

**INTER-AMERICAN DEVELOPMENT BANK**

**REGIONAL POLICY DIALOGUE**

**Education Network**

**Education Management  
Information Systems (EMIS)  
in Latin America and the Caribbean  
Lessons and Challenges**

**Thomas Cassidy**



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REGIONAL POLICY DIALOGUE**

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# **Education Management Information Systems (EMIS) in Latin America and the Caribbean: Lessons and Challenges**

***Thomas Cassidy<sup>1</sup>***

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August 2006**

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Further, the views and interpretations in this document are ours, and should not be attributed to the Inter-American Development Bank, or to any individual acting on its behalf.

Cover: Shell-shaped pendant belonging to the Quimbaya prehispanic Society.  
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## INTER-AMERICAN DEVELOPMENT BANK REGIONAL POLICY DIALOGUE

The Regional Policy Dialogue was established in December 1999 by the initiative of the Board of Executive Directors. The objective was to create a forum of communication within the Bank to expand and enhance dialogue among the countries in the region by sharing experiences, preparing them to face the great challenges of globalization, and generating processes for regional cooperation. The Bank identified seven areas to be included on the Dialogue and created seven specialized networks in which government officials at the Vice-Minister level from Latin America and the Caribbean, who are responsible for decision making and public policy design, participate.

- |   |   |
|---|---|
| 1) Trade and Integration;<br>2) Poverty and Social Protection Networks;<br>3) Education and Human Resources Training; | 4) Macroeconomic and Financial Policy;<br>5) Public Policy and Transparency;<br>6) Natural Disasters Management; and<br>7) Environment. |
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## Prologue

The present study, “Education Management Information Systems (EMIS) in Latin America and the Caribbean: Lessons and Challenges”, is part of a series of publications launched by the Education Network of the Regional Policy Dialogue of the Inter-American Development Bank (IADB). Far from a theoretical practice, the series is an initiative that intends to address challenging issues faced by the members of the Education Network of Regional Policy Dialogue, and to support Bank’s effort on providing state of the art technical assistance, while keeping a distinctive regional perspective on education priorities and needs in the region. This publication was discussed during the VIII Regional Policy Dialogue forum, held in November 2005 at the IADB headquarters in Washington, D.C.

Efforts to improve the quality of the data and information available to describe education systems and support decision-making have been underway throughout the region for many years. Nevertheless, most countries in Latin America and the Caribbean (LAC) are essentially developing education databases using results of school census and/or surveys that are usually published in bulky statistical yearbooks, often raw, fragmented, and with little or no analysis.

High stakes are attached to the evaluation of policy interventions, and countries need solid

and complete information systems to rely on. An information system should cover all the needs and areas of information and should also help to inform the formulation of education policies, their management and their evaluation. Finally, policy-makers and other actors in management and planning need easily understandable and interpretable data.

Governments and the international community have committed to regularly monitor the progress made in pursuit of the MDGs, and closely evaluate programs designed to narrow LAC’s gap relative to East Asia and the OECD. Such monitoring presupposes the actual existence of a reliable and complete education EMIS at country level. However, there are still many countries that do not have such information systems, and this situation has a direct effect on the ability of education ministries, or more generally education reformers, to sustain efforts in the medium to long term.

Through this publication, The Education Network of the Regional Policy Dialogue intends to contribute to a fruitful discussion among country members on informed policy-making, and inspire readers to find alternatives to gather and analyze relevant information and strengthen policy-making in the Region.



# Table of Contents

<b>CHAPTER 1:</b>	Education Management Information Systems (EMIS). . . . .	1
	in Latin America and the Caribbean:	
	Lessons and Challenges	
	Introduction . . . . .	1
	On Defining EMIS. . . . .	2
	Context . . . . .	3
	Background. . . . .	4
	The Changing Technical Environment . . . . .	5
<b>CHAPTER 2:</b>	A Brief Review of the History of EMIS Development in . . . . .	7
	Latin America and the Caribbean	
	Emerging Technologies . . . . .	10
	Lessons Learned . . . . .	11
	What are lessons of the past 15 years? . . . . .	11
	Elaboration of Selected “Lessons” . . . . .	12
	The Challenges Ahead . . . . .	16
	How to integrate data from the many data subsystems . . . . .	17
	that are in place?	
	How to capture expenditure and budget data in EMIS? . . . . .	18
	How to capture and maintain data on private schools? . . . . .	18
	Whether, or not, to develop student-record based EMIS? . . . . .	18
	How to develop skills in data use at all levels? . . . . .	19
	What role for the Internet in EMIS development? . . . . .	20
	How to manage the increasing technology choices that are . . . . .	20
	available to schools and others?	
	How to manage/control personnel issues? . . . . .	21
	How to fund sustainable EMIS development? . . . . .	21
	How to comply with emerging Freedom of Information laws. . . . .	22
	while at the same time meeting increasing demands for	
	transparency and accountability?	



	What forms Information and Communications Policies need . . . . .	22
	to take in Education Systems to facilitate EMIS development and assure compliance with wider government information and communications policies?	
<b>CHAPTER 3:</b>	Conclusion and Additional Investigations Recommended. . . . .	25
<b>Appendix 1:</b>	What is an EMIS? . . . . .	27
<b>Appendix 2:</b>	Promising examples of the use of computer-based education data . . . . .	33
	and information in countries in the region.	
	The Bogotá Story . . . . .	35
	Use of the Internet to Promote Transparency and Accountability. . . . .	36
	Argentina . . . . .	36
	Brazil . . . . .	36
	Chile . . . . .	36
	Guatemala . . . . .	37
	Mexico. . . . .	37
	School Report Cards . . . . .	38
	Brazil: Paraná, São Paulo, and Ceará. . . . .	38
	Development of Policy Briefs . . . . .	39
	Jamaica . . . . .	39
<b>Bibliography</b>	. . . . .	41

# Education Management Information Systems (EMIS) in Latin America and The Caribbean: Lessons and Challenges

## INTRODUCTION

This paper provides a brief review of the status of EMIS development in the Latin American and Caribbean Region. It includes: (i) a brief history of EMIS development efforts in the region; (ii) an outline of practical lessons learned from earlier EMIS development efforts; (iii) the identification of current and emerging challenges for developing EMIS; and (iv) the identification of promising examples of the use of better data and information to inform education policy and planning.

This document was commissioned by the IDB as a part of its continuing efforts to support the work of members of the Education Network of the Regional Policy Dialogue. This report is intended to complement the work of several earlier researchers<sup>2</sup> and respond to some specific concerns expressed by participants in discussions in earlier Regional and Sub-regional Policy Dialogue meetings. The document is intended to facilitate a continuing dialogue on how to strengthen EMIS development efforts.

The countries served by the IADB are many and varied in terms of population size, the educational profiles of the population, cultures, land mass and geographic features, governmental organization, the structure of the education system,

and available resources. Against these differences, the challenges that individual countries face have varied in terms of their efforts to develop a comprehensive, integrated EMIS. While some effort has been made to address some of the differences across countries, generally the perspective taken for this review has been more generic in terms of looking at the technical, organizational and human resource dimensions and challenges of EMIS design and development. A more detailed assessment of the needs and challenges facing specific countries is always recommended as a first step in devising an action plan.

Research for this paper was limited to: (i) the use of available EMIS project reports, assessments and plans; (ii) the author's experience working on EMIS development in the region and in other countries around the world; (iii) the experience of a number of the author's graduate students who have experience working in education in Latin America and the Caribbean; and (iv) conversations/interviews and email correspondence with a number of education professionals currently working in the region who are familiar with efforts to improve data quality and data use, and to develop comprehensive,

<sup>2</sup> See Fernandez (2005) and Cueto (2005)

integrated EMIS.<sup>3</sup> Additionally, the websites of most ministries of education in the region and many adjunct bodies were explored for evidence of EMIS activities, for EMIS plans, and for any examples of efforts to improve the quality of education data and information, its dissemination and its use. No fieldwork or site visits were made in support of this assessment.<sup>4</sup> A draft of this document was presented and the ideas, observations and conclusion discussed at a Caribbean Sub-Regional Policy Dialogue Meeting in Suriname in May 2006.

The results of the research conducted for this review are as interesting for what was not discovered, as for what was. While one hears many reports that EMIS are being developed in this or that country and one finds many references to the importance and potential of EMIS for supporting on-going reforms, there are few easily accessible, up-to-the-moment written reports or even anecdotal accounts of current EMIS activities. Much of what is available are project proposals and plans for projects that have yet to be implemented. In a number of cases, efforts to follow-up on reports of potentially interesting or promising examples of good practice led only back to such proposals and plans.

## ON DEFINING EMIS

The lack of a broadly shared understanding of what an EMIS hampered this investigation some, as it hampers EMIS development generally. There is no universally-accepted definition of EMIS in popular use throughout the region. The acronym, EMIS, means different things to different people. The annual school census conducted in all countries is typically associated with EMIS, but aside from this, people's understandings of what an EMIS is and the vision of what EMIS could be can be quite different from one country and one person to the next. For some people any effort to improve the quality of data and information is associated with EMIS. For some an EMIS is simply an updated, computer-

ized statistical information system. Others refer to any administrative, function-specific database system as an EMIS, e.g., personnel management systems, financial management systems, project monitoring systems, municipal education database systems, etc. For some EMIS is all about computers and computerization.

Lack of a standard definition, i.e., of a shared vision of what an EMIS involves, has hampered the development of comprehensive, integrated information systems in countries in the region. As Fernandez (2005) has noted, the "systems" in place in many countries are not the result of intentional design, but are rather an accumulation of largely unrelated applications, some computerized and some manual, that grew from largely unrelated project initiatives. While this is understandable in the context of the times, it is problematic for EMIS development efforts in going forward. Integrating and aligning the elements of these "non-system" systems, as Fernandez refers to them, poses a significant challenge to EMIS development. The future development of EMIS will depend largely on the successful integration of multiple kinds of data, from multiple sources within and external to the education system, and from multiple levels in the education system. Compatibility across sub-systems will be essential to effective system integration. Integra-

<sup>3</sup> The author thanks the following colleagues for sharing their thoughts, insights, and sources of information about EMIS development in the region and selected countries: Caswell Brown (Jamaica), Sergio Cardenas (Mexico), Diana Castillo-Trejo (Belize), Christian Cox (Chile), Luis Crouch (RTI), Ernesto Cuadra (WB), Max Fernandez (IDB, Guyana), Henry Forero (WB), Pedro Hepp (Chile), Kurt Moses (AED), Margarita Pena (Colombia), and Claudia Uribe (IDB, El Salvador).

<sup>4</sup> A more ambitious, field-based study on the topic, *Education Management Information Systems (EMIS): Case Studies and Lessons Learned*, is currently being conducted under the direction of by The infoDev Program at the World Bank. Results of this study are expected in 2006.

tion will only be possible if there is a shared vision for EMIS guiding development.

A broadly shared understanding and vision of EMIS, as an effort to build a comprehensive, integrated data management system, will be essential to the modification of existing applications and the development of new applications that are compatible and that will support development of comprehensive, integrated EMIS in the future. (Elaboration of a vision of EMIS that can serve as a basis for discussion and more localized and focused definitions can be found in Appendix 1.)

## CONTEXT

The context for this paper is a growing recognition that improving the quality of education for all students in countries throughout the region will require the provision of more relevant, reliable, unambiguous and timely data and information than has been the case in the past, and wide recognition that past efforts have not been as successful as they might have been. This increasing demand for data and information and the desire to improve future EMIS development efforts are driven by a number of significant recent trends in countries throughout the region, each of which challenges EMIS development in different ways:

*Changing goals and objectives.* As the goals and objectives for education throughout the region have shifted from an historical emphasis on access, expansion, maintenance and control to an emphasis on quality, development and performance, decision-makers are faced with an expanding and increasingly complex array of policy choices. Understanding these choices requires data of many more kinds, coming from multiple sources, from multiple levels and from multiple points in time. Collecting, organizing, integrating and analyzing this data will require more cooperation across divisions, departments and levels within the education system and between the education

system and other government ministries and agencies than has been the norm in the past.

*Education for All* raises concerns about equality and equity and highlights the need for increasingly disaggregated and integrated data and information with which to monitor and compare development across states, municipalities, communities, schools and subgroups of students. Collecting and managing increasing quantities of disaggregated data will require more disciplined and systematic operational procedures and practices than has been the norm in countries in the past.

*Decentralization.* As decentralized management and decision-making, and in particular increased community and parental involvement in schools become reality, the demand for access to more relevant, reliable, unambiguous and timely data at lower levels is increasing appreciably, and increasingly local education units are developing their own information systems. Assuring the development of systems that meet the needs of educators at all levels will require much more attention to the alignment and integration of subsystems across levels and the development of data and information standards than has been the practice until now.

*Civil Society.* As civil society initiatives mature, pressures are intensifying on governments to provide freedom of access to data and information on government programs, including and in particular data and information on education, and data and information on budgets and expenditures. The challenge for EMIS will be how to develop systems that are more accessible, but which are also secure enough to protect the privacy rights of individuals.

*Scarce resources.* In the face of increasingly scarce resources and debatable results from years of reform, the demand for more timely data and information to support the effective and efficient investment of resources and to hold educators

accountable for results is increasing in countries throughout the region. This demand is giving rise to calls for increased capacity for monitoring and evaluation of education projects, programs and policies; capacities which are not yet well-developed in many countries in the region.

The increasing demand for better data and information is a very promising development for EMIS. The lack of significant local demand for better data and information has often been cited, in assessments from around the world, as one critical explanation for why earlier efforts to build comprehensive, integrated EMIS have not been very successful.

## BACKGROUND

Efforts to improve the quality of the data and information available to describe education systems and support decision-making have been underway throughout the region for many years. The development of computer-based data and information management systems began in the mid-1980s with projects in many countries to computerize the annual school census conducted in many countries in the region. During the same period, efforts to computerize many of the routine administrative and management functions in ministries of education and in related adjunct bodies began, e.g., in examination units in many countries. Efforts to develop more comprehensive, integrated computer-based education management information systems (EMIS) to support the monitoring and evaluation of education system performance and the crafting of effective education policies began in some countries as early as in the late 1980s. Efforts to strengthen and extend all of these systems continued throughout the 1990s and into the new millennium.

Today there is hardly an education project underway or proposed in Latin America and the Caribbean that does not emphasize improving the quality of education data, the comput-

erization of data and information systems and changing the culture of decision-making to include a greater reliance on empirical data and information. The development of EMIS is an explicit objective in many of these projects, but many also continue to include objectives to build or strengthen computer-based systems to meet the routine administrative and management needs of a specific division or department, and in regional, district and municipal offices. More recently, efforts have begun in many countries to computerize routine administrative and management functions in regional, district municipal offices. Most recently, school-based efforts have begun in most countries in the region to computerize many of the routine operations in schools.

A lot of money, time and other resources have been invested in efforts to improve data quality, to computerize many administrative and management functions, to build EMIS and to encourage more data-driven decision making throughout the region over the past 15 years. The results of these efforts have been mixed. While there have been some notable successes in computerizing administrative-management functions in ministries, despite years of effort and considerable investment, development of comprehensive, integrated computer-based EMISs have been slower than anticipated. Data and information operations continue to be diffused across a number of divisions and departments with little coordination of operations and limited use of data and information standards. It is not uncommon to find one division or department using different software and hardware platforms as well as different data definitions and coding schemes. Further, while some operations have been computerized, many continue to be maintained manually, which further slows processing and data integration.

Not surprisingly then, many education leaders and decision makers at all levels, in most countries in the region still complain that much of the data and information that they need is not available; not available when needed; not available in formats that are useful; or, when data is



available, it is of questionable reliability, contradictory or ambiguous in comparison with other available data. Many observers continue to report that demand for data to support decision making continues to be limited, that capacity for data use is weak, and that significant examples of data-driven decision-making are rare.

EMIS development is still very much in its early stages in most countries in the region, but our review of EMIS development throughout the region reveals that the situation is not as bleak as the picture that some present. There is more and higher quality data and information on education available in countries throughout the region than there has ever been and, as noted above, the demand for better data and information is on the rise both from within the education sector itself and from societies at large. Many administrative and management functions have been computerized in ministries, state and municipal offices and even in growing numbers of schools in some countries. Many countries have well-developed computer-based examination and assessment systems.

## THE CHANGING TECHNICAL ENVIRONMENT

The technical environment for EMIS development is quite different now from what it was just a few years ago. Technical issues can still be considerable during implementation, but as a result of the development of widely-accepted international standards for information exchange, network administration, program and application development, etc. many of the technical issues that consumed earlier EMIS development efforts have largely been resolved. At the same

time, however, new issues and challenges, as well as new opportunities, are emerging. There are many more choices available to users today than there were just five years ago. The computer revolution has given way to the Information and Communications Technology (ICT) revolution. Rapidly emerging ICTs, most notably the Internet, offer a range of new possibilities, but also new challenges for data collection, analyses, access and dissemination.

However, while technical issues are important and technology has never been as promising as it is today, the technical environment is only one piece of the puzzle. Indeed from reports of MIS development from many sectors and many countries around the world going back many years, we know that an overemphasis on technical issues significantly limits MIS development. The experience of many well-intentioned people in building EMIS around the world supports this observation. EMIS development involves significant organizational, human resource and technical challenges.

There is a very long way to go before EMIS are fully developed and data-driven decision-making and management becomes the norm throughout the region. A foundation is in place, more so in some countries than others,<sup>5</sup> and the successful development and extension of EMIS over the next five-to-ten years will depend on how well countries in the region, and the international and regional bodies that assist them, use the lessons of past and how they respond to emerging challenges and opportunities.

<sup>5</sup> See Fernandez (2005), Cueto (2005)



# A Brief Review of the History of EMIS Development in Latin America and the Caribbean<sup>6</sup>

Educators have long sought improved data and information with which to manage and strengthen education. The first computers were employed in these efforts in the region in the late 60s and the 1970s with the introduction of mainframe computers in the operations of the statistical departments in a number of countries in the region. These early efforts although largely limited to improving the collection and reporting of basic education statistics, set the stage for more earnest efforts to computerize data and information systems that began in the mid-1980s when two things happened: (i) the goals of education began to shift from historic concerns about access and expansion to emerging concerns about quality and the performance of individual schools; and (ii) relatively low cost computers and easy-to-use database and statistical analysis software became widely available.

As the goals of education shifted to quality and improving the performance of individual schools and education reform initiatives spread throughout the region, the limitations of existing statistical information services were widely acknowledged and efforts to strengthen them began. In most countries work began with efforts to improve the annual schools census, the heart of all statistical information systems at the time. In parallel with these efforts, initiatives to improve

the quality of others types of data and information were also initiated in the mid-1980s, most notably efforts to improve assessment and examination systems.

By the end of the 1980s improved school census processes and much improved evaluation and assessment systems were in place in many countries in the region, but the overall data and information situation was still wanting. The quality of data available from statistical departments although improving was highly suspect; many schools did not respond to the annual school census, data was reported largely as it had always been as counts of schools, teachers and students by district or municipality; data was typically not reported at a school level; few indicators were routinely reported; data from one source could not be reconciled with data from other sources; examination results could not always be reliably linked to other data in ways to support rigorous analysis; and data was never available until long after it could have been useful for informing an-

<sup>6</sup> The IADB has commissioned a series of studies and reviews over the past two years that document in greater detail the history and current realities of data and information availability and use in member countries. See Fernandez, Cueto, Wolff, Kallan, and Tellez.

nual planning-budgeting processes. Data had improved, but not significantly, and it had little impact on the crafting of more effective and efficient education policies.

In the face of this situation, a number of countries intensified efforts to improve their annual school census and many began exploring the development of Education Management Information Systems (EMIS). Jamaica had an EMIS project that began in 1993. Among the earlier formalized EMIS efforts in the region, the objectives of this project were to strengthen the structures, the systems, and the processes that support information-based decision making, planning, and management. The project was funded by USAID. The project included the improvement and computerization of the annual school census, an effort to link the census with the examination results of the Caribbean Examination Council (CXC), extension of the computer-based system to all regional offices, training in policy analysis and planning and the development of a computer-based, school level geographic information system (GIS). The project was completed in 1996. The EMIS has been modified and strengthened since that time, but some of the innovations that were introduced did not take hold, e.g., GIS and the use of EMIS to produce policy briefs, and use of EMIS data to support policy decisions remains limited. Efforts to develop EMIS are on-going in Jamaica.

The Jamaica story is similar to others that one hears. Efforts to improve the quality of education data and information and to develop EMIS continued and grew in the region throughout the 1990s. Most of these efforts were largely led by external agents, mostly expatriates, and paid for with external funds. While the quality of data was improved and the capacity of existing statistics offices to produce more relevant, reliable and timely data strengthened, actual use of data and information in support of internal system monitoring, evaluation, policy analysis, budgeting and planning remained very limited.<sup>7</sup> The need and importance of improved data and information

systems was not internalized and institutionalized in the operational cultures in ministries of education in the region. In the opinion of many external observers, this was because of a lack of capacity in the planning and policy units in ministries throughout the region. In the opinion of many internal observers, the whole business of EMIS, computer-based management, and indicator-driven decision-making were ideas kept alive by external agents—local and expatriate consultants with little appreciation of local needs.<sup>8</sup> These are not mutually exclusive explanations of the situation and both are oversimplifications. What they both do represent however is the frustration and disillusionment that was creeping into EMIS development projects as everyone came to understand that computers alone were not going to magically change anything. Changing organizational practice and culture was proving more difficult and more personal than anyone had anticipated.

In the mid-late 1990s, the situation began to change. Recognizing the limited success of earlier efforts, international and regional development agencies and NGOs began to pay more attention to the development of local knowledge and skills to use data to support decision making. The development and use of education indicators to encourage and support more data-driven decision-making and management increased throughout the region in the 1990s.<sup>9</sup>

By 1997, as the result of agreements between MERCOSUR, OREALC, and PREAL a num-

<sup>7</sup> McMeekin R:W 1998.

<sup>8</sup> Domínguez, Luis Eduardo *Threats and Options When implementing an EMIS in the Dominican Republic*. An unpublished presentation, Improving Quality in Education Systems, Harvard University, June 2002.

<sup>9</sup> Di Gropello, Emanuela Monitoring educational performance in the Caribbean / Emanuela de Gropello.p. cm.-- (World Bank working paper; no. 6. [http://www-wds.worldbank.org/servlet/WDSCContentServer/WDSP/IB/2003/08/11/000090341\\_20030811144128/Rendered/PDF/265020PAPER0WB1cational0performance.pdf](http://www-wds.worldbank.org/servlet/WDSCContentServer/WDSP/IB/2003/08/11/000090341_20030811144128/Rendered/PDF/265020PAPER0WB1cational0performance.pdf)

ber of countries, including Argentina, Brazil, Chile, Paraguay and Uruguay were producing education indicators for monitoring system performance and to facilitate comparative assessments with other countries in the region.

In 1997, the Heads of State of all the Caricom countries met in Jamaica where they approved an EFA Caribbean Plan of Action for 2000–2015. This plan included a call for the development of a common set of indicators for monitoring development of education systems in member states and the development of compatible EMISs in each country in the sub-region.

At the Second Summit of the Americas in 1998, a Regional Education Indicators Project (PRIE) was established. PRIE was a cooperative agreement of the Ministry of Education of Chile and OREALC, UNESCO's Regional Office for Education in Latin America and the Caribbean. The objectives of this project were to: (i) construct a basic set of comparable education indicators for the Americas; (ii) strengthen national systems of education statistics and develop a technical cooperation program across countries; and (iii) publish the indicators and *foster their use in the design of education policies*.<sup>10</sup>

A similar initiative, Monitoring Education Reform (MER), was launched by the Education Reform Unit (OERU) of the Organization of Eastern Caribbean States (OECS) with the cooperation of educational planners from OECS member state in June of 2000. The objectives of this initiative included the development of a core set of education indicators. This initiative which was linked to National Capacity Building campaigns in each OECS country sought to strengthen the capacity of school principals to manage and use performance information in support of education reform. The initiative included the introduction and use of computer-based Performance Monitoring Tools (PMTs) to support decision making at the school level. PMTs facilitate the collection of both quantitative and qualitative data and the generation of indicators for management and decision making use at the school level.

As the decade closed, the data and information needs of regional and municipal education offices and even individual schools, which were explored in some countries earlier, began to get more significant attention.

In 1998, the Education Reform Unit (OERU) of the Organization of Eastern Caribbean States (OECS) initiated an EMIS pilot project with the objective of developing “a harmonized EMIS within the sub-region.”<sup>11</sup> The objective of this project was to test the utility of commercially-developed school-based information management tools as a strategy for building EMIS in OECS member states. The pilot was conducted in St. Lucia. The conclusion of the pilot project was that such tools do have considerable potential as a base for building a system-wide EMIS, but they stopped short of endorsing a specific tool or strategy. The OERU is continuing its efforts to develop a harmonized EMIS in the region, but using a more decentralized approach; allowing individual countries in the region to make their own choices about the strategies that are most appropriate for them, but against *a set of prescribed standards* that will insure compatibility of EMIS across the region. Work in the OECS states is ongoing.

In 2000 the Caribbean Regional Education Management Information System (CREMIS) was established with support from UNESCO as an effort to link education data systems throughout the Caribbean, promote the standardization of data and information system development and insure more timely availability of education data to support decision making and management. The OECS has set ambitious objectives for EMIS development and CREMIS in its

<sup>10</sup> See: [http://www.prie.cl/ingles/seccion/documento/panorama1\\_5.pdf](http://www.prie.cl/ingles/seccion/documento/panorama1_5.pdf)

<sup>11</sup> Report of the OECS EMIS Project: 1998–2002: Establishing a Sub-Regional Education Management Information System (EMIS). The Eastern Caribbean Education Reform Project. OECS Education Reform Unit, Castries, St. Lucia, September 2002.



2001–2010 Strategic Plan. A number of OECS countries have plans for EMIS development that are slated to begin in 2006–2008. Developments in the OECS bear watching as the level of commitment to EMIS development that is being made could yield interesting lessons for countries in the region seeking to develop “harmonized” national EMIS.

## EMERGING TECHNOLOGIES

The past five-seven years have seen some new technology-related developments with significant implications for EMIS development. Chief among these are: (i) the rapidly expanding use of the Internet; (ii) the increasing availability of commercially-developed information management tools, some claiming to be EMIS; and (iii) the growing phenomena of individual state, district and regional offices and schools pursuing development of their own, independent and semi-independent data and information management systems. Each of these will challenge EMIS development in different ways.

The Internet is already having a dramatic impact on data dissemination. Most countries in the region have committed to extending their ICT infrastructure to all parts of the country and some to extending it to include all schools. Access to the Internet is already available in all large cities and major towns in most countries. Some smaller countries in the region and some urban municipalities in some larger countries already have achieved near universal access to the Internet in schools. For all its potential, use of the Internet raises some serious issues related to access and data security. The challenge is how to provide access while at the same time protecting the integrity of databases and the privacy rights of individuals.

The emergence of increasingly powerful, easy-to-use software has made it possible for many users to develop applications for their own uses. The numbers and types of home-grown applications one encounters in ministry, state,

municipal and school offices are growing all the time. The increasing availability of commercially-developed programs and applications specifically designed to meet the needs of education managers, and in particular the needs of principals in schools, offers the promise of shortened development times and high functionality. Increasing numbers of individual schools in some countries are already using such programs. As noted above, some countries of the OECS sub-region are preparing to implement EMIS from the school-level and up using such programs. In Chile growing numbers of schools have their own systems, some self-made, but increasingly using a variety of commercially available school management systems that they purchase from private vendors.<sup>12</sup> According to one official in the ministry of education, the development of information systems in underserved regions and schools is for the most part being left to the private sector. These developments in the OECS sub-region and Chile bear watching for the lessons they may offer to other countries in how to deal with and manage the compatibility and integration issues that will surely emerge.

Portable, hand-held computing devices, commonly referred to as PDAs (personal digital assistants) are being used to facilitate data entry in information networks in some developed countries and there are reports they being pilot-tested in some countries. Cellular digital and satellite phones are already being used for data and information collection and dissemination in some countries. There is no doubt these will find their way into the efforts to extend EMIS to more rural and remote corners of the region.

Currently, in addition to the few examples mentioned above there are initiatives to build, strengthen or extend EMIS underway or planned in almost every country in the region. Colombia has been working on EMIS develop-

<sup>12</sup> Reportedly, school-based management systems are being imported from Spain and other countries by a growing number of individual schools in Chile.

ment for a number of years. Bolivia reportedly has just completed an EMIS project. Peru is developing EMIS. Suriname's Education Sector Plan includes the development of a number of sub-system applications that are to become part of its EMIS. Belize would like to develop EMIS. Guyana has been working on EMIS for several years. Guatemala is reportedly beginning an EMIS project. Mexico continues to make efforts to improve the quality of education data and information to support its national Quality Schools Initiative. Brazil is reportedly continuing work on its EMIS and extending it to its more rural states.

## LESSONS LEARNED

As already noted the record on EMIS development in Latin America and the Caribbean is mixed. There are reasons to be optimistic, but in general EMISs in the region have yet to deliver all that EMIS proponents promise. Despite the limited success of earlier efforts, there are promising examples in the region of the use of computer-based data and information leading to more effective and efficient educational services; the beginnings of more transparency in decision-making and management practices; and increased citizen participation in decision-making in education. Efforts to develop EMIS are going to continue. Indeed, EMIS initiatives are ongoing and/or planned in most every country in the region. The success of these efforts will depend on how well we have learned the lessons of the past 15 years, how we incorporate these lessons into future initiatives, and how we manage new challenges and opportunities as they present themselves.

### What are lessons of the past 15 years?

There are many important and increasingly broadly shared lessons to be taken from efforts to develop EMIS in the Latin America and the Caribbean. Lessons that are consistent with the lessons learned in countries around the world, both developed and developing.

### Lessons Learned

- EMIS design, development and maintenance have proven to be more complex, challenging, labor intensive and expensive than anyone anticipated.
- Organizational and human resource constraints are at least as significant for EMIS development as technical issues, and arguably, more so.
- Every initiative over the past 15 years has underestimated the level of professional development required to build and institutionalize EMIS and to strengthen capacities for data use.
- Sustained high level support and political will is essential.
- Broad-based involvement in system design and development is essential.
- A shared vision and clearly defined, realistic expectations are essential.
- A supply of better data is not enough to insure meaningful data use.
- Local demand for data and information *at all levels* is critical to successful development.
- The system must provide data on inputs, processes and outputs of the education system.
- Multiple strategies for data dissemination are required to serve all stakeholders.
- Assuring a supply of relevant and reliable data requires fastidious attention to many details in the supply chain from schools to ministry.
- Multiple strategies for data collection are required to assure a supply of relevant and reliable data from schools and districts often working under very different conditions.
- Insuring the timely availability of data and information is not easy.
- Integrating data and data systems across units and levels is very challenging
- Difficulties in integrating data systems are largely organizational problems.
- The building of capacities for data use is essential to successful EMIS initiatives.
- Computerization means more work for everyone over the short term.

- Lack of infrastructure and environmental factors in some localities limit the technical choices that are available.
- Some amount of staff turnover is inevitable and it slows development.

Some of these “lessons” do not require much in the way of additional explanation; others do, but for some, the more detailed information that one would like to have is not available. For example, it would be useful to know how much more expensive EMIS development typically has been from what was planned. Or, how much more effort and resources would be required to strengthen capacity for data use. Unfortunately empirical studies of these questions were not found. Below we elaborate on some of these lessons, those which may not be entirely clear to all readers.

### Elaboration of Selected “Lessons”

- *EMIS design, development and maintenance have proven to be more complex, challenging, and expensive than anyone anticipated*

Many participants in EMIS development activities and observers of these activities report that they never understood how complex, challenging and expensive EMIS development was. Efforts to improve the quality of data and information in the 1980s were sparked in part by the emergence of relatively low cost computers and increasingly easy to use software. The early belief was that rapidly developing computer technologies would lead quickly to the collection and availability of more relevant, reliable and timely data and information which would in turn lead to rapid development of education systems throughout the region. Things did not work out as planned. While the potential of the technology was/is is considerable, putting it to effective use in support of education development has proved a much more challenging task than anticipated. As it turned out putting the technology in place was relatively easy as compared to the challenges of mustering broad institutional support and partic-

ipation in a shared effort to improve data quality and getting people to use the data. It became apparent early on that EMIS development involves significantly more than computerization of existing data and information systems, and the availability of better data is no guarantee that it will be used.

Successful EMIS development is much more about organizational change and development and capacity building and human resource development than it is about technology. What has been learned is that it is important to take *a more systemic approach to EMIS* development; that it is important to balance attention to the technical issues with serious and significant efforts to build end-user skills and to address the organizational issues that have persistently constrained EMIS development.

Among the critical questions and issues that EMIS developers must attend to in a systematic way are the following:

#### *Organizational Issues*

Where should responsibility for EMIS reside? How will the system be managed? How will it be developed? How will it be maintained? How much will the system cost to develop? To maintain? How will it be funded?

Who is demanding better data and information; to address what issues and concerns? When do they need the data? What issues and concerns are priorities? What types of analyses are required to address priority issues and concerns? What data and information are needed to complete these analyses? What are the appropriate sources of the data and information that is required? What is the most effective and efficient way to collect it? What strategies and plans are there for integrating data that will come from multiple sources? What strategies should be used to disseminate data and information? In what forms and when? Who should have access to what data for what purposes?

### *Human Resources Development Issues*

What knowledge and skills are required that are not currently present—To design and build the system? To maintain the system? To modify the system? To use the system? To use the data and information generated by the system? How much professional development will be required to develop the requisite knowledge and skills? What strategies should be used to insure the building of the requisite skills?

### *Technical Issues*

What infrastructure is already in place—Is there power? Telephones and /or other communication system available? Can equipment be secured? What computer(s) and related hardware is required? How will they be used? What database and application development tools to use? What network architecture to employ? How will it be deployed? How will it be supported and maintained? What standards and protocols will be used for data access and exchange?

The answers to these questions are never as obvious as one might think and of course the answers will be context specific, i.e., they will depend on such things as the size, structure and complexity of the education system; the physical size and geographic features of the country; the available human resource capacity; the availability of financial resources to support system development; and the projected availability of financial resources to maintain it for the long haul.

To state the obvious, there is considerable variation across the countries of Latin America and the Caribbean. What is appropriate for one country may not be so for others. Each of these questions and issues, and others, must be dealt with in every EMIS development effort. Managing ones way through this maze can be daunting, particularly if one begins from a much simpler frame, but failure to map the issues at the outset and manage one's way methodically through them can seriously compromise EMIS development.

- *Every initiative over the past 15 years has underestimated the level of effort required to build and institutionalize EMIS, and to strengthen capacities for data use.*

There is little to add to this observation. We found no calculations or estimates of how much additional effort would be required, but clearly future EMIS efforts must carefully and realistically assess the professional development and training needs required to sustain EMIS.

- *Sustained high level support is essential.*
- *Broad-based involvement in system design and development is essential.*

Sustained high-level support is often cited as a key element in initiatives that seek to make significant organizational change. EMIS, once thought of as a technical intervention, is now widely understood as an organizational change intervention. It is a part of the larger efforts to shift attention to quality and performance and to replace experience—and politically-driven decision making with a culture of data-driven decision-making. Sustained high-level support sends a signal that the effort is important and central to the achievement of the larger quality and performance objectives for education development. Sustained high level support will be essential to efforts to integrated data across units and levels.

Many EMIS efforts stall during implementation as a result of a lack of cooperation and/or the indifference of critical players in the process. The development of a comprehensive, integrated computer-based EMIS requires the involvement, cooperation and participation of many people working at all levels in the education system, as well as people in other government and quasi-governmental organizations, e.g., state statistical services and examination councils. There are no shortcuts. To build and EMIS that meets the real needs of users, one must clearly understand the needs of intended users; one must carefully listen to them. To assure the smooth collection of reliable data and

information from schools and regional and municipal authorities one must involve these staff in development of the tools and processes of data collection, verification, and maintenance. To assure the timely gathering of data from other ministry divisions and from sources outside the ministry, one must know what is available, where and when. To be able to merge and integrate data from multiple sources one must have access to data definitions and database structures used by external providers. Typically, access to data from other departments and external providers requires maneuvering through a tangle of bureaucratic regulations and operational practices. External providers often want to know why the data is required and by whose authority they are required to provide it. Often access requires the development of cooperative agreements with data providers. Broad-based involvement in system design and development helps to assure the development of EMIS that meets the real needs of users and delivers data and information in a more-timely manner.

- *Lack of infrastructure and environmental factors in some localities limit the technical choices that are available.*

There is great variation across regions, municipalities and schools in terms of the communications infrastructure, the availability of secure facilities and heat and humidity. Any of these can restrict the range of possibilities for how one works such sites into the overall EMIS system and how one manages data collection and dissemination from them. For example, efforts are underway in many countries to extend and/or upgrade the communications infrastructure to all localities, but it will be years before these are available in some more rural areas. In many places security, heat and humidity are real issues. To have a computer-based system in such localities requires upgrading physical facilities and air-conditioning. It is often not feasible to buy ones way around such constraints. Despite governments' best efforts, it will not be feasible to com-

puterize operations in many rural municipalities and schools for years to come.

- *Multiple strategies for data collection are required to assure a supply of relevant and reliable data.*

Assuring the collection of reliable and timely data and information from widely diverse localities, especially in many of the larger, less-developed countries in the region will require multiple strategies for how one manages these localities as nodes in the EMIS network. Regional and municipal offices and schools vary considerably in their readiness to participant as engaged partners in a fully computerized EMIS. Plans that seek to squeeze all units into a single data collection paradigm in a short period of time will fail every time. Those responsible for EMIS must be prepared to manage several parallel data collection schemes at the same time; schemes that take account of the variation in technical infrastructure readiness and human resource capacities in regional and municipal offices and schools.

- *Multiple strategies for data dissemination are required to serve all stakeholders.*

In order to serve the needs of a very broad set of legitimate stakeholders and comply with growing mandates for accountability, transparency and freedom of access to data and information, there must be multiple strategies for data dissemination. Skills of stakeholders to understand and use data and information vary considerably, as does their access to data and information resources. Even the Internet, as promising as it may be, will not work as a sole strategy for collecting and disseminating data and information in most countries in the region, at least not for years to come. Thus, multiple, parallel strategies for data dissemination must be developed and managed to assure the informed participation of the stakeholders, to assure that the sector meets its mandated obligations, and to maximize the success of future EMIS development efforts.



- *Assuring a supply of relevant and reliable data requires fastidious attention to many details in the supply chain from schools to ministry.*

“A chain is only as strong as its weakest link.” The data supply chain from schools to the ministry is long and fragile. The threats to the quality of data are many and varied. Assuring a supply of relevant and reliable data and information from all schools requires the careful management of a set of challenges that begins with the definition of data elements and the development of good data collection instruments, but also includes: the development and delivery of effective training for data providers; the development of effective procedures for data verifications, data entry, and data merging; effective mechanisms for data maintenance and security; the development of useful reporting formats; and effective strategies for data dissemination. Careful management of the data supply chain is essential to the collection and dissemination of quality data.

- *A supply of better data is not enough to insure meaningful data use.*
- *Internal, local demand for better data is critical.*
- *The building of capacities for data use is essential to successful EMIS initiatives*

A supply of data, no matter how good the data is, is insufficient without a clearly-defined demand for the data and the capacities to analyze and interpret it. Many argue that if there is no internal, local demand for data, there is no justification for investing in EMIS. Others have argued that it is the lack of capacity to use the data that is the weakest link in the EMIS chain in the countries of Latin America and the Caribbean. This is a “chicken and egg” problem, but most agree that EMIS must be more tightly linked to the articulated data needs of specific managers and decision-makers, or to the work of a specific unit, and to complementary initiatives to build analysis, interpretation, planning and management skills. Experience suggests that it is probably not sufficient to link EMIS only to

a generalized generic need such as “to improve monitoring and evaluation,” if there is no one specifically responsible and/or championing the effort within the country.

- *Some amount of staff turnover is inevitable and slows development.*

Reports of staff turnover being a constraint to EMIS development are common. Staff turnover typically takes three forms: staff retire; staff change posts within the education sector; or staff resign, often using their newly acquired technical skills to secure more highly compensated employment in the private sector. Those responsible for EMIS development must plan for staff turnover of each of these types. It should be possible to be able to plan for and manage “turnover” due to retirement or internal changes in post, as such changes typically follow known patterns, yet very often systems seem to be caught off-guard to such changes. It is not uncommon in ministries, regional and district offices for critical staff to retire or be transferred to other posts in the education sector without much advance notice, at least notice to those responsible for EMIS development. EMIS plans must include preparations for managing and reducing such turnover. Dealing with turnover due to the unexpected departure of staff is more problematic. Understandably, many staff armed with skills and knowledge for which there is high demand in the private sector, will leave when given an opportunity. In some countries facing this particular problem staff members with advanced technical skills are compensated at somewhat higher levels than those without such skills. In going forward, ways must be found to protect the considerable investment in capacity-building that is often involved in EMIS development and is lost when critical staff leave the effort and often the education system and the public sector altogether.

- *Integrating data and data systems across units and levels is very challenging*

- *Insuring the timely availability of data and information is not easy.*

These lessons are related. The shift in the goals and objectives of education throughout the region from an historical emphasis on access and expansion, maintenance and control to an emphasis on quality, equality, equity, performance and development has had profound impacts on the work of educators at all levels with significant implications for EMIS development. When the goals of education were primarily on access and expansion the work of education leaders was very much taken up with delivering the necessary components to the school site, i.e., facilities, teachers, books and materials, etc. To accomplish the goals of access and expansion, organizational structures and processes were put in place to facilitate the delivery of the components of education to the school site. Separate divisions and units were established at the ministerial level, sometimes with subunits at the regional and district levels, each responsible for a different input, i.e., teachers, facilities, textbooks, materials, and so on. There was little, if any, formal interaction or integration across these divisions. Communication systems were hierarchical. Data collection and maintenance was largely the task of individual units. The legacy of ministries of education that were for so long focused on access, maintenance and the control of system inputs are: (i) very limited alignment of functional operations; (ii) hierarchal communications systems, and (iii) multiple, parallel and only very loosely connected systems of data collection and processing.

An emphasis on quality, equality, equity, performance and development requires significant changes in how education systems function, how they are managed, and in the kinds of data and information that education leaders and managers need to fulfill their responsibilities. Monitoring system progress against this broadened set of goals and formulating and adjusting education policies to assure successful attainment of goals and objectives requires access to much more and more detailed data and information than in the

past. It requires integrated data on inputs, outputs and processes. It requires data that permits comparative assessments of performance across levels, schools, and sub-groups of students. It requires the collection of much more disaggregated data and information than in the past. It requires collecting and gathering data from multiple sources and from multiple levels, both from within the education system and from external sources.

While the goals of education have changed significantly in recent years; most ministries have not. Bridging of the historically rigid boundaries between functional units within ministries, and between levels in the education system represents a significant challenge in many countries as boundaries are often codified in law, regulations and operational manuals, not to mention that they can be tightly woven into the organizational culture. The timely integration of data from multiple sources and multiple levels will require the development of strategies to overcome the constraints of outdated organization structures, processes and practices. Efforts to develop EMIS that do not explicitly confront and include strategies to deal with these organizational challenges always stall.

## THE CHALLENGES AHEAD

There is considerable variation across countries throughout the region in terms of the use of computers and ICT in educational administration, management and decisions-making, and in the development of computer-based EMIS. Many countries have made progress in computerizing important administrative-management functions. Most countries have significantly improved their annual school census, usually under the banner of EMIS. A number of countries have taken significant steps to make data more accessible to users. Some countries are poised to make big leaps forward in terms of EMIS development. Some are only just beginning the process.

Has as been noted above, past experience tells us that the development of EMIS requires attention to a range of organizational, human resource and technical questions and issues. At the same time, emerging societal issues and developments in the private sector, as well as continuing technical advances, place new challenges on those responsible for EMIS development.

Many of the challenges listed below are already being addressed, or at least discussed, in most countries in the region. There are, unfortunately, as yet, no clear answers or patterned strategies that will guarantee success. Each must be worked in the context of each country; all must be thoughtfully considered and managed to assure more successful EMIS efforts in the future. Much more investigation and discussion of each of these issues is required.

### *The Challenges Ahead*

- How to integrate data from the many data subsystems that are in place?
  - How to capture expenditure and budget data in EMIS?
  - How to capture and maintain data on private schools?
- Whether, or not, to develop student-record based EMIS?
- How to develop skills in data use at all levels?
- Developing appropriate uses of the Internet to support EMIS?
- How to manage the increasing technology choices that are available to schools and others?
- How to manage/control personnel issues?
  - How to motivate staff to higher levels of performance?
  - How to minimize loss of trained staff?
- How to fund sustainable EMIS development.
- How to comply with emerging Freedom of Information laws while at the same time meeting increasing demands for transparency and accountability.

- What forms Information and Communications Policies need to take in Education Systems to facilitate EMIS development and assure compliance with wider government information and communications policies.

### **How to integrate data from the many data subsystems that are in place?**

*Integration* is the most significant supply-side challenge facing those responsible for EMIS development in the region at this time. In particular, in going forward, as a minimum, efforts must focus on integrating school census data, personnel data, expenditure data and examination results. As noted in the Lessons Learned section above, most of the integration challenges have to do with organizational constraints. There is much more reliable and useful data and information available today in most countries in the region than in the past, but even in the countries considered to be leading the way in terms of EMIS development, e.g., Chile, Mexico, Argentina, Brazil, data is rarely integrated in ways that make it readily available to support monitoring and evaluation, policy analysis and planning at multiple levels. This is largely because past efforts to improve data quality were efforts designed to meet the particular, needs of specific ministry offices and adjunct organizations. As Fernandez (2005) has noted, there was little coordination across functional divisions and virtually no coordination with external bodies. Individual units frequently use their own data definitions, create their own coding systems, select their own hardware and software platforms and develop their own technical structures.

The development and maintenance of an integrated EMIS requires a high degree of coordination and collaboration at all levels in the education system, as well as with other ministries and with external agencies. This is not an easy task as organizations as complex as education systems tend to resist change. Even if one could manage to break and cross traditional organizational boundaries to gain access to data

sets there would still be a number of substantive challenges to address. In the absence of coordination, data definitions and coding schemes, as well as methods of collection, aggregation and reporting were rarely aligned. There are methods for linking data from multiple sources, but they are labor and time intensive. More timely integration of data across units will only be possible if standard definitions and coding schemes are developed and put in place across the system. The need for standards are widely discussed but efforts to develop such standards have not been very successful in the few places that have tried to implement them.

### **How to capture expenditure and budget data in EMIS?**

The lack of access to disaggregated data on educational expenditures, or even education budgets, is often cited as a major constraint to more informed dialogue on education policy. Certainly understanding the patterns of expenditures is critical to our assessments of education system performance. The limitations of past EMIS efforts to capture meaningful and detailed expenditure data has seriously limited their usefulness for policy analyses and planning. This is an issue that goes beyond EMIS, but certainly the integration of expenditure data with other elements of the EMIS must be a priority. The lack of budget transparency has been cited as a serious limitation to wider citizen participation in policy debates in countries throughout the region.<sup>13</sup> Freedom of Information legislation passed or pending in many countries promises to open access to such data. Those responsible for EMIS should be tracking this legislation and preparing to secure access to this important missing element in current EMIS if for no other reason than to adequately respond to mounting societal demands for transparency and accountability.

<sup>13</sup> Note budget transparency study

### **How to capture and maintain data on private schools?**

Monitoring the attainment of Education for All targets requires the collection and analysis of data and information on all types and forms of education. For a number of reasons, most governments in the region have not done a thorough job of collecting data from private schools and/or data on non-formal educational institutions. For their part, private schools are often not cooperative partners. As private schools come to play bigger roles in some countries in the region, EMIS in these countries must include the collection of data on private institutions, if we are to assure accurate assessments of the overall conditions and health of education systems in the region.

### **Whether, or not, to develop student-record based EMIS?**

*Concerns about equality and equity* have fueled debate in many countries around the world, including in Latin America and the Caribbean, about what the standardized units of analysis should be in a national EMIS. This issue is concerned with the types of comparisons and analyses that one wants to be able to make using data from an EMIS. Decisions about the level(s) of analysis have considerable practical implications for EMIS development and maintenance. Until recently, national averages and the capacity to do regional and district comparisons were sufficient for monitoring systems. Statistical information systems were developed to facilitate such comparisons. In the 1980s and into the 1990s, a capacity to make comparisons between schools and by student characteristics e.g., by gender, by race, by socio-economic background, etc. became desirable and systems were developed to support such analyses. The debate now in many countries is about whether, or not, to pursue the development of individual student-based EMIS. Proponents of such systems often point to the need for individual student records to monitor



the progress of all students and to support student-based financing schemes, which are emerging in a number of countries. Others question these propositions arguing that while it is true that schools need to maintain individual student records, such detail is not required at higher levels in the system. Policy analyses do not require such detail; money follows students not by name but by important characteristics; and given the movement to increasingly decentralization and local accountability, such detailed data is superfluous to the needs at higher levels. The debate is on-going, but student-based EMIS is being widely discussed and pursued in some countries in Latin American and the Caribbean, and in other countries around the world.

The implications for EMIS of a decision to build a student-based EMIS and maintain student records at the regional and national levels are considerable. The development of a student-based system is conceptually straight-forward and not particularly difficult to accomplish technically. The challenge when building and maintaining a national EMIS based on individual student records is how to manage the complexities involved with tracking and updating student records from year to year. The administrative-management demands are considerable, and beyond the capacity of most ministries at this time.

The record on student-based EMIS is mixed, but generally not good, both in the region and in other parts of the world. In Colombia for example, as noted above, while the municipality of Bogota was able to mount such a system, it has not been possible to implement such a system nationwide. Maintaining national level student-record based EMIS requires a level of administrative and management discipline that is often beyond the means of current administrative-bureaucratic-management systems. Most education administration and management systems are not disciplined enough to sustain student record-based systems for very long. Experience in other countries suggests that the decision to build an EMIS up from individual student records should be weighed carefully against existing manage-

ment capacities, administrative-bureaucratic discipline and available resources.

### **How to develop skills in data use at all levels?**

Considerable knowledge and skills are required to build, maintain and use an EMIS. A lack of available human resource capacity significantly limits EMIS development. Building human resource capacity has long been known to a critical factor in the success of EMIS development.

Limited capacity for more effective use of data in management and decision making, particularly at the municipal and school levels, is often cited by local educators and external evaluators as a critical factor limiting the development of EMIS in countries throughout the region. Several categories of knowledge and skills are often referenced as deficient: (i) knowledge and skills to lead and manage EMIS development; (ii) knowledge and skills to use technology; and (iii) knowledge and skills to use data effectively for decision making, policy analysis, planning.

As noted above, every EMIS-related initiative over the past 15 years has ended with the conclusion that the initiative was less successful than anticipated in part because insufficient attention was given to building capacity to use data. As decentralization shifts more and more responsibilities to municipalities and schools, the amount of professional development and training that will be required will increase exponentially. When and how will we address the growing need for developing higher order knowledge and skills in data use?

Given the considerable investment in the hardware-software-infrastructure associated with EMIS development, it is folly not to invest significantly more in capacity-building than has been the norm in the past. This challenge to EMIS is probably better thought of as more than an EMIS issue. Lack of knowledge and skills to use data and information is not so much limiting EMIS development as it is limiting development of the education system. Achieving the goals of



quality, equality and equity requires new knowledge and skills at all levels and in all job categories from teachers and principals to regional and national-level educators. Professional development and training must be institutionalized in the cultures of education systems throughout the region.

### **What role for the Internet in EMIS development?**

The recent rapid emergence of Information and Communications Technologies (ICT), most notably of the Internet, around the world and throughout Latin America and the Caribbean has given rise, once again, to great expectations for the improvement of education data and information through technology. Internet-based EMIS is now almost the norm in planning for EMIS. Most EMIS initiatives in the region include plans to use the Internet for some forms of data collection and dissemination. The potential of the Internet is undeniably significant. Indeed the utility of the Internet for improving data collection and, more importantly, data and information dissemination have already been demonstrated. There are impressive examples of the use of the Internet for disseminating education data, facilitating increased dialogue, and promoting transparency and accountability in a number of countries around the world, including a number in the region. However, as earlier experience taught us, the technology will not compensate for a lack of adequate user skills and knowledge, ineffective organizational processes or lack of adequate infrastructure. In most of the smaller countries of the region and maybe all of the island nations of the Caribbean, the Internet is or soon will be ubiquitous. However, in many rural and semi-rural localities in the larger countries of the region and in many poorer communities throughout the region, access to the Internet is limited and likely to remain so for some years to come. Building an EMIS, particularly in the larger countries of the region, on the assumption that computers and the Internet will be available

in all regions, municipalities and schools soon will result in failure. Reaching the margins, often the most needy populations, will require the development, integration and maintenance of multiple parallel strategies for data collection for some years to come.

### **How to manage the increasing technology choices that are available to schools and others?**

The emergence of commercially available relatively inexpensive, computer-based applications designed specifically to meet the needs of educators offers new opportunities and new challenges for EMIS. Computerized school and district level data management systems are now widely available from private sector vendors in North America and Europe. There are reports of systems being developed in the region.

The OECS completed a pilot test of the use of a school-based data management system several years ago. There were issues related to customization to meet local needs, but in general principals and other school personnel were impressed with the utility of some of the components of these systems to provide support for some of the more tedious administrative tasks in schools such as scheduling and keeping student registers. St. Lucia is reportedly preparing to implement an EMIS based on a commercially available tool. There are reportedly many schools in Chile using a variety of such tools. A packaged application from Spain is reportedly being considered for use in many Chilean schools. By some reports rural schools are being encouraged to purchase and use such tools on their own.

The opportunities that such tools offer to individual schools in some contexts are considerable. The packaged programs are relatively cost effective; they include supporting materials; and some are accompanied by telephone support.

The challenge for EMIS is how to assure compatibility of these systems with regional and national systems. The issues are not insurmountable. Protocols for data and information ex-

change are largely standardized internationally. The bigger issues will involve the standardization of data definitions and structures to assure compatibility and integration with other EMIS subsystems.

### **How to manage/control personnel issues?**

- *How to motivate staff to higher levels of performance?*
- *How to minimize loss of trained staff?*

As noted above, from experience we know that the loss of trained staff is a significant issue for EMIS development. Whether through retirement, internal reassignment or departure to the private sector, the loss of skilled personnel seriously compromises EMIS development. More recently, senior education leaders in countries throughout the region have cited a lack of motivation among staff as a serious constraint. Motivation of staff to higher levels of performance was cited as among the most critical challenges to EMIS development by senior officials at a meeting in Suriname in May 2006.

A number of efforts have been made to encourage staff with technical skills to remain in ministries in countries in the region and elsewhere. Providing incentives to staff who acquire technical skills by offering incremental salary increases has been tried in a number of countries. Jamaica tried this in the mid-1990s with mixed results.

Unfortunately, very little in the way of suggestions for how to deal with these issues was found in the reviews conducted for this paper. Few ideas/suggestions were offered in the Suriname meeting. More exploration and discussion of the personnel challenges is needed.

### **How to fund sustainable EMIS development?**

How to fund EMIS development and maintenance is no doubt the biggest challenge that faces some countries. This is an issue beyond the scope of the current review, but the Bogota example

cited in Appendix 2 suggests one strategy for how to “pay” for EMIS. While the rationale for improved EMIS is often, and justifiably argued from the perspectives of quality and equality, the use of EMIS for efficiency improvements should not be ignored. Using data and information generated by an EMIS-like data system, officials in Bogota managed to open approximately 120,000 new school places without hiring new teachers by using data in the system to significantly increase efficiency in the education system. Thus it can be argued that the “savings” made possible by the EMIS “paid” for its development. Similar, if limited examples can be cited from other countries.<sup>14</sup> The Bogota example suggests that a good strategy might be to target the use of EMIS data and information early in the process on one or more efficiency-related problems.

The donor/lending community will no doubt continue to play a critical role in moving EMIS development along in most countries in the region. Public-Private Partnerships (PPPs) are another possible and emerging source of support for EMIS development. The World Economic Forum (WEF)/UNESCO and USAID are currently exploring the use of PPPs as an approach to not only expanding ICT infrastructure in education, but also to building capacity for its use. Most of this work is currently in the Middle East, but the lessons being learned may have utility for EMIS development efforts in the LAC Region. While we did not find any specific references to PPPs and EMIS in the region, references are found to the contributions of various technology firms in some countries in support of the infrastructure for EMIS. Countries in the region would do well to track the development of PPPs in education in other parts of the world.

However, while donors and lenders continue to support EMIS and while PPPs could prove promising, if EMIS is to be sustainable govern-

<sup>14</sup> For example in Jordan where a strengthened EMIS led to considerable savings in school construction costs.

ments in the region must find ways to fund more of the development and all of the maintenance costs of EMIS in going forward. Serious thought and discussion of the longer-term funding challenges are required to assure sustainable EMIS development in the future.

**How to comply with emerging Freedom of Information laws while at the same time meeting increasing demands for transparency and accountability?**

Shifts in civil society's expectations in terms of access to information, transparency in data use, accountability standards for public officials, and the protection of the privacy rights of individuals, challenges those responsible for EMIS development in other ways. As the information environment becomes more complex, the development of clear policies and clear operational guidelines and mechanisms governing collection, management, access and dissemination of education data and information that are consistent with existing legal and regulatory statutes become critically important in such an environment.

As in many other countries around the world, many countries in Latin America and the Caribbean have already passed freedom of information laws.<sup>15</sup> Implementation of these laws is reported to be weak throughout the region at this time, but the very existence of these laws has legal implications for education leaders and managers at all levels. The passage of such laws has sparked some countries to provide greater access to education data and information. As noted above, the Internet is being used throughout the region in an effort to make data and information more readily available to a broader audience of users and the general public. Some of these efforts are more serious than others. In some countries there is resistance to the idea of providing more detailed data on education for use by the general public, particularly detailed school-level data.

<sup>15</sup> See InterAmerican Dialogue 2002.

**What forms Information and Communications Policies need to take in Education Systems to facilitate EMIS development and assure compliance with wider government information and communications policies?**

As the information revolution evolves and the information environment becomes more complex, the need for clearly articulated Information and Communications Policies and Guidelines to guide the collection, processing, dissemination and use of education data and information is being widely acknowledged throughout the region. However, little serious action has yet been taken in most countries.

The purpose of such policies and guidelines would be threefold:

- (i) To insure that the privacy rights of students, teachers, and others working in the education sector are protected;
- (ii) To facilitate the State in collecting and integrating the data and information that it requires to fulfill its legal responsibilities and obligations to provide safe and secure education and work environments and a quality education for all; and
- (iii) To facilitate the State in collecting and integrating data and information required to fulfill its obligations to provide information exchange with international bodies and associations.

In practical terms, the objectives of an Information and Communications Policy are to provide clear guidelines for education professionals and others related to:

- (i) Who has organizational authority, responsibility and accountability for collecting what data, from whom, when and for what purposes.
- (ii) Who can store and maintain what types of data and information
- (iii) Who can have access to what types of data and information and for what purposes.

- (iv) What the roles, authorities, responsibilities and accountability of teachers, principals, municipal and community education officers, and other ministry officers are in the flow of data from schools to district offices to the ministry and vice versa.
- (v) Who has the authority, responsibility and accountability for monitoring and evaluating compliance with information policy; and
- (vi) What are the sanctions for violation of information and communications policies.

These questions are of course larger than the education sector. Policies and guidelines de-

veloped for the sector will need to be consistent with broader government information and communications policies and other relevant legal and regulatory frameworks. As public demand for transparency and accountability grow, pressures can be expected to increase for greater access to education data. In the absence of well-developed broader government policies education leaders and managers are in a very vulnerable position. The development of Information and Communications Policies and Guidelines must be a priority to assure that the rules of the game are clear to all and that the needs and rights of all stakeholders are adequately provide for and protected.



## Conclusion and Additional Investigations Recommended

### CONCLUSION

The extent and results of EMIS development efforts have varied considerably throughout the region. There are some very promising examples of good practice in terms of data collection and maintenance, as well as, and more importantly, good examples of data and information presentation, dissemination and use but, overall, EMIS efforts have yet to deliver all that is needed or all of what early proponents promised. EMIS development continues to be more difficult and require much more time than anticipated. While increasingly projects tend to give more attention to human resource development, much of this effort is spent on strengthening technical skills to build and maintain and use the EMIS, not on building the skills of data analysts, evaluation specialists, education planners and others to use data more effectively in their work. Future efforts must take a more systemic approach to EMIS development. Loosely-coupled initiatives to improve data and information quality must be more tightly linked and aligned with one another via prescribed standards and protocols to assure compatibility and integration.

There are several obvious conclusions that one draws from a review of EMIS initiatives in Latin America and the Caribbean relative to how one should plan future effort to develop EMIS. When setting out to develop a comprehensive computer-

based education management information system (EMIS) one should:

- Seek, cultivate and nurture senior level support.
- Think organization—people—technology. Identify and simultaneously manage organizational, human resource and technical issues.
- Set clearly defined, realistic and cost-conscious objectives.
- Begin with a thoughtful, honest assessment of what is possible given the local context.
- Develop a phased, systemic, and integrated approach.
- Think DEMAND, then supply.
- Emphasize integration—in particular of school census, personnel, budget and examination data.
- Emphasize professional development and training to build capacities for data use at the national, municipal and school levels.
- Emphasize professional development and training to build the necessary technical capacity to sustain, strengthen and extend EMIS in the future.
- Plan for on-going maintenance and upgrading of the system.
- Develop and implement clear Information Policies and Operational Guidelines to assure more effective and efficient EMIS development and use in the future.



## **ADDITIONAL INVESTIGATIONS RECOMMENDED**

As has been noted elsewhere, not all of the information that we would like to have before planning future EMIS initiatives is available from current sources. Three areas that it would be particularly useful to know more about in going forward are: (i) How much training and professional development is required and what are the best strategies

for assuring that professional development opportunities are adequate to insure sustainable EMIS development?; (ii) What strategies have been tried elsewhere to motivate and assure the retention of EMIS staff and which strategies have worked best under which conditions?; and (iii) What are the total costs associated with EMIS and how can we assure better estimates of the total costs in going forward?

## What is an EMIS?

An Education Management Information System (EMIS) is a system for the collection, integration, processing, maintenance and dissemination of data and information to support decision making, policy-analysis and formulation, planning, monitoring and management at all levels of an education system. It is a system of people, technology, models, methods, processes, procedures, rules and regulations that function together to provide education leaders, decision makers and managers at all levels with a comprehensive, integrated set of relevant, reliable, unambiguous, and timely data and information to support them in completion of their responsibilities.

The key words in these definitions are: *relevant, reliable, unambiguous and timely; system, comprehensive, integration, all levels, and support*. By *relevant data* we mean data and information that leaders, decision makers, and managers need to fulfill their responsibilities. *Reliable data* is data that users can trust as being accurate. Data is *unambiguous* when there is no doubt about its intended meaning. *Timely* data is data that is available when, or preferably before, it is needed. A *system* is a collection of interacting, interrelated and interdependent components all of which must be present and working together to achieve the desired results. A *comprehensive* EMIS will provide access to quantitative and qualitative data; to data on inputs, processes, and outputs; and to data on students, teachers, facilities, examination results, expenditures, etc. *Integration* refers to the importance of

compatibility of data from one source with data from other sources; i.e., that data elements of one type from one source can be easily linked with data of other types from other sources. *All levels* refers to a system that serves the needs of leaders, managers and decision makers in the ministry, states, regions, municipalities and schools. *Support* suggests the service orientation of EMIS and highlights that data is only one of the factors necessary to have effective data use.

Another useful way to think about EMIS is as an early-warning and early-learning system for education leaders. That is, broadly stated, an EMIS should facilitate the timely identification of underperforming units, e.g., schools, communities, districts, and municipalities, so that decision makers can take action sooner rather than later to take remedial actions. Conversely, an EMIS should facilitate the identification of particularly well-performing units so that we can learn sooner rather than later about promising examples of good practice that may be transferable to other schools.

It is also helpful to note that an EMIS is not an administrative support system, like a personnel system or a financial management system. An EMIS is a data and information system that pulls together and integrates many types of data from multiple sources, multiple levels and multiple points in time to facilitate higher order data analyses and more thoughtful, informed decision-making and management. Administra-

tive systems are the source of much EMIS data, and thus must be developed so they are compatible with EMIS, but they typically contain lots of detailed data that is necessary for day-to-day system administration, but that is not necessary for management and decision making at higher levels.

By this definition, we cannot point to a single example of EMIS in the region or elsewhere. This definition of EMIS is really a statement of a vision of a system; a system that, if realized, would provide education leaders and decision makers with all the data and information needed to insure the development of highly effective and efficient education systems.

The six diagrams below are meant to highlight some of the important dimensions of an EMIS. Diagrams 1–3, provide an illustrative example of the demand and supply sides of an EMIS. Diagram 4 highlights the multi-type, multi-source, multi-level and multi-year nature of the data that EMIS must be capable of pulling together, managing and providing to users in the system. Diagram 5 is to emphasize that EMIS is but part of a larger policy-planning-management system; a system driven by goals and objectives and priorities. The EMIS itself is composed a number of sub-components each of which must be carefully managed to assure the delivery of relevant, reliable, unambiguous and timely data and information.

**Diagram 1**

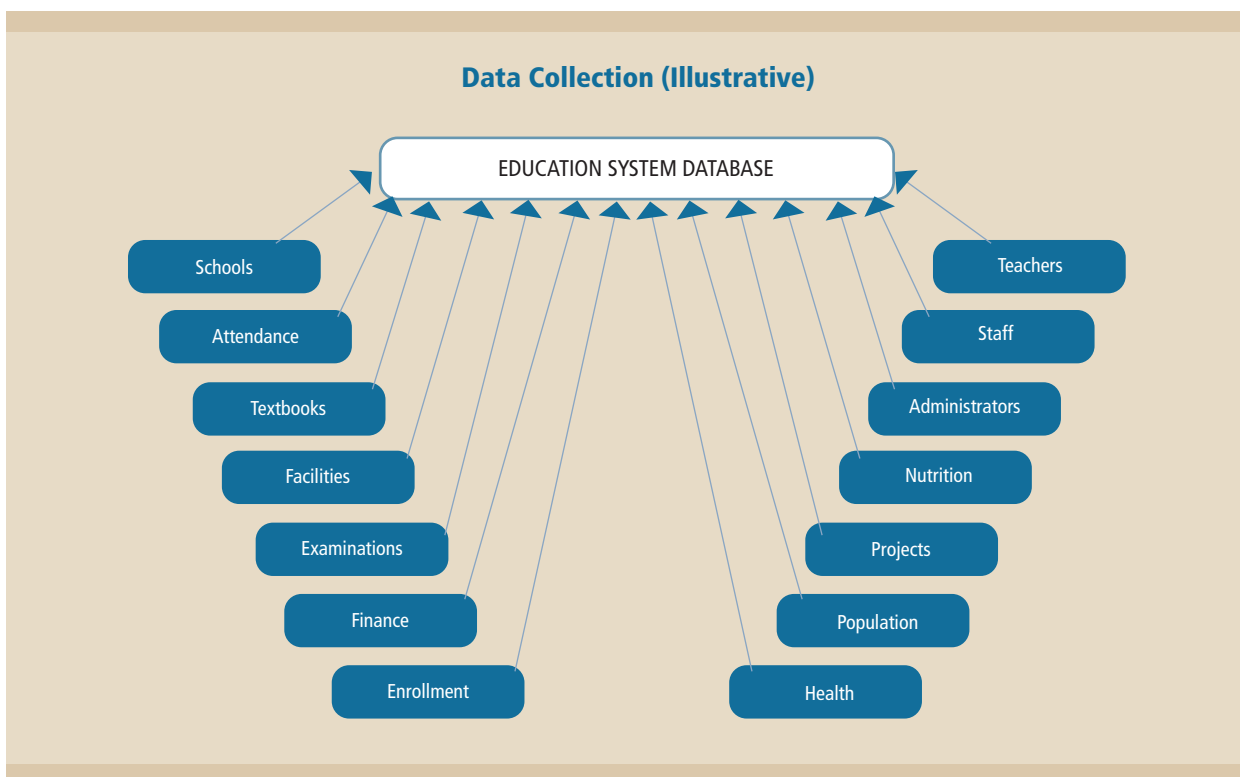


Diagram 2

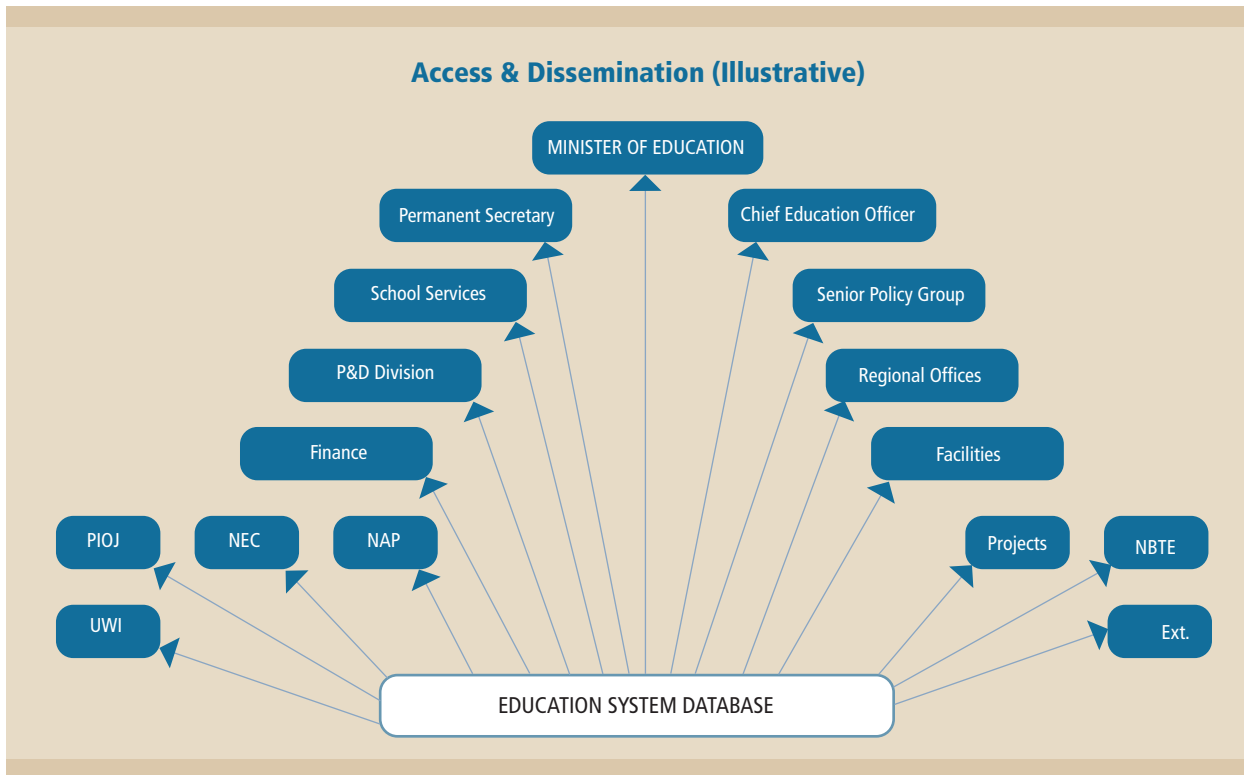


Diagram 3

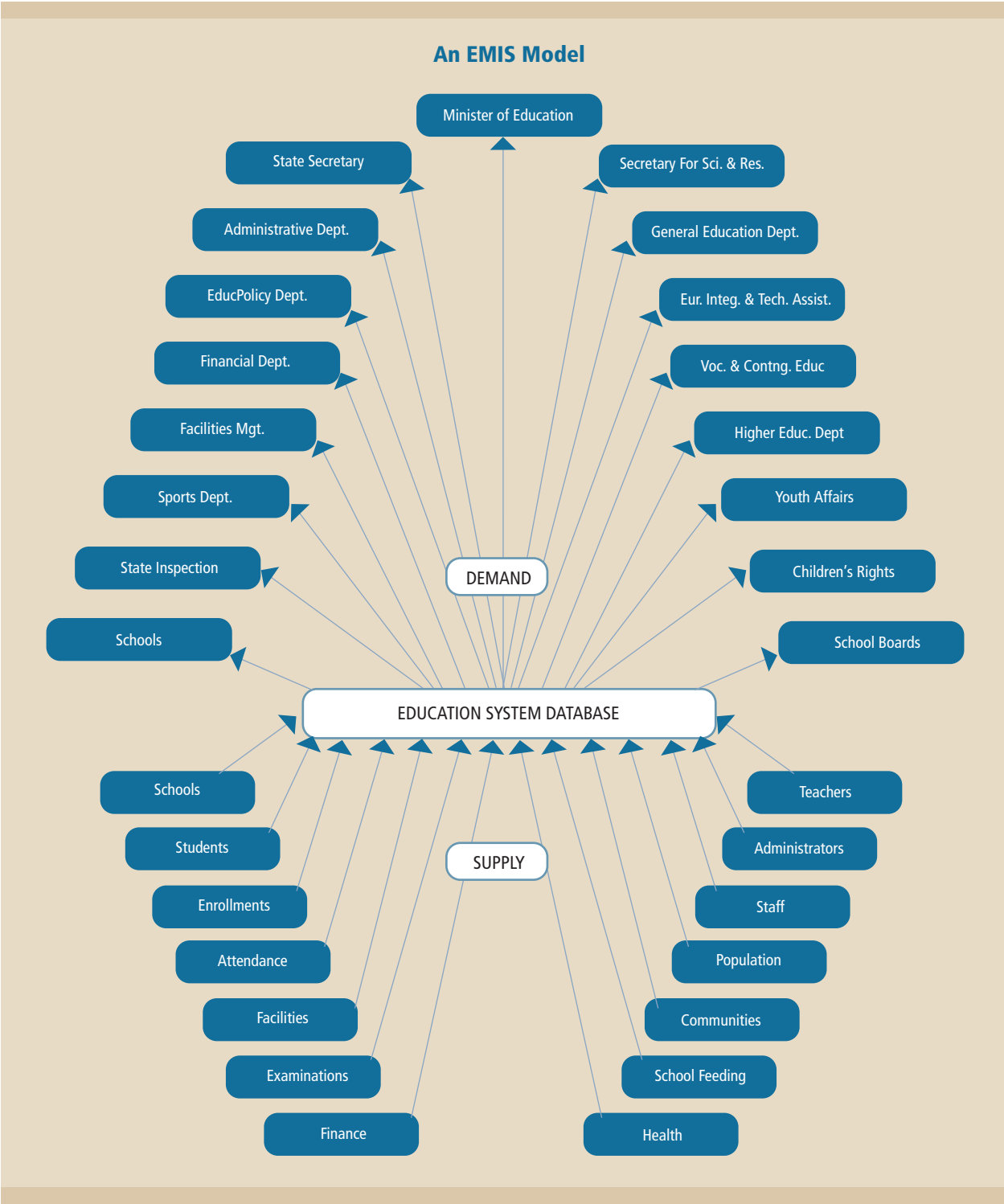


Diagram 4

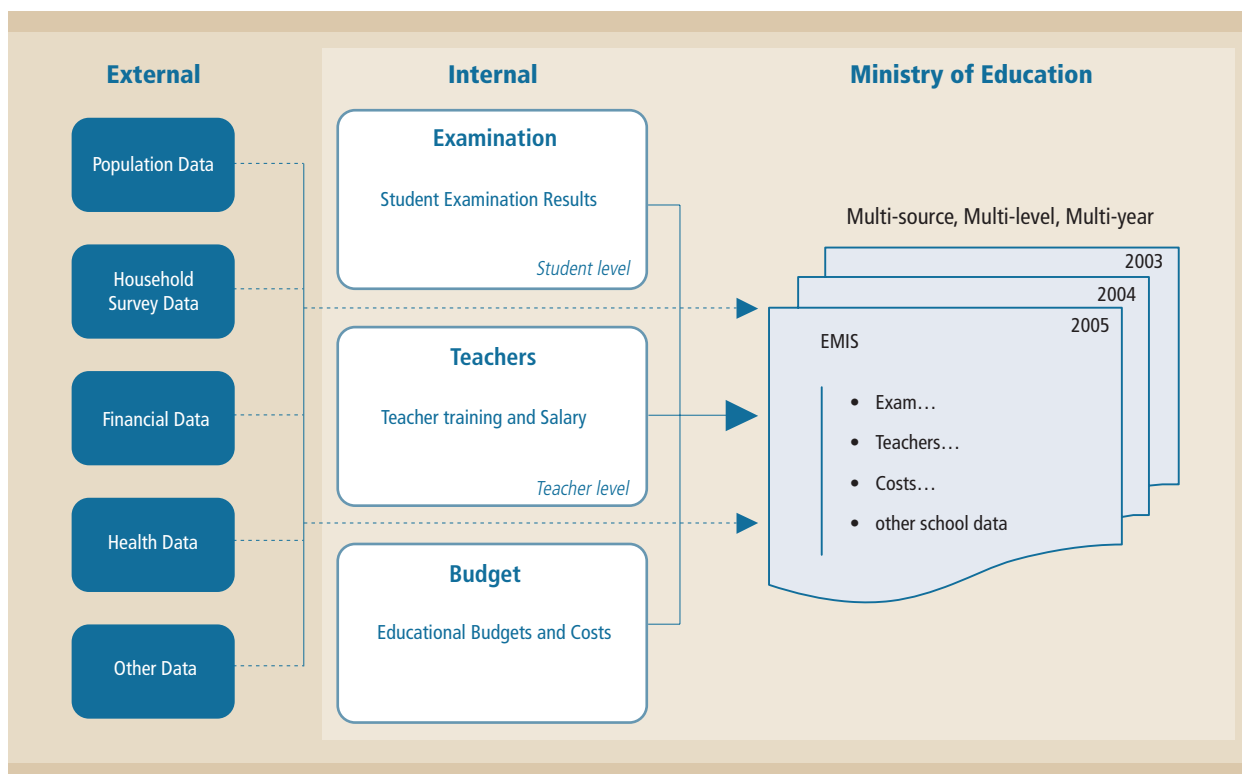
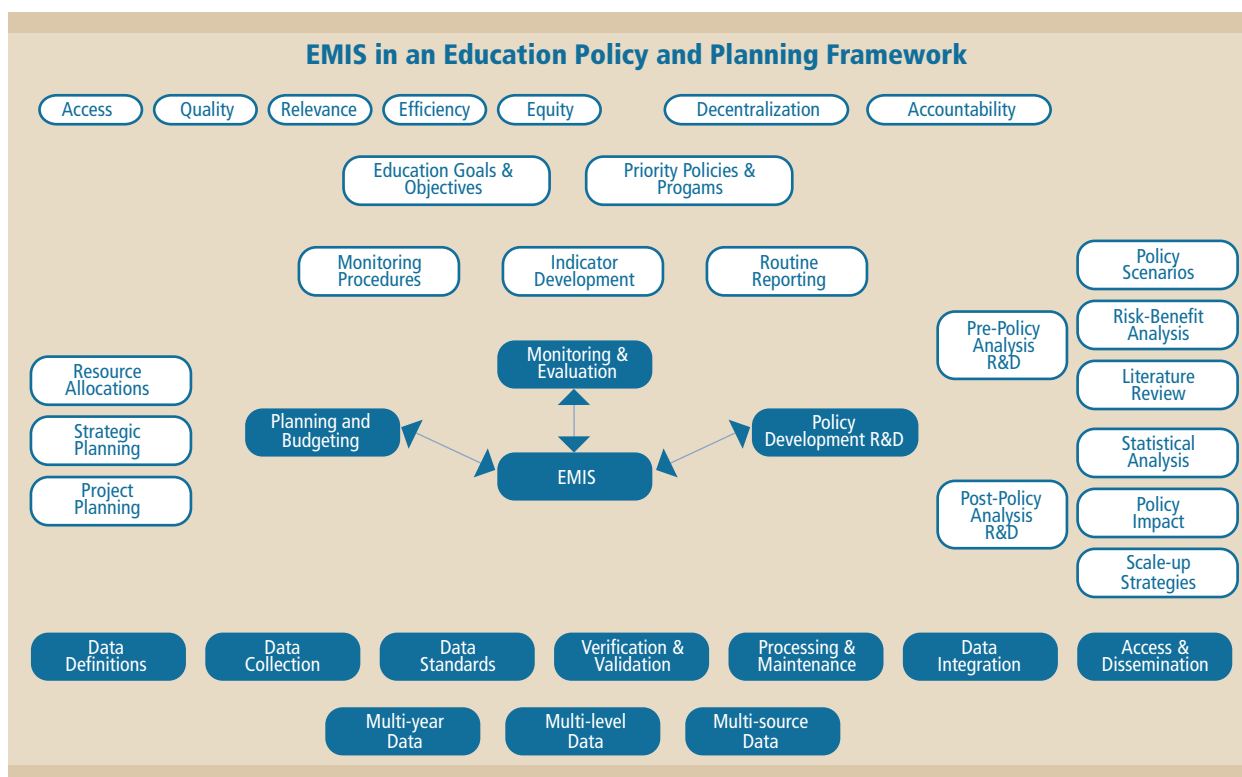


Diagram 5







## Promising examples of the use of computer-based education data and information in countries in the region.

There are promising examples of the use of computer-based education data and information systems to be found throughout Latin America and the Caribbean, but they are not easy to find. The more one probes the more hints one gets that data and information is being used increasingly for analysis and planning, but few examples have been well-documented and the stories not widely shared. Most examples one hears are related to the use of computer-based data and information in the performance of routine administrative and lower level management tasks—record keeping, report preparation, distribution of textbooks and supplies, etc.

Not all efforts to improve the quality of education data and information in the region over the past 15 years were related directly to EMIS. Parallel with efforts to develop EMIS there have been many initiatives seeking to strengthen data quality and develop computer-based data management information systems to meet the functional needs of selected administrative divisions, municipal and regional offices, and more recently schools. Although not explicitly pursued as EMIS initiatives these systems are of interest for two reasons. First, the data and information available in many administrative systems contain data and information that can be incorporated into EMIS; and the data and information

in some of these systems is vitally important to EMIS. Assessment and examination systems, for example, were largely developed as independent activities, but data and information generated by these systems must be a major element in a comprehensive EMIS. Second, many of these systems contain features that can inform EMIS development. For example, the formats used to present data or utilities for downloading data.

Examples of data use from EMIS and/or other sources for policy analysis, policy formulation and planning are not common, but they do exist. There are many examples of data being used to develop indicators and the indicators being used to compare regions, municipalities and schools, but there are few clear examples of the use of these comparisons being used to directly inform changes in policy or in the distribution of resources.

The examples below are indicative of what is taking place in the region, or has, that we could confirm. They are representative examples of promising work. There is no doubt more examples to be found than are referenced below, but even the limited examples presented below suggest there are reasons to be optimistic. Progress may be slower than we'd like, but progress is being made.

Among the examples we highlight below is the case of the Bogota municipality's collection and use of school census and student-level data to optimize the assignments of students and teachers to schools. It is hard to imagine a more persuasive example of the potential for good data to inform and support decision-making. The Bogota experience is rich in that it offers an example of the use of data to optimize resource allocation that yielded a more equitable distribution of resources and equality of opportunities for learning for students, and also an example of the power of good data when used as a part of a transparent decision making process. That good data contributed to considerable financial savings to the government makes it an even more significant example.

The potential of the Internet for increasing transparency and accountability and encouraging more active citizen participation in reform of education is observable in a number of examples from around the region. However, most current efforts to use the Internet to provide increased access to education and information fall far short of being very helpful in doing so. There are surprisingly few inspiring ministry websites in terms of significantly increasing easy access to meaningful education data and information. Many sites look wonderful, but provide very little in the way of useful data and information. Others are so cluttered with links to other sites and contain so much extraneous information that it requires great patience and time to find ones way to any useful data and information. But that said, there are promising examples of the Internet being used by a few ministries and adjunct institutions, and by some municipalities, to provide relatively easy access to useful data and information about the state of education. Most are limited to the provision of data by state, departments or municipalities, but a number of sites provide access to school-level data. In a few cases these systems provide very useful comparative analyses of performance across states, municipalities and schools. In some cases one is able to quickly and easily download numerous pre-structured

reports and data sets, some in formats that allow one to use the data and information for their own analyses.

Another noteworthy development is the growing interest in the use of *education report cards* in some countries in the region. Report cards are being used in other countries around the world, including in a number of states in the U.S. A report card provides an assessment of a school, or a municipality, or state on the basis of its performance as measured against a selection of agreed indicators. PREAL spearheaded the campaign to develop report cards in Latin America in the late 1990s. Similar, but less developed reports have been available in Chile for many years. School profiles akin to the school report cards were introduced in Jamaica in the mid-1990s. A particularly good example of the use of report cards was developed in the Brazilian State of Parana. As more and more responsibilities for education performance are decentralized, report cards could become very useful tools for assessing the performance of a school, municipality or region over time and against other similar units; and for holding officials accountable for the performance of the units for which they are responsible.

Taken together, use of the Internet and report cards are good steps in the direction of increasing transparency and promoting accountability and citizen participation—areas in which countries in the region have historically scored very poorly on international assessments.

Another promising example of the direct use of EMIS data for decision support comes from an earlier EMIS initiative in Jamaica. Using EMIS data as the foundation, analysts developed the idea of EMIS policy briefs—short focused analyses using readily available data that respond to the specific information requests of education leaders. Initially developed largely with external support, the practice did not take hold in Jamaica. However, the idea has been adopted and developed further in a number of other countries around the world.

## THE BOGOTA STORY

Use of improved data and information to optimize the assignment of students and the placement of teachers to improve quality in education in Bogota.<sup>16</sup>

Although the national government of Colombia finances education, since 1995, the Bogota municipality has managed its educational services largely autonomously. In 2003 the Bogota Secretariat Education Department (SED) served some 740,000 students in 363 public schools.

Between 1999–2003 the Bogota Municipality undertook a comprehensive modernization program. This program included commitments to: expanded coverage; improved quality; increased efficiency in the use of resources; strategic planning; and greater transparency and involvement of the public in decision making processes. The development of improved information systems and the systematic sharing of data with the public were considered essential to the process. The focus of the information system was the collection of accurate data on schools; on enrollments, including detailed data on students; and data on individual teachers. Complementary to its development of the information system, work was begun on the development of a set of indicators that could be developed to develop profiles of the current situation in school vis-à-vis enrollments, physical infrastructure and teacher availability.

The assignment of students and teachers to schools had long been a problem in Bogota. For years enrollment was largely unmanaged. Students applied to attend whichever school they wished to attend and the union largely controlled the assignment of teachers. The result was widely uneven distributions of enrollment and unequal opportunities for a quality education. Class sizes in some schools were double and triple what they were in others. The system was extremely inefficient; quality was uneven. Everyone reportedly knew the situation, but change was resisted by teachers for years. The government tried several times to address the situation, but discovered in

the process that the data systems were so bad that they could not get adequately assess the situation, nor mount a credible argument for changing the system. Thus, in the absence of good data the SED was powerless to take definitive action.

To finally tackle the problem the SED developed a multi-part strategy: (i) they developed a set of standards for student/teacher and student/class ratios; (ii) they developed a new student-based EMIS; (iii) they undertook a systematic review of the situation using data from their improved data and information systems and data from the government's payroll system; (iv) they developed an open public information and education campaign that was designed to keep all stakeholders informed of the process, the findings of the analyses, and the SED's proposals for change.

The result was that some 240,000 new school places were opened, with approximately 120,000 of these places opened as the result of efficiency gains that did not require the hiring of any new teachers.

What this example highlights is the power of good data and information when:

- There is a well-defined problem, the resolution of which demands good data.
- Data is structured to address this problem.
- There is competent data-driven analysis of the problem.
- There is political will and commitment to tackle the problem.
- There is a well-developed transparent strategy for working through the problem with all stakeholders.

The information systems used to support the optimization effort in Bogotá was student-based. As such it is only accessible to users with appropriate permission. For public use, the Bogotá SED maintains a site within its main website that is built in part with data taken from the student

<sup>16</sup> Cite Peña

database. The site includes data on population, enrollments and teachers by localities. The site also includes basic indicators for comparing localities and a utility for easy downloading of basic statistics. Historical data is available for 1997/98 to 2004, and in some cases 2005. See <http://www.sedbogota.edu.co/> (Secretariat of Bogotá Municipality) or go directly to the SED statistics site at [http://www.sedbogota.edu.co/secretaria/export/SED/seducativo/compendio\\_estadistico.html](http://www.sedbogota.edu.co/secretaria/export/SED/seducativo/compendio_estadistico.html)

## USE OF THE INTERNET TO PROMOTE TRANSPARENCY AND ACCOUNTABILITY

### Argentina

La Dirección Nacional de Información y Evaluación de la Calidad Educativa (DiNIECE)

DiNIECE's mission is to provide quality information to promote equality of access, retention, and graduation and high academic performance at each level of the education system. DiNIECE gathers and maintains a range of data and information on education in Argentina, both quantitative and qualitative. It maintains an Internet site that presents and permits one to download an extensive set of educational indicators that permit one to make comparisons by regions. See <http://www.me.gov.ar/diniece/>. The site includes detailed definitions of the presented indicators and some discussion of issues in data collection. In addition to providing access to quantitative indicators, the site contains a search utility that allows one to access a wealth of other useful information including project reports and research documents. It also includes extensive links to other data and information sources in the country and the region. There are a number of such systems to be found about the region.

DiNIECE's site also includes a way for one to find a school and some basic data through a map interface ( a Geographic Information System). This feature allows one to zero in on a school by selecting down through a series of map images until individual schools are identified. Basic

data on the school is displayed by clicking on the school's location. The data available is limited at this time, but it is good example of how a GIS works.

See <http://mapaeducativo.me.gov.ar/pages/mapas/localizacion.php>

### Brazil

In the opinion of several credible informants, Brazil has a high functioning EMIS, but much of it is not accessible to the general public. A username and password are required to access the ministry's internal restricted access portal. Reportedly, the data in the restricted access site is more up-to-date than that available via the public site and through sections of it one can access selected personal data on students and teachers.

For public use Brazil maintains an extensive collection of online quantitative data and information in a series of databases by level that are accessible via the Internet.

See <http://www.edudatabrasil.inep.gov.br/> This system permits one to drill down into the data using a well-developed and extensive set of selection criteria and produce tabular reports presented according to criteria that you select.

The ministry also maintains another link that permits one to access profiles of all schools in the country that contain basic data and selected indicators for comparing schools. See <http://www.dataescolabrasil.inep.gov.br/>

### Chile

Chile has long been cited as a leader in the development of improved education data and information systems. Its national SIMCE assessment system is often cited as a model of transparency in access to information. As early as the late 1980s, Chile had developed a system that facilitated the presentation of examination results that permitted comparisons of results by municipalities and schools. The system has developed over the years. They have been posting assessment results and comparisons on the Internet since 1995.

SIMCE still sets a standard for the region and as such is a very good example for others. See <http://www.simce.cl/> Using the SIMCE system it is possible to make some sophisticated comparison of examination results across municipalities and individual schools. The system allows one to select schools by various criteria so that comparisons can be made with other schools of similar characteristics. The system provides detailed reports that compare the performance of a given school with other schools in its community, the region and the nation. It is even possible to compare schools on the basis of the socio-economic ranking of the community it serves.

## Guatemala

<http://www.mineduc.gob.gt/> (Main Ministry Site)  
<http://www.mineduc.gob.gt/uploads/Estadisticas/>  
 (Access to education data)

The Guatemala Ministry of Education site provides very easy access to data that one can download in Excel and HTML formats for personal use. The system also includes a geographic information system format. Included is data on population by age, enrollments by age/grade, and enrollment rates. Data is available by regions, departments, and municipalities. The most recent data is for the 2004–2005 school year. The site includes access to the results of the August 2005 national examinations by department s and municipalities. Individual student results are available, but access is password protected. This site notable as an example of a system that is straight-forward, very easy to access and use.

## Mexico

A number of states in Mexico have developed and maintain there own education data and information systems. A particularly impressive example of such a site is found in the State of Aguascaliente. See [http://www.iea.gob.mx/webieagobn/sistemadeinformacion/sistemas\\_informacion.asp](http://www.iea.gob.mx/webieagobn/sistemadeinformacion/sistemas_informacion.asp)

This site provides very easy access to as complete a set of education data and information for education in the state and at the school level as is found anywhere throughout the region. It includes standard education statistics as well as examination results and six years of historical data is available. The site also includes a school mapping facility.

The Secretariat of Public Education for Mexico City maintain a very interesting site that permits comparisons and rankings of schools within its jurisdiction on the basis of performance across a number of subject areas. See <http://www.afsedf.sep.gob.mx/sime2005/index.jsp> The stated purpose of this site is to support school improvement. It is one of only a few sites identified that provide performance measures at a school level and that provides a ranking of schools. The System of Information for the Improvement of Schools allows one to compare the performance of a selected school against schools of comparable characteristics and against the ten highest performing schools in the federal territory. It provides tabular and graphic presentations with an emphasis on displays highlighting a school's range of opportunities for improvement. A helpful set of explanations is provided for each graphic presentation.

When visiting the Mexico City site it is also worth looking at the Geographic Information System that the Secretariat has developed. Although not easy to use for the uninitiated, only limited help is provided, and data provided is very limited, it is an interesting example of how a GIS works. By zooming in one eventually arrives at street maps showing school locations; by clicking on schools one can access limited information about the school.

While some cite the systems in Mexico as glowing examples of transparency and access, there is considerable debate in Mexico at this time over whether, or not, providing such open access is a good idea. Debate is intensifying over the question of who is or should be responsible when a school shows poor results. Reportedly teacher unions are not happy with the concept of total access. Some educators fear that when



parents see how poorly a school is performing, they may pull their children out. No doubt similar debates will emerge throughout the region as transparency and accountability become the norm. Careful attention to how the debate plays out in Mexico and how Mexican authorities manage this situation could be very useful to others in the region.

Also worth mentioning as a good example of an initiative seeking explicitly to build local capacity for data use is the Quality Schools Initiative in Mexico. Begun in 2001, the objectives of this initiative are to strengthen state involvement in the monitoring of schools and increase decision-making at the school level by providing feedback in the forms of quantitative and qualitative data. The feedback includes data with which schools can track their own performance over time and compare their performance with other schools. While the QSI collects some of its own data, it relies heavily on data from national and state level information sources. This initiative is notable for the emphasis it is putting on building capacity for data use at the state and local levels and pressure on education officials for access to the data they need.

## SCHOOL REPORT CARDS

### Brazil: Paraná, São Paulo, and Ceará.<sup>17</sup>

The State of Paraná, Brazil is credited with having developed what have been reported to be the best examples of the use of *school report cards* in the Region<sup>18</sup>. Report cards are used in a number of countries in the Region and around the world to monitor and report school performance in an effort to promote greater transparency, accountability and citizen participation in the oversight of education. A number of states in the U.S. use school report cards. Report cards can be developed for a state, a municipality or a school. School report cards were first introduced in the Region by PREAL (Education Reform Project for Latin America). A PREAL

report card is designed to provide an accurate representation of the situation in a school in multiple narrative and visual formats in an effort to extend access to as wide an audience as possible and in particular to make reports accessible to parents and other non-technical specialists.

The report cards developed by the education authorities in Paraná extend the PREAL approach by pulling together not only quantitative data, much of gleaned from the annual schools census, but also including qualitative data gathered from parents, students and teachers about the physical and learning environment of the school. By all accounts the Paraná Report Cards were well-received by parents and community leaders and showed significant promise as approach for improving schools. See the last pages of Sevilla & Winkler at <http://www.equip123.net/docs/e2-001.pdf> for an example of a Paraná School Report Card.

Unfortunately, Paraná's experiment with School Report Cards ended in 2002 then the secretary of education responsible for left office and her replacement chose to discontinue the effort. However the SRC idea was cited by many as one of the most promising data use and dissemination initiatives in the Region and the idea is reportedly currently being pursued elsewhere in Brazil. The Municipality of Sao Paulo is currently developing and using a form of school report cards internally. In Ceará, Brazil authorities are in the process of developing "report cards" for all municipal services including schools. There is very little publicly available information on either the Sao Paulo or Ceará experiences at this time, but development in both places bears watching.

<sup>17</sup> See Sevilla & Winkler, <http://www.equip123.net/docs/e2-001.pdf>

<sup>18</sup> See [http://www.aed.org/ToolsandPublications/upload/increasing\\_accountability\\_in\\_brazil.pdf](http://www.aed.org/ToolsandPublications/upload/increasing_accountability_in_brazil.pdf)

## DEVELOPMENT OF POLICY BRIEFS

### Jamaica

Jamaica was among the first countries in the Caribbean to pursue development of a single comprehensive EMIS. This effort took place in the 1990s. The system was school-based. The system is still in place, but in need of updating. Plans are in place to do so. Two uses of the system are particularly worth noting. First, the system was used to produce what were called school profiles. School profiles were two page presentations of selected data and information describing the situation in the school. The profiles included summary data on enrollments, the qualifications of teachers, and the condition of the facilities. The profiles also included some basic indicators including student-teacher ratios, class sizes, and male-female enrollment ratios. The objective in developing school profiles was to facilitate the sharing of school data with a wider audience of stakeholders in an effort to generate more attention and commitment to school improvement. Unfortunately, a mechanism facilitating easy sharing of profiles was not in place at the time. The Internet was not yet well-developed in Jamaica. The school profiles generated by the Jamaican EMIS were very much like the School Report Cards developed and promoted by PREAL several years later.

A second example from Jamaica with considerable promise was the use of EMIS data to support the development of a series of *policy briefs*.<sup>19</sup> A policy brief is a short focused-analysis using readily available data that responds to a specific immediate information request of an education leader. The objective was to provide system leadership with an initial assessment of a particular question or issue in a very short period of time using readily available data. Between 1994–96 the Jamaican EMIS was used as the basis for the generation of a series of 17 policy briefs. Policy briefs were developed on a broad range of topics. These are listed below as they provide a very good indication of the potential of EMIS to support a wide range of needs.

- Policy Brief 1: Teacher:Pupil Ratio in Primary and All Age Schools
- Policy Brief 2: The Qualifications of Primary and All Age Teachers
- Policy Brief 3: Student Attendance in Primary Grades
- Policy Brief 4: The WFP Nutrition Program in Primary and All Age Schools
- Policy Brief 5: Effect of Nutrition Programme on Attendance
- Policy Brief 6: Analysis of the Impact of Retirement Policy on Teaching Force
- Policy Brief 7: Pupil:Teacher Ratio in Secondary Schools
- Policy Brief 8: Analysis of Future Teacher Needs
- Policy Brief 9: The Potential Impact of Automatic Age Promotion
- Policy Brief 10: Teachers at the Secondary Level—Qualification and Offerings
- Policy Brief 11: Physical Facilities in Primary and All Age Schools.
- Policy Brief 12: Common Entrance Examinations Success: Variations by Gender, School Characteristics and Location
- Policy Brief 13: Enrollment/Attendance Data Analysis: Primary and All Age Schools
- Policy Brief 14: Attendance Rate at Primary Level: An Update
- Policy Brief 16: Accommodation in the Primary and *All Age Schools*
- Policy Brief 17: A Comparative Analysis of Students' Performance in the CXC in Three Caribbean Countries for the Period

These briefs were developed as a part of a project to build capacity for policy analysis in the ministry of education. Ministry staff were involved in the development of the briefs, but in fact, external analysts played a dominant role in their development. The practice did not take

<sup>19</sup> For more information contact Dr. Haiyan Hua at [Haiyan\\_Hua@Harvard.edu](mailto:Haiyan_Hua@Harvard.edu).

hold in Jamaica after the project ended, primarily because the project did not succeed in building sufficient capacity for policy analysis in the ministry. However, the idea of policy briefs has been adopted and developed further in a number of other countries around the world.

Of particular note, one might look to Lithuania where EMIS is being developed with an explicit connection to the ministry's Strategic Policy Unit, which has made the development of policy briefs using EMIS-generated a primary activity of the unit.

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