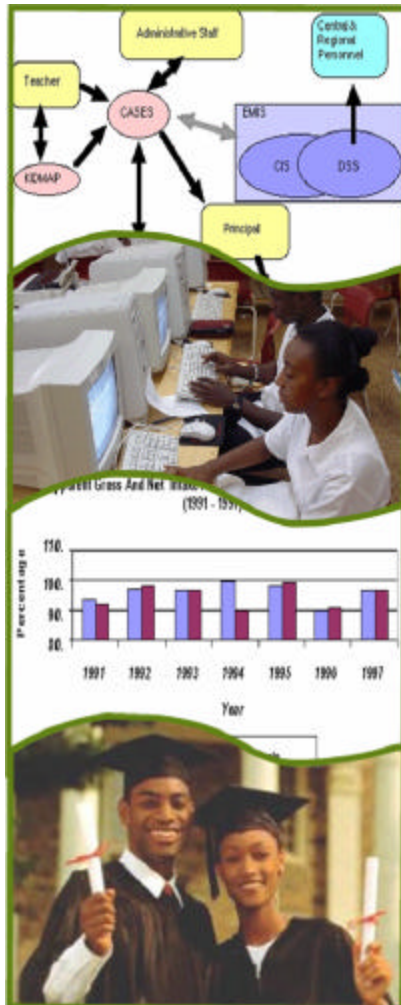




OECS Education Reform Unit



Draft Policies and Guidelines For the Selection of An EMIS Solution

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ABBREVIATIONS

EMIS	Education Management Information System
EPIE	Educational Products Information Exchange
ESS	Executive Support System
GPI	General Pedagogical Information
ICT	Information and Communication Technology
IS	Information Systems
IT	Information Technology
MOE	Ministry of Education
OECS	Organisation of Eastern Caribbean States
OERU	OECS Education Reform Unit
OETEC	OECS Education Technical Committee
RFP	Request for Proposal
SPA	Software Publishers Association
TPS	Transaction Processing Systems

BACKGROUND

The OECS Education Reform Unit (OERU) has deferred the decision on whether or not General Pedagogical Information (GPI) the software used in the Education Management Information System (EMIS) pilot project should be rolled out to the entire education in St. Lucia and to other education systems in the sub-region. This deferment followed careful consideration of the report on the evaluation of the EMIS pilot project and the stage at which this evaluation was done, that is, prior to the generation of key school and national reports.

In meantime, the OERU has decided to draft, through this consultancy, policies and guidelines for the procurement of EMIS solutions in order to increase the likelihood of success of future EMIS implementations that are undertaken by ministries of education (MOEs) in isolation and to promote the need for compatibility among EMIS solutions selected by various MOEs.

The draft policies and guidelines take into account the lessons learnt in the EMIS pilot project including (as highlighted in the terms of reference):

- The appreciation of the use of a computerised EMIS and its various modules such as timetabling of students, teachers and subjects.
- The critical importance of sufficiently large bandwidth connection to the Internet from a central location such as the MOE in order to allow simultaneous access by schools, and also the need to have dedicated access to the Internet from each school
- The relevance of the timely entry of legacy data during the early stages of the implementation
- The high level of customisation required prior to full implementation of any EMIS package, particularly those developed outside of the region and from a Non-English speaking environments
- The importance of appointing teachers and MOE officials with clear roles and responsibilities for managing, monitoring and implementing an EMIS

Consideration is also given to key issues and recommendations made in the following documents:

- The Request for Proposal (RFP) developed by the OERU and used in the EMIS pilot project
- The Report on the Requirements for an Extended EMIS for the OECS prepared by an Information Systems (IS) Consultant in a study funded by the World Bank
- The OERU's Report on the EMIS Pilot Project

1 INTRODUCTION

Educational organisations around the world are increasingly implementing EMISs with the hope of assisting in making more informed decisions and, by extension, improving management and planning. An EMIS, as defined by Moses (2001), “is a comprehensive system that brings together people, process and technology to provide timely, cost effective and user appropriate information to support educational management at whatever level needed.”

The efforts at modernising institutional management in education are driven primarily by three factors:

- (i) The increasing pressures for greater accountability from external stakeholders such as donors and funding agencies; other government departments such as the Ministries of Finance and Planning; and, citizens.
- (ii) The need for greater efficiency in internal operations, which invariably, affect responses to external stakeholders.
- (iii) The significant advances in education technology accompanied by decrease in costs.

In the OECS, like in other parts of the world, the need for modern EMISs is highly recognised. At present, priority is being given to issues associated with the implementation, and in particular, the acquisition of appropriate EMIS solutions. This document is intended to provide guiding principles that are expected to promote sound EMIS selection practices in OECS territories.

Specifically, the objectives of this document are as follows:

- To promote harmonisation in approaches used to secure the most appropriate EMISs for OECS territories
- To set the stage for greater sharing of experiences if similar approaches are used.
- To mitigate the risks usually associated with the acquisition and implementation of EMISs
- To encourage the involvement of a cross-section of stakeholders in the EMIS selection process
- To assist MOEs in being realistic about the resources needed for the implementation of the solutions selected
- To encourage extensive research in identifying promising vendors
- To assure objectivity in the assessment of proposed solutions by encouraging the use of quantifiable measurements for determining net benefits and risks
- To facilitate accountability for those involved in the selection process and promote transparency
- To ensure that, with the selection of the most suitable solutions and vendors, economisation and efficiency are realised throughout the EMIS implementation process

This document describes the concept of a suitable EMIS in the OECS context, giving consideration to the organisational structures that exist within the education systems and

the types of decisions that are normally made at each level. This document also presents an outline of a proposed process for the selection of a suitable EMIS. For each step in the selection process, philosophies or principles that the MOE are expected to uphold as well as formulated policy statements are proposed.

This document, like other policy documents drafted by the OERU, will go through a process of refinement, which will involve consultation with the OECS Education Technical Committee (OETEC) and the OECS Information and Communication Technology (ICT) Education Committee. At the end of the refinement process, the final version of this policy will be circulated to the various MOEs for use in drafting their respective policies for the acquisition of EMIS solutions.

2 MANAGEMENT STRUCTURES IN OECS EDUCATION SYSTEMS AND EMIS FUNCTIONALITY

The organisational structures of education systems in the OECS are similar. Clearly apparent in these education systems are the four typical levels of decision makers: namely, teachers/parents; school principals; district officials and national officials.

Decision-making is, to some extent, centralised in OECS education systems. School Boards responsible for the overall management of school resources do not exist. However, recently efforts towards the transformation to a more decentralised system have been initiated in some islands.

Typically information systems (IS) are categorised based on the level of organisation at which they operate. Executive support systems (ESS) that are designed to handle unstructured decision-making through advanced graphics and communication operate at the strategic or policy level of the organisation. At the other extreme, the operational level, transaction-processing systems (TPS) automates routine necessary business transactions.

Based on the needs of the OECS and the technical requirements specified in the RFP used in the EMIS pilot project, a suitable EMIS for the OECS would be expected to be board in scope and capable of supporting decisions and operations at all levels.

As described by West (2001, p.3), a proposed EMIS for OECS territories should be a totally integrated administration system and should provide permanent mechanisms for national education and school information in:

- Individual students and Student Groups
- Parents/ Guardians
- Principals, Teachers, Education Officers, and auxiliary staff
- School Timetables and Schedules
- Teaching Methods and Curricula
- Student Learning Outcomes
- Textbooks, Instructional Equipment and Materials
- School and National Education Budget
- School Sites and Buildings
- Communities and School Catchments Areas

The following briefly describes some of the functions of a suitable at each level of the education system.

Classroom (Teacher/ Parent) Level

Teachers and parents focus on the teaching-learning process in the classroom (Saito, *et. al.*, 1999). Teachers may ask questions such as:

- What are my students' achievements in specific areas of different subjects?
- Who are the students with poor attendance records?
- What are the names of the students who had been disciplined most in the last term?

At this level, the kind of information required is very detailed. The EMIS must enable teachers to monitor the progress of individual students. The EMIS must also automate routine transactions such as registration, attendance, and exam grading. Further the EMIS must be able to generate reports on each student in order to provide parents with accurate information on the performance of their children.

School (Principal) Level

Principals are concerned with the operations and transactions of the school (Saito, *et. al.*, 1999). They may ask questions such as the following:

- Which classes of which grades in my school are doing well or poorly, in what subjects, and how do they compare with similar schools in the neighbourhood?
- Who are the teachers with the highest level of absenteeism?
- Who are the teachers available during a given period of the day?

Principals would need to access, summary information for their schools and other schools, through the proposed EMIS, in order to obtain answers to questions (such as the above). Principals would also need to access detailed information such as teachers' schedule. Additionally, the EMIS would have to be capable of assisting principals in performing functions, such as timetabling.

District Level

Education district officials are concerned with resource management and control. They are responsible for ensuring that resources are distributed equitably and efficiently to the various schools in their districts (Saito, *et. al.*, 1999). The following are a few questions asked at this level:

- In this district, which schools are performing below the national average?

- In this district, what are the schools with the highest percentage of unqualified teachers?

The information needed to respond to the above questions should be extracted from summary and exception reports generated by the proposed EMIS. Specific examples of such reports are listed in the OECS RFP used in the EMIS pilot project (Requirements L1.4.11 – L1. 4.14).

National Level or Ministry of Education

The focus at this level is on policy and planning for the entire educational system of the country. Usually, within the MOE, there are a number of units responsible for various types of decisions. The following table provides some examples of questions that are asked by principal units.

Units	Sample Questions
Education Planning	How many schools need to be built or extended to achieve universal secondary school education?
Budget and Finance	Where must additional resources be targeted?
Human Resource Management	Where must new teachers be deployed?
Measurement, Evaluation and Examinations	In what subjects do students perform poorly?
Curriculum Development	What techniques, currently used by schools, are most effective in improving learning outcomes?
Information Technology Unit	What percentage of classrooms does not have the appropriate electrical infrastructure for the installation of computers for learning?
Building and Maintenance	What percentage of school buildings needs major repair work done and how much would such repair cost?

A proposed EMIS software must be capable of producing summary reports that support decisions that hinge on responses to the above questions. Some of these reports are specified in requirements L1.4.11 – L1. 4.14 of the OECS RFP used in the EMIS pilot.

OECS or Sub-Regional Level

At this level, the focus is on policies, long-term plans and strategies of the sub-region as a whole. Examples of questions asked at this level include:

- What is the dropout rate at secondary schools in the entire sub-regional?
- What percentage of the teachers in the region is qualified?
- In what subject areas are there the highest turnover of teachers?

It is necessary to summarise and compare data from various islands in order to answer the questions at this level. OECS territories, being mindful of this requirement, must select EMIS software that facilitates the conversion of data to a format specified by the OERU in order to enable analysis at the sub-regional level.

3 THE PROCESS OF EMIS SOFTWARE SELECTION

The process of selecting an EMIS software proposed here comprises the following seven (7) steps and incorporates components from proven software selection methodologies presented in prior literature (Deniz, 2001; Konoski, 1995; Vicchioli, 1999; VolResource, 2002):

1. Conduct needs assessment and document system requirements
2. Identify promising solutions and vendors
3. Create and issue RFPs and evaluate responses
4. Preview solution and conduct thorough evaluations
5. Seek reviews from actual users and implementers
6. Make recommendations
7. Obtain feedback

4 POLICIES AND GUIDELINES

4.1 Needs Assessment and System Requirements

A needs assessment is conducted primarily to obtain an accurate picture of the information needs of the education system and the resources needed to implement an EMIS successfully. The documentation of prioritised system requirements can be considered to be a deliverable from the needs assessment.

In conducting the needs assessment, several key issues are to be considered as suggested by Moses and Toro (2001):

- What kinds of information are needed?
- Who will use the information and for what purpose?
- How frequently is the information needed?
- What links the proposed EMIS is expected to have with existing information systems inside and outside the education system?
- Does the Ministry have (or can afford) the pool of skills to develop, customise, install, operate and upgrade the necessary software?
- Must consideration be given to contracting, outsourcing or training existing staff?

A documentation of the system requirements must include the following (Moses and Toro, 2001):

- The key functions that the software must be capable of performing
- Compatibility with available software and environment
- Estimated costs of core system, initial conversion, training, support, upgrades, customisation, and maintenance
- User friendliness and availability of adequate documentation
- Access to technical support
- Sustainability and upgrades
- The choice of open source code or proprietary software

Philosophies

The MOE holds the following beliefs

- The implementation of a computerised EMIS will improve the efficiency and effectiveness of education administration
- It is necessary to obtain input and to enlist the support of all stakeholders from as early as the needs assessment stage of the selection process
- A distinction has to be made between critical and non-critical requirements
- The system requirements must be realistic and must take into consideration the overall budget available for the EMIS implementation

Policies

- 4.1.1 The EMIS solution will be required to support administrative, and decision making processes at the classroom level, the school level, the educational district level, the national level (or the MOE), and the OECS level (or the OERU)
- 4.1.2 The EMIS will be required to be user-friendly, reliable, secure, adaptive and cost effective.
- 4.1.3 The EMIS will be expected to integrate seamlessly with other applications, in the education system and other government departments, with which the sharing of data will be necessary.
- 4.1.4 The resources needed (in terms of finance and human resource) for the successful implementation of the EMIS will be determined at the beginning of the selection process, and strategies will be developed to bridge the gap between existing resources and needed resources.
- 4.1.5 Awareness of the benefits of the EMIS will be promoted from the inception of the selection process.
- 4.1.6 The MOE will ensure the participation of all stakeholders in the needs assessment process.
- 4.1.7 A national EMIS steering committee will be established to guide and advise the MOE in the selection of an appropriate EMIS solution.

4.2 Promising Solutions and Vendors

One of the first dilemmas to be dealt with by the MOEs is whether the management of the development process is better done internally (in-house) or externally. There are a range of possibilities between in-house development and external development, as shown in Figure 5-1, each having its advantages and drawbacks.

In-house development			External development				
1a	1b	2	3a	3b	3c	4	5
In-house systems and application	In-house user application development	Contract staff working in-house	Vendor system tailored by in-house	Vendor system contractor tailored	Vendor system vendor tailored	Vendor bespoke turnkey solution	Standard package

Figure 5.1: Software Acquisition Continuum

In-house development offers more control and flexibility. However, it is normally time consuming, resource intensive, costly and difficult to sustain. External solutions are usually less costly and can be implemented in a shorter time frame. However, they pose some restrictions in terms of adaptability.

There has been a continual drift from in-house development to external solutions because of the myriad of available software capable of automating almost any business or administrative function in almost any sector – the education sector included. It is highly unlikely that there exists a solution that satisfies the needs of all organisations in a given sector because every organisation is likely to have its unique management structure and mode of operation. Consequently, organisations tend to opt for a hybrid between internally managed and externally managed development.

This policy document assumes the selection of a solution in which the management of the development process is primarily external for a number of reasons, including:

- (1) This assumption is keeping with the trend previously described
- (2) MOEs in the OECS do not currently have the resources (personnel and financial) required to develop an extensive EMIS capable of automating and improving the efficiency of the several facets of education administration. Further, there is no plan in the near to increase such resources
- (3) The implementation of an EMIS in the OECS is long overdue. Consequently, the option that offers a shorter implementation time is likely to be more attractive.

With externally developed solutions (options 3a to 5 in Figure 5-1), MOE have to conduct research in order to identify possible vendors. The MOE can tap into resources such education journals, web sites, independent reviewers e.g. the software publishers association (SPA) and Educational Products Information Exchange (EPIE), and ministries and departments of education within and outside of the sub region that have purchased and implemented externally developed EMIS software.

In the MOEs initial research, there are some critical vendor characteristics that must be considered in determining whether or not a vendor is promising. These include (Deniz, 2001):

- Target market
- Technology/platform on which product is based
- Range of modules or applications being supplied
- Total number of previous installations done
- Capability of providing support within the region
- Financial stability
- Pending litigations

Philosophies

The MOE holds the following views:

- There is no need for open bidding in the EMIS selection process. Only well established vendors with potentially suitable solutions should be targeted.
- Extensive research should be conducted in identifying potential vendors.

Policies

- 4.2.1 The MOE will select the most suitable software acquisition option (i.e. in-house development, external development, or a hybrid), giving careful consideration to the resources that will be required for any necessary internal development.
- 4.2.2 The MOE will include in its list of potential EMIS solutions only software and vendors of high repute as rated by independent reviewers.
- 4.2.3 The MOE will ensure that potential vendors are likely to be viable for a long time in the future.
- 4.2.4 The MOE will ensure that prospective vendors have installed their EMIS application in several education systems similar to the one that exists in its country.
- 4.2.5 The MOE will ensure that potential vendors are capable of providing technical support within its country.

4.3 RFPs and Evaluation

In this step, the MOE, through the use of request for proposal (RFP), invites the identified promising vendors to submit information on a proposed EMIS solution for consideration and evaluation. In preparing a RFPs, consideration must not only be given to the functionality of the software, but on qualitative and quantitative information about the software vendor and its resources.

There is likely to be specific guidelines, dictated by funding agencies or ministries of finance, with which the MOE must adhere in issuing RFP and evaluating their responses. Generally, however, a typical RFP for an EMIS solution must include:

- A clearly defined purpose
- Information about the education system and its existing information systems
- Proposal submission guidelines including contact information
- A system requirements matrix developed in the needs assessment (step 1) with priorities quantified
- Proposal evaluation information
- Questions to gather qualitative and quantitative information about the vendor

- Cost spreadsheet for the various components of the entire operational cost of the EMIS
- Request for supporting documents

A final decision on the software solution to be selected must not be based solely on the vendors' responses to the RFP. These responses are primarily claims made by the vendors that are to be verified. With these responses, however, it is possible to eliminate some vendors and shortlist a few (two or three) highly promising ones.

The evaluation of responses must not be based solely on cost, as is usually the case. Other factors to be considered include: (a) how closely the proposed solution matches the system requirements; (b) vendor information such as number of installations, resources available, type of support being offered; and (c) requirements from the MOEs.

Philosophies

The MOE is of the belief that:

- The objectives of (a) selection of most appropriate solution, and (b) economical and efficient implementation of that solution are best met with the practice of competitive bidding
- All bidders must be given equal treatment in order to realise the true benefits of competitive bidding.

Policies

- 4.3.1 The RFP will be consistent with the guidelines of the agency/agencies financing the EMIS project as well as the policies of the Ministry of Finance, but will be designed to obtain detailed information about vendors and their proposed solutions.
- 4.3.2 The MOE will provide all information required by promising vendors in order to enable them to devise the most suitable solution and to submit a quotation within reason.
- 4.3.3 The RFP will be designed to enable preliminary evaluation of vendors and proposed solutions.
- 4.3.4 The issuing of RFPs and additional information, the tendering of responses, and the evaluation of these responses will be done in a fair and transparent manner.
- 4.3.5 All user groups and other relevant stakeholders will be represented on the evaluation team.

4.4 Solution Preview

Vendors who are short-listed based on their RFP responses must be given an opportunity to demonstrate the capabilities of their software. The presentation being made by vendors during organised demo exercises must be focussed and guided by demo scripts prepared by the MOE. This eliminates the tendency by vendors to highlight only the positive aspects of their software.

The demo script describes the scenarios that the system is expected to support. It includes scenarios that require the use of core functions of any EMIS (such as student enrolment, attendance, scheduling and maintenance of staffing information). It also takes into consideration optional modules desired by the MOE such as home access or tracking of teacher professional development.

The demo script also describes specific features that the MOE wishes to see in action, e.g.:

- Generation of reports required at various levels of the education system
- Ability to export/import data
- Ability to perform simple and complex queries
- Integration with third party software

Ideally, demos/presentation must be done by a team comprising at least a sales person and a technical person, in order to ensure that most, if not all, of the questions and issues raised by the audience are addressed. The audience in the demo must include the individuals involved in the evaluation of the responses to the RFP.

In the evaluation of responses to RFP, vendors/solutions are rated as responsive or non-responsive (0 or 1) to each system requirement. With the more in-depth evaluation, based on the demos, evaluators can assign a score¹ to indicate the extent to which they believe the solutions or vendor meets a particular requirement.

Philosophies

The MOE believes that:

- Demonstrations are necessary to verify the functionality of proposed solutions.
- Dialogue (or a question/answer session) is necessary between potential vendors and evaluators in order to provide clarification on the EMIS characteristics of the solutions and vendor.

¹ There is usually has a maximum possible score assigned to each requirement.

Policies

- 4.4.1 The MOE will assist vendors in preparing adequately for the demo exercise (or software preview) by providing sufficient notice of the demo and furnishing them with information and material such as sample data and report format.
- 4.4.2 The MOE will ensure that each vendors demonstrates the capability of its proposed solution to fulfil the same or similar requirements.
- 4.4.3 All demos will be organised and conducted in a manner that will enable objective evaluation.

4.5 Reviews from Current Users and Implementers

Until this phase of the selection process, much of the information about the vendors and their EMIS solutions has emanated from the vendors themselves. This information is likely to be highly subjective and possibly tainted with biasness. Further the demos in the previous step were not conducted in a real setting. It is therefore understandable why evaluators may not be prepared to make a final decision with respect the solutions or the vendors at this point.

It is therefore critical that evaluators speak directly with actual users of the software and representatives of the vendors' clients (ministries or department of education, and schools).

If it is possible, the MOE, not the vendor, may specify the users and clients with whom it wishes to consult. Site visits can then be arranged with the selected clients/users.

During site visits, the MOE's representative must be allowed to observe users as they interact with the EMIS software. The MOE's representative must also attempt to find out the following (Moses and Toro, 2001):

- What do the clients like about the software?
- What are its shortcomings?
- What are the lessons learnt during the implementation?
- If the clients were given an opportunity to do it all over, would they use the same software/same vendor?
- What type of infrastructure is in place to support the software and is it adequate?
- What is the 'real' cost of the software (training and maintenance included)?

Philosophies

The MOE is of the belief that:

- A recommendation on a most suitable EMIS solution cannot be based solely on vendors' "claims."

Policies

- 4.5.1 The evaluators will be required to consult with 'real' users of the potential solutions, as well as project managers and other individuals who can provide valuable information on the implementation process.
- 4.5.2 Arrangements will be made for key evaluators to examine the potential EMIS solutions in action in real settings

4.6 Recommendations

Having assessed the vendor/ software extensively in steps 3, 4, and 5, evaluators should be able to recommend the most suitable EMIS solution, if any. A factor that should be given consideration in the overall evaluation is the perceived ability to work with each vendor.

The recommendation made by evaluators should not only identify the preferred software/vendor, but should include information such as the following:

- Possible discounts that can be negotiated with vendors
- The areas in which customisation is necessary
- The type of agreement that can be established with the vendor (special attention must be given to post-implementation support and the extent to which customisation is expected to be accomplished)
- The pre-conditions or the requirements for successful implementation of the EMIS
- The steps that are to be taken to prepare various user groups and technical support resources for the EMIS implementation
- The infrastructure (including hardware) that is to be installed
- Proposed methodologies/approaches for implementation

Philosophies

The MOE is of the belief that:

- There are likely to be pre-conditions that must be met by the vendor and the MOE itself in order to ensure the successful implementation of the EMIS.
- It is important to state clearly the obligations of the MOE and the recommended vendor.

Policies

- 4.6.1 Perceived ability to work with each vendor will be considered in making the final recommendation.
- 4.6.2 An airtight contract between the recommended vendor and the MOE will be drafted and the conditions stipulated in that contract will be fair and will provide for equitable distribution of risk.
- 4.6.3 Clear recommendations will be made with respect to the timing of the software acquisition, and the achievement of other relevant objectives such as hardware installation and staff training.

4.7 Feedback

This selection process emphasizes the need for input from stakeholders from the inception of the initiative to implement a new EMIS. Input and reviews from users and others continue to be important even after the software and vendor are selected.

Routine feedback mechanisms such as evaluation forms and focus group discussions can be used. The EMIS users and technical support resources must feel that their views are taken into account. It is therefore important to (a) select vendors that are amenable to incorporation of feedback from users into their software, and (b) to invest in a service contract that provides for 'hotline' or online help desk support, system upgrades, and access to user groups (Moses and Toro, 2001).

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Philosophies

The MOE believes that:

- The accumulation of feedback from users will serve to improve all succeeding steps in the software selection process.
- Users' sense of ownership and the level of commitment are increased if there is strong evidence that their views are not taken lightly and are acted upon.

Policies

- 5.7.1 Mechanism will be put in place to obtain regular feedback from users, members of the implementation team, technical support personnel and other stakeholders.
- 5.7.2 The agreement that the MOE will establish with the contracted software vendor will allow for the solution to be flexible in order to incorporate, if feasible, feedback from users.
- 5.7.3 The EMIS implementation will be actively monitored to determine its impact on the education system as a whole.
- 5.7.4 A contingency plan will be developed to address the problems that may arise if the chosen solution does not work out as expected.

5 REFERENCES

- Crouch, Luis; Enache, Mircea; Supane, Patrick (2001). Education Management Information Systems: Guidelines for Design and Implementation. Techknowlogia. Jan/Feb, 2001. Knowledge Enterprise Inc. Available online: www.techknowlogia.org.
- Deniz, Crista (2001). The Software Selection Process: How to Identify, Evaluate and Purchase Software. Association for Women in Computing – Upstate New York Chapter. Available online: <http://www.awc-uny.org/meeting-10-2001.shtml>
- Gurr, David (1997). The Development of Management Information Systems in Education. Available online: <http://staff.edfac.unimelb.edu.au/david-gurr/papers/mgt-inform/>
- Konoski, P Kenneth-Plotnick (1995). Seven Steps to Responsible Software Selection. Eric Digest. Eric Clearinghouse on Information Technology, Syracuse, New York
- Laudon, K.C. and Laudon J.P. (1996). Management Information Systems: Organisations and Technology. Prentice Hall. New Jersey.
- Moses, D. Kurt (Jan/Feb 2001). Education Management Information System: What is it and Why Do We Not Have More Of It. Techknowlogia. Knowledge Enterprise Inc. Available online: www.techknowlogia.org
- Moses, D Kurt and Toro, Vivian (Jan/Feb 2001). Education Management Information System: Available Software and Guidelines for Selection. Techknowlogia. Knowledge Enterprise Inc. Available online: www.techknowlogia.org
- OERU/Tecsult Eduplus Inc. Eastern Caribbean Education Reform Project: Request for Proposal – Education Management Information System. Techsult Eduplus, Quebec
- Saito, Mioko and Dias da Graça, Patricia (1998). Education Management Information Systems (EMIS): An Overview. UNESCO International Institute for Education Planning (IIEP). Working Document for Intensive Training Course on EMIS. Kingston, Jamaica.
- School Interoperability Framework (2002). How SIF works. Technology Horizons in Education (THE) Journal Online Supplement, March 2002. Available Online: <http://www.thejournal.com/magazine/vault/articleprint/verson.cfm?aid=3949>
- Vicchioli, Lisa (1999). A Process for Evaluating Student Records Management Software. Practical Assessment Research Evaluation 6(14). Available online: <http://ericae.net/pare/geton.asp?v=6&n=14>
- VolResource(2000). Selecting Software: A Realistic Approach to Software Selection for the Smaller Organisation. Available online: <http://www.volresource.org.uk/swit/select.htm>
- West, Arnott (2002). Extended EMIS for the OECS (Final Report). Technology Services West.