

Education Management Information System: What Is It and Why Do We Not Have More of It?

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An Education Management Information System (EMIS) is a comprehensive system that bring together people, process, and technology to provide timely, cost effective, and user appropriate information to support educational management at whatever level is needed. EMIS actually contrasts with other types of information systems—notably:

- Statistical Information System (SIS): which is oriented to reporting historical data (at least a year after it is relevant) and often provides considerable detail, usually mainly at the national level, in support of specific research efforts; and
- Decision Support Information System (DSIS): which is oriented to direct support of key or future decisions within an educational system and typically requires the proper functioning of both an SIS and an EMIS—there are few effective forms of DSIS in operation now.

These distinctions are relevant because most of the educational world -- seldom known for a focus on speed and accuracy in information -- is really oriented to a Statistical Information System type approach. Very few EMISs actually operate at the multiple levels necessary for effective management of education in most countries, and very few systems actually have comprehensive DSISs that can be applied to key policy and decision points...the way they often are in the competitive private sector. As importantly, most Information Systems collect quantitative information that is often only 25-40% of a factor in major policy decisions.

What Does This Mean for Education?

Education as a sector, particularly pre-university, in most countries, is the responsibility mainly of the public sector and usually one Ministry—the Ministry of Education and Culture/Sports/Technology/Scientific Research. Even in highly decentralized systems like the U.S., the responsibility for primary and secondary education rests usually with a state or district centralized agency with prime responsibility for curriculum, standards, financing, and often provision of key items like textbooks, instructional materials, and teachers. In some instances, these agencies have only policy-making authority (they help shape the executive and legislative dialogue and set and monitor standards) and in others they have implementation responsibility. In much of the developing world, ministries and agencies still have both policy-making and implementation authority—but the implementation component is being gradually weakened through deconcentration and decentralization.

The overarching problem for education systems in most countries is that on the one hand, they have too little information, in an accessible form, for the issues they are now facing, and on the other hand, they have too much informa-

tion (excessive detail) about issues that were important at one time. Throughout the world, for education, there is often too much information on “inputs” to education (the students, teachers, and schools—even if the information is of questionable accuracy) and way too little information about critical factors like finances, use of instructional materials, and even less on the outputs and outcomes of schooling—test results, good instructional practices, effectiveness on the job or at the next level of schooling.

Who Needs What Information?

Education systems are faced with both external and internal information problems, linked to the kinds of stakeholders that they have. (See article by same author, “Information Systems for Education Management,” *TechKnowLogia*, May/June 2000). The categories below are not exact, but indicative.

External Stakeholders

External stakeholders view a Ministry or its agencies as a service group – whose mission is to provide them with needed information, advice (when requested), and policy

execution – depending upon the public mandate. In practice, political influence and the allocation of money often rule these relationships, but information continues to be important.

1. Other Ministries—particularly the Ministries of Finance and Planning:

In most developing countries, Ministries of Finance, and frequently Ministries of Planning, have become very powerful because they are the locus of central funds and the central agency through which large international donors work. Under these conditions, the Ministry of Education must become an irrefutable source of good information about the educational operations at a very detailed level and must provide an historical perspective on trends as well as policy influences.

In recent years, pressured by the International Monetary Fund, the World Bank, and several others, the concept of Unit Costing has become very popular with planning and finance groups. Unit costing means that the Ministry of Education needs to come up with: very accurate student enrollment information, very accurate total cost figures for key components of education, and some trends for both enrollment and cost components. This typically requires increasingly accurate tracking of schools, students, and teachers—factors that many ministries are actually less able to track. Hence, an integrated EMIS approach that links students and costs is increasingly important. A Ministry of Education also needs to know what this means—i.e. unit costing, and how to incorporate truly educational priorities into its use. One of the major EMIS features needed for this is the ability to do budget simulation, as well as projections. The above ministries will also require certain routine reports that are required either monthly, termly or annually.

2. Donors and Other Funders:

As international donors provide assistance to a country's education system, they require measurable progress according to targets, and accountability for the use of funds. This calls for quite detailed information, and the administrative qualities of accountability, transparency, and timeliness.

To provide donor requirements, ministries must have people, organizational structure and systems that provide program-based tracking of results (i.e. enrollments, teachers trained, textbooks distributed, or curriculum revised) by time period, and by milestone. (Use of the LogFrame approach provides an appropriate way to organize such reviews—but Ministries of Education still need to provide the raw data to make these work). Most importantly, they need sufficient control of their funds allocation. In some cases, an effective EMIS means that even a simple Project Accounting program (Quicken Books) is needed to integrate financial results.

3. Citizens:

With the rapid spread of democracy throughout the world, citizens are demanding accountability from their educational systems—and from their governments. Rather than simply accepting education as given, more and more parents are making demands on the educational system for performance, for accountability for use of resources, and for transparency. Ministries of Education have a key role in helping define what are reasonable measures for these factors, and for helping to put in place mechanisms for gathering and understanding measures of performance, accountability, and transparency.

4. Other Providers of Education:

With rising democracy, the orientation of more economies towards the market sector, and the internationalization of Non-Governmental Organizations (NGOs), other providers of education are key stakeholders in Ministries of Education. Some of these providers are religiously based, others secular, others are strictly community based, and some are schools converted from government to a government-assisted status. Frequently these other providers need registration and certification from the Ministry – most ministries are very behind in performing this function. Some providers look to the government for some portion of their funding – either of teachers, or of instructional materials, or some other part of educational supplies. Typically, those requiring the most assistance from government also provide the most frequent and reliable reporting – those that do not, frequently, do not report or even wish their operations to be well understood.

Ministries of Education, if not careful, can become only ministries of public education when they have not attended sufficiently to these other providers. In some countries, non-government education is responsible for 50-70% of all primary and secondary education, and even in countries with previously small private education sectors, they are growing. Hence, Ministries of Education need to create EMIS structures that have major incentives for reporting and for reliability, in conjunction with the non-governmental education sector. In some instances, the Ministry may need to use another trusted information group for non-governmental education information (e.g. in Zambia, the Community Schools Secretariat tracks the majority of community schools in the country).

Internal Issues

Ministries are faced with a series of internal issues that in many instances complicate response to external stakeholders. The challenge of deconcentration and decentralization of functions further complicates many of these internal issues.

The three major issues for ministries are: 1) old organizational structures that do not meet current challenges; 2) hierarchies that may not be responsive; and 3) the speed of transfer of information.

1. Organizational Structures:

Most Ministry organizations were developed during the 1950s and 1960s. Some even date back to the late 1930s. As a result, the necessary links to more modern educational integration have not taken place. In some instances, planning, rather than being no lower than the second level in a ministry, is subordinate to some other unit— or else so isolated from line responsibilities that it lacks resources. In other instances, the individual sectors like basic and secondary education are so bureaucratically isolated from one another that common issues do not get addressed. With the HIV/AIDs pandemic sweeping many countries, effective coordination with Ministries of Health and Environment has no effective entry point and therefore programs end up being established outside the regular structure.

As importantly, most countries still have “stove-pipe” structures of ministries replicating the national function at each lower level – for example, province, region, district, and in some cases zone. These “stove-pipe” structures of parallel operation – a representative of Ministry of Education, Health, Finance, Planning, Social Welfare, Labor, etc. at every level, create a great deal of duplication and require multiple infrastructure investments to support each ministry.

Some countries, recognizing the duplication and realizing the need for organized collaboration have created departments of social services combining education, health, and labor. Other countries have created government-wide data networks that allow sharing of information more readily both across and within ministries, enhancing some of the links that are artificially blocked by organizational barriers.

2. Functional Hierarchies:

One of the most compelling challenges for the public sector, and ministries of education in particular, is the new sets of skills necessary for effective operation. All public service has been slow to set aside special labor categories for those who operate computers, develop computer programs, maintain networks, and configure national communication structures. A similar situation is happening with good policy and information analysts.

Another issue is that while there are attempts to delegate decision making to lower level personnel, those officers may not have access to the information needed to make enlightened decisions in a timely manner. The information revolution, of which EMIS is a part, requires that organizations

rethink how they are organized, and what information is really needed for each position. Decision mapping is one technique to clarify what types of decisions are made and where the decision occurs. This provides some guidance on how to structure access to information.

3. Timeliness of Information Transfer

There is a serious problem with the speed at which information is conveyed in most government systems. Not only does most information depend upon moving a piece of paper from one place in a country to the capital city, but also the same paper needs to be moved around various offices within a ministry or regional office. Many registries (in Anglophone countries) that are often the first recipients of paper, have become almost dysfunctional—people do not even know that paperwork has been sent forward. In other cases, traditional practices of sending all personnel paperwork care of the Permanent Secretary – even if he/she is not the decision-maker on the matter – further delay and complicate administrative action. Ministries often find themselves inundated with paper in duplicate and triplicate on matters that could have been resolved at lower levels.

The net result of much of this activity, built on old procedures, is delay. Information that is needed can, frequently, only be gotten on an emergency basis—with individual telephone calls or faxes—because the routine processing is so stalled. In other cases, paperwork is sent two or three times because of misrouting, non-delivery, or slow processing—hence actions sometimes catch themselves coming and going. Finally, because of traditional approaches, laborious letters are often used instead of forms or even machine readable inputs. The result is that more intermediate people are needed to interpret a letter, rather than a form, and more delays are introduced.

An effective EMIS can begin to change both the tools and the processes used to exchange information and to support decisions. An effective EMIS needs to address not only what information is necessary for decisions, but also who will use it, in what manner, and how that process is to be supported. Only when the entire cycle of people, process, and technology is addressed can governments expect to see real change in the speed with which information flows, and consequently an option for increasing the speed of decision-making.

A Process to Follow

Most educational establishments have some type of management information—even if it is just a blackboard outside a school listing every week enrollment by grade. Information is being provided to those who might want to use it. But a modern system needs more than this on a supported basis. As a minimum, upgrading, modernizing and seizing on new

approaches to improve education delivery using EMIS requires the following:

1. **Determine who the stakeholders are for education information.** Most systems can determine this quite quickly and there are many guides to this.
2. **Assess who needs information for what decisions.** Decision-making as the focus for defining information needs is the key to an effective EMIS—one that is appropriate in size and complexity to the current situation. Answers to this question will distinguish those who need information from those who would like to know.
3. **Determine which functions need to be supported and at what level.** With decentralization, a function like personnel recruitment may no longer be a national activity, but rather devolved to the District level. Hence, the personnel recruitment function will need support at the District level, and perhaps the sending of summary information to the national level.
4. **Assess available resources.** Assessing resources means not only financial, but also material, personnel, time, and commitment. More EMIS efforts have failed because of the unavailability of good personnel and commitment than any other cause.
5. **Set priorities (short-term, medium-term, and long-term), get some knowledgeable review and set a time-frame.** Knowing what might be needed and what is available, determines what is most important. A simple question to help set such priorities is..”What information is really needed for each position within one year.“ Make sure to allow time to get a decent review of the plan by someone who has already done it in an institution of similar size and design.
6. **Get multiple commitments.** EMIS will change the way in which people work, and will affect how they view their jobs and their work. They need to be involved at the design stage and during the subsequent stages.
7. **Get sufficient resources for people, for the process, and then for the technology.** People and process will determine the effectiveness of EMIS, not the Technology. As a result, plan on spending at least 25% of any EMIS budget on training during the initial stages, and another 15-30% on “reengineering.” Over time, training and software will be the largest costs for EMIS, not the equipment.
8. **Stay clear on the outcomes and monitor.** Make sure that the key information needed will be produced and focus on that as the outcome of the system. To do this, prototypes are often effective as a way to get a clear sense of outcomes before a full system comes into place. The key part of this stage is to keep checking and making sure that the necessary outcomes are coming. **Exhibit A** below provides one indication of how the various outcomes from an EMIS can be conceptualized.

The Challenge for EMIS

Education Management Information Systems have a technical element, but they are primarily about the use of information. Using information is a highly specific, often personal activity that affects work habits, work style, and work flows. Since information use tends to be specific, training and reengineering are a big part of making EMIS effective. Many old style information systems have ceased to work not because they became obsolete, but because the people supporting them failed to maintain them properly. EMIS will involve several things that are critical to success:

1. **Set standards for information.** As part of EMIS, information that is needed must be defined, described, and sourced.
2. **Set timing.** Information will vary simply by being gathered at a different time. If you measure enrollment in January, rather than April, the counts will be different—both accurate, but different.
3. **Define the level of possible accuracy.** Most systems (statistics, personnel, inventory, textbook, examinations), except finance, cannot report with more than 2-3% accuracy simply because of delays.
4. **Reports should be the result of daily activities not special purpose efforts.** To the extent possible, all reporting should derive from daily operational activities – not be a special, separate activity. For example, enrollment reporting should derive directly from the school registry of students.
5. **Define formats early, so that people get used to and understand how information is presented.** Formats should also set the stage so that users of information can ask multiple questions. For example, if one presents enrollment data for the nation, EMIS must be prepared to support an elaboration at the provincial, regional, district or other level—as well as provide information on trends—to allow not just a snapshot of activity—but the basis for analysis.
6. **Ensure that the providers of information quickly see the results of their work.** The quicker and closer information processing is to the source, the higher the level of accuracy and speed of correction.
7. **Measure the cost of producing information.** Most ministries produce more information than they need or can use, and no one really measures the cost. Annual surveys, as one example, can cost up to \$400,000 per administration—a high cost if only a fraction of the information is made available.

Some Simple Lessons

There are a few simple lessons surrounding EMISs that can serve as a high level guide for most ministries and their agencies. Although there will always be highly technical detail underneath these lessons, policy makers should be able to be guided by them.

1. EMIS is not working unless it is able to give guidance to three basic issues for decision-makers:
 - What is going on?
 - What caused the current situation?
 - What can be done about it?
2. For educational statistics at a District level or above, the minimum standard for information is, "This year's information, this year." Effective systems provide much more frequent updates at all levels, but the above is a minimum.

3. Put information into the hands of people who can use it—and quickly. This means that, for example, testing data should be in the hands of teachers quickly so that they can improve, not just judge. It means that if recruitment of teachers is at the District level, District officials need personnel information quickly and in useable format—not just national level staff.
4. Do not let the Perfect be the enemy of the Good. Too many overly complex, and difficult to sustain, EMIS systems have been developed because of the goal of perfection, when what the Ministry needed was a good system.

Above all, we must recall that an EMIS is a tool to make the goals of education for a nation's population a reality. In the long-term, the true test of an effective EMIS is whether it has directly fostered the accomplishment of those goals.

