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IFAP

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Programme

Free and Open Source Software, Open Data, and Open Standards in the Caribbean: Situation Review and Recommendations August 2013



Prepared by:

Dr Lora Woodall
Lumine Consulting Inc.

Ms Michele Marius
ICT Pulse

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Acronyms

AtoM	Access to Memory
BSS	Barbados Statistical Service
BVI	British Virgin Islands
CARICOM	Caribbean Community
CBS	Central Bureau of Statistics
CCC	Corozal Community College
CIRPTT	Caribbean ICT Research Programme, Trinidad and Tobago
CKLN	Caribbean Knowledge and Learning Network
COI	Caribbean Open Institute
COL	Commonwealth of Learning
CSEC	Caribbean Secondary Examination Certificate
CXC	Caribbean Examinations Council
EMIS	Education Management Information System
ERP	Enterprise Resource Management
ESO	Economics and Statistics Office
FOSS	Free and Open Source Software
FOSSBAR	FOSS Barbados
GIS	Geographic Information System
GOB	Government of Belize
HEDU	Higher Education Development Unit
ICT	Information and Communication Technology
IDRC	International Development Research Centre
IFAP	Information for All Programme
ITSD	Information Technology Services Division
MEHRDL	Ministry of Education, Human Resource Development, and Labour
MOEYSG	Ministry of Education, Youth, Sports, and Gender Affairs
NALIS	National Library and Information System Authority
NREN	National Research and Education Network
OCMS	Open Campus Student Management System
OD	Open Data
OECS	Organization of Eastern Caribbean States
OER	Open Educational Resources
OpenDRI	Open Data for Resilience Initiative
Open MRS	Open Medical Record System
OS	Open Standards
OSS	Open Source Software
PDF	Portable Document Format
Redatam	REtrieval of DATa for small Areas by Microcomputer
SLING	Saint Lucia Integrated National GeoNode
SJPP	Samuel Jackson Prescod Polytechnic
SVGCC	Saint Vincent and the Grenadines Community College
TTCS	Trinidad and Tobago Computer Society
UNA	University of the Netherland Antilles
UNESCO	United Nations Educational and Scientific Organization
UWI	University of the West Indies
UWIOC	University of the West Indies Open Campus

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Executive Summary

In 2000, the United Nations Educational and Scientific Organization (UNESCO) launched its *Information for All Programme* (IFAP), the overall aim of which is to create more equitable societies through increased access to information.¹ This report presents the results of a study commissioned by UNESCO in support of IFAP, to investigate the awareness, implementation, and use of Free and Open Source Software (FOSS), Open Data (OD), and Open Standards (OS) in the Caribbean. The study was executed in the following countries: Antigua and Barbuda, the Bahamas, Barbados, Belize, British Virgin Islands, Cayman Islands, Curaçao, the Commonwealth of Dominica, Grenada, Guyana, Jamaica, Saint Kitts and Nevis, Saint Lucia, Sint Maarten, Saint Vincent and the Grenadines, Suriname, and Trinidad and Tobago.

The study used desk research, an online survey, field visits, and in-country consultations to ascertain the current state of and prospects for the increased awareness, acceptance, and use of FOSS, OD, and OS by identified stakeholders. The main stakeholders were regional governments, tertiary education institutions, libraries, museums, private enterprises, and communities supporting FOSS, OD, and OS.

Generally, there was a strong awareness and understanding of the term FOSS, although this varied from country to country. While most countries and institutions did not have official policies on FOSS, some level of FOSS use was evident in each country, although levels of use varied from institution to institution. At the time of writing, almost all governments have significant licence agreements with proprietary software companies, but some are beginning to consider other solutions in response to economic pressures.

OD was less familiar to most organizations than FOSS, but still widely recognized. A few policies clearly referenced OD, and

several countries have begun to publish data online, even though some of this data is not in a format which would align with OD standards. Several regional initiatives have the potential to promote OD, including the Caribbean Open Data Conference, the Caribbean Knowledge and Learning Network's C@ribNET, and a collaborative project between the World Bank and the Caribbean Open Data Institute. In contrast, OS was the least familiar of the three concepts and there was very little evidence of use of OS in the countries studied.

Challenges identified in adoption and use of FOSS, OD, and OS can be grouped into the following five categories: limited awareness; lack of buy-in; insufficient policy frameworks; limited technical support; and inadequate change management processes. In order to tackle these challenges, the chart below provides a list of recommendations, each of which are described in detail in this report.

¹ UNESCO (2012). *About Information for All Programme*. Retrieved from <http://www.unesco.org/new/en/communication-and-information/intergovernmental-programmes/information-for-all-programme-ifap/about-ifap/>



Challenges	Recommendations
Limited Awareness of Open Concepts	<ul style="list-style-type: none"> a) Seminars to increase awareness of FOSS, OD, and OS. b) Provide opportunities for regional collaboration. c) Cost-benefit analysis of FOSS versus proprietary software. d) Conduct a 'Day in the Life' simulation using FOSS.
Lack of Buy-in by Decision and Policy Makers	<ul style="list-style-type: none"> a) Targeted meetings with senior government officials. b) Strategic relationships/partnerships with key regional organizations. c) Country and regional commitment to promote openness.
Insufficient Policy Frameworks	<ul style="list-style-type: none"> d) Creation of government policy for FOSS, OD, and OS. e) Encourage participation in Open Government initiatives. f) Foster legislative support for new or amended laws as required. g) Create a government implementation framework. h) Review OS technical requirements.
Limited Technical Support	<ul style="list-style-type: none"> a) Develop FOSS technical support personnel. b) Establish a local and regional FOSS support community. c) Create a FOSS application portal/marketplace. d) Create a local and regional FOSS programmer directory. e) Provide digitisation support for libraries, archives, and museums. f) Provide support for the development of an OD portal. g) Develop local and regional technical support community for OS framework. h) Create regional technical support community for OS framework.
Inadequate Change Management Processes	<ul style="list-style-type: none"> a) Provide change management support as required for the shift to FOSS, OD, and OS (including support for planning, implementation and technical assistance). b) Implement public education campaigns. c) Provide training in select FOSS applications. d) Provide training support for OD initiatives.

In summary, levels of awareness and use of FOSS, OD, and OS vary widely across the region, with FOSS being the best understood and implemented. OD is beginning to be implemented in some areas, but there is little evidence of OS implementation. Most organizations are heavily dependent on proprietary software for the bulk of their operations, but there is interest in using FOSS,

OD, and, to a lesser extent, OS, which provides an opportunity for UNESCO to implement strategies to support IFAP in the Caribbean region.

1 | Introduction

Within the framework of the *Information for All Programme* (IFAP), the United Nations Educational and Scientific Organization (UNESCO) aims to increase awareness of Free and Open Source Software (FOSS), Open Data (OD), and Open Standards (OS) in developing countries. In order to determine the types of support and interventions that could be offered in the Caribbean, the organization commissioned a study to conduct a situation review of FOSS, OD, and OS in the region.

1.1 Information for All Programme

Launched in 2000, IFAP was conceptualized to advocate for and support the development of common strategies, methods, and tools for building Information Societies, with a focus on communication, information, and informatics.² In summary, its objectives include:

- 1) Promoting international reflection and debate on challenges related to realizing Information Societies;
- 2) Promoting and increasing the access to information in the public domain;
- 3) Supporting training, continuing education and lifelong learning;
- 4) Supporting local content development and indigenous knowledge availability;
- 5) Promoting the use of international standards and best practices; and
- 6) Promoting information and knowledge networking.³

1.2 Promoting Openness: FOSS, OD, and OS

Over the last decade, initiatives that promote increased openness have gained traction worldwide, leading to greater transparency, collaboration, and cohesion, both within societies and between

countries. Countries often begin with FOSS, OD, and OS as the starting points for development of a more open posture, including but not limited to collection, use, and distribution of information, and the degree of transparency in the culture.

FOSS

FOSS refers to computer programmes that are usually available free of cost and have been licensed to grant users the right to use, copy, change, and distribute their source code. The converse of FOSS is often called 'proprietary software', programmes to which users have neither access to the source code nor the right to copy, modify, or distribute their code. Table 1 highlights examples of proprietary software that might be available free of cost or for a fee, but for which the users have no right of access to the source code, as well as FOSS or OSS (Open Source Software) alternatives for each.

² UNESCO (n.d.). *Information for All Programme*, p 4. Retrieved from <http://www.ifap.ru/ofdocs/unesco/programe.pdf>.

³ UNESCO (2012). *Information for All Programme Objectives*. Retrieved from <http://www.unesco.org/new/en/communication-and-information/intergovernmental-programmes/information-for-all-programme-ifap/about-ifap/objectives/>.

Table 1 FOSS options for proprietary software applications

Function	Proprietary software	OSS/FOSS options
Operating systems	Mac OS (Apple) Windows (Microsoft)	Linux
Office productivity	Lotus Symphony (IBM) iWork (Apple) Office (Microsoft)	LibreOffice OpenOffice
Online survey	Survey Monkey Poll Daddy	LimeSurvey
Learning Management Software	Blackboard Learning Management System Desire2Learn eCollege	Moodle Sakai
Web browsers	Chrome (Google) Explorer (Microsoft) Safari (Apple)	Mozilla Firefox

The right to have access to, and to be able to modify, a programme's source code confers a number of benefits on users, including flexibility, modifiability, and more efficient use of computing resources. However, countries can also realize considerable benefits when FOSS is adopted, including increased cost savings, innovation, and empowerment of their citizens, along with reduced piracy and improved intelligence security.

Open Data

Open Data (OD) is the concept by which information is made freely available to the public, and where 'anyone is free to use, reuse, and redistribute it — subject only, at most, to the requirement to attribute and/or share-alike'.⁴

Historically, the accepted stance was to limit access to information. Where it was possible to share it, considerable money would typically be required. However, there has been a growing shift, especially among countries, towards making data more freely available and accessible, or, in other words, more open. While OD increases the wealth of information in the public domain, there is also growing

realization among countries that OD initiatives can foster innovation and stimulate economic growth. For example, a key finding of a recent study published by Capgemini Consulting noted that:

Public administration officials are now beginning to realize the value that opening up data can have. For instance, the direct impact of Open Data on the EU27 economy was estimated at €32 Billion in 2010, with an estimated annual growth rate of 7%.⁵

Open Standards

Similar to OD, OS denotes the availability and accessibility of technical standards for others to review and implement. However, there does not appear to be a single, universal definition of this term that defines the scope of what OS would comprise. Nevertheless, definitions established by the International Telecommunications Union and the European Union provide a useful starting point:

'Open Standards' are standards made available to the general public and

⁴ Open Knowledge Foundation Network (n.d.) *Open Definition*. Retrieved from <http://opendefinition.org/>.

⁵ Capgemini Consulting (2013). *The Open Data Economy: Unlocking Economic Value by Opening Government and Public Data*, p. 2. Retrieved from <http://ebooks.capgemini-consulting.com/The-Open-Data-Economy/>.

*are developed (or approved) and maintained via a collaborative and consensus driven process. 'Open Standards' facilitate interoperability and data exchange among different products or services and are intended for widespread adoption.*⁶

To attain interoperability in the context of pan-European eGovernment services, guidance needs to focus on open standards. The following are the minimal characteristics that a specification and its attendant documents must have in order to be considered an open standard:

- *The standard is adopted and will be maintained by a not-for-profit organization, and its ongoing development occurs on the basis of an open decision-making procedure available to all interested parties (consensus or majority decision, etc.).*
- *The standard has been published and the standard specification document is available either freely or at a nominal charge. It must be permissible to all to copy, distribute, and use it for no fee or at a nominal fee.*
- *The intellectual property - i.e. patents possibly present - of (parts of) the standard is made irrevocably available on a royalty-free basis.*
- *There are no constraints on the re-use of the standard.*⁷

1.3 Project Scope and Deliverables

Within this context, UNESCO commissioned a study to investigate the status of FOSS, OD, and OS in following countries: Antigua and Barbuda; Bahamas; Barbados; Belize;

⁶ International Telecommunications Union (2013). *Definition of 'Open Standards'*. Retrieved from <http://www.itu.int/en/ITU-T/ipr/Pages/open.aspx>.

⁷ European Communities (2004). *European Interoperability Framework for Pan-European eGovernment Services*, p. 8. Retrieved from <http://ec.europa.eu/idabc/servlets/Doca2cd.pdf>.

British Virgin Islands; Cayman Islands; Curaçao; Dominica; Grenada; Guyana; Jamaica; Saint Kitts and Nevis; Saint Lucia; Saint Vincent and the Grenadines; Sint Maarten; Suriname; and Trinidad and Tobago.

The purpose of the study was to investigate awareness about the use and application of FOSS solutions, OD, and OS at national and regional levels, as well as to identify gaps, needs, and potential areas for intervention. To achieve those objectives, four key activities were implemented:

- 1) Desk research, to gain an overview of the subject area and an initial picture of the status of FOSS, OD, and OS in the countries under review;
- 2) An online/electronic survey to gain inputs from a broad range of stakeholders;
- 3) On-site assessments in select countries, to begin to validate the initial findings; and
- 4) On completion of the draft report, consultation to discuss the findings and revise the final recommendations.

This report is the final deliverable of the project. The draft report was subjected to consultation, both electronic and in-person, which allowed stakeholders and country representatives to provide feedback and to share their views on potential areas for intervention, which ultimately strengthened the final document.

1.4 Project Methodology

The project first required development of an overview of understandings of the terms FOSS, OD, and OS, as well as identification of their current and potential use in identified Caribbean nations. To achieve this, research was undertaken using a qualitative approach to data collection. Qualitative inquiry is a form of research that explores social problems in their natural settings and where analysis is mostly performed through interpretive

rather than statistical techniques.⁸ A qualitative approach was chosen for this study because the phenomenon under review involves the attitudes and behaviour of groups of people in specific settings.⁹ Thus, the study attempted to answer the question of how FOSS, OS, and OD are being used.¹⁰

The following key research questions were identified:

- 1) How can the current context for FOSS, OD, and OS be described in each country?
- 2) How do stakeholders describe the following concepts:
 - a) Free and Open Source Software;
 - b) Open Data;
 - c) Open Standards?
- 3) How are stakeholder organizations using FOSS, OD, and OS?
- 4) What projects, practices, policies, procedures, and legislation exist that cover FOSS, OD and OS?
- 5) What challenges have been identified in use of FOSS, OD, and OS?
- 6) How have these challenges been tackled?
- 7) What strategies can be suggested to increase use of FOSS, OD, and OS?
- 8) What national and regional organizations or communities exist that promote the use of FOSS, OD, or OS?
 - a) How can the purpose, activities and sustainability of these organizations be described?
 - b) What support services do they offer for FOSS, OD, or OS?
 - c) What links do these organizations have to international bodies with respect to FOSS, OD, and OS?

8 Fowler, F. (2002). *Survey research methods* (3rd ed.). California: Sage Publications Inc.
Strauss, A., & Corbin, J. M. (1998). *Basics of Qualitative Research: Techniques and procedures for developing grounded theory* (2nd ed.) Sage Publications Inc.

9 Cresswell, J. (1998). *Qualitative inquiry and research design: Choosing among five traditions*. Sage Publications Inc.

10 Patton, M. Q. (1990). *Qualitative Evaluation and Research Methods* (2nd ed.). Newbury Park, CA: Sage Publications, Inc.

Yin, R. (2009). *Case Study Research: Design and Methods* (4th ed.) Sage Publications Inc.

Data Collection Methodologies

Multiple data collection techniques were employed to triangulate the data. Data collection techniques used included an Internet search, document review, online surveys, site visits, and interviews.

Internet Search

An Internet search was done to identify the following in each country and the region:

- 1) Documents that outlined national and regional policies, strategies, and practices;
- 2) Organizations that currently support FOSS, OD, and OS or would benefit from their use; and
- 3) Key stakeholders (both individuals and organizations).

Once key stakeholders and relevant organizations were identified, a document review was undertaken to gather information pertaining to the research questions and allow for development of survey questions.

Online Surveys and Field Visits

A self-administered, online single wave assessment of status survey¹¹ was developed to answer the research questions. Questions included open-ended items, as well as statements to which the respondent indicated their level of agreement on a uni-polar, five point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). All survey participants were assured of confidentiality and asked to indicate their agreement to participate in the research by clicking a checkbox, which indicated that no identifying data would be collected. The survey collected some demographic information (such as gender and island of residence), but no identifying information. Interviews of necessity would have collected identifying information (for example, name and role), but this data was stripped from transcripts and has not been included in

11 Spector, P. (1992). *Summated rated scale construction: An introduction*. California: Sage Publications Inc.

Fowler, F. (2002). *Survey research methods* (3rd ed.). California: Sage Publications Inc.

the report. This protection is especially important for administrators and key stakeholders in small communities where there may only be a few persons in each role.

Field visits were carried out in six countries: Antigua and Barbuda; Barbados; Curaçao; Jamaica; Saint Vincent and the Grenadines; and Trinidad and Tobago. The countries were chosen based on their responses to the survey and initial contact with key stakeholders. Semi-structured interviews¹² were developed, based on the results of the background research, online surveys, and document review, and then used in the field visits. The sample chosen for both the interviews and online survey was not random but purposeful, targeting key stakeholders in select organizations. Appendix A lists the organizations contacted.

1.5 Consultations on the Draft Report

The next stage in the methodology was to provide opportunities for participants to comment on a draft report. Feedback on the draft report was solicited via email and through country consultations. The report was disseminated via email to all persons who were contacted during country visits and to all people invited to participate in the survey, in order to solicit feedback. Participants were given four weeks to review the document and provide comments. At the end of the consultation period, feedback was received from three people, which has been considered and is reflected in this report.

Consultation Meetings

In addition, the draft document was also sent to individuals who were selected to participate in two consultation meetings, held on 18-19 July, 2013 in Jamaica, and 25-26 July, 2013 in Saint Lucia.

The key objectives of the consultation

meetings were to:

- 1) Comprehensively review the draft report;
- 2) Secure clear input on the state of FOSS, OD, and OS from participating countries;
- 3) Identify regional commonalities and priorities issues for possible intervention; and
- 4) Finalize an action plan that UNESCO can implement in individual countries and across the region.

In both consultations, there were four main activities, namely:

- 1) A summary presentation of the research findings by the UNESCO consultants and discussion of the results;
- 2) Presentations by experts in FOSS and OD;
- 3) Presentations by country representatives on the state of FOSS, OD, and OS in their countries; and
- 4) Development of an action plan per country through a group discussion exercise.

Consultant Presentations

The consultants presented a 30-minute summary of the critical points in the draft report and then responded to participant questions and comments. The presentations were well received in both consultations, followed by animated discussion on the findings. Participants had no significant questions on the methodology of the research study, and there was considerable agreement with the research findings and the recommendations in both meetings.

One key perspective that emerged from both consultation meetings was the need for regional governments to create a cohesive framework/strategy for the integration of FOSS, OD, and OS at both national and regional levels. It was suggested that this could be discussed at the level of the Caribbean Community (CARICOM) to ensure that a regional strategy be created. Participants also noted a regional need for support in the development of a policy framework for FOSS, OD, and OS. It was also posited that the Caribbean Examinations Council

¹² Willis, G. (2005). *Cognitive interviewing: A tool for improving questionnaire design*. California: Sage Publications Inc.



Figure 1 Participants at the consultation meeting held in Jamaica, 17-18, July 2013



Figure 2 Participants at the consultation meeting held in Saint Lucia, 25—26 July 2013

(CXC) could support the integration of FOSS throughout the region by including FOSS in relevant syllabi and emphasizing FOSS programming languages more explicitly in its curricula. Participants also stressed the need for promulgation of success stories in FOSS, OD, and OS.

Summary of Select Expert Presentations

The presentation on FOSS at the Jamaica meeting was given by Mr Ace Soares, who described the main steps necessary in choosing a suitable FOSS solution and provided some suggestions for the implementation of FOSS, including preparing a matrix of all software currently in use and then deciding which could be replaced by FOSS applications in the short, medium, and long term. Mr Soares pointed out that the increasing use of smartphones and tablets is reducing dependency on proprietary applications, since many tablets and smartphones run on Android (a FOSS application). One of the challenges he identified was the widespread use of proprietary software names instead of generic terms for applications (for example, using 'Excel' instead of 'spreadsheet' or 'Word' instead of 'word processor'). He also suggested that schools need to prepare students to be both creators and users of FOSS applications.¹³

Dr Maurice McNaughton explained the concept and importance of Open Data at the Jamaica consultation, and indicated that the Caribbean region is the only one without an Open Data portal. He noted that there is limited access to high quality data in the region, resulting from both cultural norms and systemic practices in government and private companies.¹⁴ He also described several Open Data projects and reiterated that Open Standards were simply a means to an end, not an end in themselves.

Key presentations on FOSS at the Saint Lucia meeting were made by Mr David

Pile and Mr Andre Bailey. Mr Pile provided a perspective on the wide range of FOSS applications available and some related implementation strategies. He strongly suggested that, before deciding on implementation of any FOSS application, analysis of the client's workflow should be conducted and a decision then made regarding which application will most effectively meet the needs of users.

Mr Bailey provided participants a deeper understanding of successes and challenges inherent in implementing and championing FOSS in a key government department. He described a few FOSS applications that his Department found useful, as well as how his Department has successfully focused on development of human resources rather than purchase of software. He also emphasized that, in order to move a department or a government to FOSS, it was necessary to have a strong champion, who was empowered to make and implement decisions. He suggested that development of a support plan for each component and an overall strategy for the use of ICT and the integration of FOSS was critical.

Participant Input

Representatives from each country were provided a template prior to the meetings, and asked to present briefly on the state of FOSS, OD, and OS in their country. These presentations provided supplementary information, which has been included in this final report. Many participants had not been involved in the earlier survey or country consultations, which also added another voice to the discussion and another layer of detail to the report.

During the final sessions, participants were provided a set of questions and asked to work in groups to create an action plan for their country. Group participation allowed countries to work together to highlight similarities and to share ideas. The consultants provided support for development of plans. Action plans were discussed on completion of the group sessions so that the larger group could provide comments and suggestions. Many participants found

¹³ Soares, A. (2013) *How to make a presentation on FOSS*. Presented at the UNESCO Consultation on FOSS, OD, and OS in Jamaica, July 18-19, 2013.

¹⁴ McNaughton, M. (2013). *Open Data*. Presented at the UNESCO Consultation on FOSS, OD, and OS in Jamaica, July 18-19, 2013.

it extremely useful to hear experiences from other islands, while several expressed a desire to create a community to continue to share experiences.

The consultation meeting agendas and participant lists for the Jamaica and Saint Lucia meetings, along with country action plans submitted by the participants, can be found in Appendices B, C, and D respectively.

2 | Survey Results

In this section of the report, the results of the online survey that was developed as part of this study are presented. First, we highlight key demographic information associated with respondents. Thereafter, we briefly discuss the results received with regard to FOSS, OD, and OS. Finally, we summarize all of the findings. The survey questions are listed in Appendix E.

2.1 Demographic data

During the eight-week period for which the survey was active, 68 responses were received. With the exception of Sint Maarten, there was at least one entry from each country being assessed. The most entries (11) were provided from Barbados, followed by Saint Vincent and the Grenadines (10); whilst fewest responses were registered by Sint Maarten, British Virgin Islands, Belize, and the Cayman Islands.

Over 80% of respondents worked in government or higher education institutions. The remainder came from museums, archives, quasi-government organizations, and private concerns.

2.2 Free and Open Source Software

FOSS issues were covered by questions 5 to 12 on the survey. These questions were intended to:

- 1) Measure respondents' awareness and understanding of the term FOSS;
- 2) Explore the extent to which organizations have implemented FOSS and what software is being used;
- 3) Measure levels of agreement about the need for, and benefits of, policy support for FOSS; and
- 4) Identify ways in which UNESCO can support the increased use of FOSS.

Awareness and Understanding

Most participants were familiar with the term FOSS, with only 9% indicating that they had never heard of the term. Most also correctly described the key tenets of OSS, with only 16% incorrectly indicating that users could not distribute modified code.

Figure 3 Respondents by participating country

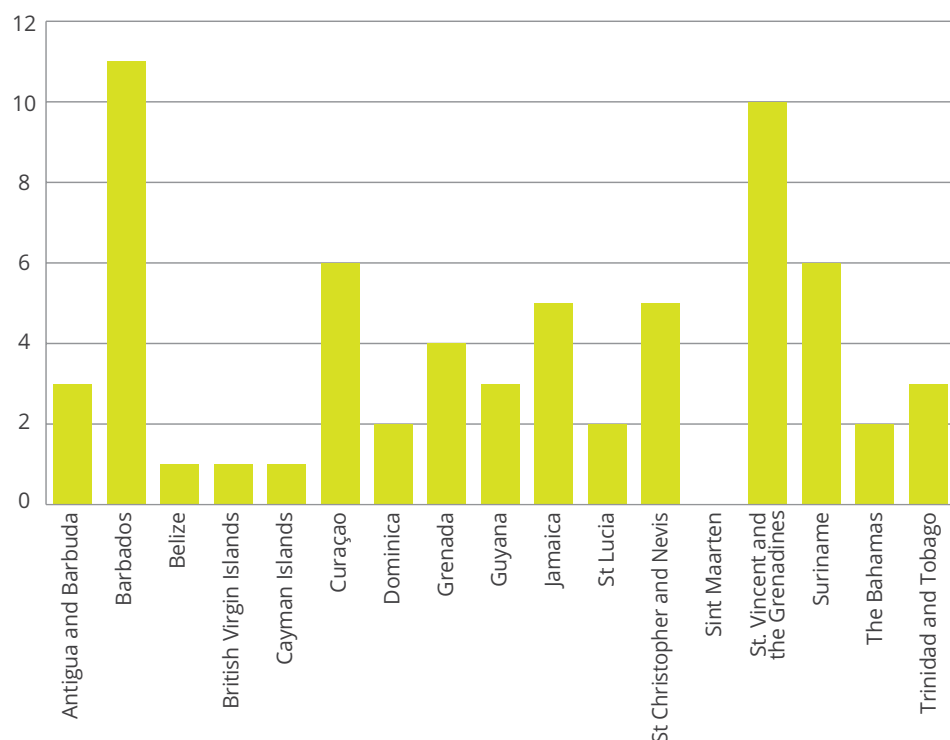


Figure 4 Familiarity with the term 'Free and Open Source Software'

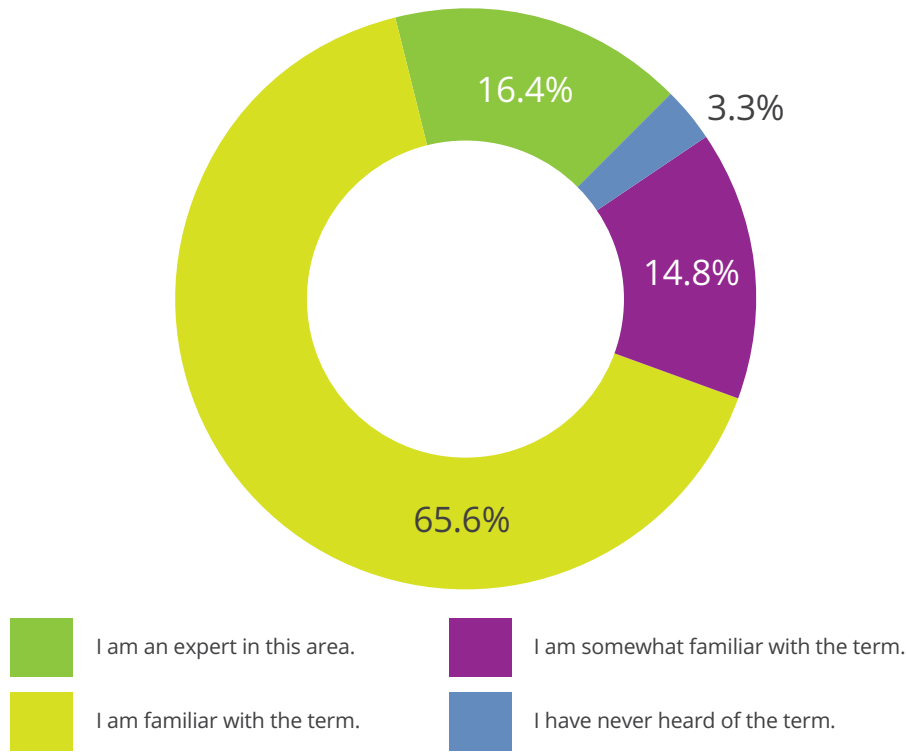
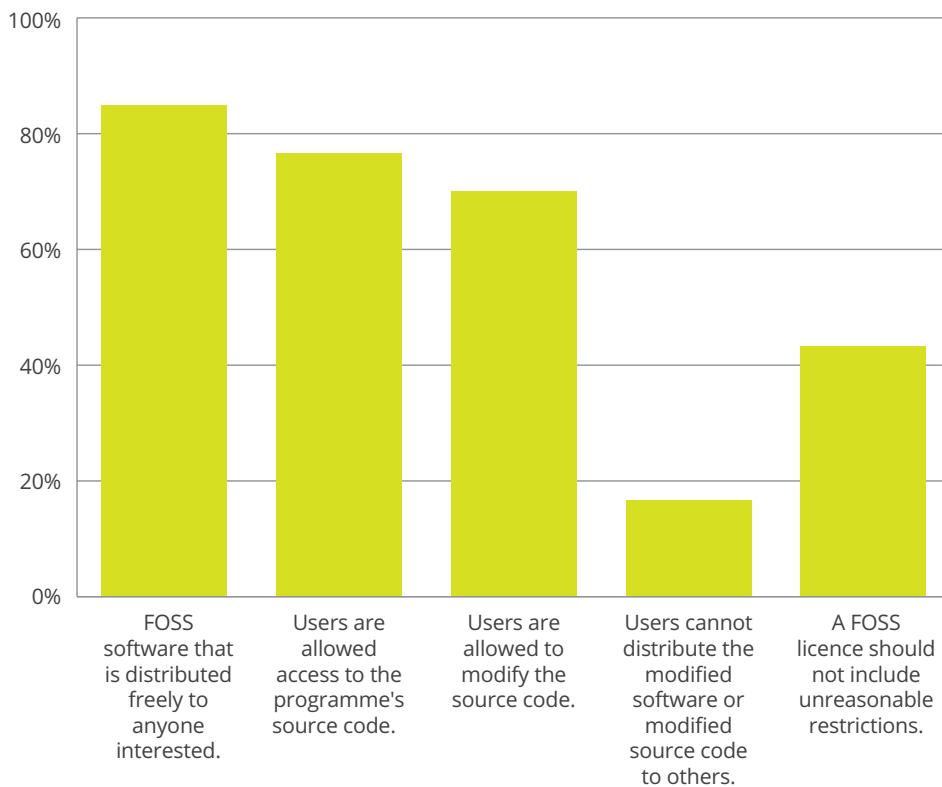


Figure 5 Understanding of FOSS



Implementation and Use of FOSS

When participants were asked to identify software used, over 95% indicated that they use proprietary operating systems and word processing programmes. The most commonly used FOSS programmes were Firefox and Moodle.

Of the 51 open-ended responses to the question on the implementation and support for FOSS, only 6% indicated that there was strong support for FOSS, as exemplified by wide use across the organization in a variety of areas. In comparison, some 31% indicated that there was no use of FOSS in their organizations.

Figure 6 Software used in institutions

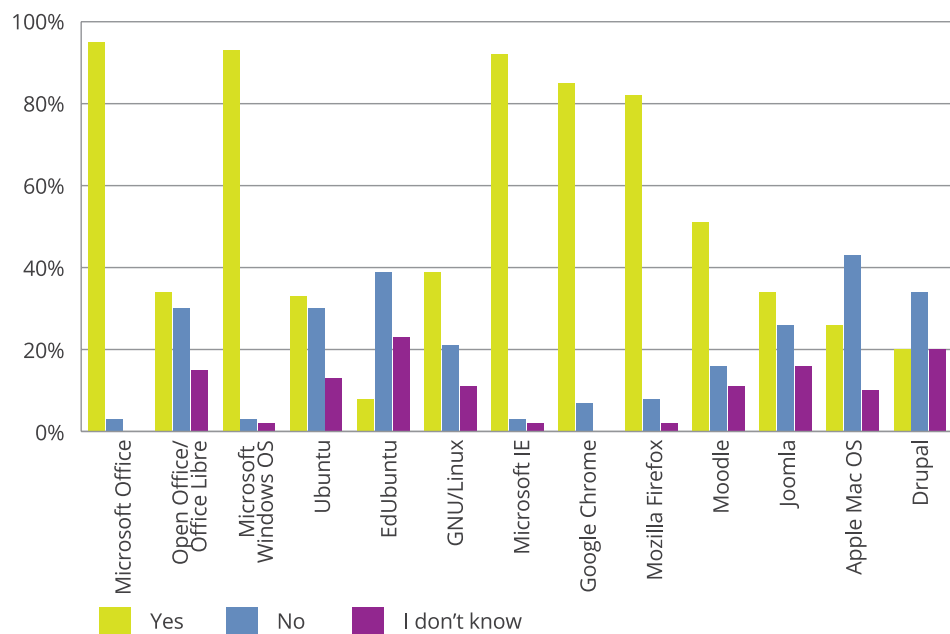


Figure 7 Levels of support for FOSS

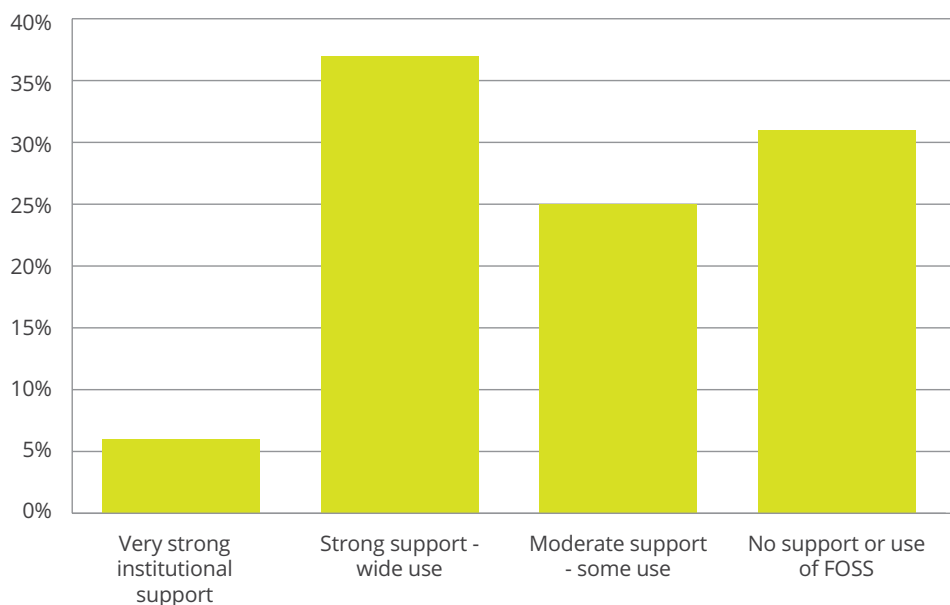


Table 2 Sample respondent comments by category

Category	Sample Respondent Comments
Very strong institutional support	FOSS adoption and use within my organization has been based on a deliberate institutional policy and largely driven by specific areas of need.
Strong support – wide use	Used in servers, web services, content managers, system monitoring.
Moderate support – some use	Used on limited basis where technical staff are familiar with the available tools. Not currently driven by organization policy.
No support or use of FOSS	There has not been any implementation of FOSS in my organization.

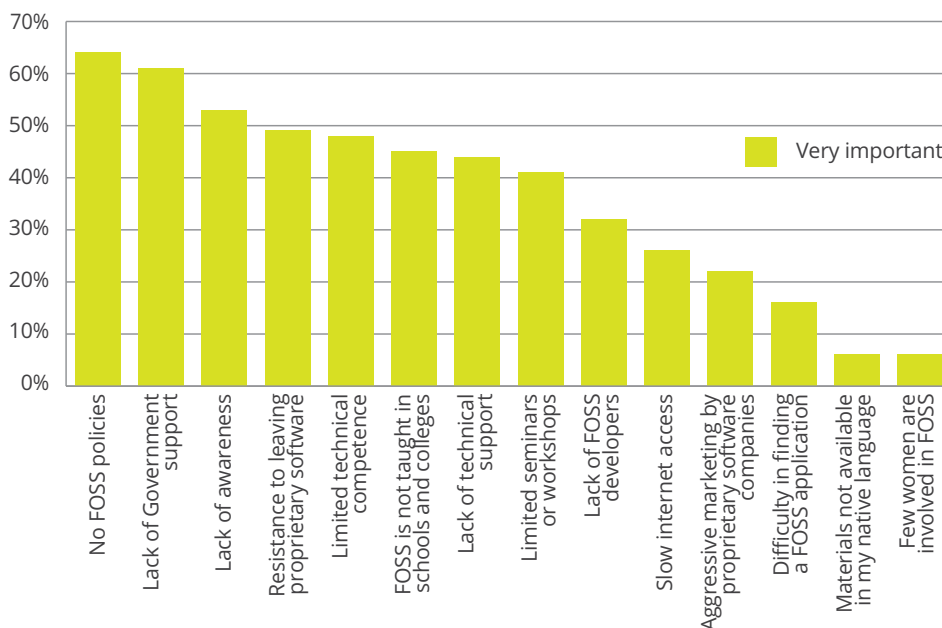
Barriers to Adoption

Several barriers to the use of OSS were identified, with those most often mentioned being lack of awareness, lack of support from policies and government, and resistance to shifting from proprietary software. Respondents also commented that there was ‘considerable long term investment in the proprietary software in current use which is working well’ and that ‘senior management also have confidentiality issues with FOSS’. Other comments were that ‘it was common... to use pirated software’ and that many

locally used licences are not paid for, so therefore ‘lots of people don’t feel the need to look for alternatives’. Another respondent indicated that the main barriers were ‘lack of awareness, skills, and technological infrastructure’ and that ‘lack of human and other resources leave a piece of software with some rough edges or requiring more technical knowledge’.¹⁵

¹⁵ Survey data, 2013.

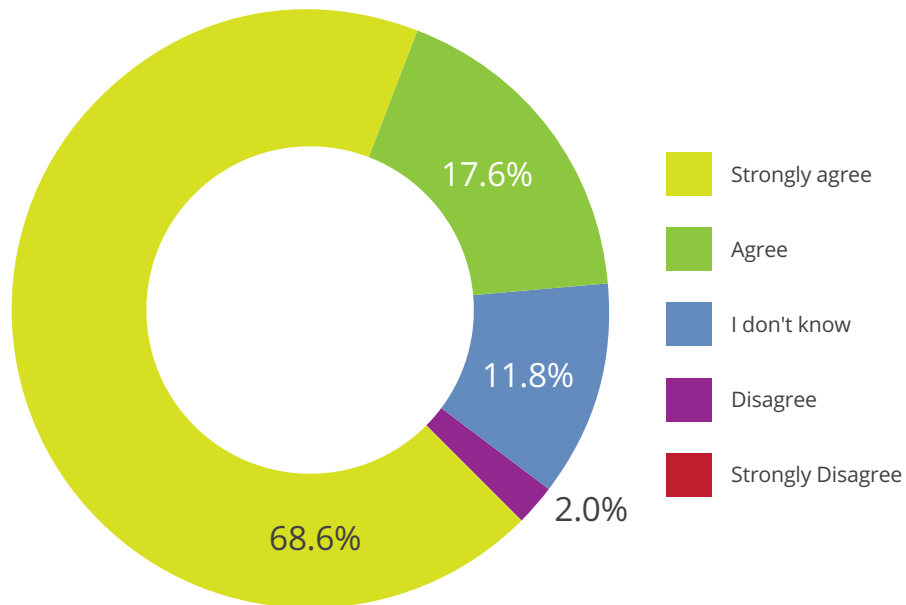
Figure 8 Barriers to FOSS adoption



Policies

Most respondents (86.2%) agreed or strongly agreed that their organization would benefit from adopting policies to support FOSS.

Figure 9 Level of agreement with likelihood of institutions benefiting from adoption of policies to support FOSS



2.3 Open Data

The section of the survey dealing with OD comprised nine questions (questions 13 to 21). Similar to the survey questions on FOSS, they had the following objectives:

- 1) Gauge respondents' familiarity with the term OD, along with their appreciation of benefits that may be realized from implementing policies that support OD;
- 2) Reveal perceptions of the availability of select government-generated or collected data, and the usefulness of OD;
- 3) Determine the extent to which organizations have adopted OD principles;
- 4) Identify possible barriers to adoption of OD; and
- 5) Identify ways in which UNESCO can support the use of OD.

heard of the term OD, which suggests that most had some degree of familiarity with the term. Between 75% and 90% of respondents selected the correct statements to describe the concept, which demonstrated, at the very least, a general understanding of the term 'Open Data'.

Availability of Data

With regard to data that governments typically generate and collect, almost a third of respondents indicated that such information was available. However, just under half were of the view that there was 'limited availability' of such information, whilst approximately 12% indicated that it was either not available or did not exist. Approximately 16% of respondents did not know whether certain data sets were publicly available.

Awareness and Understanding

From the 45 responses received for this section, only 9% of respondents had not

Figure 10 Familiarity with the term 'Open Data'

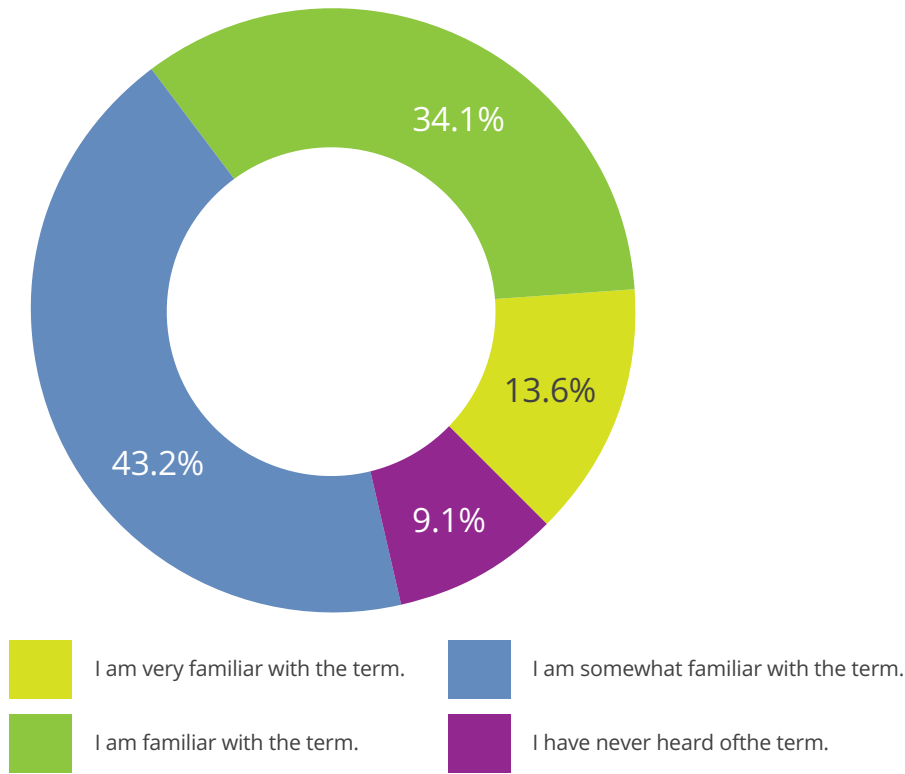


Figure 11 Public availability of select government-collected and generated datasets and records

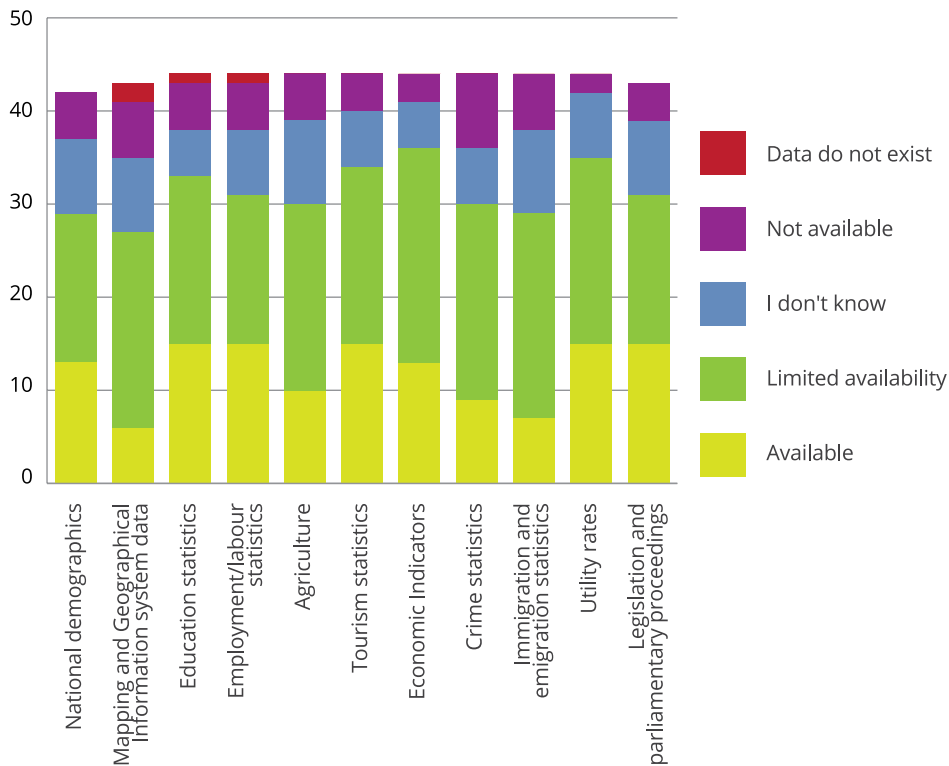
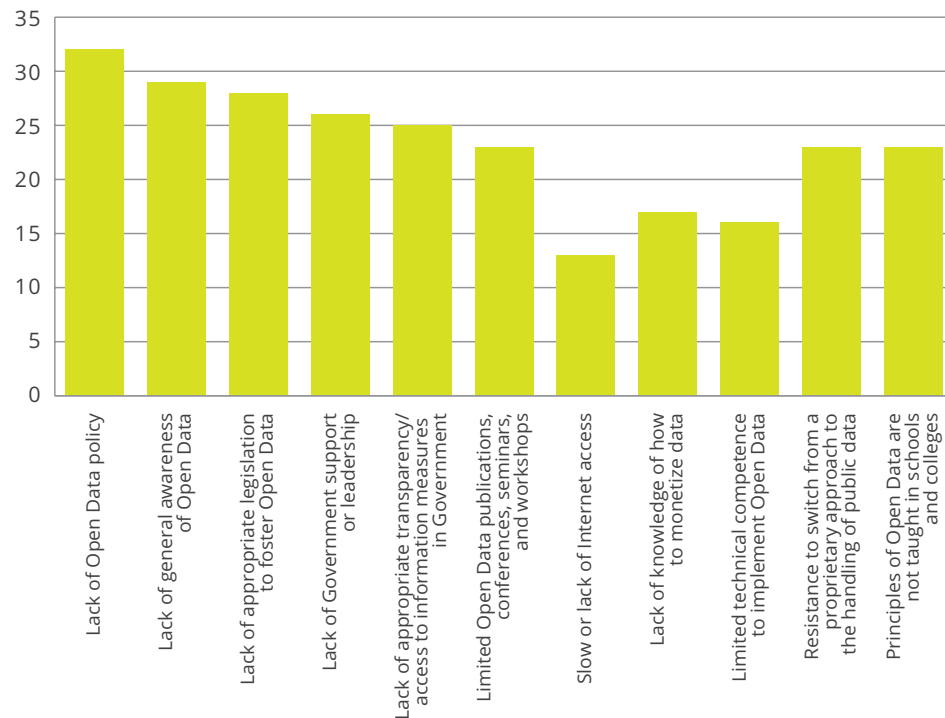


Figure 12 Responses to most important barriers to OD adoption



Barriers to Adoption

Figure 12 shows factors that respondents considered the most important barriers to OD adoption. The absence of policy, lack of awareness of OD, and inadequate legislation to foster adoption were the three most frequently selected reasons. Conversely, factors such as limited Internet connectivity, inability to monetize data, and limited access to OD publications and meetings were not considered especially important contributors to limited adoption of OD in the region.

Benefits and Usefulness of Open Data

The majority of respondents (around 85%) indicated that their countries would benefit from implementing policies that promote and support use of OD in the following ways:

- 1) More efficient use of available resources;
- 2) Improved transparency;
- 3) Better research, due diligence and data processing;
- 4) Better decision making; and
- 5) Greater innovation and improved service delivery.

Over 80% of respondents were of the view that OD would be useful to their organizations. They noted that greater access to information would foster, *inter alia*, innovation, research, planning, analysis, and projections. However, well over half (62%) indicated that their organizations had not implemented OD policies or systems.

Recommendations for UNESCO

To improve adoption of OD, respondents suggested that UNESCO could offer the following types of support:

- 1) Implementing initiatives to increase awareness of the need for OD systems among policy makers and senior government officials;
- 2) Providing technical assistance in formulating OD policies and systems;
- 3) Making available training and other forms of technical support; and
- 4) Sponsoring a pilot project to create an OD repository.

Respondents cautioned against a ‘one-size-fits-all’ approach regarding initiatives that might be implemented, noting that

what might work for one institution might not work for another. Additionally, there was concern about the impact of copyright and intellectual property rights on OD schemes, along with matters related to transparency of the process. For example, who decides what data should become open, and what data cleansing process (if any) should be adopted?

Open Standards. These questions were intended to:

- 1) Measure respondents' awareness and understanding of the term OS;
- 2) Explore levels of OS implementation and barriers to implementation; and
- 3) Identify ways in which UNESCO can support the increased use of OD.

2.4 Open Standards

Questions 22 to 27 in the survey explored

Awareness and Understanding

Respondents were least aware of this concept, which was less well understood than FOSS or OD.

Figure 13 Level of awareness about the term 'Open Standards'

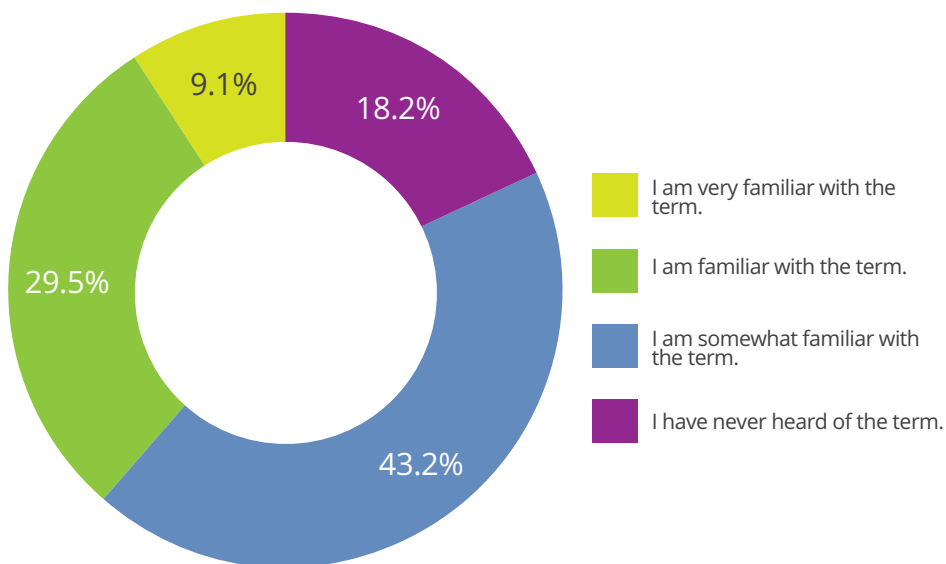
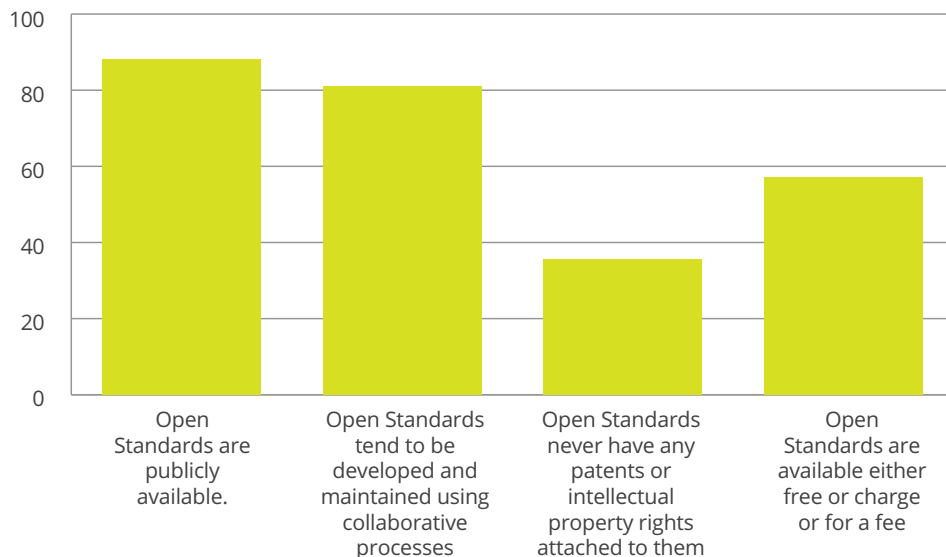


Figure 14 Understanding of Open Standards



Levels of Implementation and Barriers to Adoption of OS

When asked about levels of adoption of OS in their organizations, some 65% of respondents indicated that ‘there was no adoption of Open Standards’, while only 12% indicated some level of adoption. Participants noted that the primary barriers to the adoption of OS were lack of awareness, lack of information, and absence of policies on OS.

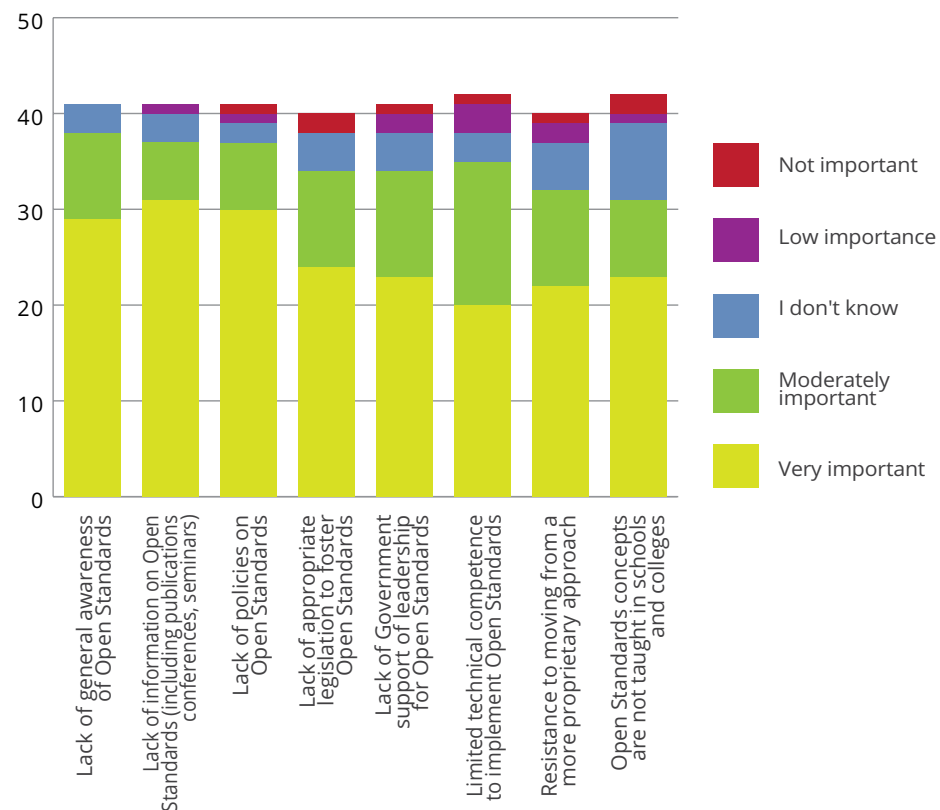
Recommendations for UNESCO

Participants made several suggestions about potential UNESCO activities, including: increasing awareness through seminars and workshops; provision of training; providing examples of best practices; and development of policy frameworks. The strongest recommendation by far was that UNESCO should focus on increasing awareness of the term ‘Open Standards’ through seminars and the development of policy frameworks.

2.5 Summary of Survey Data

The survey collected information on awareness of, use, and implementation of FOSS, OS, and OD in the 17 countries designated for the study. The 68 participants provided responses to some 27 questions over an eight-week period. Most participants worked in government or higher education institutions. In general, survey respondents had a good understanding of FOSS and there was some implementation of FOSS in the surveyed sectors. The most common uses of FOSS were for e-learning (Moodle), web browsing (Firefox), and server side technologies (for example, Apache and Linux). There were very few existing policies on FOSS, but most participants believed that their organizations would benefit from implementation of policies to support FOSS. In comparison, levels of awareness and use of OD were lower than FOSS, and there was no evidence of existing policies. Most respondents

Figure 15 Barriers to adoption of OS



understood the concept of OD, and believed that creation of policies supporting implementation and use of OD would be beneficial. There was some indication that country data was available to the public, but almost half of the respondents indicated that there was only limited access to such data. OS was generally less familiar than either FOSS or OD and generally not used in the countries surveyed.

The primary barriers to adoption of FOSS, OD, and OS were identified as lack of awareness (especially of appropriate software in the case of FOSS), absence of supporting policies, and lack of technical support.

3 | Country Summaries and Select Regional Initiatives

This chapter presents key findings about FOSS, OD, and OS in each of the 17 countries specified for this study. The findings were drawn primarily from desk research, but, in the following six countries, this was augmented by in-country meetings and discussions: Antigua and Barbuda; Barbados; Curaçao; Jamaica; St. Vincent and the Grenadines; and Trinidad and Tobago. Additionally, country summaries have benefited from stakeholder review and have been amended to reflect the status of FOSS, OD, and OS as of July, 2013. The chapter concludes with summaries of select regional initiatives and organizations that are currently strong advocates for FOSS, OD, or OS, or have the potential to have a regional impact.

3.1 Antigua and Barbuda

FOSS

The *National Policy on Information and Communication Technology (ICT)*¹⁶ outlines the government's desire to increase access to ICT for the people of Antigua and Barbuda and to use ICT to provide economic opportunities. However, this policy does not specifically mention the use of FOSS, OS, or OD.

There is some awareness of FOSS in the government sector, mainly in the Ministry of Telecommunications, Science Technology, and ICT. Although there is no overarching policy, this Ministry is using FOSS for server side applications in some locations and has expressed interest in the use of FOSS. Earlier attempts had been made to implement the use of Open Office, but high levels of resistance forced the abandonment of the project.

Discussions with the Ministry of Education, Youth, Sports, and Gender Affairs (MOEYSG) suggested that there is an emergent awareness of FOSS in this Ministry. Currently Microsoft products are used heavily for both server-side and desktop applications, although

there is some use of FOSS for e-learning, browsers, and server-side applications. However, given the increasingly strict requirements of Microsoft for licensing of its products, the MOEYSG is seeking alternatives in some sectors in an effort to reduce licensing costs. There is an increasing recognition of the dependency of the Ministry on proprietary software, but insufficient awareness of open source alternatives. The use of Ubuntu is being explored, and some members of staff have completed a course on Ubuntu with the Commonwealth of Learning (COL). OpenSIS is also being considered as a replacement for AbuStar, which is the current education management information system (EMIS).

Secondary students in Forms 4 and 5 have been issued tablets running open source operating systems, and MOEYSG staff members are exploring use of Open Educational Resources (OER) as a means of providing educational content to those students. In March, 2013, UNESCO and COL jointly sponsored two workshops on the development of a national policy on ICTs and OER, entitled *An ICT in Education Policy for Antigua and Barbuda*. This new policy (which was approved by the Cabinet in June, 2013), and the *Antigua and Barbuda Draft Strategies for Implementing ICT Policies in The Education System of the Organization of Eastern Caribbean States (OECS)*¹⁷ were the only two policies outlining the use of ICT in education. *The ICT in Education Policy for Antigua and Barbuda* policy speaks strongly to the government's commitment to the use of ICT and OER, although it does not explicitly specify the use of FOSS.

Moodle (an open source learning management system) is currently in use at the Antigua State College, the Antigua and Barbuda International Institute of Technology, and at the Antigua and Barbuda Hospitality Training Institute.

MOEYSG staff indicated that there are

16 Ministry of Information, Broadcasting and Telecommunications (n.d.). *Antigua and Barbuda Information and Communication Technologies (ICTs) Draft Policy*. Retrieved from http://www.carib-is.net/sites/default/files/Antigua_ICT_Policy.pdf

17 Ministry of Education, Culture and Technology (2003). *Antigua and Barbuda Draft Strategies for Implementing ICT Policies in The Education System of the OECS*. Retrieved from <http://redgealc.org/download.php?len=pt&id=2945&nbre=ICTPolicyAB.doc&ti=application/msword&tc=Contenidos>.

several problems for which they would be willing to explore FOSS solutions, including:

- 1) Provision of secure communication between the Ministry and all school principals (i.e. email and the development of an educational portal);
- 2) Implementation of Moodle as a learning management system to serve all schools in Antigua and Barbuda;
- 3) A need to collect data on student performance in order to ensure timely interventions (for example, through the use of Mahara for portfolio development); and
- 4) A need to enable teachers to embed ICT into their pedagogy through the use of OER and to create and share educational materials using ICT.

There was no evidence of the use of FOSS in the National Parks Antigua Department, or in the Nelson's Dockyard Museum, although some interest was expressed in this regard. The Department is open to seeking OSS solutions to various problems, including the publication of a peer-reviewed journal and development of a scalable, searchable database of all the museum's artefacts.

Open Data and Open Standards

In March 2013, the World Bank and Caribbean Open Institute partnered to do an assessment of the readiness for implementation of OD in Antigua and Barbuda in several governmental ministries and departments. The assessment was done by interviewing individuals to determine what types of data were available, identifying the form of that data, and deciding whether it would be feasible to make the datasets open. This data would be carefully selected so as to be non-sensitive and would be depersonalized. Possible datasets include financial information, procurement data, and statistics on education, health, labour, and agriculture, as well as information from the National Office for Disaster Services. Most persons interviewed were amenable to the idea of sharing data, although some departments were selling access to data

as a means of earning income and thus were reluctant to make that data freely available.

There was little indication that FOSS, OD, or OS were being used in the National Parks department, although the idea of openly sharing heritage information was deemed a worthy goal. There has been an attempt to share Geographic Information System (GIS) information on the location of archaeological spots with other government entities, but this was largely unsuccessful. One challenge with use of open data in this context is that the museum uses its information to create several publications that are sold to patrons to generate income. With the open publishing of information, this significant source of funding for the museum may be lost.

Participants also emphasized that this type of open data sharing was not part of the culture of Antigua and Barbuda, and therefore there would need to be some type of culture change to successfully implement this new concept. A vignette illustrates this attitude towards sharing of data. Research was being done by interns on the causes and rates of mortality in Antigua and Barbuda by race over the past 200 years. No identifying data was being collected, but staff at the Archives reportedly refused researchers access to the data because they did not 'like this kind of morbid research – you all go outside and don't come back'.¹⁸ It was mentioned that a two-pronged approach was being used to change attitudes, both top-down (starting with Cabinet ministers), and bottom-up.

3.2 Bahamas

FOSS

There does not appear to be any national policy or legislation mandating the use of FOSS in the Bahamas. Use of FOSS appears to be almost exclusively driven by the private sector.

¹⁸ Interview data, 2013.

Open Data and Open Standards

The Bahamas does not appear to have any legislation or policy framework to support access to technical standards and to public information/freedom of information.¹⁹ With regard to government-collected data, the Department of Statistics website²⁰ has published compiled reports for a number of sectors (for example, economics, labour, population and census, tourism, and trade) in a non-editable format. However, the published statistics are not consistently kept up-to-date. For example, while the statistics for the Consumer Price Index and labour market were updated in March, 2013, the most recent tourism statistics published were from August 2008.

3.3 Barbados

FOSS

Barbados has a national policy entitled *The National Information and Communication Technologies (ICT) Strategic Plan of Barbados 2010-2015*,²¹ but this policy only mentions that FOSS should be used in addition to proprietary software. Nevertheless, there is considerable awareness of FOSS in the government and tertiary education sector, although this does not always translate into heavy use. There is some use of FOSS for server-side applications and as a temporary replacement for Microsoft Office, but, with the exception of e-learning, none of the organizations canvassed had adopted FOSS beyond an individual level. People interviewed suggested that individuals abhor change and are comfortable with the proprietary

software, despite the significant cost attached to licence renewal.

One example of the challenges accompanying implementation of FOSS was the introduction of Moodle for e-learning at three institutions in Barbados: the Barbados Community College, the Erdiston Teachers' College, and the Samuel Jackson Prescod Polytechnic (SJPP). The project was conceptualized as a solution to the problem of limited access to tertiary education at the three institutions. It was envisioned that use of e-learning could increase access, and thus the project began in 2009. In order to reduce costs and reap the benefits of scale, a shared services model was developed in which the Higher Education Development Unit (HEDU) of the Ministry of Education and Human Resource Development provided the software, paid hosting costs, and offered some support to the institutions free of charge. Project activities included deployment of the e-learning system, training for instructors and technical support staff, creation of centralized supporting structures, development of an e-learning policy guideline, and creation of a joint e-learning committee.

At present, use of the e-learning platform is uneven across the three institutions, with some use by instructors at all three. However, the SJPP is the only one with a structure that supports institutional course development and delivery. Factors that have prevented more widespread adoption include:

- 1) Lack of awareness of e-learning at the level of leadership and staff;
- 2) Absence of strong support from institutional leadership;
- 3) Omission of e-learning from the strategic plans of the institutions and subsequent lack of appropriate planning and resource allocation;
- 4) Lack of resources to support e-learning; and
- 5) Lack of institutional policies to support e-learning.

HEDU is also considering OSS solutions for project management and is using FOSS in small ways on the network (for example, use of Spiceworks for monitoring).

19 Taylor, K. (2011). *A Review of Freedom of Information, Data Protection and Open Data in the Caribbean*. p. 4–6. Retrieved from <http://www.scribd.com/doc/66799430/OpenDataCaribbean220911-V1>.

20 Department of Statistics (2013). *Bahamas Department of Statistics*. Retrieved from <http://statistics.bahamas.gov.bs>.

21 Ministry of Economic Affairs, Empowerment, Innovation, Trade, Industry, and Commerce (2010). *The National Information and Communication Technologies (ICT) Strategic Plan of Barbados 2010-2015*. Retrieved from http://www.carib-is.net/sites/default/files/Official_Barbados_National ICT_Strategic_Plan_Final.pdf.

However, most server and application software being used comprises Microsoft products. There is some possibility that the current development of a National Research and Education Network (NREN) in collaboration with the Caribbean Knowledge and Learning Network (CKLN) may spark increased use of FOSS.

Many private companies that use or provide support to FOSS are in the website building or hosting arena. For example, PixID Inc²² is a web design and new media company that specializes in using OSS. In the private sector, FOSS is generally being used for web browsing, firewalls, email, Voice-over Internet Protocol, and server-side applications. In terms of FOSS support communities, an organization called FOSS Barbados (FOSSBAR) promotes the use of FOSS in a wide variety of applications. The organization, which was founded by Mr David Pile, had its first public presentation in 2012. At the time of writing, the official membership was fewer than 25 individuals, although there is some interest from others in joining. FOSSBAR has held public seminars to raise awareness about FOSS and has provided participants compact discs that include several FOSS programmes, as well as instructions for their installation and use.

Open Data and Open Standards

The Data Processing Department is a central support structure for several government ministries. It is not currently using or supporting OD or OS. Members of this Department expressed a strong interest in the use of Open Standards, especially in the area of document storage.

The Barbados Statistical Service (BSS) has a website²³ that publishes current statistics on a range of areas, including tourist arrivals and socio-economic data. At present, this data is presented in Portable Document Format (PDF)

for download from the website. Some archived data is available for purchase, but most data on the site is freely available. The BSS is currently developing a capability to present searchable data from the 2010 Population and Housing Census on its website.

One of the aims of the Barbados Meteorological Office is to 'provide meteorological and related data, information, forecast, warning, and advisory services on a national basis'.²⁴ To that end, it provides climate data online in various formats, but it does not appear that any of these formats is editable.

In summary, there does not seem to be evidence currently of the use of open data or open standards in Barbados, nor were any policies found in this area.

3.4 Belize

FOSS

Belize has a long history of using FOSS, starting with a workshop on Linux in 1997.²⁵ Following the workshop, there were initiatives, such as the Belize Internet Task Force, to encourage Internet access in schools across Belize, but they were initially short-lived. However, since 2006, Belize has been participating in Software Freedom Day (<http://softwarefreedomday.org/>), which aims 'to educate the worldwide public about the benefits of using high quality FOSS in education, in government, at home, and in business'.²⁶

The Government of Belize (GOB) recently published a draft *National ICT Strategy, 2011—2016*, which reportedly has not yet been finalised. No mention is made in this report of FOSS and/or any efforts to promote its use in Belize. However, the Government did acknowledge that, in relation to e-government, Microsoft

22 PixID Inc. (2013). *Passion + Function + Creativity = The PixID Way*. Retrieved from <http://pixidinc.com/>

23 Barbados Statistical Service (2013). *About us*. Retrieved from <http://www.barstats.gov.bb/census/>.

24 Barbados Meteorological Office (n.d.). Barbados Weather Climate Data. Retrieved from <http://www.barbadosweather.org/about.php>.

25 Linux.bz. (2013). 1997-2007 Ten Years of Software Freedom Activities in Belize. Retrieved from <http://linux.bz/sfd/history/en>.

26 Software Freedom Day. (n.d.). About SFD. Retrieved from <http://softwarefreedomday.org/en/sfd>.

Office was the most widely used office productivity/automation software, but in the majority of instances, that application is unlicensed.²⁷ To resolve this problem, a strategy has been proposed to establish a Government Software Warehouse, which would 'focus on the coordinated development and acquisition of computer applications to be used across GOB ministries, departments and agencies'.²⁸

Open Data and Open Standards

Belize has enacted the Freedom of Information Act 1994, which was amended in 2000. The Act does specify the types of documents that are exempt from the legislation, but it is not entirely clear to what extent government ministries and other agencies are required to make information publicly available and the types of information that should be made available. Nevertheless, the legislation does enshrine the right of individuals to access government information:

9. Subject to this Act, every person shall have a right to obtain access in accordance with this Act to a document of a Ministry or prescribed authority, other than an exempt document.

*10. Where –
(a) a document is open to public access, as part of a public register or otherwise, in accordance with another enactment; or
(b) a document is available for purchase by the public in accordance with arrangements made by a Ministry or prescribed authority, the access to that document shall be obtained in accordance with that enactment or arrangement, as the case may be.*²⁹

The Statistical Institute of Belize has data for a broad range of indicators (such as census, labour force, national accounts,

and trade) available on its website.³⁰ Although the information provided might be detailed for some indicators, it is published in a non-editable format, and, in some instances, has been placed within the framework of a report.

There is no evidence that OS has been implemented or adopted in Belize.

Success Story: OSS at Corozal Community College

Corozal Community College (CCC) is one of the leading secondary schools in Belize. It offers junior college, high school, and adult continuing education to over 1,500 students. In 2004, to meet growing demand for access to computing facilities, the College developed and implemented an ambitious plan to expand its computer and network infrastructure from a single 35-station computer laboratory to four computer laboratories, approximately 200 workstations, mobile devices, and other structures and facilities.³¹

The CCC credited successful implementation of its plan on its use of OSS whenever possible, which in turn allowed it to use most of the budget to purchase quality hardware and infrastructure. This also accelerated rollout. Through the new laboratories, every student now has access to a computer without having to share.³² The table below lists key software applications (both proprietary and Open Source) used at the institution.

27 Ministry of Public Service, Governance Improvement, Elections & Boundaries, and Sport (2011). Belize National ICT Strategy, p 32. Retrieved from <http://www.belize.gov.bz/public/Data/1102716565571.pdf>

28 *Ibid*, p 59.

29 Law Revision Commissioner (2000). Freedom of Information Act, CAP 13, Laws of Belize, ss. 9–10. Retrieved from <http://www.wipo.int/wipolex/en/details.jsp?id=8782>.

30 Statistical Institute of Belize (2010). *Statistical Institute of Belize*. Retrieved from <http://www.statisticsbelize.org.bz/dms20uc/Main.asp>.

31 Corozal Community College (2013). *Open Source Software in Education (A success Story)*, pp. 1-3.

32 *Ibid*, p. 6.

Table 3 *Software applications used by CCC*

Software Type	Applications In Use
Operating Systems	<ul style="list-style-type: none"> • Ubuntu Server LTS (Servers) • Ubuntu GNU/Linux and Windows (Workstations)
Workstation Software	<ul style="list-style-type: none"> • OpenOffice • Free compilers • Mozilla Firefox • Etc.
Network-Based Services	<ul style="list-style-type: none"> • File server capabilities using SAMBA and NFS • Student Information System using MARKUS • Databases using MySQL • Domain name service using Bind • DHCP server using ISC-DHCP server • Distributed Block devices (Network Raid 1) using DRBD • Cluster management using Heartbeat • Web server using Apache • Network time management using NTP • Proxy, firewall and content filtering using Squid and Dansguardian integrated into Pfsense • VPN service using OpenVPN • Backup service using custom scripts implementing Rsync • Helpdesk service using Hesk • Inventory and asset tracking using OCS Inventory NG and GLPI • Authentication and Domain control using Samba • Print Server and print accounting using CUPS and Jasmine • Virtual campus powered by Moodle LMS

Finally, CCC noted that using OSS has yielded several benefits, including:

- 1) Improved Total Cost of Ownership, since the institution was able to invest in its hardware requirements, rather than software;
- 2) Greater freedom to customize the network and its components to satisfy its needs;
- 3) Increased opportunities for learning by the technicians implementing the systems, and for flexibility and innovation in how products are used;
- 4) Extension of the effective life cycles of some of the hardware, since Open Source products tend to work with older equipment; and

- 5) Access to free technical support available through the OSS community, which greatly augmented the skills and expertise that were available locally.³³

3.5 British Virgin Islands

FOSS

No national policies were identified which indicated support for the use of FOSS in the British Virgin Islands (BVI). The Government of the BVI appears to be using FOSS for its website and the H. Lavity Stout Community College is using

³³ *Ibid.*

FOSS various ways, including in e-learning (Moodle), for its website, and for some aspects of library services. There does not appear to be much use of FOSS by the Government of BVI.

Open Data and Open Standards

The Department of Disaster Management, British Virgin Islands provides weather data online,³⁴ but does not appear to supply significant archived climatic information for use by the public. The Developmental Planning Unit has a website³⁵ which will provide information on balance of payments, social, and demographic statistics and will also allow for data requests to be made. The data that is currently available is presented in Microsoft Excel and PDF formats. The site appears to be in an early stage of development, since, at the time of writing, none of the projected data was available. Thus, there does not appear to be any evidence of widespread use of OD or OS in the BVI.

3.6 Cayman Islands

FOSS

There does not appear to be any active, nationally driven initiative for FOSS in the Cayman Islands. Although there might be small-scale and isolated use of FOSS, such as by the local ICT Regulator, early reports suggest that there might be a greater emphasis on proprietary software because of the country's significant banking and legal base, and the need to manage technical support and legal concerns.

Open Data and Open Standards

The Cayman Islands enacted the Freedom of Information Law, 2007, which, subject to certain exceptions, applies to public authorities and records held by public

authorities.³⁶ The law seeks to ensure that 'every person shall have a right to obtain access to a record other than an exempt record'³⁷ without having to give a reason for their request.³⁸ The Law also established the Office of Information Commission, which is empowered, amongst others, to monitor compliance with the legislation, and hear and investigate and rule on disputes.³⁹

The Economics and Statistics Office (ESO) is a key data collection and processing agency of the Government of the Cayman Islands. On the agency website, various reports have been published in a non-editable format on a broad range of subjects, including: population and vital statistics; annual and quarterly economic data; consumer price index; labour force surveys; and overseas trade.

The ESO also publishes the *Annual Cayman Islands Compendium of Statistics*,⁴⁰ on its website. It is a compilation of data from most, if not all, government institutions and associated organizations. Hence all major sectors are represented, resulting in a comprehensive picture of the Cayman Islands.

3.7 Curaçao

FOSS

Although there is record of Linux training in Curaçao from as early as 2002, FOSS use appears to be almost exclusively driven by the private sector. The Government of Curaçao has an enterprise licence agreement with Microsoft Corporation and hence has established a strict policy regarding the use of that proprietary software across public agencies.

However, public sector organizations do use free, but proprietary, software, OSS, and FOSS applications for specialized

34 Department of Disaster Management British Virgin Islands (2013). *Hurricane Season*. Retrieved from <http://www.bviddm.com/>.

35 BVI Developmental Planning Unit (2013). *Statistics*. Retrieved from <http://www.dpu.gov.vg/>.

36 Government of the Cayman Islands (2007).s. 3(1) *The Freedom of Information Law, 2007, Laws of the Cayman Islands*. Retrieved from <http://www.infocomm.ky/images/documents/FOI%20Law.pdf>.

37 s. 6(1), *ibid*.

38 s. 6(3), *ibid*.

39 ss. 35 and 29, *ibid*.

40 Economics and Statistics Office (2012). *The Cayman Islands Compendium of Statistics*. Retrieved from <http://www.eso.ky/docum1/docum161.pdf>.

activities necessary in the conduct of their functions, especially if they are widely used in their field, or might be considered an industry norm. For example, the Central Bureau of Statistics uses Joomla for its website, and also uses CSPro, which is free, but not open, software, for census and survey processing. Likewise, the National Archives uses AtoM (Access to Memory), which is an OSS application.

Additionally, due to the historical links between countries in the Dutch Caribbean, some public and non-governmental organizations, such as the National Archives, the National Museum, and the University of the Netherlands Antilles (UNA) Library, have sub-regional projects for which affordable and reliable FOSS applications are being used. However, a challenge that has been experienced, particularly by the UNA Library, which is spearheading the Dutch Caribbean Library Association, is securing access to the expertise needed to customize the ABCD software programme for use by all of the participating institutions.

Concern was expressed by government agencies in particular on possible challenges in accessing the requisite technical expertise to customize and maintain FOSS generally, especially in Curaçao. There was also a recognition that training on the use of FOSS/OSS applications is limited in Curaçao, and may need to be supported for greater adoption. Additionally, although cost has been a consideration in selecting free (but not necessarily open) software, personnel at some agencies readily admitted that they were not aware of FOSS options that might be available for their particular sector or discipline.

From the discussions held, there appeared to be little government support for openness in Curaçao. However, two organizations exist that do support open initiatives:

- Open Curaçao (www.opencuracao.com), a private foundation and a key advocate for increased use of open systems in Curaçao. Although its members are all volunteers, the organization has developed a spell checker in Papiamentu, which it

plans to upgrade. It also intends to embark on a programme to increase awareness of open systems, and to access funding through which to implement other projects.

- Stimul-IT (www.stimul-it.com), a government-funded organization that executes a range of IT development initiatives, especially software applications training, in Curaçao. It is a supporter of, and has incorporated into its curriculum, OSS options. The organization is also involved in the One-Laptop-per-Child initiative that is being piloted in Curaçao.

Open Data and Open Standards

Curaçao has not instituted any policies promoting OD and OS. The Central Bureau of Statistics (CBS) makes summary data for a broad range of indicators publicly available on its website (<http://www.cbs.cw>) in a read-only format. Datasets and metadata may be shared with individuals upon request, but the organization is concerned about confidentiality and ensuring that identifiable data for sources is removed.

Although some organizations, such as the National Museum and National Archives, are legally obliged to make their collections accessible, other public sector agencies are reluctant to share data in their possession, especially if it is being used for commercial purposes. Further, if they do share, the information is not searchable, which can limit its immediate usability.

Many government agencies that are repositories for information or data, such as the CBS, local museums and archives, have either implemented, or are proposing to implement, digitization projects to create electronic versions of existing print documents. However, many are under-resourced or lack the expertise to establish comprehensive digitization programmes that will produce searchable/indexable content. Additionally, it was noted that, to varying degrees, persons were not familiar with the term OD, or what it entails and

likely benefits, which provides a likely key reason why no policy has been established.

3.8 Dominica

FOSS

There does not appear to be any national policy on the use of FOSS in Dominica, though there is some awareness in the government sector. FOSS is being used for server-side applications, databases, and the main government website (i.e. Joomla).⁴¹ Sources indicate that FOSS has been used because of its low cost, usefulness of applications, and easy access to online support. On May 13, 2013 the government posted a request for a consultancy⁴² to test and implement an OSS health information system, the Open Medical Record System (Open MRS). This is a possible indicator that government intends to use FOSS more widely in future. Dominica's Library and Information Service is currently using Koha,⁴³ an open source library automation software which allows patrons to search library shelves online and to perform other library functions.

The Ministry of Education in Dominica is aware of FOSS, and is currently using it for server-side applications and for the student information system. The Dominica State College is using FOSS for its website, and for its e-learning platform (Moodle), as well as some server-side applications.

Open Data and Open Standards

At this point, there does not appear to be any evidence indicating widespread awareness or use of OD or OS in Dominica. There are limited statistics available

41 Government of the Commonwealth of Dominica (2013). *Web Portal*. Retrieved from <http://dominica.gov.dm/>.

42 Government of Dominica (2013). *Customization and Implementation of an Open Source Health Information System*. Retrieved from <http://dominica.gov.dm/vacancies/196-customization-and-implementation-of-an-open-source-health-information-system-his-for-dominica>.

43 LibLime (2013). *About LibLime Koha*. Retrieved from <http://www.koha.org/>.

online,⁴⁴ but these are presented in PDF format and are not current.

3.9 Grenada

FOSS

At present, Grenada does not appear to have any policies on FOSS. The only ICT policy document located was the *ICT Policy Strategy and Action Plan 2001-2005*,⁴⁵ which does not mention FOSS, OD, or OS. There is some awareness of FOSS in the government sector, where it is used for web browsers, content management (Drupal and Joomla), and intranet applications. Grenada appears to be heavily dependent on proprietary software, although the need for cheaper alternatives and avoidance of software piracy is leading government to consider other solutions. In 2011, Grenada established an ICT Centre of Excellence and Innovation with the goal of promoting ICT awareness and creating employment.⁴⁶ In March 2013, the Ministry of Education, in collaboration with UNESCO and COL, held what began as a consultation on the creation of an OER Policy,⁴⁷ but subsequently became a forum to create an integrated policy on ICT in education. This document aimed to identify a policy position on the use of ICT in teaching and learning, governance, human resources and support the use of Creative Commons licences for all educational and research content created with public funds. At the time of writing, this policy was being finalized.

Grenada has identified several issues in implementation and use of FOSS software in the government sector, which

44 Government of Dominica (2005). *Dominica Statistics at a Glance 2005*. Retrieved from http://dominica.gov.dm/images/dominica_statistics_at_a_glance_2005.pdf.

45 Government of Grenada (2009). Retrieved from <http://www.grenadagrenadines.com/media-travel-center/detail/category/tourism-statistics/>.

46 Government of Grenada (2011). *ICT Centre For Excellence and Innovation*. Retrieved from http://www.gov.gd/cei_information.html.

47 UNESCO (2013). *Drafting Open Education Resources Policy for Grenada*. Retrieved from http://www.unesco.org/new/en/communication-and-information/resources/news-and-in-focus-articles/all-news/news/drafting_open_educational_resources_policy_for_grenada/#.UgaJ6G0yj88.

included:

- 1) FOSS often requires support and maintenance that may incur significant costs, and thus the total cost for FOSS is not as easily determined as proprietary software;
- 2) Few opportunities are provided to local developers to bid for government projects that require the development of FOSS solutions; and
- 3) Local and regional curricula do not provide individuals the skills to develop FOSS solutions rapidly.⁴⁸

There is some awareness about FOSS in the higher education sector, namely at the T.A. Marryshaw Community College, where FOSS is being used for the website (Joomla), for e-learning (Moodle), and some server-side applications.

Open Data and Open Standards

Grenada does have a statistical department, but does not appear to publish data on the government website. Only a few tourism statistics from 2009 were available,⁴⁹ and these were presented in PDF format. At this point, there is no evidence of widespread awareness about or use of Open Data or Open Standards in Grenada.

3.10 Guyana

FOSS

Guyana does include references to FOSS in its National ICT Strategy published in 2006, but no definite commitment was given for its comprehensive adoption and implementation across sectors. For example, the strategy considers:

- (a) *Open-source being included in ICT curriculum,*
- (b) *Making an effort to explore and use FOSS, and*
- (c) *Suggesting that national agencies and the ICT education sector*

48 Nurse, E. (2013). *Grenada's Position on FOSS*. Presentation presented at the UNESCO St Lucia Consultation on FOSS, OD, and OS, July 25-26, 2013.
 49 Government of Grenada (2013). *Tourism Statistics as at 2009* Retrieved from <http://www.grenadagrenadines.com/media-travel-center/detail/category/tourism-statistics/>.

*strongly consider appropriate Open Source solutions.*⁵⁰

A 2011 study examining the state of FOSS in Guyana's education system reported that, under the construct established by the National ICT Strategy, there was still limited use of FOSS in Guyana.⁵¹ In summary:

- (a) *There is no cohesion among government ministries with regard to their ICT direction;*
- (b) *There is no common approach or policy among schools regarding what software is used;*
- (c) *Among schools and the Ministry of Education, the core platform is Microsoft- based, though there is latitude regarding secondary applications;*
- (d) *Comprehensive training on FOSS tools is not available; and*
- (e) *There is a concern about the cost of training teachers to use FOSS.*⁵²

Hence, similar to other jurisdictions, FOSS use in Guyana appears to be primarily driven by the private sector. Public authorities may be using FOSS applications, but not within a cohesive framework across government.

Open Data and Open Standards

Guyana does not appear to have an official policy promoting OD or OS. Through its website,⁵³ the Bureau of Statistics provides data on a number of indicators, but, like most other countries, summary reports are available and published in a read-only format.

3.11 Jamaica

FOSS

In Jamaica, FOSS use is more evident

50 ICT4D (2006). *Guyana National Strategy: Final draft*. Retrieved from <http://unpan1.un.org/intradoc/groups/public/documents/tasf/unpan024899.pdf>.

51 Singh, L and Williams, M (2011), *Free and Open Source Software (FOSS) in Education: A Guyana Perspective*, an e-Conference Presentation for the Caribbean Educators Network on 13 August, 2011.

52 *Ibid.*

53 Guyana Bureau of Statistics (2013). *Home*. Retrieved from <http://www.statisticsguyana.gov.gy>.

in the private sector and in tertiary education institutions than in the public sector. The Government of Jamaica has established an enterprise licensing agreement with Microsoft Corporation, which covers use of the latter's office productivity applications, along with other select software products.

At tertiary education institutions, such as the University of the West Indies (UWI), Mona Campus, a policy has been adopted to use FOSS whenever practicable. UWI has had longstanding tradition of using FOSS, especially for back-office and operational purposes. It also reportedly rewrote the chat plug-in component for Moodle, which is now standard in the application. Other colleges and universities might not have such an official position, but FOSS use is encouraged in both the academic and operational spheres.

At the primary and secondary levels, a cohesive network to connect schools in Jamaica is absent. However, through e-Learning Jamaica Co. Ltd., which has been executing projects to computerize and provide Internet access to primary and secondary schools across Jamaica, a comprehensive e-learning platform using Moodle has been established based on the Caribbean Secondary Examination Certificate (CSEC) curriculum.

In light of existing relationships between proprietary software vendors, the Government of Jamaica did not establish any position regarding use or adoption of FOSS in its 2011 National ICT Policy. However, in the Master Implementation Plan, which has been informed by the country's national development plan,⁵⁴ mention is made of promoting the use of FOSS across all sectors of society.⁵⁵ The strategy, which was rolled out in 2007, focused on the completion of a then ongoing FOSS pilot project, the output of which would have determined 'the strategic direction for the promotion and use of open source technologies, firstly in the public sector, an[d] the wider society'.⁵⁶ The findings or outcomes of that pilot project, which should have

been completed by 2008, have, however, not been made public.

However, with financing from the International Telecommunications Union, the Ministry of Science, Technology, Energy, and Mining is conducting a project to develop a FOSS policy framework for Jamaica. The project, which was scheduled to run from July 2013 to December 2013, aims at:

*Facilitating the development of a National Governance framework and Policy guidelines for public and private sector enterprise adoption of Free and Open Source Software in Partnership with the Government of Jamaica.*⁵⁷

Key deliverables for the project include:

- 1) Preparing an inception report outlining the allocation of resources and the plan for knowledge transfer to the Government of Jamaica;
- 2) Conducting a critical review of the previous FOSS pilot project and producing a report on the same;
- 3) Developing a FOSS migration strategy and corresponding guidelines;
- 4) Implementing three pilot projects to validate and adapt the FOSS migration methodology;
- 5) Preparing a FOSS National Governance Framework and Policy Guidelines.⁵⁸

However, people highlighted various challenges that could affect wider adoption of FOSS in Jamaica. These included:

- 1) Absence of a clear government policy on FOSS use by the Government of Jamaica as a best practice user;
- 2) The fact that some government agencies, such as the Ministry of Finance, have customized extensively, and developed plugins for, currently-used applications, such as Microsoft Excel, which would be expensive

57 CITO (2012). *Free Open Source software ('FOSS') Policy Framework for Jamaica*, p 1. Retrieved from http://www.itu.int/net/ITU-D/CDS/gq/generic/asp-reference/gq_file_download.aspx?FileID=1142.

58 Robinson, J. (2013), Information and Communication Technologies (ICTs) as an enabler for growth and development: Sector Debate Presentation, 28 May 2013, p 20. Retrieved from http://www.julianjrobinson.com/uploads/2/1/8/4/218445/jjr_sectoral_debate_presentation_2013_final_-_ict_as_enabler_for_growth_and_development.ppt.

54 Planning Institute of Jamaica (2012). *Vision 2030 Jamaica*. Retrieved from <http://www.vision2030.gov.jm/>.

55 CITO (2007). *e-Powering Jamaica: Draft Master Implementation Plan*, p 5. Retrieved from http://www.cito.gov.jm/files/file/Master%20Implementation%20Plan%20EPJ%202012%20draft_Dec07.pdf.

56 *Ibid.*

- and disruptive to replace;
- 3) The need for comprehensive training;
 - 4) The likelihood that 'brand snobbery' or concerns regarding use of 'inferior software' will be demonstrated, which could thwart adoption efforts in some quarters.

Open Data and Open Standards

In 2002, Jamaica promulgated the Access to Information Act, which has the objectives of fostering accountability among public authorities, along with transparency and public participation in decision-making, by, subject to certain exemptions, granting the public access to official documents held by government organizations.⁵⁹ However, there is no official policy promoting or mandating

⁵⁹ s. 2, Access to information Act, 2002, Laws of Jamaica. Retrieved from http://www.jis.gov.jm/special_sections/ATI/ATIACT.pdf.

OD or OS in Jamaica. Consequently, public sector organizations tend to have considerable latitude regarding the types of data, and the extent to which said data is made publicly available. The table below summarizes known OD repositories in Jamaica.

Although some OD portals do exist and there is access to information legislation in Jamaica, there is a general sentiment that government agencies are reluctant to share the full breadth and depth of the information in their possession. A possible reason for this position is that they recognize the value of that information, but have been unable to develop viable models through which to monetize it. Organizations also institute constraints under which data supplied can be used, for example, stipulating that it must be used for research purposes only and charging for the retrieval and processing of information to satisfy data requests.

Table 4 Select OD portals in Jamaica (Sources: K. C. Taylor⁶⁰ and portal websites)

Portal	Website	Summary
Data.org.jm	http://data.org.jm	An agriculture-based data catalogue that includes farm data, crop data, and crop retail prices.
DSpace at the University of the West Indies, Mona	http://dspace.mona.uwi.edu/	Provides access to the outputs of the UWI.
Edward Seaga Database		
Collection	http://macrodata.org/	A compilation of over 700 of the most important macroeconomic and social variables for Jamaica between 1950 and 2010.
eJamaica.org Public Digital Repository	www.ejamaica.org/library/	A public digital repository for information about Jamaica.
Mona Online Research Database	http://mord.mona.uwi.edu/	Provides research information from the UWI.
Sports.data.org	http://sports.data.org	An Open Data Webservices API that provides access to data relating to Jamaican sports.

⁶⁰ Taylor, K (2011). A Review of Freedom of Information, Data Protection and Open Data in the Caribbean, p. 15. Retrieved from <http://www.scribd.com/doc/66799430/OpenDataCaribbean220911-V1>.

The above scenario does suggest that Jamaica is not yet an OD-oriented society, which was also intimated by government officials. In government, and possibly more specific e- government, the focus tends to be on services and not necessarily providing access to data. Additional challenges or gaps that were highlighted included:

- 1) Absence of a clear OD policy by Government;
- 2) Absence of a clear OD/information-sharing policy in Government, both within and between government agencies; and
- 3) Limited technical knowledge (and support) to implement digitization initiatives, which a number of agencies have been considering.

However, the Government of Jamaica is currently participating in an OD initiative, in which OD will be used to create software applications. A pilot project will be implemented for agriculture through the Rural Agriculture Development Authority, running from July to December 2013, and is being spearheaded by the Mona School of Business and Management at UWI.⁶¹

Additionally the Government has indicated that it plans to establish an Open Government Data Portal, which should commence in December, 2013.⁶² However, limited information has been made publicly available regarding the process and resources needed for this activity.

3.12 Saint Kitts and Nevis

FOSS

The *National Information and Communications Technology Strategic Plan*⁶³ indicates that FOSS should be used in

61 Robinson, J. (2013), *Information and Communication Technologies (ICTs) as an enabler for growth and development: Sector Debate Presentation*, 28 May 2013, p 44. Retrieved from http://www.julianjrobinson.com/uploads/2/1/8/4/218445/jjr_sectoral_debate_presentation_2013_final_-_ict_as_enabler_for_growth_and_development.ppt.

62 *ibid.*

63 Office of the Prime Minister, Government of St. Kitts and Nevis (2006). *National Information and Communications Technology (ICT) Strategic Plan*. Retrieved from <http://unstats.un.org/unsd/dnss/docViewer.aspx?docID=2297>.

the public sector along with proprietary software as appropriate. Although it is not widely used, there is awareness of FOSS in the Government of Saint Kitts and Nevis. Government sources there indicated that there was some interest in FOSS, but there was uncertainty about how to use FOSS more widely and that the acquisition of resources was problematic. At present, FOSS is being used for word processing in some departments, while the new laptops being provided to students use Edubuntu and LibreOffice. In the museum and archives sector, use of computers is quite limited and there is currently no awareness or use of FOSS.

Open Data and Open Standards

There is currently no evidence of widespread awareness about or use of OS or OD in Saint Kitts and Nevis.

3.13 Saint Lucia

FOSS

The *Draft Policy for the Integration of Information & Communication Technology in the Education System*⁶⁴ describes FOSS as being useful to education and suggests several strategies about how it could be implemented. At this point, it is not clear whether this policy has been finalized or implemented. However, the National ICT office has drafted an *eGovernment Interoperability Framework for Open Source Software* document which describes a range of open source software solutions for government agencies. This document is currently being finalized and describes the 'features and rationale for inclusion and limitations of the software'.⁶⁵ The document also outlines open standards for a number of types of software, where the standards can be accessed, and the limitations of the standards. One critical feature of this document is that it outlines some key

64 Ministry of Ministry of Education, Human Resource Development, Youth and Sports St. Lucia (2003). *Draft Policy for the Integration of Information & Communication Technology in the Education System*. Retrieved from <http://unpan1.un.org/intradoctr/groups/public/documents/tasf/unpan024792.pdf>.

65 National ICT Office (2011) *eGovernment Interoperability Framework for Open Source Software*, Government of St Lucia, p. 4.

success factors and challenges, as well as a roadmap for implementation of FOSS.

The Ministry of Education, Human Resource Development, and Labour (MEHRDL) is using FOSS in some areas (i.e. Firefox, OrangeHRM for human resources management, Zimbra for email, Knowledge Tree for document management, and Joomla for some websites). Generally however, MEHRDL uses proprietary software on its servers and for most desktop applications, although there is limited use of OfficeLibre. There was an expressed need to move to wider use of FOSS, because of the expense incurred in providing licences for the approximately 7,000 computers in the schools and main Ministry offices. However, there is some resistance to use of FOSS because of the perception that, since it is free, it cannot be as 'good' as proprietary software.

There is awareness about FOSS in Saint Lucia in the private sector, but there are no formal ICT groups or communities that explicitly support FOSS. In November 2003, there was a two-day FOSS seminar entitled 'Open for Business', aimed at government and the business sector. This event was sponsored by Mr Gerry George of Digisolv Inc., (who is a strong FOSS advocate) and the office of Public Sector Reform (e-Government Project).

Open Data and Open Standards

At this point, there does not appear to be an official policy on OD in Saint Lucia, but the Ministry of Physical Development, Housing and Urban Renewal is seeking to implement the World Bank's Open Data for Resilience Initiative (OpenDRI),⁶⁶ a project that supports sharing of data to reduce the impact of disasters. In April, 2012, the Saint Lucian government launched a geospatial data web application called the Saint Lucia Integrated National GeoNode (SLING).⁶⁷ SLING uses GeoNODE (an OSS geospatial data archiving and map

sharing application) and will enable users to access maps and other geospatial data on St Lucia in a variety of formats through a searchable database.

The Meteorological Service⁶⁸ has a website that publishes current weather forecasts, but it does not appear to provide historical data. The Saint Lucian Central Statistics Office recently developed an interactive website⁶⁹ that provides current and archived statistics from several government ministries. The site also has several searchable databases that present data in Microsoft Excel or PDF formats. At the time of writing, this site was presumably still under construction (since some sections are not yet populated with data) and was using free software entitled Redatam.⁷⁰ Redatam is an acronym for REtrieval of DATA for small Areas by Microcomputer, a free programme which was developed and is maintained by the Latin American and Caribbean Demographic Centre, the Population Division of the Economic Commission of Latin America and the Caribbean.⁷¹

3.14 Sint Maarten

FOSS

There does not appear to be any national policy to promote the use of FOSS in Sint Maarten. Limited information has been found on the use of FOSS in Sint Maarten, which suggests that it is being used primarily by individuals and private institutions, but with no organized support. Sint Maarten, like Curaçao, transitioned from being part of the collective, known as the Netherland Antilles in 2010, to an individual colony of the Kingdom of the Netherlands, with responsibility for its own domestic affairs. Hence, it may still be in the process of refining the requisite policies and systems, which either have already been implemented or it intends to implement.

66 Global Facility for Disaster Reduction and Recovery (2013). *Open Data for Resilience Initiative (OpenDRI)*. Retrieved from <https://www.gfdrr.org/opendri>.

67 St Lucia Integrated National Geonode (2013). *SLING*. Retrieved from <http://sling.gosl.gov.lc/>.

68 St Lucia Meteorological Service (2013). *Forecast*. Retrieved from <http://www.slumet.gov.lc/>.

69 Central Statistics Office St Lucia (2013). *St. Lucian Statistics* Retrieved from <http://204.188.173.139:9090/stats/>.

70 Redatam (2013). *What is Redatam?* Retrieved from <http://www.redatam.org/>.

71 *Ibid.* 54.

Open Data and Open Standards

There does not appear to be a national policy to foster adoption of OD and OS. Based on information published online by the Department of Statistics, basic information for a number of topics/indications is available.⁷² However, much of the information is dated, being at least two years old. The Department also publishes a bi-annual magazine and an annual statistical yearbook, which must be purchased at its office.

3.15 Saint Vincent and the Grenadines

FOSS

The *St Vincent & the Grenadines National ICT Strategy and Action Plan*⁷³ indicates that use of OSS is limited, but suggests, in its list of strategies, that the Ministry of Education and Human Resource Development should increase its use. This document also indicates that the government will develop a policy on the use of OSS, although to date this appears not yet to have been achieved. There are varying levels of awareness about FOSS in the government and the tertiary education sector.

In March and June 2013, UNESCO and COL held consultations with representatives from the Ministry of Education and community colleges to increase awareness about the concept open access research and to develop a national policy on ICT in education, which included a component on OER. The draft policy was completed late in July, and is

now awaiting formal approval.⁷⁴

The Information Technology Services Division (ITSD) is promoting use of OSS because proprietary software has become too expensive. The current leadership of this Department has been a strong advocate for the use of FOSS for several years. The focus in ITSD is on building knowledge about FOSS amongst departmental staff. At present, ITSD is using FOSS in several areas, including virus protection, email (Zimbra), web browsers, content management (Joomla), process flow (Processmaker), rapid development (Zend framework), EMIS (Open SIS), monitoring (Nagios), operating systems such as Ubuntu, and server-side applications such as Apache. There is also some use of Edmodo for e-learning in the schools. This Department supports all other Government departments, so it would seem that potential for continued use of FOSS could be significant. Despite the strong push for FOSS, however, there is still resistance from individuals and the pace of change is slow. There are some cases where a move to FOSS would not be feasible, since the main software application being used has been customized to meet the needs of a particular department. There is also an emerging project to develop a national ICT centre, where the intent is to produce web-based applications to support development in Saint Vincent and the Grenadines.

In the tertiary education sector, the Saint Vincent and the Grenadines Community College (SVGCC) is using FOSS heavily for a variety of purposes, including server-side technologies, website content management, (Joomla), e-learning (Moodle), the student information system, and database applications. The ICT department at SVGCC has the ability to develop and support open source programmes.

72 Department of Statistics (2010). *Official Website of Sint Maarten* <http://www.sintmaartengov.org/Government/Ministry%20of%20Tourism%20Economic%20Affairs%20Transport%20and%20Telecommunication/stat/Pages/Statistics.aspx>.

73 Government of St. Vincent and the Grenadines (2010). *St. Vincent & the Grenadines National ICT Strategy and Action Plan 2010-2015* Retrieved from http://www.gov.vc/images/stories/pdf_documents/svgictstrategyfinal.pdf.

74 UNESCO.(2013).*Developing Draft policies on Open Educational Resources and open Access in St Vincent nad the Grenadines*. Retrieved from http://www.unesco.org/new/en/communication-and-information/resources/news-and-in-focus-articles/all-news/news/developing_policies_on_open_educational_resources_and_open_access_in_saint_vincent_and_the_grenadines/#.UgaS_20yj88.

Although the Department of Libraries, Archives and Documentation Services does not currently have a policy on the use of FOSS, one of its goals is to ensure that citizens are ready and able to use ICT.⁷⁵ To that end, it is currently creating ICT policies and manuals and providing ICT rooms for students and children, as well as programmes to enable these populations to have increased access to the internet. There are ten learning resource centres across the island, which have free Wi-Fi and also support this goal. The library uses some FOSS for server-side applications and web browsers, but otherwise is using proprietary software such as Alexandria and Microsoft Office. The Department of Libraries, Archives and Documentation Services is interested in FOSS solutions and is seeking support from UNESCO to:

- 1) Use the Archivist's Toolkit⁷⁶ as a FOSS solution;
- 2) Digitize and conserve its collection (i.e. software and conservation training) so that more people can access the resources; and
- 3) Create a programme to develop ICT skills in children.

There are few ICT companies in Saint Vincent and the Grenadines, and there does not appear to be much support available for OSS in the private sector, although this may change in the near future. One notable exception is the Digital Spark Agency,⁷⁷ which uses and supports FOSS extensively. The company includes analysts, developers, and designers, and is composed of a core team of five people, led by Mr Ayodele Pompey.

Open Data and Open Standards

There does not appear to be any governmental policy on OD or OS, and

⁷⁵ Ministry of Education, Government of St Vincent and the Grenadines (2013). *Libraries - General Information*. Retrieved from http://www.education.gov.vc/index.php?option=com_content&view=article&id=36&Itemid=45.

⁷⁶ The Archivist Toolkit (2013). *The Archivist's toolkit: Home* Retrieved from <http://www.archiviststoolkit.org/>.

⁷⁷ Digital Spark Agency (2013). *Digital Spark- Meet the Spartans* Retrieved from <http://www.digitalsparkagency.com>.

little evidence of use, although study participants indicated some awareness of these concepts. The Ministry of Housing, Informal Human Settlements, Lands and Surveys and Physical Planning⁷⁸ is planning to use Geonode to support management and publication of geospatial data. The Ministry of Finance is also apparently learning towards publication of financial data, although the format has not yet been chosen. The Statistics Office has a website⁷⁹ that provides statistics in various areas, including financial data and census information. The current financial data is presented in Microsoft Excel and PDF formats, while census information is presented in a searchable database, which allows users to choose the presentation of results and to download these results in spreadsheet or PDF format. Archived financial information is presented in PDF format.

There is some understanding of both OS and OD in the tertiary education sector, however at present there does not appear to be any significant use of either of these concepts.

3.16 Suriname

FOSS

Limited information was found on the use of FOSS in Suriname, a finding corroborated by the country representative at the consultation meeting. This suggests that FOSS is being used primarily by individuals and private organizations, and there might be no established agency or group advocating for wider FOSS adoption.

Open Data and Open Standards

Desk research yielded no evidence of a formal OD or OS policy in Suriname, nor a freedom-of-information policy

⁷⁸ The Ministry of Housing, Informal Human Settlements, Lands and Surveys and Physical Planning (2013). *Background*. Retrieved from http://www.housing.gov.vc/index.php?option=com_content&view=article&id=23&Itemid=4

⁷⁹ Statistical Office, Ministry of Finance and Planning (2013). *Statistics*. Retrieved from <http://www.stats.gov.vc/>.

or framework.⁸⁰ However, when the country's General Office of Statistics website⁸¹ was examined, basic datasets (for example, population, road traffic, and labour) were available for download in editable formats, such as text and Comma-Separated-Values formats.

3.17 Trinidad and Tobago

FOSS

The Government of Trinidad and Tobago is in the process of finalizing its National ICT Plan (2012-2016), which will replace the 2008-2012 version. The focus of the new plan is on 'creating opportunities for the people and businesses and improving the quality of life'.⁸² There is no specific mention of FOSS within the document.

Similar to most countries, the Government of Trinidad and Tobago has an enterprise licence agreement with Microsoft Corporation, which covers access to and use of key frontend and some backend applications by government agencies. However on-the-ground discussions suggest that the Government has been considering OSS to broaden the choice of applications available, but an official position has not been confirmed.

Having noted this, government agencies are prepared to, and do, use OSS/FOSS for some specialized work that must be conducted under their mandate. An example of this is the National Library and Information System Authority (NALIS), which is using WinISIS (for information storage and retrieval), Greenstone (for digital library management), and DotNetNuke (for content management).

In education, software used at primary and secondary schools in Trinidad and

Tobago is covered by a campus agreement with Microsoft. Free e-learning tools are being used for the One-Laptop-Per-Student project, but there is concern that there are insufficient applications, and especially age-appropriate applications, designed for students. Trinidad and Tobago is yet to develop a comprehensive e-learning programme, but the Ministry of Education is considering using Moodle as the platform for that initiative. Rollout of this project could begin before the end of 2013.

FOSS is being used by universities in Trinidad and Tobago, although the extent of that use varies between institutions. At the very least, FOSS applications are being used for backend and operations purposes. Additionally, Computer Science students are frequently exposed to FOSS through the programme's curriculum or projects to customize software as part of their course of study.

Challenges and gaps identified in use of FOSS include:

- 1) A general lack of awareness of FOSS by key decision makers, in public and quasi-government sectors;
- 2) Absence of a clear policy on use of FOSS by public bodies in Trinidad and Tobago;
- 3) Limited awareness of FOSS-based applications that could be considered to replace (or complement) existing proprietary options;
- 4) Limited access to expertise that would be needed to customize FOSS applications to suit the needs of users, especially when they are organizations;
- 5) Absence of comprehensive training to facilitate widespread transition to FOSS;
- 6) Concerns about the likelihood of limited technical support and limited availability of tools when compared with those offered by vendors of proprietary software.

A major advocate for FOSS is the Trinidad and Tobago Computer Society (TTCS), whose members are typically computing specialists or people interested in ICT. TTCS has developed and makes freely available through its website

80 Taylor, K (2011). A Review of Freedom of Information, Data Protection and Open Data in the Caribbean, pp. 4–6. Retrieved from <http://www.scribd.com/doc/66799430/OpenDataCaribbean220911-V1>.

81 Algemeen Bureau voor de Statistiek (General Office of Statistics) (2013). Retrieved from <http://www.statistics-suriname.org/>.

82 IDA International (2007) *Draft National ICT Plan*. Retrieved from http://www.igovtt.tt/sites/default/files/National%20ICT%20Consultations%20Draft_0.pdf.

(www.ttcsweb.org), over 100 Microsoft Windows-compatible FOSS applications, organized into the following categories: desktop applications; educational; games; graphics; internet; server; sound and video; and utilities.⁸³

Open Data and Open Standards

Currently, there is no official policy position regarding OD and OS in Trinidad and Tobago, although it may be covered, albeit indirectly, through the new National ICT Plan. Trinidad and Tobago is a signatory to the Open Government Partnership,⁸⁴ which promotes, *inter alia*, increased availability of information about governmental activities and greater support for civic participation.⁸⁵

Based on information available at the Central Statistics Office website (<http://cso.planning.gov.tt/>), summary reports are published in a read-only format for a broad range of indicators. However, for many indicators, the data published online dates back to 2008. In other areas of government, such as

the Ministry of Education and NALIS, projects have been conceptualized to develop portals through which to share information. Existing OD portals are presented in the table below.

In most sectors, there is a need for assistance and guidance with regard to digitizing existing records and collections, as well as creating the requisite metadata and searchable indexes. Additionally, and among public authorities, it was noted that the absence of a clear OD policy by Government has hindered implementation of OD. Moreover, it was recognized that a complementary policy regarding OD/information sharing policy within Government – both within and between government agencies – was needed.

Success Story: mFisheries Project

Conceptualized by the Caribbean ICT Research Programme, Trinidad and Tobago (CIRPTT) at the UWI St. Augustine Campus, the mFisheries Project is an initiative that aims to use mobile applications and services to improve the lives and livelihood of people at the bottom of the economic pyramid. In the case of mFisheries, the focus is on small-scale fishing industries in the Caribbean and other developing countries, as these are typically marginalized.

In Trinidad and Tobago, where the project was conceived and piloted, local

83 Trinidad and Tobago Computer Society (n.d.). *List of Software on the DVD*. Retrieved from <http://www.ttcsweb.org/osswin-dvd/#about>.

84 As at 29 May 2013, Trinidad and Tobago had not delivered its country commitments to the Open Government Partnership (Source: Open Government Partnership website).

85 Open Government Partnership, *Open Government Declaration*. Retrieved from <http://www.opengovpartnership.org/open-government-declaration>.

Table 5 Select OD portals in Trinidad and Tobago

Portal	Website	Summary
Police Service Serious Crime Statistics	http://tpps.gov.tt/Statistics.aspx	Serious crime statistics published by the Trinidad and Tobago Police Service.
Central Bank of Trinidad and Tobago Data Centre	http://central-bank.org.tt/content/data-centre	Online repository of macroeconomic data collected by the Central Bank of Trinidad and Tobago.
National Agricultural Market Information System	http://www.namistt.com/	Real-time access to market information and intelligence on agricultural sector in Trinidad and Tobago.

Table 6 Summary of applications comprising the mFisheries suite (Source: Infonomics Society)⁸⁷

Proposed Intervention	Application Name	Function
Virtual Marketplace	Got Fish, Need Fish	Allows fisher folk to advertise catch availability to the wider public and prospective customers to indicate needs based on species and quantity; matches and facilitates contact information between interested parties.
	Prices	Displays the most recent industry prices of fish by type and market.
At-Sea Safety	http://www.namistt.com/	Real-time access to market information and intelligence on agricultural sector in Trinidad and Tobago.
Support	Global Positioning System	Provides a periodic recorded presence of the registered user to a Web server.
	S.O.S.	Sends immediate pre-defined notifications (via text messaging, email) and automatically initiates a voice call to the local Coast Guard.
	Compass	Provides a personal navigational tool.
Industry support services	Tips	Audio podcasts on fisheries-related themes.
	First Aid Training Companion	Provides short Audio-visual training videos on attending to common fisheries-related injuries.
	Camera Tool	Allows fisher folk to report injustices/grievances by uploading photographic evidence to an online database.
	Info Zone	Provides survey, feedback facilities, and links to fisheries-related information.

⁸⁷ *Ibid*, p 10.

fisher folk had been experiencing a broad range of challenges, including drastic price variations, wastage, unhygienic practices, at-sea vulnerability, and financial mismanagement.⁸⁶ Hence the mFisheries Project sought to tackle two key issues: safety at sea and facilitating

a more sustainable livelihood through the creation of a suite of mobile/cellular phone applications, as outlined below.

⁸⁶ Mallalieu, K, Sarkarsingh, C (2012), *mFisheries: Lessons in First Cycle Design of a Context-appropriate Mobile Application Suite*, International Journal of Technology and Inclusive Education (IJTIE), Volume 1, Issue 1, June 2012, p. 9. Retrieved from http://infonomics-society.org/IJTIE/mFisheries_Lessons%20in%20First%20Cycle%20Design%20of%20a%20Context_appropriate%20Mobile%20Application%20Suite.pdf.

Parts of the mFisheries applications, specifically the web services elements, were built using open source platforms, such as WSO2/PHP, MySQL Server 5 series, APACHE2, OpenSSL, and Libxml2. Additionally, the 'Prices' application, which displays the most recent fish prices, uses data collated by the National Agricultural Marketing and Development Corporation, through the National Agricultural Market Information System, which publishes market prices online.

Since the roll out of mFisheries among the fisher folk population in Trinidad and Tobago, there have been several successes, including:

- 1) Changes in behaviour, capacity, and attitude;
- 2) Increased knowledge and awareness amongst policy makers and other stakeholders;
- 3) Capacity building opportunities;
- 4) Customization of the project for other countries, such as the Cook Islands; and
- 5) Recognition of the project by various regional and international agencies.⁸⁸

3.18 Caribbean Examinations Council

In 1973, the CXC was established as the regional body tasked with development and management of examinations, as well as awarding of certificates and diplomas at the secondary and post-secondary levels for 16 Caribbean countries.⁸⁹

While there is currently no policy at CXC covering use of FOSS, OD, or OS, a few OSS applications are being used, including Drupal, Solaris, and Spiceworks. Although CXC is providing free educational resources to teachers and students to support the CSEC through Notesmaster

Caribbean,⁹⁰ this platform appears to be proprietary rather than using FOSS. In 2011, the CXC Registrar, Dr Didicus Jules, indicated in a presentation to the Caribbean Telecommunications Union that CXC was moving towards becoming an ICT-intelligent organization.⁹¹ This transformation is apparently well underway and will result in the integration of ICT in several areas of the organization, including communication with stakeholders, data mining, enhancement of teaching and learning, and syllabus development.⁹²

As a regional entity involved in certification, CXC has significant potential to influence attitudes towards FOSS through the inclusion of references to FOSS in their syllabi, specifically ICT-related syllabi. Unfortunately, in the 2008 version of the CSEC IT Syllabus,⁹³ the list of software requirements only includes proprietary software, (mainly Microsoft Office products) and no FOSS alternatives.

CXC could also place stronger emphasis on programming and promote the use of programming languages that are commonly used in FOSS development. It is noteworthy that the high failure rate in the programming sections of the CSEC IT examination was described in the Caribbean Examiner, a CXC publication.⁹⁴ Several reasons for this deficiency were provided, including teachers' lack of academic qualifications in programming, teachers' lack of interest in teaching programming, and lack of sufficient time to complete the syllabus. Limited ability

88 Inter-American Centre for Knowledge Development in Vocational Training (n.d.). *Summary of mFisheries*. Retrieved from <http://www.oitcinterfor.org/en/experiencia/mobile-opportunities-20-mfisheries- Caribbean>.
89 Caribbean Examinations Council (n.d.). Retrieved from <http://www.cxc.org/about-us/about-council>.

90 Notesmaster (2013). *Learn More About Us*. Retrieved from <http://www.notesmaster.com/learnmore>.

91 Didicus, J., James, K. & Passmore, S. (2011). *ICT in Teaching and Learning- a CXC Perspective*. Retrieved from http://www.ctu.int/download/ICT%20in%20Teaching%20and%20Learning%20-%20A%20CXC%20Perspective_DJules.pdf.

92 Retrieved from <http://www.cxc.org/SiteAssets/Examiners/CaribbeanExaminerOctober2011Final.pdf>.

93 Caribbean Examinations Council (2008). *Caribbean Secondary Education Certificate Information Technology Syllabus*, CXC Western Zone, Jamaica.

94 Gay, G. (2011). A Place for Programming. *Caribbean Examiner* 9(2), 30-35. Retrieved from <http://www.cxc.org/SiteAssets/Examiners/CaribbeanExaminerOctober2011Final.pdf>.

in programming is of significant concern in a global knowledge-driven economy, where programming skills can enable individuals to become producers and not merely consumers in a computer-driven world.

Open Data

CXC also has potential to be a provider of significant quantities of statistics on regional examinations, some of which could be published in an open data format. At present, CXC is surveying Ministries of Education across the region, in order to develop a single database through which to provide and accept information on students and examinations seamlessly across all their stakeholder countries. The data will be produced in a standardized format, which all key stakeholders will be able to access. There may also be some data that is open to the general public. Decisions have yet to be taken on what format the data should take, what data should be provided, and how that data will be anonymized for publication.

Given CXC's importance to the region and potential to influence the implementation and use of FOSS, OD, and OS, it is clear that, in order to effectively implement the IFAP in the Caribbean, UNESCO should consider establishing a strategic partnership with CXC.

3.19 Caribbean Knowledge Learning Network

As an agency of CARICOM, CKLN was given the task of increasing

*the relevance of tertiary education and training institutions in the Caribbean, by increasing the number of relevant accredited tertiary education courses and programs supported and offered to a significantly increased numbers of Caribbean students.*⁹⁵

In pursuit of that goal and with support from the European Union, CKLN has created a regional research and education network

⁹⁵ Caribbean Knowledge and Learning Network (2013). *Our Goals*. Retrieved from <http://www.ckln.org/home/content/our-goals>.

called C@ribNET. This broadband fibre-optic network will connect institutions involved in knowledge development research across the Caribbean, and also join those institutions to the wider world through other NRENs such as Internet2 and GÉANT. C@ribNET was launched⁹⁶ on 26th February, 2013, and will provide opportunities for real-time collaboration, research, and sharing of large quantities of data.

In the past few years, CKLN has been heavily involved in institutional strengthening through various means, one of which has been provision of workshops and training on Moodle, to enable regional institutions to develop online courses and thereby expand access to education. This promotion of FOSS has been at least partially responsible for the uptake of Moodle for e-learning at regional tertiary education institutions.

The future sustainability of C@ribNET will depend substantially on its ability to provide cost-effective services that respond to user demands.⁹⁷ Indications are that future services might include a learning management system for delivery of online courses, student record management systems, and videoconferencing services,⁹⁸ all of which can be provided at a low cost by harnessing FOSS. Although, to date, C@ribNET does not have policies covering use of FOSS, OD, or OS, it is envisioned that, as a regional facilitator for research and education, C@ribNET will be able to support the use of FOSS, OD, and OS in the region and should therefore be part of any strategies developed to support IFAP in the Caribbean.

⁹⁶ Caribbean Knowledge and Learning Network (2011). *C@ribNET Update*. Retrieved from <http://www.ckln.org/home/content/cribnet-progress-report>.

⁹⁷ Sylvester, K. (2011). *A Sustainability Framework for C@ribNET*. Caribbean Knowledge and Learning Network.

⁹⁸ *Ibid.* p. 81.

3.20 Caribbean Open Data Conference

The 2013 Caribbean Open Data Conference and Code Sprint was held in April of that year, with eight territories participating: Cuba, Jamaica, the Dominican Republic, Saint Kitts and Nevis, Barbados, Trinidad and Tobago, Guyana, and Suriname. Initially conceptualized by the SlashRoots Developer Community (based in Jamaica) and the Mona School of Business Centre of Excellence, key objectives of the event included:

- 1) *Sensitize the public to the growing global open data movement, as well as issues, opportunities, and potential gains for open data in the Caribbean. Key communities targeted were data gatherers, producers, processors and publishers, policy makers, regulators, executing agencies, academics, development-focused communities of practice, and service providers.*
- 2) *Present ICT students, innovators, and entrepreneurs with the proposition of data-centric, development-focused applications as a viable and meaningful target of their attention.*
- 3) *Demonstrate the application of data-centric, development-focused ICT solutions to contemporary local and regional problems.*⁹⁹

The event comprised a series of talks and panel discussions on openness and OD, along with a 24-hour software development competition. Over the last two years of the competition, the focus has been on developing applications in the following thematic areas: agriculture and fisheries; trade and economic indicators; tourism; ICT access; and national statistics and/or census. Developers were encouraged to use publicly available data sets, thus promoting OD. Additionally, as an Open Source event, although developers retain

⁹⁹ Regional Organising Committee (2012), *Executive Summary Report, The Caribbean Open Data Conference & Code Sprint*, p 2. Retrieved from http://data.org.jm/DevelopingCaribbean_CountryReports.pdf.

copyright for the resulting applications, they are required to make them freely available under a GNU Affero General Public License.¹⁰⁰

3.21 Caribbean Open Institute

Sponsored by the International Development Research Centre (IDRC), the Caribbean Open Institute (COI) is a regional initiative that aims to ‘facilitate the emergence of a Caribbean Knowledge Economy’.¹⁰¹ At a workshop hosted by the IDRC in Jamaica in 2010, participants identified a number of challenges within the Caribbean that hinder OD adoption. These included:

- 1) Unavailability or inaccessibility of Caribbean-generated research data;
- 2) Limited access to high quality data that is timely and accurate;
- 3) Limited availability of structured, current, machine-readable, and locally relevant data for public consumption; and
- 4) Insufficient incentives for research institutions to make data publicly available.¹⁰²

Hence, the COI will be encouraging OD in a number of ways, including:

- 1) Supporting and highlighting projects that foster or use OD;
- 2) Encouraging transparent and open communications; and
- 3) Regularly assessing the impact of OD initiatives in the Caribbean.

¹⁰⁰ Developing Caribbean (2012), *Terms and Agreements*. Retrieved from <http://developingcaribbean.org/developers/>.

¹⁰¹ Caribbean Open Institute (2012). *Caribbean Open Institute*. Retrieved from <http://caribbeanopeninstitute.org/node/12>.

¹⁰² IDRC (2010). *Towards a Caribbean Open Institute: Data, Communications and Impact*, p 5—6. Retrieved from <https://docs.google.com/viewer?a=v&pid=forums&srcid=MTEyOTc2MTQxNzgNTE0NTM2NzkBMDE0NDE3OTA4NTYxODg1NDQ1NTkBWkjcVXk4aER2ZTBKATQBAXYy>.

3.22 University of the West Indies Open Campus

The UWI Open Campus (UWIOC) is a virtual campus, established in 2008 and with 42 sites geographically distributed over 16 countries in the Caribbean. UWIOC delivers education to its students primarily through the use of online learning, with some face-to-face classes at the country sites. The Guiding Principles state that:

The Open Campus of the University of the West Indies is based on the idea that the high-quality university education, research, and services available at our institution should be open and available to all people who wish to reach their full potential inside and outside of the Caribbean region.¹⁰³

Although there does not appear to be an official policy on the use of FOSS, UWIOC is heavily dependent on FOSS for several mission-critical functions, including its e-learning platform (Moodle), student management system, student portfolio management (Mahara), and many server-side applications. UWIOC is, however, using proprietary software for numerous desktop applications and for some administrative functions.

Early in the development of the Open Campus, a decision was taken to use OSS for enterprise resource management (ERP) to allow the UWIOC to create new functionalities in the ERP to meet its internal needs. This decision resulted in the development of the Open Campus Student Management System (OCMS), which was built from scratch using PHP, MySQL, and the Zend Framework.¹⁰⁴ The OCMS was customized for the UWIOC and integrated seamlessly with other systems (for example, Moodle and several externally hosted applications) to provide users a single sign-on service. Using OSS

provided the small development team significant software development skills, an important investment in the rapidly evolving campus.

UWIOC is an example of an institution that is successfully using FOSS to achieve its objectives. Its technical expertise in development and support of FOSS makes it a potentially important partner in implementation of the IFAP across the Caribbean region.

¹⁰³ UWI Open Campus. (2013). *About UWI Open Campus*. Retrieved from <http://www.open.uwi.edu/about/welcome-uwi-open-campus>.

¹⁰⁴ Ramnanan, A., Haniff, R., & Beharry, S. (2010). *Deploying a Successful Learning Content and Student Management System using Open Source Technologies*. Retrieved from www.col.org/pcf6/fp/BB4364.doc p.2.

4 Recommendations and Next Steps

In Chapters 2 and 3, findings from the desk research, online survey, and in-country missions have been presented. In addition, several challenges and gaps were highlighted, which have been collated and summarized below. Deficiencies identified in the draft report were confirmed during discussions in the stakeholder consultations held in Jamaica and Saint Lucia, and extensive discussions were held regarding the recommendations and action plans to resolve identified issues. Regional and country-level action plans are presented in this chapter.

4.1 Summary of Gaps and Challenges

Identified deficiencies can be organized into the following five categories:

- 1) *Limited awareness of open concepts.*
There is limited awareness of:
 - a) FOSS, OD, and/or OS concepts among policy and decision makers;
 - b) The organizational and national benefits that can be realized from implementing FOSS, OD, and OS;
 - c) FOSS alternatives to popular or proprietary software;
 - d) Best practices in FOSS, OD, and OS; and
 - e) Initiatives and activities within the Caribbean region that aim to promote FOSS and OD in particular.
- 2) *Lack of buy-in by decision and policy makers:*
 - a) Decision- and policy-makers are uncertain of the national benefits of FOSS, OD, and OS;
 - b) Decision- and policy-makers are hesitant to commit to promoting FOSS, OD, and OS;
 - c) There is an absence of existing initiatives, objectives, or goals regarding FOSS, OD, and OS.
- 3) *Insufficient policy frameworks:* The following issues were identified with respect to policy frameworks:
 - a) There is no clear policy within governments or for public authorities promoting the use of FOSS, OD, and OS;
- 4) *Limited technical support, including:*
 - a) General concern about limited technical support that might be available for FOSS applications;
 - b) Lack of awareness of how technical support for FOSS applications can be accessed;
 - c) Limited expertise and experience in testing FOSS applications to determine their suitability for a particular context;
 - d) Challenges in securing the services of third party software developers/programmers who can customize existing FOSS;
 - e) Limited technical experience and resources to digitize projects for OD initiatives;
 - f) Limited experience and resources to create indexable and searchable databases for OD initiatives; and
 - g) Limited experience and expertise in determining the best standards for adoption in an OS framework.
- 5) *Inadequate change management processes, including:*
 - a) Limited knowledge in creating a transition strategy to move from proprietary software to

- b) OS/FOSS within organizations; Limited knowledge in creating a transition strategy to move from the current situation to an OD construct within public organizations;
- c) Limited knowledge in creating a transition strategy to move from the current situation to use of OS;
- d) Limited knowledge in creating a transition strategy to facilitate greater adoption of OSS/FOSS at the country level; and
- e) Insufficient training options for specific FOSS applications that are being considered for adoption.

4.2 Action Plans and Recommended Initiatives

Enabling the region to integrate FOSS, OD, and OS successfully in the government and private sectors will require significant changes in attitudes,¹⁰⁵ organizational culture,¹⁰⁶ and procedures at both the regional and national levels. Given this, it is suggested that UNESCO provides a positive context to support the required changes and clearly demonstrate to stakeholders how these changes will be beneficial¹⁰⁷ to the region, in order to garner support for the use of FOSS, OD, and OS.

The following regional and national action plans are recommended to foster wider adoption and use of FOSS, OD, and OS in the Caribbean, based on deficiencies that have been outlined in this report, as well as the feedback from the consultations held in Jamaica and Saint Lucia. The first plan (Table 7) outlines a suggested set of actions to be undertaken by UNESCO at the regional level in order to obtain buy-in and establish regional priorities for action, while Table 8 proposes actions

at the national level. Timelines have not been included, as these will depend on UNESCO's priorities and resources, as well as participation of stakeholders. The ultimate goal of both the regional and national action plans is to make progress in the Caribbean region towards achieving the IFAP's objective of creating a more just and equitable society through increased access to information. To that end, it is critical that the following five results be achieved:

- 1) Increased awareness of FOSS, OD, and OS;
- 2) Commitment from regional governments and strategic partners to support adoption and use of FOSS, OD, and OS;
- 3) A policy framework for strategic integration of FOSS, OD, and OS;
- 4) Implementation of coherent change management plans; and
- 5) Establishment of regional technical support systems for FOSS, OD, and OS.

The activities below have therefore been geared towards achievement of these results. There is some repetition in suggested activities between the regional and national plans. This was purposefully done, in recognition that some actions need to be repeated at both regional and national levels to increase overall effectiveness. A more detailed description of each suggested activity is provided in Table 9.

Prior to adoption of these recommendations, it will be important to refine them based on the country context, in order to facilitate more effective implementation.

¹⁰⁵ Armenakis, A., & Harris, S. (2009). Reflections: Our Journey in Organizational Change Research and Practice. *Journal of Change Management*, 9(9), 127-142.

¹⁰⁶ Walker, H. J., Armenakis, A. A., & Bernerth, J. B. (2007). Factors influencing organizational change efforts. *Journal of Organizational Change Management*, 20(6), 761-773.

¹⁰⁷ Ibid. p. 103.

Table 7 Proposed Regional Action Plan

Goal	Purpose	Outputs	Activities to be supported by UNESCO
Creation of more equitable societies through increased access to information.	Increased awareness of FOSS, OD, and OS across the Caribbean Region.	Increased awareness and understanding of FOSS, OD, and OS by high-level stakeholders.	Targeted meetings with senior government officials to increase awareness of FOSS, OD, and OS (e.g. regional heads of government, Ministers of Education, Finance, Minister of Technology, etc.). Create strategic relationships/partnerships with key regional organizations (e.g. CXC, CKLN, UWIOC) to secure support for increased adoption and use of FOSS, OD, and OS.
		Commitment from regional governments and strategic partners for use of FOSS, OD, and OS.	Explain and demonstrate advantages of the use of FOSS, OD, and OS. Provide a cost-benefit analysis of FOSS versus proprietary programmes. Promote regional and local success stories. Provide support for a pilot of FOSS, OD, and/or OS initiatives. Explain how UNESCO will support adoption of FOSS, OD and OS. Establish regional priorities for implementation of FOSS, OD, and OS through signing of a charter for FOSS, OD, and OS by regional governments and agencies.
	Increased use of FOSS, OD, and OS across the Caribbean region.	Policy framework for the strategic integration of FOSS, OD, and OS.	Provide consultative support to develop a regional policy template on FOSS, OD, and OS that can be adapted to national needs. Provide support to draft or amend legislation to support FOSS, OD, and OS. Provide opportunities for regional collaboration and knowledge transfer.
		Implementation of coherent change management plans.	Identify common change management needs across the region (i.e. public education campaigns, training etc.). Provide consultative support to develop a change management framework and strategies that can be adapted for local application.
		Establishment of regional technical support systems for FOSS, OD, and OS.	Establish/identify a regional body that can provide/develop technical support personnel for FOSS, OD, and OS. Facilitate creation of regional FOSS support communities and communication channels.

Table 8 Proposed Country-Level Action Plan

Goal	Purpose	Outputs	Activities to be supported by UNESCO
Creation of more equitable societies through the increased access to information.	Increased national awareness of FOSS, OD, and OS.	Increased awareness and understanding of FOSS, OD, and OS in key local stakeholders.	Provide seminars/workshops to increase awareness of FOSS, OD, and OS for targeted national stakeholders. Provide cost-benefit analysis of FOSS vs. proprietary programmes. Demonstrate a 'Day-in-the-Life' simulation for an IT manager. Provide collaboration opportunities for local stakeholders.
		Commitment from government departments and local strategic partners for the use of FOSS, OD, and OS.	Targeted meetings with senior government officials and key local organizations. Acquire written commitment to promote adoption of FOSS, OD, and OS.
	Increased use of FOSS, OD, and OS nationally.	Implement national policy framework for integration of FOSS, OD, and OS.	Provide support for adaption of regional policy to local needs. Develop a multi-agency government implementation framework. Encourage government participation in Open Government Initiatives. Provide legislative support to draft or amend legislation to support FOSS, OD, and OS. Identify OS technical requirements.
		Establishment of national technical support systems for FOSS, OD, and OS.	Identify/develop local FOSS technical support personnel. Facilitate creation of local FOSS support communities and link them to the regional community. Create a FOSS application portal/marketplace. Create a FOSS programmer directory. Identify/train local and regional technical support personnel for OS framework. Develop a regional technical support community for OS framework.
		Implementation of coherent change management plans.	Adapt change management strategies to local context. Provide support to develop and implement public education campaigns. Provide training in select FOSS applications. Provide training support for OD initiatives. Support select FOSS, OD, and OS initiatives (e.g. Software Freedom Day, Caribbean Open Data Conference). Provide digitization support for archival information. Provide technical support to develop a local OD portal.

Table 9 *More detailed description of recommended activities to foster increased adoption of FOSS, OD and OS.*

Gaps/ Challenges	Recommended Activities	Description
Awareness of Open Concepts.	Seminars to increase awareness of FOSS, OD, and OS.	These meetings, which could be held both online and in-person, should be targeted to stakeholders in government, education, and the public sector. The meetings should ensure that participants understand both the individual and corporate advantages of using FOSS, OD, and OS. Meetings should also identify possible FOSS applications that could meet the identified needs of the stakeholders.
	Regional collaboration.	Provide opportunities to share lessons learned, testimonials and best practices with regional stakeholders on the use of FOSS, OD, and OS.
	Cost-benefit analysis.	Share the outcomes of a cost-benefit analysis of using FOSS compared to proprietary software.
	'Day in the Life' simulation.	Conduct a simulation of a 'Day in the Life of an IT Manager', where all proprietary software is replaced with FOSS to highlight, by demonstration, the extent to which FOSS can replace proprietary software, along with the pros, cons, and other considerations, should an organization decide to move from proprietary applications to FOSS.
Increasing Buy-in by Decision- and Policy-Makers.	Targeted meetings with senior government officials.	Conduct targeted meetings with senior government officials to discuss the benefits of FOSS, OD, and OS, issues and challenges being experienced by countries, and what activities might be necessary to encourage FOSS, OD, and OS adoption.
	Strategic relationships/partnerships with key regional organizations.	Create strategic partnerships with key regional organizations including, but not limited to, CXC, CKLN, and the UWIOC to tackle FOSS, OD, and OS adoption on various fronts simultaneously.
	Country and regional commitment to promote openness.	Governments should be encouraged to adopt the policy of openness and to exemplify this commitment through a variety of initiatives, including Open Government.
Policy Framework.	Regional and national policy creation.	Provide support for the creation of suitable national policies (or policy templates that can be amended at the national level) to promote adoption of FOSS, OD, and OS. Create suitable organizational policies for government and public authorities to implement (as appropriate) FOSS, OD, and OS, including software use, disaster recovery, and standards for metadata.
	Open Government Initiatives.	Encourage regional and national participation in international Open Government initiatives, such as the Open Government Partnership, which aims to encourage governments to adopt more open and transparent systems.
	Legislative support.	Draft or amend legislation, as necessary, to promote adoption of FOSS, OD, and OS. Legislation should include provisions on among, other things, software usage, disaster recovery, and standards for metadata.
	Government implementation framework.	Creation of a multi-agency implementation framework to execute the agreed policy and FOSS, OD, and OS initiatives among public authorities.
	OS technical requirements.	Collate and conduct a review of existing technical standards to determine the extent to which specific standards can be adopted within the OS framework.

Gaps/ Challenges	Recommended Activities	Description
Technical Support.	FOSS technical support personnel.	Develop a cadre of trained personnel that can provide technical support – maintenance and customization – of specific FOSS applications that had been adopted.
	Local and Regional FOSS support communities.	Encourage establishment of local and regional technical support communities to collaborate, advise, and share experiences on specific FOSS applications.
	FOSS programmer directory.	Create a local and regional online directory of software developers specializing in FOSS applications, which can be hired to customise specific applications.
	Digitization support.	Provide technical assistance for digitization projects and to create indexable and searchable data. Assistance could include advising on approaches that could be employed, and best practice, as well as funding to purchase specialized equipment.
	FOSS application portal/marketplace.	Create an online platform where various categories of FOSS applications are housed and made available for use. The platform could include links to technical support communities (local, regional, and international), along with guidelines on how to test software and recruit developers to customize programmes.
	Development of an OD portal.	Provide advice and training on developing an OD portal, including standards that should be adopted, best practice, and how to maximize the utility of such a platform.
	Local and regional technical support personnel for OS framework.	Develop a local cadre of trained personnel that can review and consider technical standards that ought to be adopted into an OS framework.
	Regional technical support community for OS framework.	Develop a regional cadre of trained personnel that can review and consider the technical standards that ought to be adopted into an OS framework.

Gaps/ Challenges	Recommended Activities	Description
Change Management Processes.	Change management.	Foster support for change management process required for widespread adoption of FOSS, OD, and OS among policymakers, technocrats, and the wider community as appropriate. Required initiatives include providing technical assistance to develop a change management plan: For adoption of FOSS among governments and public authorities; To encourage greater awareness and uptake of FOSS nationally; For consistent, quality and timely implementation of OD among government authorities; and To foster adoption of OS nationally.
	Public education campaigns.	In addition to focusing on public authorities, quasi-government and NGOs, public education campaigns should be implemented to attune the wider society to FOSS, OD, and OS, as well as their benefits to individuals, organizations, and the country.
	Training in select FOSS Applications.	Create and implement comprehensive training programmes for select FOSS applications as requested by stakeholders. Training would be necessary for users and for technical support staff; hence programmes must be designed to address different needs.
	Training support for OD Initiatives.	Develop a training programme that covers, among other things: Creating digitized materials, especially with respect to archival material; Design, installation and support of a database for heritage materials; and Metadata standards.

4.3 Summary

This study used various research methods including surveys and country consultations to describe the current state of, and prospects for, integration of FOSS, OD, and OS in the stakeholder populations of 17 Caribbean countries. The findings demonstrated that levels of awareness and use of FOSS, OD, and OS vary widely across the region and even between departments in a single institution. In general, there is some level of familiarity with FOSS and several applications are widely used, especially for web browsing, content management, and e-learning. However, OD and OS were much less well understood, and, with one or two exceptions, there was no use of OD or OS in the countries studied. The findings can be summarized into five categories:

- 1) Limited awareness of open concepts;
- 2) Lack of buy-in to the use of FOSS, OS and OD by decision and policy makers; (c)

- inadequate policy framework;
- 3) Limited technical support; and
- 4) Inadequate change management processes.

Several recommendations were made and an action plan presented to enable change at the regional and national levels. It is clear that changing attitudes, organizational culture, and procedures will not be easy, but achievement of a more equitable society as envisioned by IFAP (2000) will certainly be worth the effort.

Appendix A: In-Country Organizations Contacted

Antigua and Barbuda:

- Ministry of Education, Curriculum Unit
- Antigua and Barbuda Institute of Technology
- Ministry of Telecommunications, Science, Technology, and ICT
- National Parks Antigua

Barbados:

- Barbados Community College
- Erdiston Teachers' College
- Free and Open Source Software Association of Barbados
- Higher Education Development Unit, Ministry of Education and Human Resource Development
- The National Library
- The Data Processing Unit, Government of Barbados

Curaçao:

- Central Bureau of Statistics
- Open Curaçao
- Ministry of Administration, Planning, and Service
- Ministry of Education
- National Archives
- National Museum
- Stimul-IT
- University of the Netherland Antilles Library

Jamaica:

- Ministry of Science, Technology, Energy, and Mining
- Statistical Institute of Jamaica
- University of the West Indies, Mona Campus
- University College of the Caribbean

St. Vincent and the Grenadines

- The Information Technology Services Division
- Ministry of Education, Curriculum Unit
- St Vincent and the Grenadines Community College
- The Department of Libraries, Archives, and Documentation Services
- Digital Spark Agency

Trinidad and Tobago

- Central Statistics Office
- iGovTT
- Ministry of Education
- Ministry of Science and Technology
- National Archives
- National Museum
- National Library and Information Services
- Trinidad and Tobago Computer Society
- University of Trinidad and Tobago

Regional Entities

- Caribbean Examinations Council
- Caribbean Knowledge Learning Network
- University of the West Indies, Open Campus

Appendix B: Draft Agenda and Participant List for Jamaica Consultation Meeting

Day 1: 18 July 2013

Time	Event
8:00-9:00	Registration
9:00-9:30	Inauguration ceremony Welcome remarks by Mr Everton Hannam , Secretary-General, Jamaican National Commission for UNESCO Remarks from Dr Hara Prasad Padhy , Advisor in Communication and Information to the Caribbean, UNESCO Inaugural Address: Hon. Julian Robinson , Minister of State for Science, Technology, Energy and Mining, Jamaica
9:30-10:00	Introduction of FOSS, Open Standards and Open Data Programme: UNESCO: Hara Padhy, UNESCO IFAP Programme and Priorities: UNESCO
10.00-10.15	Coffee Break
10:15-10:45	Presentation of survey findings and recommendations: Michele Marius and Lora Woodall Chair: Thea Lygia Smith , Suriname
10:45-11:00	Discussions on findings
11:00-11:30	Experts Panel on FOSS Presenter: Ace Suarez , Curacao Chair: Gary Campbell , Jamaica Q & A follows
11:30-13:00	Country Presentations : Jamaica, Bahamas, Belize, Cayman Islands Chair: Dwight Heston Gillett , Belize Discussions follow
13.00-14.00	Lunch
14:00-14:30	Experts Panel on Open Standards and Open Data Presenter: Maurice L. McNaughton , Jamaica Chair: Leona Melva Wilson , Bahamas Q & A follows
14.30-16.00	Country Presentations : Curacao, Guyana, St. Maarten, Suriname, and Trinidad and Tobago Chair: Jan Karel Liebaers , Cayman Islands Discussions follow
16.00-16.30	Wrap up

Day 2: 19 July 2013

Time	Event
9.00-9:30	Welcome and overview of Day 1
9:30-10:00	Expert presentation – Country case study/testimonial on success realised through FOSS and OD Presenter: Anil Pradeep Ramnanan , Trinidad and Tobago Chair: Hughes, Tamara Natasha , St. Maarten Q & A follows
10:15-10:30	Coffee Break
10:30-12:00	Group Session 1 : The way forward <ul style="list-style-type: none"> • Commonalities among countries – regional versus individual initiatives • Areas of possible cooperation • Priority areas for possible intervention by UNESCO Chairs: Michele Marius and Lora Woodall
12:00 - 13:00	Lunch
13:00-14:30	Group Session 2: Next Steps; Proposed Action Plan for UNESCO Chair: Maurice L. McNaughton , Jamaica
14:30-15:00	Presentation of action plan for UNESCO Chair: Mr Everton Hannam , Secretary-General, Jamaican National Commission for UNESCO
15.00-15.30	Closing ceremony

Bahamas

- Ms Leona Melva Wilson, Deputy Director, Department of Statistics

Belize

- Mr Dwight Gillett, Policy Coordinator, Ministry of Energy, Science, Technology and Public Utilities

Cayman Islands

- Mr Jan Karel Liebaers, Acting Information Commissioner, Information Commissioners Office

Curaçao

- Mr Ace Suares, Director, Suares & Co; and Consultant, Open Curaçao

Jamaica

- Mr Gary Campbell, Director of Technology, Ministry of Science, Technology, Energy and Mining
- Mr Howard Hamilton, Research Officer, Statistical Institute of Jamaica
- Mr Crafton Jennings, Department Head, Fiscal Services Limited
- Ms Hope Perkins, Senior Research Officer, Corporate Services Division, Statistical Institute of Jamaica
- Ms Kaydian Smith, Principal Director, Ministry of Science, Technology, Energy and Mining
- Dr Thomas Thompson II, Senior Director - Business and Product Development, Fiscal Services Limited

Sint Maarten

- Mr Terrance Baptiste, Assistant Researcher, Department of Statistics
- Ms Tamara Hughes, Instructional Technology and Distance Education Specialist

Suriname

- Ms Thea Smith, Deputy Director of Communications, Ministry of Transport, Communication and Tourism

Trinidad and Tobago

- Mr Anil Ramnanan, Learning Management Systems Administrator, University of the West Indies Open Campus

Presenters/Subject Matter Experts

- Mr Ace Suares (Curaçao representative) – FOSS
- Dr Maurice McNaughton, Director, Centre of Excellence for IT-enabled Business Innovation, Mona School of Business & Management, University of the West Indies – OD
- Mr Anil Ramnanan (Trinidad and Tobago representative) – FOSS

Meeting Facilitators

- Dr Hara Padhy, Regional Advisor in Communication and Information for the Caribbean, UNESCO
- Ms Michele Marius, UNESCO Consultant
- Dr Lora Woodall, UNESCO Consultant

Appendix C: Draft Agenda and Participant List for Saint Lucia Consultation Meeting

Day 1: 25 July, 2013

Time	Event
8:00-9:00	Registration
9:00-9:30	Inauguration ceremony
9:30-10:00	Introduction of FOSS, Open Standards and Open Data Programme: UNESCO: Dr Hara Padhy IFAP Programme and Priorities: UNESCO: Mr Eric Nurse
10.00-10.15	Coffee Break
10:15-10:45	Presentation of survey findings and recommendations: Ms Michele Marius and Dr Lora Woodall
10:45-11.00	Discussions on findings
11:00-11:30	Experts Panel on FOSS Presenter: Mr David Pile , Barbados Chair: Q & A follows
11:30-13.00	Country Presentations : St. Lucia, Antigua and Barbuda, British Virgin Islands, Dominica Discussions follow
13.00-14.00	Lunch
14:00-14:30	Experts Panel on Open Standards and Open Data Presenter: Dr Maurice L. McNaughton , Jamaica (via Skype) Chair: Q & A follows
14.30-16.00	Country Presentations : Grenada, St. Kitts and Navies, St. Vincent and the Grenadines and Barbados Discussions follow
16.00-16.30	Wrap up

Day 2: 26 July, 2013

Time	Event
9.00-9:30	Welcome and overview of Day 1
9:30-10:15	Expert presentation – Country case study/testimonial on success realised through FOSS and OD Presenter: Mr Carson Millar , St. Lucia Mr Andre Bailey , St. Vincent and the Grenadines Chair: Q & A follows
10:30-10:45	Coffee Break
10:45- 12.00	Group Session 1 : The way forward Commonalities among countries – regional versus individual initiatives Areas of possible co-operation Priority areas for possible intervention by UNESCO
12:00-13:00	Lunch
13:00 -14:30	Group Session 2: Next Steps; Proposed Action Plan for UNESCO
14:30-15:00	Presentation of action plan for UNESCO
15.00-15.30	Closing ceremony

Barbados

- Dr Patrick O. Rowe, Director, Higher Education Development Unit, Ministry of Education, Science, Technology and Innovation

Dominica

- Ms Jizelle Allport, Senior Administrative Officer, Ministry of Information, Telecommunication & Empowerment

Grenada

- Mr Eric Nurse, ICT Director, Ministry of Communication, Works & Information Communications Technology

Saint Lucia

- Mr Burt Collymore, Database Engineer, Central Statistical Office
- Ms Alisha Errance, ICT Research Assistant, Ministry of Public Service, Information & Broadcasting
- Mr Patrick Freeman, Collector's Assistant, National Archives Authority of St. Lucia
- Mr Gerry George, ICT Consultant & Open Source Evangelist, Digisolv. Inc.
- Mr Johannith Khodra, ICT Officer, National ICT Office
- Mr Lincoln Jean-Louis, Network Administrator, Sir Arthur Lewis Community College
- Mrs. Cynthia Joseph McFarlane, Librarian, Library Services
- Mr Joshua Vernor, IT Manager, Ministry of Education

St. Vincent and the Grenadines

- Mr Andre Bailey, Director – Information Technology Services Division

Presenter/Subject Matter Expert

- Mr David Pile, Chairman, Free and Open Source Software Association of Barbados – FOSS

Meeting Facilitators

- Dr Hara Padhy, Regional Advisor in Communication and Information for the Caribbean, UNESCO
- Ms Michele Marius, UNESCO Consultant
- Dr Lora Woodall, UNESCO Consultant

Appendix D: Proposed Country Activities Submitted by Consultation Meeting Participants

Bahamas

Objectives	Activities	Success measures	Timelines	Comments
Enact Freedom of Information Act Enact Statistics legislation	Engaging UNESCO to provide technical support Identify a local champion	Successful promulgation of the Freedom of information Act and the Statistics Act	By 2015	Activity proposed by Bahamas representative at consultation meeting in Jamaica

Barbados

Objectives	Activities	Success measures	Timelines	Comments
To promote and facilitate the use and application of ICTs by all segments of society for economic, social and cultural development.	Introduce FOSS characteristics to promote targeted dialogue around ICT entrepreneurial support or development	Completion of 6 months training pilot language development awareness for 25 students with CXC IT and not working Generation of 5 pilot ideas around FOSS software business actions supported by IDC mentors (solving current business problems)	2 year project	

Belize

Objectives	Activities	Success measures	Timelines	Comments
Build capacity in high schools and junior colleges	Training	Develop timelines for changes in schools	by December 2013	Activity proposed by Belize representative at consultation meeting in Jamaica

Cayman Islands

Objectives	Activities	Success measures	Timelines	Comments
Incorporate OD principles and use of government information in review of Freedom of Information legislation	Analyse the issues Consider best practices	Inclusion of OD principles in revised Freedom of Information legislation	Fall 2013	Activity proposed by Cayman Islands representative at consultation meeting in Jamaica

Dutch Countries – Curacao, St. Maarten, Suriname

Objectives	Activities	Success measures	Timelines	Comments
IT Professionals – increased awareness of FOSS & demonstration of commitment	Seminars facilitated by UNESCO	Action plans for their departments Follow up checks to ensure that action plans are implemented	Oct/Nov 2013	UNESCO needs a greater presence in St. Maarten Activity proposed by Dutch representatives at consultation meeting in Jamaica

Grenada

Objectives	Activities	Success measures	Timelines	Comments
Increase awareness and use of FOSS in the public service (Head of ICT Departments)	Workshops	An increase in the use of open source programs within the public service	1 year	
Students should be able to use FOSS programming languages to developing applications.	Training workshop for ICT Teachers in secondary schools. Starting of the Clubs. Development of training materials.	Students being able to produce open source programs to showcase at Grenada's TEXPO event. Students can participate in the code sprint event. Students being able to develop applications for phone	1 year(s)	
Increase access to relevant and appropriate government Data	Seminars Workshops	Clear Increase in availability or access to data from government websites.	2 years	
The development of a national Policy that includes the use of FOSS, OD, and OS	Workshops with National ICT subcommittee. Setting up of different roles of individuals based on expertise.	Successful completion of the policy by the end of August.	2 Months	
Bring awareness to FOSS, OD, and OS to the Public	Radio and television discussion on FOSS, OD, and OS	Clear increase in use of open source programs by workers within the public service.	1 year(s)	

Jamaica

Objectives	Activities	Success measures	Timelines	Comments
Achieving gains toward info Society – developing a policy position aligned with V2030 and other ICT policies	Developing a common cohesive policy driven by government	Policy for information exchange between public agencies	December 2013 And March 2013	Activity proposed by Jamaica representative at consultation meeting in Jamaica

Saint Lucia

Objectives	Activities	Success measures	Timelines	Comments
Legislate on the use of FOSS, OD, and OS	Policy framework	Policy enacted	9 to 12 months	
Sensitize the masses on the use of FOSS and the shift from traditional to non-traditional methods	<ol style="list-style-type: none"> 1) Education reforms at the ministerial level. 2) Education reform in schools through the cascading of FOSS into the labs. 3) Teacher training. 	FOSS widely accepted in all public school laboratories	3 to 5 years	

Trinidad and Tobago

Objectives	Activities	Success measures	Timelines	Comments
Bringing software development capacity into the primary, secondary, and tertiary levels	Provide software development training and curriculum in schools Hackathons and coding competitions		Within 6 months to launch a programme, for the activities outside of schools	Activity proposed by Trinidad and Tobago representative at consultation meeting in Jamaica

Appendix E: Survey Questions

Please complete this survey to help UNESCO understand the awareness and use of Free and Open Source Software, Open Data and Open Standards. The survey is anonymous and the information collected will be used to inform UNESCO's decision-making process regarding support for the Information for All Policy (IFAP). The full policy can be accessed at:

<http://www.unesco.org/new/en/communicationandinformation/intergovernmentalprogrammes/informationforallprogrammeifap/aboutifap>.

1) Please indicate your willingness to answer the survey questions below:

- a) Yes
- b) No

Demographic information

2) Please indicate your gender:

- a) Female
- b) Male

3) Please select your country of residence:

- a) Antigua and Barbuda
- b) The Bahamas
- c) Barbados
- d) Belize
- e) British Virgin Islands
- f) Cayman Islands
- g) Curaçao
- h) The Commonwealth of Dominica
- i) Grenada
- j) Guyana
- k) Jamaica
- l) Saint Kitts and Nevis
- m) Saint Lucia
- n) Sint Maarten
- o) Saint Vincent and the Grenadines
- p) Suriname
- q) Trinidad and Tobago

4) Which of the following best describes your institutional affiliation?

- a) Government
- b) Higher Education (e.g. College, University)
- c) Private IT company
- d) Library
- e) Museum
- f) NGO
- g) Other private company
- h) Other (please specify)

Free and Open Source Software

5) Please choose the response which most closely describes your understanding of the term 'Free and Open Source Software'?

- a) I have never heard of the term.
- b) I am somewhat familiar with the term.
- c) I am familiar with the term.
- d) I am an expert in this area.

6) Which of the following are true about the term Free and Open Source Software? You may select more than one response.

- a) FOSS is software that is distributed freely to anyone interested.
- b) Users are allowed access to the programme's source code.
- c) Users are allowed to modify the source code.
- d) Users cannot distribute the modified software or modified source code to others.
- e) A FOSS license should not include unreasonable restrictions.

7) Please identify whether your organization is currently using the following software?

Software Package	Used	Still using
Microsoft Windows OS	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Apple Mac OS	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
GNU/Linux	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Microsoft Office	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
OpenOffice/OfficeLibre	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Microsoft Internet Explorer	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Google Chrome	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Mozilla Firefox	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Joomla	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Drupal	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Moodle	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Ubuntu	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
EdUbuntu	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No

8) To what extent are each of the following important barriers to the adoption of FOSS in your country?

Please use the following rating scale to answer this question:

- 1 Not at all important
- 2 Low importance
- 3 I don't know
- 4 Moderately important
- 5 Very important

- Lack of general awareness of FOSS
- Lack of Government (infrastructure, support or leadership)
- Lack of policies related to FOSS
- Slow Internet access
- FOSS is not taught in schools and colleges
- Limited technical competence to use FOSS
- Lack of technical/maintenance support for FOSS
- Resistance to switch from proprietary platforms/software
- Aggressive marketing by proprietary software companies

- o Difficulty in finding the appropriate FOSS application
- o Limited FOSS publications, conferences, seminars, and workshops
- o Materials are not available in my native language
- o Few women are involved in FOSS
- o Other (please describe)

- 9) **How has Free and Open Source Software been implemented and supported in your organization?**
- 10) **What challenges have been encountered in the use of Free and Open Source Software at your organization?**
- 11) **How can UNESCO best support your organization to increase the use of Free and Open Source Software? Please indicate any strategies you believe would be useful.**
- 12) **Please indicate your level of agreement with the statement below: My organization/country would benefit from the implementation of policies which promote and support the use of FOSS.**
- a) Strongly agree
 - b) Agree
 - c) No opinion
 - d) Disagree
 - e) Strongly disagree

Open Data

- 13) **Please choose the response which most closely describes your understanding of the term Open Data:**
- a) I have never heard of the term.
 - b) I am somewhat familiar with the term.
 - c) I am familiar with the term.
 - d) I am an expert in this area.
- 14) **Which of the following are true about Open Data? You may choose more than one response.**
- a) Data is available and can be accessed by anyone interested
 - b) Users can use and republish the data
 - c) Data is not restricted by copyright, patent, or other IP constraint
 - d) Data is always available free of charge
- 15) **Please rank the public availability of each type of data in your country using the following scale:**
- Please use the following rating scale to answer this question:
- 1 Data do not exist
 - 2 Not available
 - 3 I don't know
 - 4 Limited availability
 - 5 Available
- o National demographics
 - o Mapping and geographic information system data
 - o Education statistics
 - o Employment/labour statistics
 - o Agriculture
 - o Tourism
 - o Economic indicators
 - o Crime statistics
 - o Immigration and emigration statistics

- o Utility rates
- o Legislation and parliamentary proceedings

16) Would the use of Open Data be useful in your organization? Why or why not?

17) How has Open Data been implemented and supported in your organization?

18) To what extent are the following important barriers to the adoption of Open Data in your country? Use the following rating scale to answer :

- 1 Not at all important
- 2 Low importance
- 3 I don't know
- 4 Moderately important
- 5 Very important

- o Lack of Open Data policy
- o Lack of general awareness of Open Data
- o Lack of appropriate legislation to foster Open Data
- o Lack of Government support or leadership
- o Lack of appropriate transparency/access to information measures in Government
- o Limited Open Data publications, conferences, seminars, and workshops
- o Slow or lack of Internet access
- o Lack of knowledge of how to monetize data
- o Limited technical competence to implement Open Data
- o Resistance to switch from a proprietary approach to the handling of public data
- o Principles of Open Data are not taught in schools and colleges
- o Other (please specify)

19) How can UNESCO best support the use of Open Data in your organization?

20) In what ways could your country benefit from implementing policies that promote and support the use of Open Data?

21) Are there any other thoughts or concerns you would like to share on Open Data that might not have been captured above?

Open Standards

22) Please indicate your level of awareness of the term 'Open Standards'?

- a) I have never heard of the term.
- b) I am somewhat familiar with the term.
- c) I am familiar with the term.
- d) I am an expert in this area.

23) What do you do you understand by the term Open Standards? You may choose more than one answer.

- a) Open Standards that are publicly available.
- b) Open Standards tend to be developed and maintained using collaborative processes
- c) Open Standards never have any patents or intellectual property rights attached to them
- d) Open Standards are available either free of charge or for a fee.

24) How has your organization or country adopted Open Standards?

25) To what extent are the following important barriers to the adoption of Open Standards? Use the following rating scale to answer :

- 1 Not at all important
- 2 Low importance
- 3 I don't know
- 4 Moderately important
- 5 Very important

- Lack of general awareness of Open Standards
- Lack of information on Open Standards (including publications, conferences, seminars, and workshops)
- Lack of policies on Open Standards
- Lack of appropriate legislation to foster Open Standards
- Lack of Government support or leadership for Open Standards
- Limited technical competence to implement Open Standards
- Resistance to moving from a more proprietary approach
- Open Standards concepts are not taught in schools and colleges
- Other (please specify)

26) How could UNESCO help your organization to increase the use of Open Standards?

27) Are there any thoughts or concerns on Open Standards that you would like to share with us?



United Nations
Educational, Scientific and
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IFAP

Information for All
Programme

IFAP Secretariat
UNESCO
Communication and Information Sector
Information Society Division
7 place de Fontenoy
75352 Paris 07 SP
France

Tel.: + 33 (0) 1 45 68 10 00
E-mail: ifap@unesco.org

www.unesco.org/webworld/ifap