

# Opportunities and Challenges for EMIS Implementation in the Caribbean

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# OPPORTUNITIES AND CHALLENGES FOR **EMIS IMPLEMENTATION** IN THE CARIBBEAN

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# ABSTRACT

This report aims to identify relative strengths and weaknesses in Education Management Information Systems (EMIS) across the Caribbean region, as well as recommendations for improvement, by collating findings from analysis of EMIS implementation in three countries -Barbados (2022), Jamaica (2019), and Suriname (2019-20)- and a description of the Guyana EMIS. The analysis highlights three strengths across the countries analyzed: (i) use of annual school census as a data capturing tool; (ii) use of data and digital content for the management of students, learning, and teaching; and (iii) the availability of technological infrastructure in place to run the EMIS. It identifies challenges in: governance in terms of EMIS policy and design; various aspects of the collection, processing, storage, management, analysis and use of data; and access to the required physical infrastructure, equipment, technology, and internet connectivity. The document points to the need for an EMIS policy linked to ICT and education policies and to national objectives, a change management strategy, ongoing capacity building, and a closer collaboration between countries and with regional bodies, such as the Caribbean Examinations Council (CXC).



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## LIST OF ACRONYMS AND ABBREVIATIONS

<b>BSSEE</b>	Barbados Secondary Schools Entrance Examination
<b>CAPE</b>	Caribbean Advanced Proficiency Examination
<b>CSEC</b>	Caribbean Secondary Education Certificate
<b>CSF</b>	Community Systems Foundation
<b>CXC</b>	Caribbean Examinations Council
<b>EMIS</b>	Educational Management Information System
<b>ESMS</b>	Enterprise School Management System
<b>ESTP</b>	Education System Transformation Programme (Jamaica)
<b>FMS</b>	Facilities Management System
<b>GCE O-Level</b>	General Certificate of Education, Ordinary Level
<b>GFMS</b>	Government Finance Management Information System (Jamaica)
<b>HRM</b>	Human Resources Management System
<b>IDB</b>	Inter-American Development Bank
<b>LAC</b>	Latin America and the Caribbean
<b>LCMS</b>	Learning Content Management System
<b>LMS</b>	Learning Management System
<b>METVT</b>	Ministry of Education, Technological & Vocational Training (Barbados)
<b>MOE</b>	Ministry of Education (Guyana)
<b>MOESC</b>	Ministry of Education, Science and Culture (Suriname)
<b>MOEY</b>	Ministry of Education and Youth (Jamaica)
<b>NGSA</b>	National Grade Six Assessment (Guyana)
<b>NSRS</b>	National Student Registration System (Jamaica)the d
<b>NCERD</b>	National Centre for Educational Resource Development (Guyana)
<b>OIS</b>	Onderwijs (Education) Management Information System (Suriname)
<b>RBM</b>	Results-Based Management
<b>SIS</b>	Student Information System
<b>SMS</b>	School Management System



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# 1 INTRODUCTION

**An EMIS can be defined as ‘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 (UNESCO, 2008: 101).<sup>1</sup>**

**An [EMIS] can be defined as the set of key educational management processes required for the design, registration, generation, exploitation and dissemination of strategic online information in an integral manner in the framework of specific legal, institutional and technological infrastructure. An [EMIS] should allow a complete and efficient management of the relevant processes at all the levels of the education system (central, regional and schools themselves), incorporating new technologies (Arias Ortiz et al., 2019, in Arias Ortiz et al, 2021).<sup>2</sup>**

Education remains a key foundation for preparing learners for lifelong learning, a capacity to engage meaningfully in society, and adapt to the Fourth Industrial Revolution. Sound educational management requires conditions to respond strategically to rapid change, so that the sector serves the needs of all learners. Quality data collection and analysis are critical foundations for strategic and operational decision-making in education. A high impact EMIS that is interoperable and captures data in real time to enable analysis and decision-making is a key support for quality educational management. Quality data enables the diagnosis of needs, problems, and challenges in a system, so that they can be addressed in a purposeful way, and in a way that utilises all levels of resources prudently and efficiently. An EMIS can be used effectively to enhance communication between different stakeholders in education (such as parents/caregivers and teachers), and to ensure that resources are channelled to where they are most needed and serve strategic goals. This ties in with United Nations Sustainable Development Goal 4 (SDG 4), to ‘ensure inclusive and equitable quality education and promote lifelong learning opportunities for all’.<sup>3</sup>

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<sup>1</sup> Accessed from: <https://learningportal.iiep.unesco.org/en/glossary/educational-management-information-system-emis/>.

<sup>2</sup> *Education Management and Information Systems (SIGEDS) in Latin America and the Caribbean: the road to the digital transformation of education management* (Arias Ortiz et al., 2021).

<sup>3</sup> See: <https://www.sdg4education2030.org/the-goal/>.

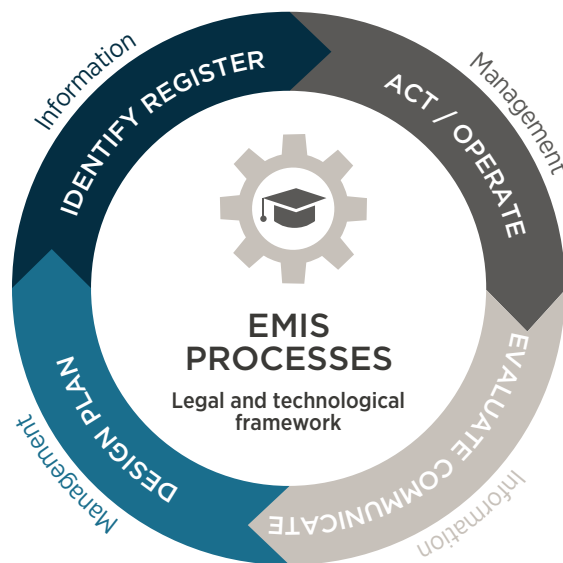


## 1.1 FEATURES OF A HIGH-IMPACT EMIS

A high-impact, functional EMIS requires financial and human resources, in addition to a cohesive, well-defined structural plan for how it connects all aspects of educational management. Data needs to be captured in real time for swift decision-making and action. In the Caribbean region, a key issue that has been revealed is that most EMIS are fragmented and contain a mix of manual data capture with various digital applications that are poorly connected, if at all. There may be more cohesive systems at the national or regional level, but at the institutional level, schools do not have the infrastructure to capture and analyse data digitally in real time. This affects all aspects of educational management, from student attendance to resource mobilisation, to managing assessment and delivering support to learners who need it.

A fit-for-purpose EMIS exists as a set of processes in a cycle that comprises planning, identifying, operating, and evaluating, with information and management as key elements in different parts of the cycle. It is located within a legal and technological context that must be reflected in the processes, as depicted in Figure 1 below.

**FIGURE 1 CYCLE OF THE EMIS PROCESSES**<sup>4</sup>



Source: Chapelet (2019).

<sup>4</sup> Analysis of the Education Management and Information System of Jamaica Diagnosis and proposal for strengthening the EMIS (Chapelet, 2019).



This report collates findings from the analysis of three Educational Management Information Systems (EMIS) in the Caribbean region – Barbados (2022), Jamaica (2019), and Suriname (2019-20),<sup>5</sup> in addition to a description of the Guyana EMIS.<sup>6</sup> The systems were analysed using an instrument developed by the Inter-American Development Bank (IDB) called *A guide towards a high impact EMIS*. It collects information through group interviews about six key management processes and two structural conditions. The six key processes are: (i) physical infrastructure and equipment; (ii) schools; (iii) human resources, budget, and finance; (iv) students and learning; (v) digital content for teacher training and students' learning; and (vi) tools for strategic management. The two structural conditions are: (i) technological infrastructure; and (ii) governance and institutional arrangements. The findings for the four countries were examined to identify relative strengths and weaknesses across the sample. In addition, findings from the IDB report *Education Management and Information Systems (SIGEDS) in Latin America and the Caribbean: the road to the digital transformation of education management* were included in the analysis<sup>7</sup>.

A summary of EMIS implementation in each country is presented in this report, along with common key strengths and weaknesses identified across the sample. Recommendations for strengthening EMIS in the Caribbean are derived from the analysis and in relation to good practice in EMIS.

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<sup>5</sup> Barbados Education Management Information System (EMIS) Diagnostic Assessment and Three-Year Implementation Final report (Butcher, 2022, Unpublished). Analysis of the Education Management and Information System of Jamaica Diagnosis and proposal for strengthening the EMIS (Chapelet, 2022); Analysis of the Education Management and Information System of Suriname - Diagnosis and proposal for strengthening (Deweese, 2020, Unpublished).

<sup>6</sup> Information for this report is taken from the Government of the Co-operative Republic of Guyana Ministry of Education's Education Management Information System (EMIS) Functional Overview and Masterplan (Draft version) (UNESCO, 2021).

<sup>7</sup> Education Management and Information Systems (SIGEDS) in Latin America and the Caribbean: the road to the digital transformation of education management (Arias Ortiz et al., 2021).



## 2 OVERVIEW OF EDUCATION IN EACH COUNTRY

### 2.1 BARBADOS

The country's current strategic development plan -the National Strategic Plan of Barbados 2005–2025- has six strategic goals. The third goal, 'Strength and Unity', targets the expansion of education and training in the country to achieve a skilled and knowledge-based economy. In 2022, the President of Barbados announced that the education system would be reformed to make it more focused on problem-solving skills, critical thinking, and lifelong learning. Reforms are to include the establishment of Schools of Excellence in arts, sciences, commerce, information, and communications technology (ICT), technical skills and a range of other skill sets.<sup>8</sup> Specific educational reforms are outlined in the 2022–2027 Strategic Plan for the Ministry of Education, Technological & Vocational Training (METVT). They include enhancing overall student achievement, strengthening the quality of teaching and professional development for teachers, enhancing physical infrastructure and digital resourcing, and strengthening the regulatory framework of the education sector.

Education in Barbados is managed by the METVT and is free for all citizens from primary to tertiary level.<sup>9</sup> There are five levels of schooling: (i) pre-school/nursery school (3-5 years old), (ii) primary, (iii) secondary, (iv) post-secondary non-tertiary, and (v) tertiary. All children aged 5 to 16 must attend a formal institution. At the end of primary education (aged around 11), students take the Barbados Secondary Schools Entrance Examination (BSSEE). It tests students' Mathematics, English and Essay writing skills. Entry to secondary school is based on performance in the BSSEE, parental choice, and geographic zoning.

Secondary school prepares students for their future careers. There are 21 public secondary schools and five government-assisted private secondary schools in Barbados. Students sit for the Caribbean Secondary Education Certificate (CSEC)<sup>10</sup> examinations at the end of secondary schooling. Students typically complete secondary school at age 16. After that they may opt to attend a Sixth Form school for up to two years, which prepares them to sit for the Caribbean

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<sup>8</sup> See: <https://barbados.loopnews.com/content/academic-shift-education-act-be-replaced/>.

<sup>9</sup> Country Profile: Barbados (Moore and Greenidge, 2019). IDB Report.

<sup>10</sup> Regional certification of general and technical proficiencies offered by the Caribbean Examinations Council (CXC). It provides students with certification for further studies and entry to the workplace. CSEC certificates are required for matriculation in four-year university programs, community colleges, teachers' colleges and any other tertiary institution offering post-secondary programs (Thailinger et al., 2023).



Advanced Proficiency Examination (CAPE)<sup>11</sup> or pursue further education at a post-secondary institution. Six public institutions provide post-secondary courses, including vocational pathways. The TVET Council establishes standards and qualifications for Barbados in relation to technical and vocational education and training.

Students at post-secondary and tertiary institutions may pay some fees, but most education is government-funded (at national level). The government also manages most of schools' expenditure and transfers lump sum grants for three main budget items: curriculum (textbooks and instructional materials), maintenance (equipment servicing and maintaining school facilities), and sanitation (cleaning supplies). The Ministry of Finance, Economic Affairs, and Investment (MOF) is the primary source of school funding. The METVT feeds budgets and requirements to the MOF each year. Principals and Boards of Management are responsible for managing and executing funds. Operational and student services budget planning is done nationally and at the school level. Schools raise funds for additional needs that are not covered by ministerial funding. There are no regulations on class sizes.

**TABLE 1 PROFILE OF SCHOOLS IN BARBADOS**

TYPE OF SCHOOL	TOTAL	PUBLIC VS PRIVATE
Nursery	28	Public: 12 Private: 16
Government primary	95	Public: 68 Private: 27
Secondary	31	Public: 21 Private: 10
Special	9	Public: 4 Private: 5

Source: own elaboration.

## 2.2 GUYANA

The Ministry of Education (MOE) is responsible for overseeing education in Guyana and ensuring educational reform that supports the nation's development.<sup>12</sup> Universal primary education, and three years of secondary education, are compulsory and free.<sup>13</sup> The government's Education

<sup>11</sup> Regional exam offered by CXC for students who have completed a minimum of five years of secondary education and wish to pursue university studies (Thailinger et al., 2023).

<sup>12</sup> Ministry of Education, Guyana. See: <https://education.gov.gy/en/index.php/about-us/>.

<sup>13</sup> See: <https://unesdoc.unesco.org/ark:/48223/pf0000189035/>.



Sector Plan 2021–2025 (Vision 2030) focuses on providing opportunities for quality, equitable education and lifelong learning for all.<sup>14</sup> There are four levels of education: (i) nursery (from age 3; not compulsory), (ii) primary (from age 5 to 11; compulsory for six years), (iii) secondary (from age 11+; five-year programme), (iv) post-secondary and university. Students sit the National Grade Six Assessment (NGSA) at the end of the primary phase for entry to secondary schooling.

There are senior secondary schools, junior secondary schools, community high schools and secondary departments of primary schools. After finishing grade 11, students in senior and junior secondary schools sit for the CSEC and continue to grade 12 if they are interested in the CAPE qualification. Students in community high schools or the secondary departments of primary schools are offered four-year programs, until grade 10, which are mostly oriented towards the acquisition of pre-vocational skills. These schools do not offer the possibility to sit for CSEC or CAPE.<sup>15</sup> Post-secondary pathways include vocational training that typically lasts for two years. The University of Guyana offers four-year bachelor’s degree courses, as well as diploma courses and master’s programmes.

Schools are administered through 11 decentralised regions, each with a Regional Democratic Council and Regional Education Department. Each region has Subject Committees that develop each subject area, focusing on subject objectives, content, teaching strategies, materials, and evaluation procedures. A separate Inspectorate Unit is responsible for analysing and reporting on reasons for success or failure of planned programmes. The National Centre for Educational Resource Development (NCERD) plans and develops in-service teacher education programmes. The Curriculum Development Unit develops curriculum guides for teachers in primary schools and grades 7-9 of secondary schools, while the Curriculum Development and Implementation Unit develops, tests, and evaluates curriculum and curriculum materials.

**TABLE 2 PROFILE OF PUBLIC SCHOOLS IN GUYANA**

TYPE OF SCHOOL	TOTAL OF PUBLIC SCHOOLS
Nursery	509
Primary	444
Secondary	116

Source: own elaboration.

<sup>14</sup> See: <https://education.gov.gy/en/index.php/policies/sector-plan/>.

<sup>15</sup> Thailinger et al (2023).



## 2.3 JAMAICA

The Ministry of Education and Youth (MOEY)<sup>16</sup> manages an education system that ensures quality education and training for all people in Jamaica. The MOEY has authority for the legislative framework, national policies, strategies, plans, and resources to enable institutions to achieve their agreed mandates. It is organized as follows. The Minister’s Secretariat heads the Ministry. The Permanent Secretary’s Secretariat is under the Minister’s Secretariat and oversees five units: the Education Services Division, the Finance Division, the Human Resource Management and Administration Division, the Planning and Development Division, and the Project Management and Technical Services Division. The Education Services Division provides educational support to all education institutions to ensure sound management and administration of the education system. The Planning and Development Division oversees educational policy and plans, and programme monitoring and evaluation.

Jamaica has achieved universal enrolment of students from early childhood up to grade 9, but still faces challenges in terms of governance, quality of teaching and learning and enrolment in the higher levels of secondary education. The Education System Transformation Programme (ESTP) was adopted to increase accountability, devolve decision-making to the regional level, increase the capacity of teachers and administrators, and provide targeted support to schools. This programme was complemented by the restructuring of the Ministry of Education, with six independent agencies responsible for results, quality assurance, service delivery, and monitoring of reforms.

Formal education is provided mainly by the government, in some cases in partnership with private trusts and churches, across 14 parishes and seven education regions. There are private and public schools at all four levels of education: (i) early childhood (ages 3-5; optional), (ii) primary (entry age 6; grades 1-6; mandatory), (iii) lower secondary (entry age 6; grades 7-9, mandatory) and (iv) upper secondary (entry age 15; grades 10-11, optional). The Primary Exit Profile (PEP) test is administered at grades 4 and 6. At grade 6, it is used to determine students’ placement in secondary school. Secondary schooling is divided into two pathways giving all students access to seven years of secondary: continuous school learning leading to CSEC and CAPE, and the Sixth Form Pathways Programme.<sup>17</sup> At the end of grade 11, students in the first path may sit the CSEC. Students who continue and complete grades 12 and 13 may take the CAPE. CSEC is only offered in high schools, technical high schools, and independent and private high schools, while CAPE is offered by all high schools.

<sup>16</sup> The Ministry of Education and Youth (MOEY) was known as the Ministry of Education, Youth and Information (MOEYI) at the time the EMIS assessment was conducted. The current name and acronym are used throughout this report.

<sup>17</sup> Sixth Form Pathway Programme (MOEY). See: <https://educate.gov.jm/wp-content/uploads/2021/09/Sixth-Form-Pathways-Programme-Supervision-Framework-v7-20210428.pdf>.


**TABLE 3 PROFILE OF SCHOOLS IN JAMAICA**

TYPE OF SCHOOL <sup>18</sup>	TOTAL	PUBLIC VS. PRIVATE
Infant schools Kindergarten/preparatory schools (2015)	288	Public 41 Private 247
Primary	585	Public 585
Primary and Junior High	78	Public 78
Preparatory and Secondary High Schools (2015)	42	Private 42
Secondary High Schools (2018) Secondary Private High Schools (2015)	405	Public 150 Private 255
Technical and Agricultural High Schools (2019)	15	Public 15
Private vocational high schools	68	Private 68
Vocational High & Commercial/Business Colleges (2015)	255	Private 255
Special Schools (2018)	26	Public 10 Private 16
Tertiary and Other institutions (public)	20	Public 20

Source: own elaboration.

## 2.4 SURINAME

The Ministry of Education, Science and Culture (MOESC) manages education in Suriname. Education is compulsory and free from ages 6 to 12 (primary). It is administered across ten districts in the country. There are five levels of education: (i) pre-primary (entrance age 4), (ii) primary (entrance age 6), (iii) lower secondary (entrance age 12), (iv) upper secondary (entrance age 15), and (v) post-secondary. About 80 per cent of children participate in pre-primary education.<sup>19</sup> Primary and secondary education is delivered through state supported schools, subsidized schools (usually denomination schools), and private schools. The coastal regions are more developed, with higher participation rates in education compared to rural areas.

<sup>18</sup> Per 2016 data accessed from: [https://statinja.gov.jm/Demo\\_SocialStats/Education.aspx/](https://statinja.gov.jm/Demo_SocialStats/Education.aspx/).

<sup>19</sup> See: <https://uis.unesco.org/en/country/sr/>.





## 3 EMIS IMPLEMENTATION

EMIS implementation in Barbados, Guyana, Jamaica, and Suriname is summarized in this section based on the information in the reports cited above, in addition to a summary of EMIS development in Trinidad and Tobago.

### 3.1 BARBADOS

Barbados adopted an application called OpenEMIS Core in 2017, managed and hosted by a non-profit organization, the Community Systems Foundation (CSF), under the leadership of UNESCO. The application provides scope for interoperability of systems. It is used at nursery, primary and secondary levels but covers only public schools. The application is used by schools as their main recordkeeping portal, and to generate end-of-term student reports. The METVT uses it to prepare annual reports to UNESCO. It also has reporting dashboards that the public can access on the Ministry's website. The system has other applications, shown in Table 4 below. Since the diagnostic evaluation in 2022, the system has been developed to a point where the specific requirements for an EMIS for Barbados are being refined. It is now used as a basis for developing human resources policies. As part of the IDB loan Skills for the Future II (BA-L1053), the METVT will digitize human resource records to be entered into the EMIS system. An agreement has been reached with OpenEMIS regarding updates and user support. The development of a policy for EMIS is occurring in tandem with the government's move to implementing e-government services across all its functions by 2025 with the support of the IDB. This will facilitate shared services and enable teachers to use digital services for teaching and learning.



**TABLE 4 APPLICATIONS AND THEIR FUNCTIONS IN THE BARBADOS EMIS<sup>20</sup>**

APPLICATION	FUNCTION
<b>MS Excel</b> <b>MS Access</b>	<ul style="list-style-type: none"> <li>• Maintains a digital record of facilities and structures at schools</li> <li>• Contains record of achievements of annual summer construction programmes</li> <li>• Maintains record of demand for urgent building maintenance</li> <li>• Inventory submissions by nursery and primary schools</li> </ul>
<b>aSc Timetables</b>	<ul style="list-style-type: none"> <li>• Used by some schools to produce school timetables</li> <li>• May be procured centrally for future use by all schools for timetabling</li> </ul>
<b>SmartStream</b> <b>CloudSuite</b>	<ul style="list-style-type: none"> <li>• Used to manage salary information and payroll for nursery/primary teachers and ministry officials</li> <li>• SmartStream is a legacy application and CloudSuite is its replacement, but SmartStream is still used for teacher payments</li> <li>• All salary information and payments for secondary school teachers are handled directly by schools</li> </ul>
<b>Hard-copy personnel files</b>	<ul style="list-style-type: none"> <li>• Maintain much of the record of personnel, including key documents submitted during applications and appointment process (copies of qualification certificates, etc)</li> <li>• Performance management review reports are included in hard copy on hard-copy personnel files</li> </ul>
<b>SafeZone</b>	<ul style="list-style-type: none"> <li>• Web app that tracks bullying, student/parent satisfaction, and provides school closure alerts</li> <li>• Used only by some schools</li> </ul>
<b>CXC Examinations system</b>	<ul style="list-style-type: none"> <li>• Maintains record of student results in all examinations administered by the Caribbean Examinations Council (CXC)<sup>21</sup></li> </ul>
<b>METVT Accounting System</b>	<ul style="list-style-type: none"> <li>• Maintains record of expenditure in school system, including annual budgets for schools, disbursements to schools, payments to transport companies for local transportation, book grants provided to students, etc</li> </ul>
<b>METVT Website</b> <b>Google Classroom &amp; G-Suite</b> <b>YouTube</b> <b>Profituro</b> <b>Notesmaster</b> <b>Vex Project Platform</b> <b>NearPad</b>	<p>Taken together, these systems provide various of the functions of a virtual learning environment, including:</p> <ul style="list-style-type: none"> <li>• Learning Management System to deliver structured course materials to students</li> <li>• Content repositories for students and teachers</li> <li>• Streaming of video content</li> <li>• Online assessment tools</li> <li>• Data analytics on learning progression through online courses</li> </ul>

**Source:** own elaboration.

<sup>20</sup> Barbados Education Management Information System (EMIS) Diagnostic Assessment and Three-Year Implementation Final report (Butcher, 2022, Unpublished).

<sup>21</sup> See <https://www.cxc.org/examinations/> for details.



## 3.2 GUYANA

Guyana has an approved EMIS Policy, and the Education Act is being updated to support EMIS and improve the governance framework. There also has been a draft change management strategy for the development of an EMIS. Development of a new EMIS is in process, focusing on the deployment of the OpenEMIS Core Module since 2019. The survey element of the system has been used to collect data from all schools electronically for the first time in 2023. Further planned steps are the adoption of the system's special educational needs element and human resources element. Most planning, management and administrative processes are currently paper-based. The Planning Unit of the Ministry of Education has a legal mandate for statistical reporting of education data. Data is captured centrally and regionally, but there is lack of integration between the levels. Once data from schools is collated at the national level, it is not yet accessible to schools for decision-making. There is also duplication of data collection in different processes. Various software solutions are used for processes such as HR management and managing educational resources, but they are not interoperable. Most institutions do not have management information systems software solutions that support digitized day-to-day management or allow for real-time information services to users. There is limited capacity to train users in the use of digital solutions for educational management. The disparity in data is currently being addressed to improve the EMIS ecosystem, so that specific data is stored in dedicated spaces.

## 3.3 JAMAICA

The Jamaica EMIS is a census-based system transitioning to a fully transactional system that captures real-time data for workflows and operations. The system has several computer applications that are not currently integrated and do not cover all aspects of EMIS. These include the Annual School Census Application (SCA), the National Student Registration System (NSRS), the Enterprise School Management System (ESMS), OrangeHR, and the Government Finance Management Information System (GFMIS). Schools typically manage their records manually. Since the diagnostic analysis was undertaken, the Ministry is focusing on using OpenEMIS to build out the system (this began in 2021). The current priority is to evaluate applications and how to improve them, with documentation as a key focus.

The Annual School Census plays a key role in the EMIS. Prior to 2021 it was administered every first Monday of October, through paper questionnaires sent to all schools. Principals and school personnel completed the forms and submitted them to MOEY regional offices by the end of October. The questionnaire covers basic school characteristics, aggregated information on student enrolment and special needs, on teaching and non-teaching staff characteristics with their assigned grades, physical infrastructure, furniture, facilities, and equipment. Data was entered manually in each regional office before being sent to the central Ministry. The Early Childhood



Commission administers a separate questionnaire for early childhood providers. The National Student Registration System (NSRS) is a web-based application used to capture student records, including their performance, and is regarded as the primary student management system at most schools. There is a separate database to issue National School Leaving Certificates. Excel spreadsheets are used to capture data on physical infrastructure. A customized version of OrangeHR is used by the Human Resource Management and Administration Division to capture and manage records on human resources, budget, and finance processes. It records staff leave and professional development information as per the MOEY's specifications. The system also keeps track of the opening and closing of uniquely identified staff positions and assignment of staff records to available positions. All HR processes at the subnational level, such as teacher recruitment by School Boards, were handled through paper forms before being submitted to the central ministry to be reflected in OrangeHR. The application is not accessible to general staff, but authorized central ministry users can access the system from the intranet. Notably, there is no digital system for managing physical infrastructure and equipment. A comprehensive EMIS was initiated in 2015 by the MOEY, comprising a School Management System (SMS), Learning management System (LMS) and Learning Content Management System (LCMS). The MOEY also engaged in planning an Enterprise School Management System (ESMS), intended to integrate all the EMIS system components. There was limited capacity and budget for skilled programmers to handle the development of the system. Most schools are connected to internet and public schools have their own budgets to purchase connectivity plans.

Since 2021, several activities have been undertaken to strengthen the EMIS. The current focus is on configuring the OpenEMIS application and streamlining its different parts. A pilot project was undertaken in 15 schools to implement the application and collect census data in real time. Committees were established to provide support during the process, including an oversight committee, working groups, and working streams within the implementation team (for example, the change management stream and file management infrastructure from the ICT division). These activities are aligned with the legal framework that supports EMIS development, and the legal department is working on regulations in this regard. The IDB is also providing technical and financial support for the piloting of a school financial management system. In tandem with the development of EMIS, the government has focused on providing internet access to public schools (48% of schools have internet connectivity through the MOEY's National Broadband Internet to Schools project and an additional 39% are connected through private services in 2023) and devices have been provided to teachers to access the platform.

Jamaica has also adopted an ICT policy that reflects the potential of ICT in educational initiatives to impact education systems in the country, aiming to achieve sustainable human and socio-economic development, ICT-enabled transformed education, a knowledge-based society, and



citizen transformation through ICT in education, which are national priorities.<sup>22</sup> It contains a clear strategic vision, that the successful adoption of an ICT in education policy will transform teaching and learning processes, provide learning opportunities for all, promote the development of ICT innovations, and develop the capacity for efficient management and administration of the education system. The policy is based on a situational analysis of the country's educational context.

The range of applications used for different processes in the EMIS is presented in Table 5 below.

**TABLE 5 APPLICATIONS USED IN THE JAMAICA EMIS<sup>23</sup>**

NAME	DESCRIPTION	PROCESSES AND STRUCTURAL CONDITIONS OF EMIS TO WHICH THE SYSTEM IS RELATED
<b>National Student Registration System (NSRS)</b>	Application recording student information from Grade 1 to Grade 6 (to be progressively extended to secondary grades starting from 2019). Information is mainly used by the Student Assessment Unit	<b>Process</b> 4 - Students and Learning
<b>Annual School Census application (SCA)</b>	Teleform (ORM)/FoxPro application used by the Planning and Development Division to administer yearly school census questionnaires to schools	<b>Processes</b> 1 - Physical Infrastructure and Equipment 2 - Schools 3 - Human Resources, Budget, and Finance 4 - Students and Learning 6 - Tools for strategic Management
<b>Monitoring and Management Information System (MMIS)</b>	Application used mainly by the School Feeding Unit to monitor implementation of the conditional cash transfer Programme of Advancement through Health and Education (PATH). The system was recently discontinued.	<b>Processes</b> 2 - Schools 4 - Students and Learning
<b>XYTHOS On Demand (XOD)</b>	Centralized document management solution under deployment across MOEY Divisions and Units	<b>Structural Condition</b> 1 - Technological Infrastructure
<b>OrangeHRM</b>	Human Resource Management application used by the MOEY Human Resource Management and Administration Division to manage teaching and non-teaching staff records	<b>Process</b> 3 - Human Resources, Budget, and Finance
<b>MyHR Plus</b>	Official public sector Human Resource Management application deployed by Ministry of Finance and currently piloted by MOEY	<b>Process</b> 3 - Human Resources, Budget, and Finance

<sup>22</sup> ICT in Education Policy (Ministry of Education and Youth Jamaica, 2022).

<sup>23</sup> Analysis of the Education Management and Information System of Jamaica Diagnosis and proposal for strengthening the EMIS (Chapelet, 2019).



NAME	DESCRIPTION	PROCESSES AND STRUCTURAL CONDITIONS OF EMIS TO WHICH THE SYSTEM IS RELATED
<b>Textbook management system</b>	Application used by the Media Services Unit to manage textbook distribution to public schools	<b>Process</b> 1 - Physical Infrastructure and Equipment
<b>Renweb</b>	School Information System (SIS) commonly used by private schools in Jamaica	<b>Process</b> 2 - Schools
<b>My School</b>	School Information System (SIS) commonly used by private schools in Jamaica	<b>Process</b> 2 - Schools
<b>Enterprise School management System (ESMS)</b>	New Education Management Information System (EMIS) currently developed by MOEY for school records management	<b>Processes</b> 1 - Physical Infrastructure and Equipment 2 - Schools 3 - Human Resources, Budget, and Finance 4 - Students and Learning 6 - Tools for strategic Management
<b>JTC Teacher Registration Database</b>	Application used by the Jamaica Teaching Council (JTC) to manage public and private sector teachers' registration as well as professional development records	<b>Processes</b> 3 - Human Resources, Budget, and Finance 5 - Digital Content and Teacher Training
<b>National Education Inspectorate Database (NEI)</b>	Application used for the management of school inspections by the National Education Inspectorate (NEI)	<b>Process</b> 2 - Schools
<b>Primary Exit Profile website (PEP)</b>	Online application offering training materials and learning resources for students	<b>Process</b> 5 - Digital Content and Teacher Training
<b>Book Fusion</b>	MOEY online library application offering Digital content (ebooks) to students	<b>Process</b> 5 - Digital Content and Teacher Training
<b>Learning Hub Online</b>	Online portal offering access to PEP, CPEA, CSEC, and CAPE materials for students and for teachers	<b>Process</b> 5 - Digital Content and Teacher Training
<b>EduFocal</b>	Online portal offering tools and resources to prepare for PEP	<b>Process</b> 4 - Students and Learning 5 - Digital Content and Teacher Training
<b>BasePay</b>	Payroll system provided by the MOFPS	<b>Process</b> 3 - Human Resources, Budget, and Finance



NAME	DESCRIPTION	PROCESSES AND STRUCTURAL CONDITIONS OF EMIS TO WHICH THE SYSTEM IS RELATED
<b>Finance Management Information System (GFMS)</b>	The public sector budgeting and accounting platform. System was recently deployed (Feb 2019)	<b>Process</b> 3 - Human Resources, Budget, and Finance
<b>Google Suite</b>	MOEY uses Google services for emails	<b>Structural Condition</b> 1 - Technological Infrastructure
<b>Microsoft Active Directory</b>	Used to manage user accounts in central MOEY. Some information systems such as Xythos use active directory for login	<b>Structural Condition</b> 1 - Technological Infrastructure
<b>National Education Trust Educational Needs Database</b>	Enables schools to record infrastructure and equipment needs and allows donors/partners to finance	<b>Process</b> 1 - Physical Infrastructure and Equipment
<b>National School Leaving Certificate (NSLC) Database</b>	Indicates the extent to which students have attained the required competencies at the end of secondary education. It documents the knowledge, skills and attitudes developed by each student over the entirety of their secondary schooling (Grades 7 - 13)	<b>Process</b> 4 - Students and Learning

Source: own elaboration.

### 3.4 SURINAME

There is no legal framework set in place yet for EMIS development. Several Divisions and Bureaus/ Offices of the MOESC are responsible for day-to-day education management and data collection. There are separate Bureaus for each level of education (primary, lower secondary and upper secondary). They collect paper-based records on students and staff. The data is archived digitally, typically using Microsoft Excel and Access. The Division of Vocational and Technical Education has similar processes. The Research Bureau in the Division of Development Services administers the annual school census. In the past, data was captured manually and then entered into the Onderwijs (Education) Management Information System (OIS). The OIS associated each school, student, and teacher with a unique ID. Physical infrastructure in the OIS only existed as aggregated data (numbers of facilities). Private schools are not included in the system, and upper secondary schools have incomplete coverage. The system was used primarily to generate reports for UNESCO.

Currently, the Examinations Bureau has digital systems for managing exams. The Technical Services Division has offices for buildings and grounds, cleaning and security and transportation, and provides technical assistance (but no funding) to schools. HRM maintains information on teacher demographics and salaries, but salary settlements are not connected to any networked



application at the MOESC. The Financial Management Division manages financial information. The key problem with the OIS was that there was no interoperability between applications. Captured data could be used to make short-term decisions, but the old system did not allow for long-term strategic planning or decision-making.

The OIS was not a useful system for the country. There was limited human capital and technological infrastructure, and too much dependence on third parties to manage the system. OpenEMIS Core has subsequently been identified as being fit for purpose. A structure for EMIS has been created by identifying key stakeholders who will be working with the system daily. Weekly meetings are being held with these key stakeholders, such as the Examinations Bureau, the Bureau of Basic Education, the Bureau of Education Inspection, the Bureau of Education in the Interior, the Bureau of Vocational Education and some primary school leaders to consolidate ideas for adopting and implementing the system. The MOESC is working on strengthening ICT infrastructure within its own operations, and the intention is to upgrade the system to schools. The approach being taken is to identify what should be added to the EMIS system and narrow down its development based on these identified priorities. Future action plans include building the EMIS, piloting it at several schools, re-evaluating and re-aligning it, and then implementing it nationwide with the support of experts in the field and technical and financial support from the IDB.

The specific applications used across the system are presented in Table 6 below.




**TABLE 6 APPLICATIONS AND THEIR RELATIONSHIP WITH EMIS PROCESSES IN SURINAME<sup>24</sup>**

NAME	DESCRIPTION	PROCESSES AND STRUCTURAL CONDITIONS OF EMIS TO WHICH THE SYSTEM IS RELATED
<b>OIS</b>	MS SQL database capturing results of annual school survey. Until recently, the application was managed by an external provider. In the MOESC, the system is managed by the Research Bureau in the Development Services Division. System is standalone and not connected to any network.	<b>Processes</b> 1 - Physical Infrastructure and Equipment 2 - Schools 3 - Human Resources, Budget and Finance 4 - Students and Learning 6 - Tools for strategic Management
<b>Bureau* level digital archives of paper-based systems (Excel, MS Access, SPSS)</b>  * Primary, Lower Secondary, Upper Secondary (incomplete), Primary Vocational, Secondary Vocational	Bureaus manage some of the information needed for day-to-day management and short-term projections in off the shelf database and/or electronic spreadsheets. The digital systems support analysis and archiving of information, but source data comes from an established system of "cards" (paper records) developed by the MOESC. Bureau digital systems (databases and spreadsheets) are standalone with limited access and no capacity for networked data entry or analysis. A digital system to manage a school feeding program is under development. The school feeding program was just in the pilot stage at the time of the field study.	<b>Processes</b> 1 - Physical Infrastructure and Equipment 2 - Schools 3 - Human Resources, Budget and Finance 4 - Students and Learning 6 - Tools for strategic Management
<b>Inspection* digital archives of paper-based systems</b>  * Inspection Bureau for each level of the system	Information on students (demographics, enrolment, grades, attendance); teachers (assignments, demographics, attendance); schools (management, PTA). Information is not consolidated and not networked with any other MOESC system.	<b>Processes</b> 1 - Physical Infrastructure and Equipment 2 - Schools 3 - Human Resources, Budget and Finance 4 - Students and Learning 6 - Tools for strategic Management
<b>Transportation</b>	Database of recipients of state provided school transport (by MOESC norms) and transportation providers. Recently (2018) developed system to complement paper-based processes.	<b>Processes</b> 3 - Human Resources, Budget and Finance 4 - Students and Learning 6 - Tools for strategic Management
<b>Finance Free Balance PFM software as user interface to GFMS</b>	Used for budget management and to execute payments, primarily salary settlements. Is not linked to any other system with teacher information in the MOESC. Each salary settlement period requires manual reconciliation.	<b>Processes</b> 3 - Human Resources, Budget and Finance 6 - Tools for strategic Management
<b>Examinations Bureau</b>	Database of examination registration, exams and results (Lower secondary, Upper Secondary, Tertiary, Non-tertiary professional) Not linked to other systems with student information.	<b>Processes</b> 4 - Students and Learning 6 - Tools for strategic Management
<b>Pre-bachelor's pilot e-learning</b>	Moodle e-learning platform. Pilot project. Medium term objective is to incorporate e-learning into teacher education programs.	<b>Processes</b> 4 - Students and Learning 5 - Management of Digital Content for Teacher Training and Student Learning 6 - Tools for strategic Management

Source: own elaboration.

<sup>24</sup> Analysis of the Education Management and Information System of Suriname Diagnosis and proposal for strengthening (Deweess, 2020, Unpublished).



### 3.5 TRINIDAD AND TOBAGO

The development of an EMIS for Trinidad and Tobago has been under discussion since 1999. Several challenges were experienced through the years and limited development occurred prior to the Covid-19 pandemic and the resultant need for digitized learning. The government of Trinidad and Tobago is currently transitioning to digital transformation of all its services. The development of an EMIS is now part of this wider digital transformation. The Ministry of Education is rolling out projects, such as internet accessibility in schools, device provision for staff and students, an e-book platform, human resources support, e-testing, and automation of test results. A School Management System (SMS) is being implemented in phases. The first phase involves the collection of student attendance data, which was initiated during the Covid-19 period. Wider SMS systems are currently being piloted in 70 primary and secondary public schools throughout the country. Training has been provided to school principals and personnel in these schools. The pilot is concerned with identifying barriers to the smooth functioning of an SMS as part of the development of an EMIS for the country.



## 4 STRENGTHS AND CHALLENGES

### 4.1 METHODOLOGY FOR MEASURING AND CLASSIFYING EMIS

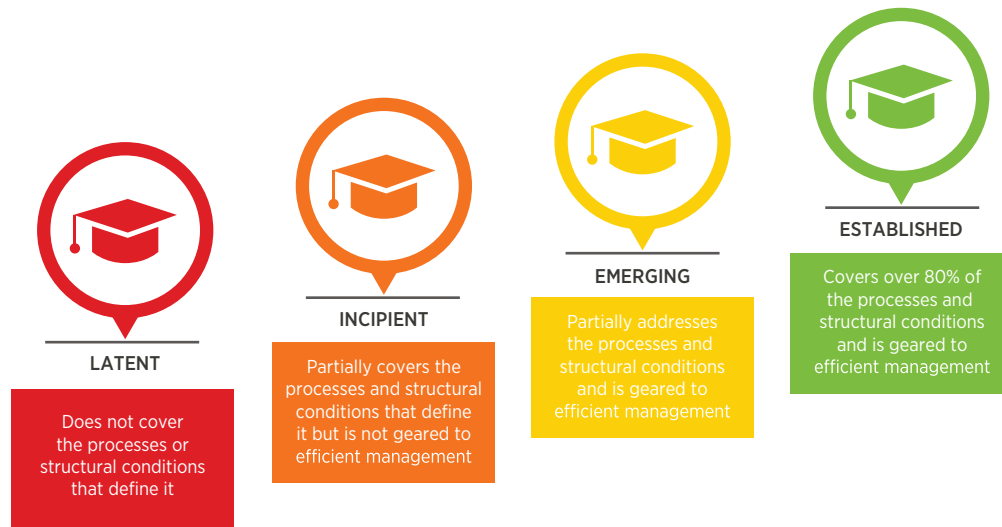
The IDB classification of EMIS is based on measuring six management processes and two structural conditions against a set of criteria, and then using scores (1 to 4 for each question) to classify the EMIS as Latent, Incipient, Emergent, or Established (see Figure 2 below). These classifications indicate the level of development of the EMIS. There are two levels of analysis: (1) the median of the evaluation of all corresponding questions is calculated for each of the processes and structural conditions (to identify the level of development in each area analysed); (2) the global EMIS score is obtained as the median of the evaluation the system has obtained for the eight elements.

The management processes are:

1. Physical infrastructure and equipment
2. Schools
3. Management of human and budgetary resources
4. Students and learning
5. Digital content for student learning and teacher training
6. Tools for strategic management (encompassing the first five)

The structural conditions are:

1. Technological infrastructure
2. Governance and institutional framework


**FIGURE 2 LEVELS OF CLASSIFICATION OF EMIS<sup>25</sup>**


**Source:** Arias Ortiz et al (2021).

Taking the characteristics of an established EMIS (4) as a reference, the instrument informs actions required to strengthen an EMIS on the path to its digital transformation. An established EMIS permits adequate management of the different aspects of the education systems and generates and distributes integrated, relevant, timely, reliable, and easy-to-interpret information at all levels of the system. Its contribution is reflected throughout the education management process and in the formulation of policies, their implementation, and evaluation of their effectiveness.

The levels of classification reported in terms of the six management processes and two structural conditions in the analysis of EMIS in Barbados, Jamaica, and Suriname can be used to identify areas of relative strength. None of the countries were found to have any management processes or structural conditions at the Established level. This means that in all cases, fewer than 80 per cent of the processes and structural conditions are geared towards efficient management. In some cases, they have achieved an Emergent classification, which implies that these areas are not immediate priorities (compared to those that have Incipient and Latent classifications).

<sup>25</sup> Education Management and Information Systems (SIGEDS) in Latin America and the Caribbean: the road to the digital transformation of education management (Arias Ortiz et al., 2021). See: <https://publications.iadb.org/en/education-management-and-information-systems-sigeds-latin-america-and-caribbean-road-digital/>.

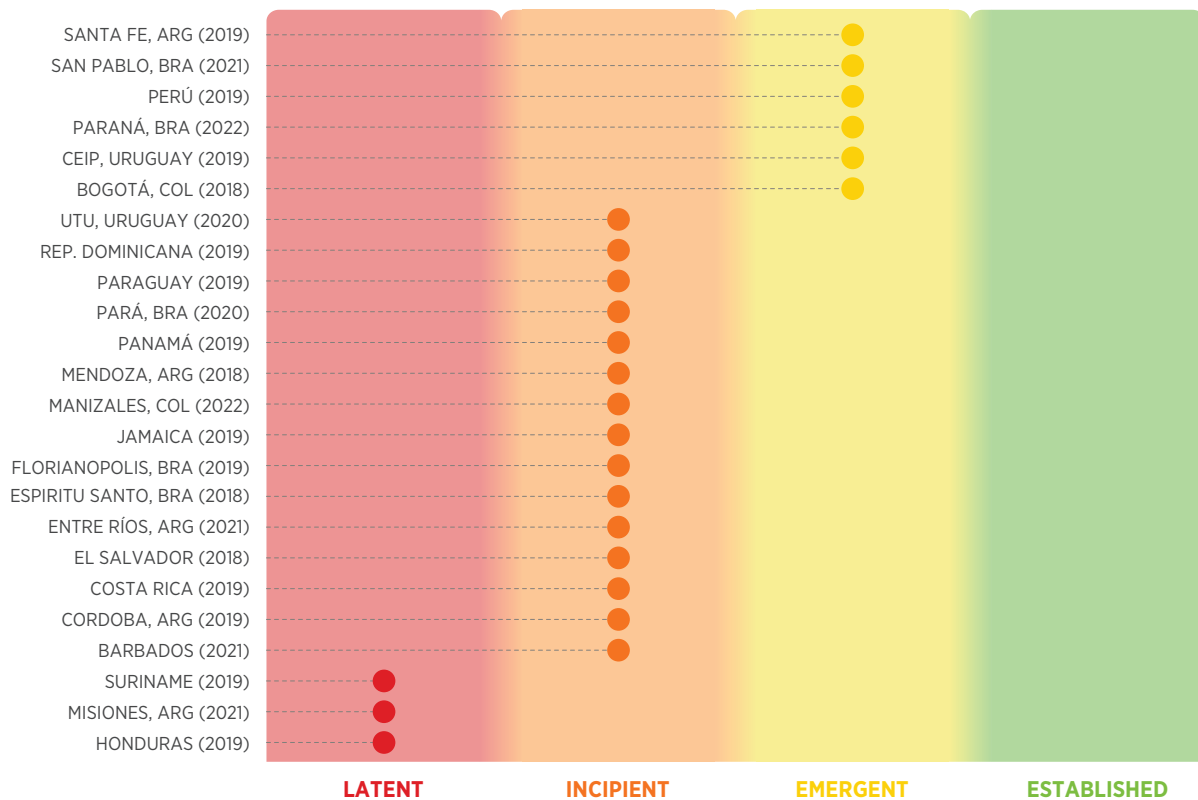


Figure 3 presents global scores for EMIS analysis conducted in the Latin America and Caribbean (LAC) region. None of the systems analysed were classified as Established, indicating that regional efforts may still be required to improve the functionality of EMIS.

Figure 4 presents an overall summary of management processes and structural conditions for each analysed EMIS discussed in this report. The table should not be read as a comparison between the countries or EMIS; it is merely a way to derive common areas of relative strength and relative challenge.

In terms of digital transformation of educational management, countries in the study (and Guyana, for which the same kind of analysis is not available) are making some progress; for example, there is internet connectivity which is a key strength, but none have achieved full digitization or interoperability of systems.

**FIGURE 3 GLOBAL EMIS SCORES FOR LAC COUNTRIES, INCLUDING BARBADOS, JAMAICA, AND SURINAME**



Source: Arias Ortiz et al (2021).



**FIGURE 4 LEVEL OF GLOBAL EMIS DEVELOPMENT BY PROCESS AND STRUCTURAL CONDITIONS**

	STRUCTURAL CONDITIONS		KEY PROCESSES						Global Score
	Technological infrastructure	Governance and institutional framework	Infrastructure and equipment	Schools	Human and financial resources	Students and learning	Digital content	Tools for strategic management	
BARBADOS	●	●	●	●	●	●	●	●	●
JAMAICA	●	●	●	●	●	●	●	●	●
SURINAME	●	●	●	●	●	●	●	●	●
LAC	●	●	●	●	●	●	●	●	●

Source: own elaboration.

Taken from a general view, *students and learning*, *digital content for teacher training and students' learning*, and *technological infrastructure* are the areas of relative strength in the sample, while *governance and institutional arrangements* and *physical infrastructure and equipment* are the areas most in need of development. It is important to note that these are primarily structural issues – i.e., that the foundations that support the entire EMIS are weak, so these need to be seen as priorities for strengthening the systems.

## 4.2 STRENGTHS ACROSS THE SYSTEMS

### Annual school census as a data capturing tool

Each system analysed uses a school census process each year to capture learner and enrolment data. In most cases, this process appears to work efficiently, even though it is largely paper based. The challenge comes in when attempts are made to capture the data digitally. Useful data is captured in most cases, and is digitized at regional or district level, and then sent to a central database. There is evidence that this data is used to make decisions about resourcing.

### Management of students, learning, and teaching

Data gathered from the annual school census is used for planning and management at the central ministry departments (for example, in Jamaica). There is also evidence of purposeful and efficient systems to manage learning and assessment. In the case of Jamaica, the MOEY uses the results of student assessment to inform educational practices and policies. Assessment



management is also a strength across the sample. In Jamaica, the PEP student learning assessment programme relies on the National Student Registration System (NSRS) to record key results of student assessments. These are used to inform policy and educational practices. In Barbados, data on student grades is captured in the main OpenEMIS application and end-of-term reports are generated by schools for individual students. There is an online procedure for recording and managing enrolment as well as a clear policy on school admissions. Digital content is also available for teachers to support their professional development, across multiple platforms. All schools in Barbados currently use Google Classroom as their learning management system (LMS) for remote learning (since school closures caused by Covid-19). The ProFUTURO platform, which covers Mathematics, Science, English, and Social Studies, amongst other subjects, can be used to track student progress, and there is a centralized management platform that provides Ministry-level access to usage statistics on Google Classroom for all nursery and primary schools, and some access to statistics for secondary schools. In Suriname, the OIS is used to generate statistical reporting for external and internal audiences, and certificates at the primary and lower secondary level are generated centrally. In Suriname, a pilot program for ‘pre-bachelor’s’ training program for prospective teachers has been developed using the Moodle e-learning platform with digital content.

### **Technological infrastructure**

All the systems analysed have basic technological infrastructure in place to run the EMIS to some extent. In most cases there is internet connectivity, and some storage capacity for data. In the case of Barbados, the main EMIS application (OpenEMIS) contains a significant portion of data required for comprehensive school records. It is hosted remotely by the service provider, with a development, a testing, and a production environment. The countries discussed (Barbados, Guyana, Jamaica and Suriname) have adequate infrastructure, and the hosting environment caters adequately for demands in the production environment.

## **4.3 CHALLENGES ACROSS THE SYSTEMS**

### **Lack of governance in EMIS policy and design, and poor institutional design**

There is limited legislative and government support for EMIS (a key structural issue) across the countries (other than Jamaica). This overarching issue is directly linked to challenges across the management processes. Most countries have a vision statement for educational development and reform. In some cases, these vision statements mention technology. But there is generally insufficient policy and national oversight of the EMIS, or guidelines for reviewing and improving it. In Jamaica, for example, regulations to protect the privacy of information in the EMIS were not fully implemented at the time the system was analysed, although the country does have an



ICT in education policy with an implementation plan.<sup>26</sup> Legislation and norms governing data and information in Suriname are incomplete and a framework for EMIS development does not exist in the MOESC.

### **Limited integration and interoperability across systems that make up the EMIS**

Systems used to capture and store data are poorly integrated or not integrated at all, making evaluation and decision-making challenging. There is limited interoperability between software applications used for different parts of EMIS. This is a critical challenge across all the systems analysed, and it reflects the weakness of EMIS as a whole. Within each EMIS there are components that are working well, but because they are not integrated with other processes, the full scope of potential of the EMIS to inform strategic and operational diagnoses and decision-making remains unrealised. For example, in the Jamaica EMIS, the NSRS does not capture student behaviour and attendance. These criteria are critical to identifying drop-out risks and other possible needs that students may have (such as health and social challenges). Parents and guardians should have some access to data that concerns their children. The current EMIS in Jamaica does not provide parental or guardian access to data or reports. In Barbados, unique school identifiers are different across different systems and are not integrated; therefore, it is almost impossible to access a broad overview of their conditions for decision-making and analysis. Although multiple platforms and projects exist to share digitized content and online learning experiences for teachers and students, there is limited coherence across these. No centralized content repository exists, and there is no integration with OpenEMIS, the main application used in Barbados. There is a web app called Safe Zone which tracks bullying, student/parent satisfaction, and provides school closure alerts, but it is not integrated with OpenEMIS. In addition, at the school level, a book grant is provided to students at nursery and primary level, and data on this is tracked but not integrated with the EMIS.

### **Redundancy and duplication of data capture**

A large volume of management data is captured, but it is often redundant (the same data required in different systems/processes) and is not cohesively linked or stored.

### **Different processes for public and private institutions**

Ministries should have oversight of all institutions -public and private- across the country. Education legislation applies to all registered institutions. However, in Barbados, for example, private schools are not connected to the public EMIS structure; therefore, a significant amount of data that could be useful in diagnosing broader educational challenges and opportunities is completely missing.

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<sup>26</sup> ICT in Education Policy (Ministry of Education and Youth Jamaica, 2022).





## Mix of paper-based and digital data capture and storage

This is a problem across the systems. Data collection is fragmented and not fully digitized. There is a mix of manual and digital data capture. Paper-based systems allow for data capture, but not analysis and evaluation. In some cases, manual data capture takes several weeks to complete and only reaches a central or district office for digitized capture months later. For example, in Barbados, some HR information and records are only paper-based and are not linked to other aspects such as salaries and professional development. Because they are paper based, it is difficult to have any central overview of staff issues that could prompt action or policy change. The other related challenge is that manual data capture is slow and cumbersome and does not enable real-time diagnostics or analysis to inform swift decision-making. In some cases, digital data is stored on platforms that are not integrated into the EMIS at all. Therefore, they cannot be used diagnostically or to make decisions and monitor goals. In Suriname, the primary systems for managing institutions are paper-based systems used by the Bureaus and Inspection. They are not comprehensive and do not exist in real time. Information for comprehensive sector-wide analysis of trends for management requires manual consolidation of Bureau and Inspection systems.

## Inadequate or under-utilization of EMIS applications

An EMIS should have the capacity to support detailed processes and requirements for the day-to-day management of schools. But capacity is lacking in all countries. For example, in Jamaica, the MOEY does not currently have a sector-wide single system to store and maintain the information on schools which could be used to inform decisions at all administrative levels, including at the school level. The EMIS also does not contain digitized information to manage the grouping of students in shifts and sections based on criteria for categorizing schools and regulations regarding the minimum spaces required per student per classroom. Jamaica's EMIS does not have the capacity to record school occupancy shifts in the building, and management of monthly transfers for expenses managed by schools is not systematized. Information related to educational material received by schools is not recorded nor updated in the EMIS.

## Limited automation of processes and labour-intensive data management

Much of the work of data capture is handled manually and laboriously, including the generation of reports, in some processes. This is a waste of human resources as well as of the capacity of technology to serve multiple purposes. There is limited use of business intelligence tools, data dashboards, and automated reporting, driven by: knowledge gaps (limited awareness of existing dashboards and limited skills to use existing tools); manual data updating processes leading to delays in updating data; and limited human resource capacity. In some cases, there is replication of tasks; for example, salary information may be manually checked as well as digitally reconciled. This also leads to a lack of tools for strategic management. In Jamaica, for instance, the MOEY does not implement business intelligence tools that provide online information through



dashboards. There is also no system to generate student performance indicators for different levels to enable comparison. There are no tools to detect learning challenges or drop-out risks. In addition, EMIS users cannot build their own dashboards based on available data.

### **Limited human resource capacity and management**

There is a need to provide more training and capacity building across the systems. For example, in Guyana there are insufficient skilled programmers to engage in adapting generic software specifically for the Guyanese context. In Jamaica, the MOEY has limited human resources to develop and maintain the EMIS. In Barbados, the records and data stored in the personnel module in OpenEMIS do not yet cover all METVT's personnel, focusing primarily on teachers to date. The digital record for teachers does not cover all the data listed for this sub-process; some of the data is not tracked and some is available only via paper records. In addition, the Unique Personnel Record does not contain any information on in-service training and continuing professional development. Personnel are not able to update any of their personal information when it changes (e.g., physical address, mobile number), both because the platform has not yet been configured to enable this functionality and because policy does not yet clearly provide for this possibility. There is no electronic record for assessing teachers' level of satisfaction, and the school climate and performance management reviews for teachers are submitted to the METVT only in hard copy. Teacher data maintained by the MOESC in Suriname is not fully linked to salary settlements. The system requires manual reconciliation of changes in aspects such as status, grade, compensation for additional assignments, and leave for each settlement period.

### **Lack of thorough budgeting and funding to maintain EMIS**

EMIS development and maintenance requires careful goal setting, including long-term goals. These goals inform budgeting and funding for EMIS management. This is an issue across the countries studied. In some cases, budgeting is centralized, and individual institutions have very little autonomy over their own goal setting and funding, and in other cases there are no long-term goals to properly inform the costs of maintaining EMIS. Cost estimates (for example, in Jamaica) tend to be short-term.

### **Physical infrastructure and equipment**

EMIS has the potential to automate equipment and infrastructural inventories so that these can be managed efficiently and in a cost-effective way. However, in many cases not even the basic requirements exist, such as unique identifiers for school buildings and facilities. In some cases (e.g., Barbados), parts of the sector (nursery and primary schools) have manual inventories, but no record is kept of these inventories. In the case of secondary schools, there is no corresponding submission of inventory lists. Where digital lists exist, they are incomplete and not up to date. In



Suriname, the office responsible for the physical maintenance of facilities does not have digital information and does not currently track renovations and works historically.

### **Technology and internet connectivity**

All countries in the sample have some level of internet connectivity, but bandwidth may be insufficient to handle the volume of data management required for a high-impact EMIS. Where internet is unreliable, it is challenging to capture, store and access data when needed. In addition, individual institutions (such as in Barbados) often do not have a functional internal network. Bandwidth and reliability of internet connections may be insufficient. In addition, disaster recovery procedures exist on the side of the service provider, but there is inadequate internal knowledge within the Ministry regarding how they work and what should happen in the event of disasters. Contracts with external service providers may be inadequate. In Barbados, a maintenance and support contract for OpenEMIS exists with the service provider but it is limited to cloud hosting and service desk support and does not cover all the requirements of the Barbados education system.



## 5 RECOMMENDATIONS TO STRENGTHEN EMIS IN THE CARIBBEAN

The recommendations presented here are broad and generic, based on an overall view of the challenges that need to be addressed in strengthening EMIS in the Caribbean. Both key challenges are related to structural conditions for EMIS. The main weakness identified was related to governance. If governance is addressed as a key priority, the other management processes will have a clear pathway for development.

### **Use a diagnostic tool to evaluate, update, and monitor current EMIS performance**

A key lesson learnt from the IDB analyses of countries' EMIS is that it is critical to measure the performance of an existing EMIS to identify its strengths and weaknesses. The instrument that was used allows for detailed classification of the level of development of eight elements of educational management that must be served and represented in an EMIS. Some of the countries considered in this report have already used the tool, but assessments should be updated regularly, and progress in terms of recommendations and action plans should be monitored for continuous improvement. In the absence of analysis and diagnosis of the current state of the system, decision-making is likely to be fragmented, and resources may be wasted investing in disparate platforms or software, for example, when they do not serve a cohesive and thoroughly planned purpose. Diagnostics are thus the first step in identifying where a system can be strengthened, so that it can be resourced and developed accordingly.

### **Articulate an ICT in education policy linked to national objectives**

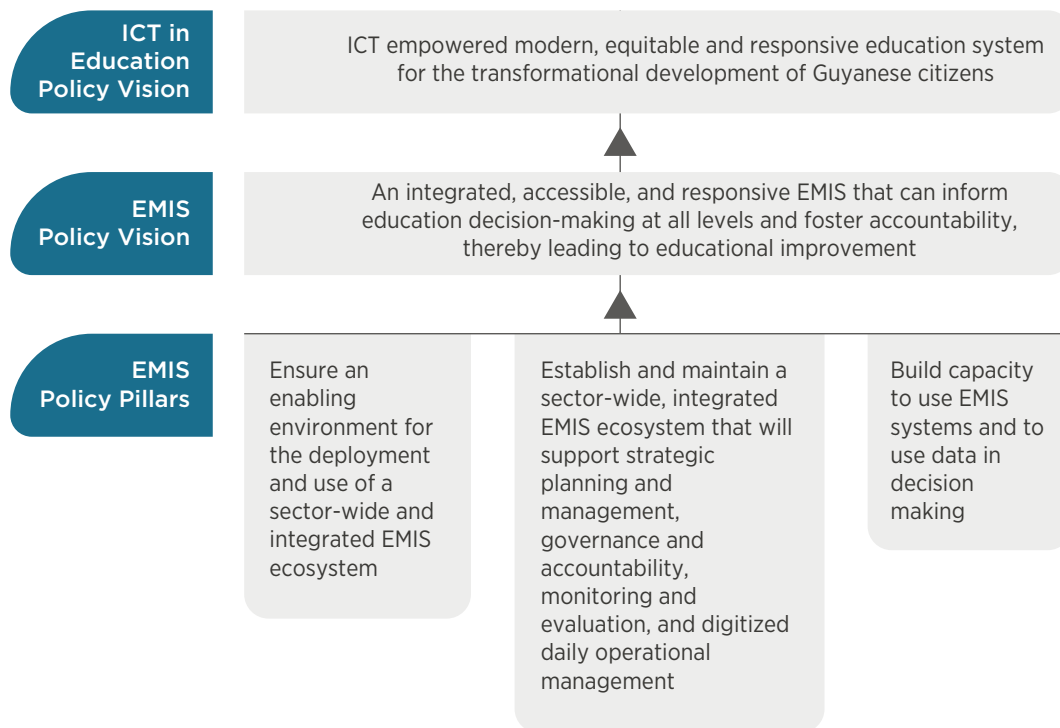
Most countries in the sample have national vision statements and strategic policies for education and development. There should be an ICT in education policy that captures the national vision because it informs a framework for an EMIS that supports management in education, with ICT as a key resource. This would ensure that digital solutions adopted in EMIS development reflect the overall national policy. Currently, Guyana and Jamaica have an ICT policy.



## Adopt and apply a theory of change to drive the development of EMIS policy

The theory of change proposed for EMIS policy in Guyana<sup>27</sup> (see Figure 5 below) is relevant to the whole region. It presents the need for an overall ICT in education policy which informs the vision for an EMIS policy. The three policy pillars capture the overall purpose of an EMIS policy.

**FIGURE 5 EMIS POLICY THEORY OF CHANGE**



**Source:** Arias Ortiz et al (2021).

<sup>27</sup> Government of the Co-operative Republic of Guyana. Education Management Information System (EMIS) Functional Overview and Masterplan (draft version) (UNESCO, 2021).



## Articulate the strategic vision for EMIS and design a change management strategy

Based on the ICT in education policy, a vision and specific purpose for EMIS which considers the policy pillars shown in Figure 5, the EMIS itself must have an articulated strategic vision. This vision must name the stakeholders and their needs that the system should serve. In addition, a change management strategy must be designed to create a road map for users (school managers, principals, educational authorities), which incorporates this vision.

## Develop a purpose-driven EMIS policy

An EMIS policy should reflect legislation and regulations pertinent to the country and its education ministry. These links should be made very clear in the initial part of a policy. There are nine other discrete sections that should be developed in the policy: (1) Functional overview of the EMIS and its sub-systems; (2) Use of EMIS data and reports to support strategic planning and management; (3) System hosting, ICT infrastructure, and connectivity requirements; (4) Data security, privacy, and disaster recovery; (5) Roles and responsibilities; (6) Capacity building; (7) EMIS governance and management; (8) Monitoring, evaluation and policy revision; and (9) Financing implementation of the EMIS policy.

## Reflect the features of a high-impact EMIS in the policy

Lessons from global experience provide a conceptual framework for understanding what an effective EMIS looks like to inform a strengthening plan. A high-impact EMIS supports analysis from a current, historical, and predictive perspective as well as appropriate management and monitoring of the education sector at all levels.<sup>28</sup> A high-impact EMIS also provides relevant and timely information to stakeholders outside of the core education managers: other government and non-government entities, citizens, parents and students.<sup>29</sup> It should consist of master data sets connected through common indexes. Figure 6 below presents a conceptual diagram for a high-impact EMIS, based on the case study of Suriname. It would be appropriate for any EMIS in terms of the components and users.

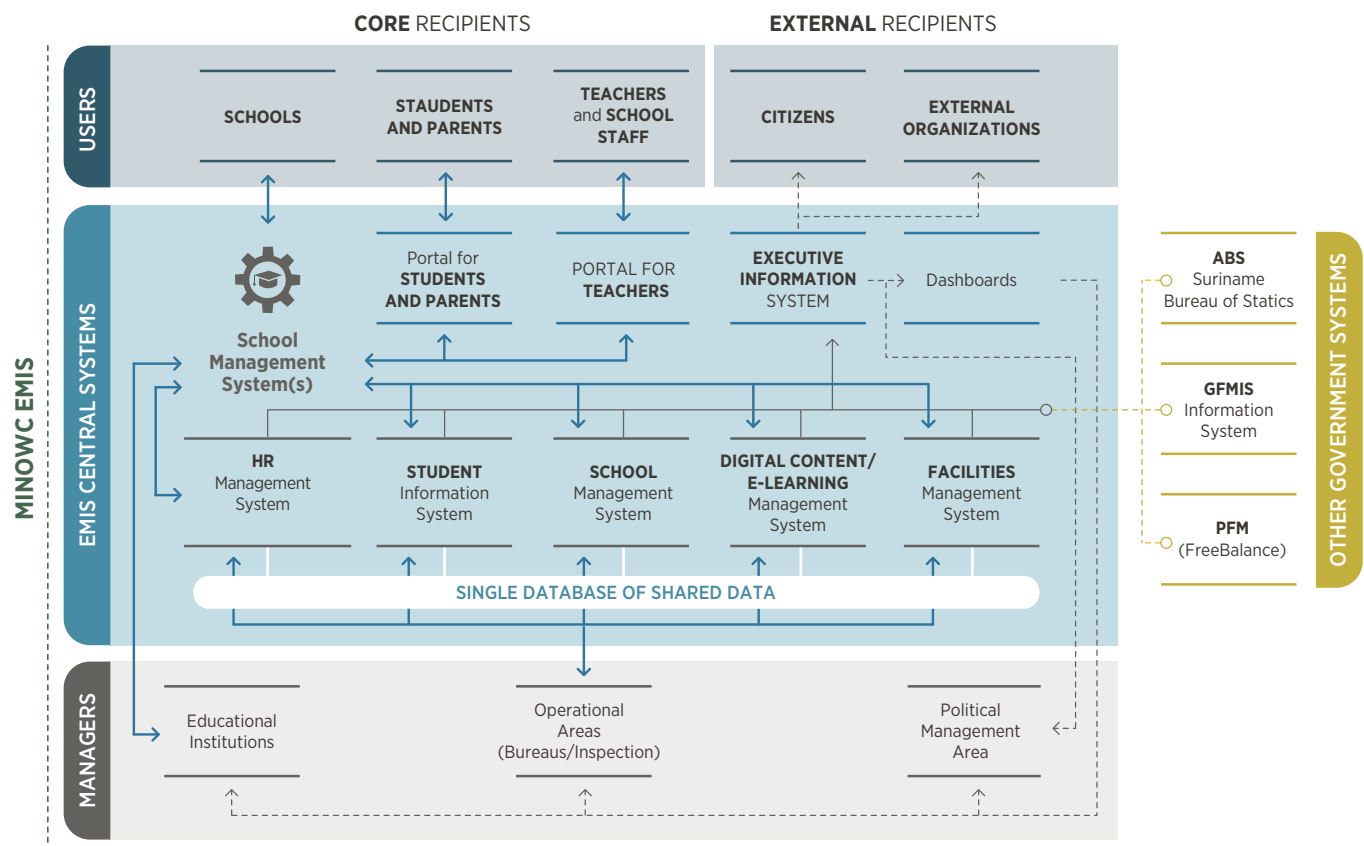
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<sup>28</sup> Re-orienting Education Management Information Systems (EMIS) towards inclusive and equitable quality education and lifelong learning (UNESCO, 2018). Retrieved from <http://unesdoc.unesco.org/images/0026/002619/261943e.pdf>.

<sup>29</sup> Analysis of the Education Management and Information System of Suriname Diagnosis and proposal for strengthening (Deweese, 2020, Unpublished).



**FIGURE 6 CONCEPTUAL DIAGRAM FOR A HIGH IMPACT EMIS (BASED ON THE CASE STUDY OF SURINAME)<sup>30</sup>**



Source: Dewees (2020).

<sup>30</sup> Analysis of the Education Management and Information System of Suriname Diagnosis and proposal for strengthening (Dewees, 2020, Unpublished).



## Build capacity

One of the weaknesses of current digitized systems is that users need more skills and knowledge to use the applications to their full potential. In the case of technological infrastructure, there are also limited technical skills to program and develop tailored software solutions. Funding and support need to be channelled to develop user capacity across the entire spectrum of users. It is imperative that users see the purpose of a well-functioning EMIS (therefore a change management strategy is critical). Building capacity in schools and educational systems that goes from digital skills to data-informed decision-making are key aspects for successful EMIS in the region.

## Collaborate closely with regional bodies such as the Caribbean Examinations Council (CXC)

The CXC deals with several legacy systems to manage the integration of examinations components across the region. The CXC Data and Intelligence Gateway is a platform used to provide data in the system to ministries of education that require access for policy formulation, planning and research. It has the capacity to provide data at three levels: candidate centre, parish/county, and national. The platform provides updates on student performance in examinations for which students may enrol up to twice per year. Researchers may also apply to the ministries of education for permission to access different kinds of data from the CXC. The CXC thus has the capacity to support planning and research. However, the multiplicity of initiatives in the region and the varying legislative and policy agendas are not harmonized. There is opportunity for the ministries of member countries to collaborate to streamline and improve interoperability of systems so that data from different sources can be centrally located, managed, and used for research and regional planning.

## 5.1 NATIONAL ACTIONS AND STEPS TO STRENGTHEN EMIS

The recommendations presented here are a generic approach to strengthening or devising a high-impact EMIS. Suggested actions are listed, along with specific steps to follow. It should be noted that some of these actions will be developed in Barbados and Suriname with IDB loan support, and in Jamaica the focus of IDB support is on school financial management.





SUGGESTED ACTIONS	STEPS
<b>Devise a change management plan</b>	<ul style="list-style-type: none"> <li>• Elaborate a plan for how the development of a highly functioning EMIS system will be managed (change management plan), including suitable appointed parties to facilitate and oversee it.</li> <li>• It may be required to contract a team to be responsible for leading the process.</li> </ul>
<b>Formulate a strategic vision and plan for EMIS development (establish conditions for strong governance)</b>	<ul style="list-style-type: none"> <li>• Set up a steering committee with representatives from senior management, all levels of the education systems, finance, HR, and technical services/IT.</li> <li>• Develop a strategic vision for the EMIS. Consider legislation, country, and local contexts, and identify the specific stakeholder groups whose needs must be served by the EMIS.</li> <li>• Develop an EMIS policy.<sup>31</sup></li> <li>• Develop a data management framework which states the needs of all stakeholder groups and data needs for reporting indicators; data definitions; and a map of all data items linked to component systems -Human Resources Management System (HRM), School Management System (SMS), Facilities Management System (FMS), Student Information System (SIS), digital content/e-learning platform-. These will make up the Executive Information System.</li> <li>• Facilitate a legal and administrative review to ensure that the policy and framework meet the requirements of information, privacy laws, asset ownership regulations within the country, and so on.</li> </ul>
<b>Establish medium and long-term goals for the development of the EMIS</b>	<ul style="list-style-type: none"> <li>• Goals should be linked clearly to the purpose and vision for the EMIS, which will be driven by legislative and contextual needs.</li> <li>• Develop medium-term and long-term goals to roll out aspects of the EMIS, aligned with the strategic vision and plan.</li> <li>• Develop a process for monitoring and evaluating the achievement of these goals.</li> </ul>
<b>Identify technological and capital investment requirements (cost implications)</b>	<ul style="list-style-type: none"> <li>• Develop standards for IT and connectivity at school level and estimate recurrent costs for connectivity, equipment, and maintenance.</li> <li>• Plan a budget (if required) for investing in a reliable internal network and the establishment of a central data warehouse for education statistics.</li> <li>• Conduct capacity analysis of the existing technology infrastructure and its maintenance requirements. Map this to system requirements and identify solutions and costs for addressing system maintenance needs.</li> </ul>
<b>Ensure connectivity of government/ ministry buildings to the network infrastructure</b>	<ul style="list-style-type: none"> <li>• All government and regional/district institutional buildings must be connected to the national network infrastructure in such a way that connectivity is ensured.</li> <li>• Locate all EMIS components on virtualized environments hosted on data centres and ensure linkages.</li> <li>• If necessary, procure equipment to ensure connectivity.</li> </ul>
<b>Ensure connectivity for schools</b>	<ul style="list-style-type: none"> <li>• Use standards developed to check and ensure that all schools have connectivity.</li> <li>• Procure infrastructure where required.</li> </ul>

<sup>31</sup> The Barbados Educational Management Information System (EMIS) Policy: Final Draft for Approval (Government of Barbados, Ministry of Education, Technological and Vocational Training, 2023, Unpublished) could be used as a model for developing a policy.



SUGGESTED ACTIONS	STEPS
<p><b>Ensure system components for capturing data across all applications</b></p>	<ul style="list-style-type: none"> <li>• Develop an online, sector-wide directory or register of educational institutions with appropriate levels of access to the EMIS.</li> <li>• Develop a school census platform to enable data entry from schools and integrate it with the SIS and SMS.</li> <li>• Develop a SIS to capture student information for all levels and providers in education (including a school portal with school management function for populating student data).</li> <li>• Deploy a suitable HRM system that enables automation of payroll reconciliation within approved software.</li> <li>• Develop appropriate authorities and modules for all relevant administrative levels to have a real-time view of human resources deployed in schools.</li> <li>• Develop/ensure a SMS for all schools and ensure that it has bi-directional data exchange with the ministry and the data sets in the school census platform.</li> <li>• Link it to a digital hub for e-learning content, where appropriate.</li> <li>• Develop/deploy an FMS that has data exchange with the SMS and the finance system.</li> <li>• Develop norms and protocols to update facility (equipment and materials) information through school level data entry and via regular maintenance assessments (buildings and grounds).</li> <li>• Develop a digital content/e-learning platform via the SMS, with content available on the student and parent portals. Ensure data exchange with the HRM system to support teacher professional development and ensure updating of teacher qualifications.</li> <li>• Consolidate the components of the executive Information System (school census platform, SIS, SMS, HRM, FMS, Finance) and deploy dashboard applications for data visualization relevant to different levels and functions.</li> <li>• Deploy a Results-Based Management (RBM) online application to manage and monitor Education sector Plan(s) activities (if relevant).</li> <li>• Develop and deploy simulation models for scenario planning.</li> </ul>
<p><b>Develop the capacity of technical staff and end-users</b></p>	<ul style="list-style-type: none"> <li>• Develop and execute a capacity development plan for staff with responsibility for maintaining the EMIS technological infrastructure.</li> <li>• A specific need may be in the Cloud technology, servers and network infrastructure, database management and specific software on which the EMIS components will be developed.</li> <li>• Develop and execute an orientation for EMIS and end-users at central and school levels.</li> </ul>

Source: own elaboration.



## 5.2 THE BENEFIT OF REGIONAL COLLABORATION

In addition to suggested national actions such as those listed in the previous table, there may also be significant merit in closer regional collaboration between Caribbean countries, which share many common features in their education systems, implementation challenges they experience, and budgetary resource constraints. Given this, regular engagement between governments, their development partners, and key service providers that support EMIS implementation in the region could be a very effective way to accelerate EMIS reforms, coordinate efforts, and reduce overall costs.

Regional collaboration could, amongst others, aim to achieve the following:

- 1) Ensure regular sharing of relevant documents related to EMIS** during and after their development to enable learning from regional best practices, keeping shared documents accessible through a suitable online document management system. Documents might include: EMIS policies and any related policies covering EMIS issues; EMIS implementation plans and annual budgets; documents pertaining to EMIS governance and management, such as Terms of Reference for EMIS governance structures<sup>32</sup>, organizational structures for EMIS Units, job descriptions, and so on; technical documents, such as business requirements documents, functional and technical specifications, and data management frameworks; user manuals and training materials; change management strategies; data analytics reports and data dashboards; and EMIS evaluation reports. If mechanisms can be found to share these documents through small networks under non-disclosure agreements, the benefits to participating countries would be potentially very significant, both in terms of learning from others and eliminating unnecessary duplication of efforts.
- 2) Periodically convene virtual meetings to share progress and lessons being learned across countries in EMIS implementation.** While such knowledge sharing may happen from time to time, a regular and structured forum for such engagements would significantly improve communication and enable countries to identify additional opportunities for collaboration. There is already a Network of Ministry of Education Planning Officers in the Caribbean under the umbrella of the CARICOM, and a regularly held virtual meeting under the auspices of such a Network would be a simple and effective way of facilitating such engagements, if the necessary planning and secretarial support were provided. Ideally, this might also include key development partners actively supporting EMIS reforms in the Caribbean, including the Inter-American Development Bank, the World Bank, UNESCO, and UNICEF, amongst others. Such

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<sup>32</sup> By way of example, an EMIS committee bringing together key stakeholders might have the following kinds of responsibilities, amongst others: ensuring that the EMIS aligns with the stakeholder requirements and education policy; reviewing and approving EMIS policy revisions, processes and standards; overseeing existing EMIS projects, initiatives, deliverables and status; assessing, approving, and recommending EMIS resources, budgets, priorities and proposals; and managing EMIS issues, risks and conflicts and adjusting the EMIS change management plans accordingly.



meetings could potentially take place quarterly to ensure regular communication between all key role players.

**3) Implement a coordinated approach to engaging with EMIS service providers operational in the Caribbean,** potentially under the auspices of a Regional EMIS Information-Sharing Forum of the kind outlined in the previous action. Given that several of the Caribbean countries are opting to use OpenEMIS, they might work together to address common issues with Community Systems Foundation (CSF), which manages the OpenEMIS platform. Currently, the countries engage individually with CSF to plan and implement OpenEMIS, even though their data management needs are very similar in most respects. A synchronized approach could help to streamline CSF's work in the region and ensure a coordinated development roadmap that would be more predictable and stable, while enabling CSF to consolidate its resources around a single, integrated development pathway. This could take the form of regular planning meetings in which all national development needs are pooled and priorities are identified for an integrated Caribbean OpenEMIS platform development roadmap that meets the needs of all participating countries. This could have significant efficiency benefits to CSF and all the countries it supports. Even countries not using OpenEMIS might benefit from participating in planning meetings of this kind, to give them ideas and inputs into meetings with their own service providers and technical teams.

In conclusion, the research analysed in compiling this report has demonstrated that there is a wealth of knowledge and experience emerging regarding EMIS reform in the Caribbean. Finding ongoing, structured mechanisms and strategies to share this knowledge and coordinate ongoing efforts has significant potential to strengthen and accelerate EMIS reforms across the region, ultimately to the benefit of the learners served by education systems in all Caribbean countries.



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