sector policy development especially for personnel management and staff deployment.
- To enable decentralization of education service management through providing sufficient and appropriate information for provincial and school level managers to make proposals to senior officials on staffing and other resource allocation decisions.
- To enable greater inter-ministerial coordination and consultation on education sector planning and performance management through comprehensive EMIS including education statistics, personnel, training, financial, demographic and geographic components.

This focus on comprehensive, sector wide, performance management and monitoring rather than narrower technical and micro-planning objectives required a different EMIS design and implementation strategy. This included greater emphasis on EMIS dissemination to users external to central education planning systems including Public Service Commission, Ministry of Planning, poverty reduction strategic planning teams and public expenditure review teams. Within the Ministry of Education itself, EMIS familiarization focused on policy makers (e.g. Minister, Permanent Secretary) rather than only technical staff.

As highlighted by Russell Craig⁹, the EMIS project team decided to bypass most of the usual preparatory stages. A decision was taken at the start of the project that a computer disk containing the desired information database, together with software that would provide “user-friendly” access, should be distributed to local administrative heads within three months. It was accepted that this implied both that the content of the database would be largely determined by a small number of senior officials in limited discussions, with the consultants, and that the quality of the data, particularly in terms of completeness would initially leave much to be desired. A judgment was made that the priority should be to rapidly disseminate whatever reasonably reliable and relevant information was available centrally to local offices. The aim was deliberately to reverse the normal practice, which typically involved requesting information from those same offices.

As a result, the main outcomes of the EMIS were at the sector policy and strategy level rather than more micro planning and management, including:

- ❑ Formulation of education staff deployment and postings strategy as part of ensuring equitable access to quality basic education, including strengthened decentralise personnel management at provincial levels.
- ❑ Formulation of teacher service conditions policy and strategy including more strategic use of performance based incentives for more equitable staff deployment to underserved provinces.
- ❑ In order to implement these policies, development of staff performance appraisal systems linked to training needs assessment and planning.
- ❑ Setting up the EMIS to enable both medium-term trend analysis and annual performance assessment, which informed the PRSP and PER.

Cambodia

The difference between Cambodia and Gambia in terms of the history of EMIS development needs to be recognized. In The Gambia, there were already well-established data gathering systems in place, managed by the Planning Department. In Cambodia, EMIS systems were dislocated by the conflict in the 70's and restoration of data gathering systems were through individual department initiatives, with no effective sector wide coordination.

Reduction in the level of fragmentation only began when the Planning Department, MoEYS was established in the early 90's. This initiative was further consolidated with the formation of an EMIS unit within the Planning Department in the mid 90's. It

⁹ Personal communication: Annex 10: Disseminate First, Monitor Later, Russell Craig, 2001.

should be noted that there was significant resistance from UNICEF and UNESCO leadership to support EMIS development, in part, due to their focus on small-scale projects initiatives directly related to child development, as opposed to a broader sectoral support strategy.

However, the EFA assessment 2000 (driven by EMIS data) justified and reinforced the sense of value of UN support and also contributed to subsequent development of the medium-term Education Strategic Plan (ESP) and Education Sector Support Program (ESSP), prepared in 2001. In addition, the EMIS also reassured UNICEF/Sida and other donors to participate in a revitalized education partnership process, underpinned by reliable and timely sector performance indicators. In other words, a proven EMIS contributed in a complex way to MoEYS/donor/NGO confidence and trust building, including a willingness of some donors to provide performance based sector budget support rather than project oriented approaches (e.g. ADB, EC).

In the past four years, a strong EMIS has enabled a shift in sector planning and management processes from emergency relief planning to a sector wide approach, driven by a focus on sector performance outcomes rather than activities or inputs. Some key features of this transition include:

- Introduction of an annual education sector performance report in 2002 and 2003 including extensive trend analysis of education indicators which forms the basis of a joint annual sector performance review process and follow-up strategic negotiation by Government/MoEYS, donors and NGOs.
- Introduction of an annual poverty impact analysis of education indicators, especially access and efficiency analysis of schools in the poorest communes, based on an integration of EMIS with nationally recognized WFP poverty mapping data.
- As in The Gambia, accepting the need for information at the earliest possible opportunity (sometimes quick and dirty) and associated accuracy trade-offs, is deemed more important than less responsive information with maximum accuracy; for use in planning, decentralized programming and spending and information based school management in provinces, districts and schools e.g. priority action programs.
- Introduction of annual provincial education sector performance reports to stimulate policy and strategic dialogue at decentralized levels, through provision of key sector performance trends and indicators to provincial writing teams.
- Use of agreed sector performance targets and trends informed by EMIS as a basis for long-term EFA planning and financing.

- Recognition of the need for operational research and lessons learned from the field as part of sector performance monitoring and long-term policy and strategy development, drawing on a mixture of EMIS based quantitative analysis and more qualitative studies e.g. parental satisfaction surveys.

The evolution of the EMIS in Cambodia also has had to be responsive to sector performance monitoring priorities. For example, the current priority is to monitor access improvement based on current available EMIS data. As financial, quality and institutional performance monitoring becomes more important, existing but discreet personnel, aid, facilities, finance and student performance information systems will have to be integrated accordingly.

Lessons Learned and Forward Look

In designing EMIS support in the future, DFID program appraisal systems need to focus on the following issues:

- How can EMIS support enable longer-term national EFA strategy, planning and implementation including the Fast Track Initiative (FTI) in selected countries?
- How can EMIS support enable the growing transition from project support to sector wide approaches and what does this mean for EMIS design and implementation strategy?
- How can EMIS support enable effective growth of education partnerships and to do so, what should be the early EMIS development priorities?

In summary, EMIS design and implementation needs to be informed by and responsive to Government ambitions for sector reform and planning processes and the status of policy and strategy development. In particular, EMIS designs should not neglect the importance of timely and reliable information on both public and private provision for post-basic education, nor critical personnel, recurrent/capital and aid finance data. Early EMIS implementation with a view to ongoing refinement, driven by sector priorities, allows for faster EMIS integration and trust building, rather than pre-implementation system perfection and delayed rollout.

Chris Perry, Education MIS and Planning Advisor; The Gambia and Cambodia

Mike Ratcliffe, Senior Policy Advisor; The Gambia and Cambodia

Technical aspects where sharing experiences, or further research, could help

There are various technical aspects of EMIS work where there is the potential to improve practice. In some cases techniques being tried in some countries might usefully be extended to others, where they are successful and applicable. In other cases some further research is also required.

The first table lists areas where practice could be improved by sharing successful experiences.

Table A3.1: fruitful areas for sharing experience

Optical Character Recognition (OCR)	OCR (Optical Character Recognition) that reads handwriting for faster, more accurate form entry than traditional manual data entry: being attempted this year in provinces in South Africa and in Tanzania.
Geographic Information Systems (GISs) to support planning provision	School mapping using GIS (Geographic Information Systems, which has the potential for greater local use of EMIS data and, hence, improved data quality for all users. This is being developed in many countries, including Mozambique, Pakistan and provinces in South Africa. Mendelsohn 1996 (ref on p 20) seems to be a useful source, though the technology will have developed since the book was written.
Decentralised data processing	<p>Decentralising data processing to regional or district levels: as has been done or is being done in various countries, including South Africa, Mozambique, Ghana and Uganda, and many others are interested in moving this way.</p> <p>This is a complex area. In principle, decentralising data can improve data availability and usage at lower levels, and can improve data quality nearer the data source. However, data quality may be threatened by losing uniform central processing, and costs may rise as efficiencies of scale are lost.</p>

There are also some other areas where better practice would also lead to better EMIS performance. While there may be some good practice in countries in these areas, some conceptual developmental work and probably some trialling in pilot countries would also be necessary.

Table A3.2: fruitful areas for further research

Auditing the data	Auditing, to combat inaccuracy caused by misunderstanding and distortion in data reported by schools. Where supplied data are audited in some way (eg India [DPEP], Pakistan, Uganda) there are various ways of collecting information and different ways of applying the results. It would be very useful to identify effective and economical approaches.
Estimating the effect of non-response	Estimation to arrive at the best estimates for totals and consistent time series by allowing for non-response. Uganda is one country that provides some of the key figures on this basis.
Improving response rates from private schools	Techniques for improving response rates from private schools: South Africa claims to have some good practice to share here.
School sampling	<p>In principle collecting some EMIS information from only a sample of schools could generate cheaper and faster data for policy development. The information may even be more reliable as the quality control should be better. The main drawbacks are that the data cannot be used for administrative purposes, and are not valid at levels below national or – possibly – state / region.</p> <p>The potential will remain unrealised without guidance to assist countries in drawing samples and constructing estimates. IIEP has been doing some apparently relevant work on SAMDEM and IIEPJACK that has been used in its SACMEQ work, though it would probably need to be tailored to the EMIS environment.</p>

Acronyms

ADEA	Association for Development of Education in Africa
CWIQ	Core Welfare Indicators Questionnaire
DFID	Department for International Development
DHS	Demographic and Health Survey
DPEP	District Primary Education Programme
DQAF	Data Quality Assessment Framework
ED*ASSIST	Education Automated StatiStical Information Toolkit
EFA	Education For All
EMIS	Education Management Information System
GBS	General Budget Support
GDDS	General Data Dissemination Standard
GIS	Geographical Information System
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit
IIEP	International Institute for Education Planning
IMF	International Monteary Fund
LSMS	Living Standards Measurement Survey
MICS	Multiple Indicator Cluster Survey
NESIS	strengthening National Education Statistical Information Systems
OCR	Optical Character Recognition
OSMIS	Open School Management Information System
PRSP	Poverty Reduction Strategy Paper
SIDA	Swedish International Development Agency
SIS	Statistical Information System
SWAp	Sector Wide Approach
UIS	UNESCO Institute for Statistics
WGES	Working Group on Education Statistics

2 Transforming Education for the Next Generation A Practical Guide to Learning and Teaching with Technology. Our goal is not just to engage students. We are building their fascination, excitement, and passion, and then getting out of the way. We're always asking: Are we using all the capabilities that are at our disposal? Are we teaching differently? Professional learning will always be the most effective thing you can do to improve learning. As technology becomes essential to teaching and learning, IT has to run more like a business. Schools can't afford to squander funds, so we need to build In addition to A Practical Guide to Information Systems Strategic Planning, Cassidy has authored the following books, published by St. Lucie Press: A Practical Guide to Information Systems Process Improvement (2000), with Keith Guggenberger A Practical Guide to Planning for E-Business Success (2002) Cassidy has a BS degree from the University of Minnesota and also attended St. Cloud State University. Business management viewed the application systems and processes as critical vehicles for providing customers with a common face for the new organization. In addition, executive management wanted to obtain consistent information to manage the newly merged company as one organization. Education Management Information Systems. A Guide to Education Project Design, Evaluation, and Implementation Based on Experiences from EQUIP2 Projects in Malawi, Uganda, and Zambia. By Marcia Bernbaum, Ph.D. and Kurt Moses. EQUIP2: Educational Policy, Systems Development, and Management is one of three USAID-funded Leader with Associates Cooperative Agreements under the umbrella heading Educational Quality Improvement Program (EQUIP). Implications for USAID education officers In working with host country counterparts, invest in appropriate training and knowledge development for those who interpret information and make it available to senior and mid-level managers for use in taking important decisions.

Education Management Information System (EMIS): Integrated Data and Information Systems and Their Implications in Education Management This paper by Haiyan Hua (Harvard University) and Jon Herstein (now with the Research Triangle Institute, RTI) was presented at the Annual Conference of Comparative and International Education Society (New Orleans, LA, USA: 2003). Previously unavailable on the Internet, the authors have generously granted permission for infoDev to post this paper. The Partnership in Statistics for Development in the 21st Century (PARIS21) has posted a draft version of Robin Ellison's A practical guide to working with Education Management Information Systems: Guidance for DFID Advisers. In addition to A Practical Guide to Information Systems Strategic Planning, Cassidy has authored the following books, published by St. Lucie Press: A Practical Guide to Information Systems Process Improvement (2000), with Keith Guggenberger A Practical Guide to Planning for E-Business Success (2002) Cassidy has a BS degree from the University of Minnesota and also attended St. Cloud State University. Business management viewed the application systems and processes as critical vehicles for providing customers with a common face for the new organization. In addition, executive management wanted to obtain consistent information to manage the newly merged company as one organization. Education Management Information Systems (EMIS) Education Management Information Systems (EMIS) Education Management Information Systems (EMIS) Education Management Information Systems (EMIS). An overview. By Tegegn Nuresu Wako NESIS/UNESCO. November 2003 Harare, Zimbabwe. NESIS/UNESCO. The acronym EMIS stands for 'Education Management Information System'. It is a system designed to systematically organize information related to the management of educational development. It can also be used as a reference guide for staff working in the field of data collection, processing, analysis, and dissemination at regional and sub-regional offices of the MoE. A Practical Guide for Work-integrated Learning. Effective Practices to Enhance the Educational Quality of Structured Work Experiences Offered through Colleges and Universities. An agency of the Government of Ontario Un organisme du gouvernement de l'Ontario. Work-integrated learning is becoming increasingly popular in higher education (Smigiel, Macleod & Stephenson, 2015). The intention is for the reader to bring personal experience with work-integrated learning to the reading and interpretation of the material included in this guide, and after reflecting on previous experiences in light of the material shared in this guide, readers will be in a good position to develop an action plan to enhance further the educational quality of their structured.