

Introduction

The *Survey of ICT and Education in the Caribbean* is intended to meet the need for a comprehensive representation of the current state of ICT¹ use in education in the Caribbean. For SIDS² in the region, the study addresses:

- The state of policy and planning
- Current usage of ICT in the primary, secondary and tertiary systems
- Pre-service and in-service TPD
- Critical challenges

For each country, the review also presents information about the incorporation of ICT into non-formal and community-focused ICT education and into technical and vocational education and training (TVET).

In general, the experiences and situations among the countries examined vary only within a limited range. Countries differ in terms of their goals for the introduction of ICT and in the pathways they have chosen to achieve those goals. And, certainly, some governments and some institutions have invested more, attempted more, and achieved more than others. However none of the countries included in the *Survey* have “lapped the field” by achieving either system-wide adoption of ICT or the ICT-supported transformation of teaching and learning.

The importance of the introduction of ICT into Caribbean education systems is linked—as it is in other regions, both developing and developed—to the pressure on societies and economies to respond dynamically to globalization. In many Caribbean countries, globalization has brought increased competition in formerly protected agricultural-export markets, plus increasing economic reliance on service-oriented sectors such as tourism and financial services. These factors have in turn led to increasing fluidity of cultural information and

exchange, taking forms that range from the out-migration of the highly educated to the importation of mass media. The region’s SIDS, moreover, struggle against the challenges presented by their geographies, such as small and distributed populations, and vulnerability to both international economic and local climate events.

ICT occupies a complex position in relation to globalization. ICT facilitates the entry of foreign elements of many types—by simplifying tourists’ travel, lowering barriers to capital flows and business expansions, by delivering Web pages to screens. And ICT is at least in terms of its origins foreign to the region, an imported product. As a suite of tools, however, ICT also strengthens the abilities of local populations to participate in the international economy as workers and as consumers, and as exporters of culturally (and personally) linked goods, services and information, thus accelerating the pace of globalization.

Understanding ICT as a paradoxical, “double-edged” factor in globalization is reflected in the wide range of goals attached to the use of ICT in Caribbean schools. Computers and the Internet are presented as tools—or subjects—to be mastered, with that mastery promising enhanced productivity and economic success. They are also presented as solutions to the challenges of ensuring that students have adequate literacy, numeracy, and other basic skills. And ICT is presented as enabling teachers and students to engage with learning in new ways, ways that transform their relationships to mathematical problems, history, culture, and art, and to innovation and creativity. This continuum, stretching from

¹ “Information and Communications Technology,” or ICT, has become a term of art in the field of development. One definition, of many possible, is “Any technology that allows users to create, store, display information in all its forms or communicate with others over a distance; such as computers, television, handheld computers, radio, audiocassettes, DVD and CD players, cell phones, networks, and the convergence of any of these technologies” (from the glossary of this *Survey*).

² A glossary addressing relevant education, technology, and other terms is included at the end of this volume.

rote learning of ICT-as-tool to ICT-enhanced building of knowledge and the ability to wield it, frames the efforts Caribbean countries have made and continue to make in this regard today.

This first volume of the *Survey* presents information on region-wide trends in relation to policy, management of information, ICT use in schools, and other topics. Common challenges are also described, and where appropriate, opportunities for regional action to address these challenges are identified. The final section presents profiles of selected ICT projects in Caribbean schools.

The second volume of the *Survey* comprises individual studies of the countries, protectorates, and departments selected for inclusion in the *Survey*.

Context: ICT in Caribbean schools

The Caribbean's investment in ICT in education has led to significant incremental achievements and to the emergence of active regional organizations. Increases in students' technology skills are the most concrete outcome. Changes in curricula, teaching practices, and learning behaviors have proven much more elusive.

Caribbean countries have in many instances built systems that provide adequate access to computers and the Internet, and have developed capacity to design, implement, and manage educational technology projects. To cite progress in four countries: Anguilla now ensures that all primary students have ICT skills; Barbados and Trinidad and Tobago have conceived ambitious and comprehensive technology projects for their secondary schools (see "Profile: EduTech 2000" and the relevant country profiles in Volume 2); Dominica—which as of this writing hasn't adopted an ICT-in-education policy, and has yet to pass 90 percent gross secondary enrolment—has provided Internet-enabled computer labs in over 50 percent of both primary and secondary schools; the Jamaican Human Employment and Resource Training Trust/National Training Agency (HEART Trust/NTA) has established ICT support, including e-learning, for its 80,000 TVET students (see "Profile: HEART Trust/NTA"). While a great deal remains to be done to integrate ICT into operations and classrooms, Ministries of Education (MOEs) are seeing returns on these and other investments: region-wide performance on the hands-on portion of the Caribbean Secondary

Education Certificate (CSEC) IT exam increased by 32 percent between 2004 and 2005.

At the regional and tertiary levels, organizational strength in ICT is also emerging. Support for ICT policy development by the OERU has been successful. OERU efforts at sparking use of EMIS have achieved less. But as an active, regionally focused strategic partner—with a unit wholly devoted to ICT—OERU is well positioned to assist Caribbean MOEs as they strive to increase ICT access and effectiveness. Organizations such as the CKLN and CUPIDE have the potential to leverage existing content and operational structures, such as the very effective programs managed by UWIDEC, to meet the increasing demand for local tertiary learning.

(See the sections, "Selected regional ICT initiatives in education" and "Regional and national EMIS initiatives" for more information.)

Challenges: Education, technology, and economic development in the Caribbean

Poverty and economic development remain critical issues for the countries of the Caribbean, despite economic growth during the 1980s and 1990s that averaged 4 to 6 percent per year in real terms. Over 30 percent of the populations of countries such as Dominica, St. Kitts and Nevis, and St. Vincent and the Grenadines are unable to finance basic consumption, with slightly smaller percentages of populations in Anguilla, British Virgin Islands, Jamaica, St. Lucia, Trinidad and Tobago, and the Turks and Caicos Islands also living in poverty.

In the later 1990s and the first years of the 21st century, economic growth has slowed, and Caribbean economies have demonstrated increased volatility. Factors impeding growth have included the September 11, 2001, attacks on the United States, loss of protected markets for agricultural exports, increasing oil prices, and hurricanes (e.g., Ivan in 2004). Expatriate remittances, including those from unskilled and semi-skilled workers moving within the region to find jobs, are vital to individuals and to national economies, surpassing exports of goods and services in several countries. Overall, the economies of the region lack resilience,

demonstrating the high vulnerability to external and internal events that typify SIDS.

As discussed in the recent report, *School and work. Does the Eastern Caribbean Education System Adequately Prepare Youth for the Global Economy?*,³ demand for skilled labor exceeds capacity in OECS countries, limiting economic competitiveness, while unemployment among low-skilled workers continues to grow. Concurrent with the steady-growth years of the 1980s and 1990s and continuing through the present, OECS economies have increased their reliance on services, while agricultural sectors have steadily declined in importance. Tourism is among the fastest growing industries in most national economies in the Caribbean. However, tourism's positive impact on poverty reduction is limited by foreign ownership of hotels and airlines, the skill levels required for employment, and tourism's effect on inflation.

School and work finds that inadequate ICT skills among Caribbean school leavers combined with the lack of employer-sponsored professional development limit both the employability of individual youth and the competitiveness of businesses.

As discussed in the Volume 1 section of this *Survey*, "Regional trends: Trends in ICT in Caribbean education," Caribbean MOEs tend to address the gap directly, channeling their ICT-related efforts primarily toward the introduction of IT curricula and preparation for the CXC IT exams. The exams themselves focus on hands-on and theoretical development of workplace-appropriate ICT skills. School labs operate at capacity, with schools frequently challenged to meet demand for IT classes.

Results from the 2007 CSEC IT exams, however, suggest that even students completing IT curricula and sitting for IT exams do not demonstrate mastery of workplace-level computer skills and knowledge. Students' hands-on skills generally surpassed their mastery of theoretical or abstract sections. While student performance has improved, the skills gained do not match up with skills required by the workplace. (Additional information about the CXC exams appears in the section, "Regional trends.")

To address the more complex, non-technological skills required by business, ICT-in-education

policies call for integrating the use of ICT into standard curricula.

However, foundational elements of many ICT implementations in Caribbean school systems amplify the obstacles to technology integration posed by low levels of teacher education and lack of ICT skills. As discussed in the section, "Regional trends: Trends in ICT in Caribbean education," factors such as test-based curricula, lab-based IT curricula, and lack of incentive for IT teachers to engage in integration limit the potential for technology to support changes in teaching and learning.

Among prior and current projects in the Caribbean, the designs of the Barbadian project EduTech 2000 and the Trinidadian FastForward project most closely approach the systemic transformation required for ICT integration. However, the history of EduTech 2000 reveals that the strains that large-scale, multi-component technology projects place on education ministries and their partners.

Overall, countries included in the *Survey* have progressed in terms of providing access to computers and the Internet, and in learning of basic computer skills. Efforts to support students' development of workplace-appropriate ICT skills and the higher-order skills related to collaboration, communication, and problem solving have been less successful.

Key questions: Integration or innovation?

Two factors call into question the value placed on technology integration by Caribbean MOEs. As noted, the challenges that confront integration efforts are to a large extent systemic, and; the effectiveness of the curriculum itself in terms of the needs of students as individuals and in relation to economic development appears to be limited. *School and work* cites the use of education as a screening mechanism for civil-service jobs and frames the resulting problem as follows:

There seems to be a general disconnect between education and the world of work

³ World Bank, 2007, Regional Brief. Additional information is drawn from "Trends and circumstances in Caribbean tourism," by David Timothy Duval, in *Tourism in the Caribbean: Development, management, prospects* (London: Routledge, 2004) and from Prof. Compton Bourne's "Economic challenges in the Caribbean community," a presentation delivered at the Twelfth Conference of Montreal, Canada, on 8 June, 2006. Professor Bourne is president of the Caribbean Development Bank.

in the Eastern Caribbean.... The over-emphasis on academia leads to an education system that does not necessarily impart skills related to the labor market.⁴

Given this disconnect, and given the limited success of skills-based IT programs thus far, three questions should perhaps be asked:

- Will system-wide efforts aimed at integrating technology across the curriculum improve student learning and educational relevance if and when they succeed?
- What other approaches and tools might better enable students to develop the skills required in today's workplace?
- Can those alternative approaches also enhance the relevance and practical value of education?

Important alternatives for consideration include introduction of “distributive” approaches to ICT implementation, and Web 2.0 tools such as blogs, wikis, and podcasts.

Distributive approaches focus on school and classroom transformation at the local level by supporting motivated school leadership, faculty, and students. Examples of the success of distributive approaches to educational change can be found in countries as disparate as the United States—where early ICT implementation, charter schools, and home schooling all reflect distributive frameworks—Singapore, and Uganda.⁵ In these and other instances, the experiences of early adopters can lead to “ecosystems” of innovation into which other teachers, students, and schools can enter and thrive.

Web 2.0 tools and other alternatives to productivity software and IT classes can complement distributive support for pedagogical innovation—in many instances by facilitating teachers’ and students’ activities as producers of knowledge (and educational content) in contrast to their more traditional roles as, respectively, suppliers and consumers of information.

Regional and national initiatives that can support use of alternative tools and activities include the hosting of wiki, blogging, and file-sharing Web sites for images or audio, developing newly-started teacher resources for educational blogging, and providing incentives for participation in interna-

tional contests, such as ThinkQuest (www.think.com) or theoneminutesJr video network (www.theoneminutesjr.org).⁶ Hypothetical examples of local innovations that might emerge from such initiatives include student-created pod-casts to develop reading fluency among early-language learners or teachers’ collaborative development of an image repository of local and regional plants.

(Discussion of the educational use of alternative approaches, tools, and other current developments in learning-related ICT occurs in the section, “Global trends in education and ICT.”)

A salient Caribbean example of the results possible with local implementation of Web 2.0 tools is the School of Tomorrow (www.schooloftomorrow-ipaaruba.com) at the Pedagogical Institute of Aruba (IPA). Sparked by the enthusiasm and leadership of one teacher, the School of Tomorrow has engaged in group-blog collaborations with Dutch students and others, and incorporated ICT—including Web-page development—into many aspects of teaching and learning. The program and its relation to Aruba’s overall progress in ICT in education is described in detail in the section, “Profiles of selected projects: School of Tomorrow.”

Over the course of the past decade, many countries included in the *Survey* have made significant efforts in relation to educational ICT. Resolving from the two intrinsic challenges, such as the exam-focused orientation of instruction, and extrinsic challenges, such as limited private sector ICT capacity, these

⁴ *School and work*, pages 10–11.

⁵ Distributive initiatives such as Singapore’s “Thinking skills, learning nation,” and the Uganda Rural Schools Very Small Aperture Terminal (VSAT) Connectivity project have succeeded as a result of the empowerment of local teachers and schools to adjust curricula and pedagogy to achieve impact. The Singapore initiative was congruent with other steps by the Singaporean MOE to devolve control of learning, including the 1988 creation of “independent schools,” comprising high-performing private secondary schools, and later of analogous, public “autonomous schools” that were to serve as leaders in the development of a high-skills workforce. In Uganda, where other priorities supercede computers in schools, the MOE’s initial support for ICT took shape as an elective IT curriculum and exam launched in 2002. Substantial inputs by local NGOs, the private sector, and development agencies, partly in response to these measures, led over 54 schools to acquire VSAT broadband Internet capacity and to develop sustainable computer labs by 2004. Key factors included the leadership of SchoolNet Uganda, emergence of a private sector ISP motivated to provide broadband to client schools, and committed teachers and head teachers.

⁶ A contest and collection of one-minute videos by youth, theoneminutesJr was co-founded by the United Nations Children’s Fund (UNICEF) in 2002. The website features over 1,500 videos from youth in over 80 countries, including LDCs such as Burundi, The Gambia and Sierra Leone. Although a theoneminutesJr videography workshop was held in Barbados in 2005, neither Barbados nor any other Caribbean country is represented by youth videos on the Web site.

efforts have not yet been rewarded by substantial impact. However much has been done to increase student access to ICT at the secondary level; in the process knowledge, capacity and experience have been gained by the region's education personnel, especially among those now responsible for moving forward with ICT. At this juncture, ICT has if anything become more important to the region's economic development, and both more affordable and more flexible in terms of its potential use in schools. To disregard the Caribbean countries' achievements in terms of educational computing would be no less dangerous than to disregard the limitations of these achievements.

Overview of sections

The *Survey* is intended to address the information needs and interests of personnel at donor organizations as well as Caribbean education policymakers, strategists, and implementers. Accordingly, sections include:

- **Regional trends**
Broad factors conditioning ICT use in education in the region; trends in connectivity, maintenance and other program areas; challenges commonly cited by respondents; barriers to technology integration; e-waste disposal
- **Global trends in education and ICT**
Current international developments in the use of ICT for education, ranging from lease-based procurement, to active-learning pedagogies, to one-to-one computing

- **Selected regional ICT initiatives in education**
Profiles and discussion of six initiatives intended to increase ICT access and/or capacity among education systems and educational institutions: OERU policy initiative; CUPIDE; CKLN; UWIDEC blended learning project; Caribbean Association for Distance and Open Learning (CARADOL); Virtual University of the Small States of the Commonwealth (VUSSC)
- **Regional and national EMIS initiatives**
A brief history of EMIS implementation in the region; chart of current status of EMIS in individual countries; discussion of three current (2007) EMIS pilot tests
- **Profiles of selected projects**
Brief discussions of four country-based ICT projects in education: EduTech 2000 from the Barbados Ministry of Education, Youth, Sports and Culture (MOE) Barbados Learning Management System (LMS) and National Qualifications Register (NQR), from Jamaica's HEART Trust/NTA; Voice Over Internet Protocol (VOIP) network from the US Virgin Islands Department of Education (VIDE); School of Tomorrow from Aruba's MOE

Volume 2 of this study presents:

- **Profiles of ICT in education in Caribbean countries**
Profiles of ICT in education in each Caribbean country included in the *Survey*, addressing: policy and planning; ICT in primary and secondary schools; TPD; tertiary education; non-formal learning and TVET; EMIS and MOE capacity; barriers and challenges