



The Computerization of the Jamaica National Family Planning Board

Final Report

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I. INTRODUCTION

The Computerization of the Jamaican National Family Planning Board (JNFPB) Project was launched in September 1997 as a twelve month activity of the United States Agency for International Development (USAID) through its Mission in Kingston, Jamaica. The overall aim was to increase the capacity of the Family Planning Board to have an impact on the family planning activities in Jamaica.

To implement this assistance, USAID contracted with LearnLink, the Global Communications and Learning Systems Project of the Academy for Educational Development (AED). The activity was designed with three clear components:

- the assessment of hardware and software requirements necessary for the JNFPB to move all its divisions into computerized operations;
- the procurement and installation of the computer hardware, software and other components of a local area network (LAN) to be installed at the JNFPB headquarters and its regional and parochial offices; and
- training for JNFPB staff in the use of computer fundamentals, office applications, and Internet resources as well as the provision of organizational training.

BACKGROUND

The National Family Planning Board was officially enacted by the National Family Plan Act of 1970 as the principal agency of Government responsible for preparing promoting, and implementing family and population programs in Jamaica. Within the Jamaican health system, the JNFPB plays a central role in binding together the various elements of family planning to form a comprehensive approach. The JNFPB's mission is to enable the achievement of the development and demographic goals of Jamaica. Their work is directed toward ensuring the maintenance of a reduced population growth rate and promoting family planning as beneficial to the health and well being of Jamaican society. A large part of their presence revolves around coordinating and implementing cost-effective and sustainable services that contribute to the reproductive health of the nation. This includes ensuring ready availability of a mix of contraceptives and effecting an increase in contraceptive use among a wide cross section of the population in the reproductive age group. Additionally, the Board provides training and support for individuals and organizations involved in family planning and family life education island wide.

At the onset of this activity the JNFPB had headquarters offices located in Kingston, 4 regional offices, and 9 parochial offices and 3 family planning clinics in 12 remote locations throughout the country, with a total of 88 staff members including professional and support personnel. The JNFPB works closely with the Ministry of Health, the Planning Institute of Jamaica, the Statistical Institute of Jamaica and other government institutions to which it provides sector specific information. It analyzes the family planning data contained in the OHS and liaises with donor institutions. However, one of its most extensive responsibilities is to provide a network of 350

government and private sector NGOs and family planning clinics with contraceptive supplies and education, social marketing materials, community outreach, and technical assistance.

To facilitate these tasks, the institution had only 6 stand alone PCs which were used for critical purposes; one for statistics data entry, two for accounting, two for all word processing work, and one for inventory at the warehouse. This allocation of computers had become extremely insufficient for the magnitude of workflow and the amount of professional staff working at the Board. The situation was exacerbated by the growing number of tasks involving sophisticated data analysis, research, and materials production.

Finally, it was becoming increasingly more of a challenge to facilitate data and communication flows between the HQ, regional and parochial offices. With more staff traveling to the outlying parishes, a dependable way for them to access data and facilitate communications became increasingly important.

The proposed solution was a comprehensive and planned introduction of computer hardware and software along with accompanying technical training for all staff. The goal was that this would result in an increased capacity to effectively impact the Jamaican society with family planning activities.

II. PRELIMINARY ASSESSMENT

Dr. Dennis Foote, Director of the LearnLink Project, visited Jamaica from 9/16/97 to 9/26/97 to conduct a preliminary organizational assessment of the JNFPB. During that time he conducted extensive interviews with the staff of the JNFPB and USAID. The purpose of the interviews was:

- to determine the current activities and working patterns of JNFPB staff;
- to assess their current level of knowledge and utilization of information technology;
- to solicit their perception of workflow bottlenecks and inefficiencies that might be rectified by computer networking;
- to explore their plans and hopes for future working styles;
- and to identify areas where information technology inputs could improve organizational efficiency.

During the initial visit, Dr. Foote met with representatives of virtually all the units of the JNFPB. Individuals from the following organizational units were interviewed:

- Core Executive Personnel (Executive Director, Deputy Executive Director, Medical Director)
- Finance and Budget, and Internal Audit
- Administration and Personnel / Registry and Common Services
- Logistics Management

- Public Relations
- Information, Education, and Communications / Training
- Project Coordination and Management / Management Information Systems
- Warehousing and Distribution

These contacts included all the core functions of the JNFPB except for service delivery in the field and the Board of Directors.

FINDINGS

The basic findings from these investigations were that:

- the work pattern of the organization is heavily information dependent and is of a type that would benefit from computerizing many of the information-related functions;
- the personnel of the organization have the ability to adapt to and make productive use of a computer network, and are positively disposed toward incorporating a network into their working styles;
- many of the staff already have significant experience with using computer applications, though no one on the staff has appropriate technical skills for managing a network;
- the physical environment in JNFPB headquarters in Kingston is capable of being equipped with a computer network;
- the means of integrating the field staff into the network may be constrained at the moment by technical and fiscal issues, but it appears to be feasible to integrate them on a limited basis now and gracefully improve their integration level as the technical environment in Jamaica develops;
- many of the issues relating to design and implementation of an appropriate network to support JNFPB objectives are straightforward and can be provisionally decided on the basis of available information, but others will require the technical input of the network designer before they can be finally resolved.

Much of the Board's effort goes into the collection, management and dissemination of information in various forms. This is reflected in such activities as IEC and training, public relations, statistical analysis, report preparation, systematic planning for procurement and distribution of commodities, and management and accounting. All of these areas are prime candidates for achieving efficiency gains from the incorporation of computer support. Thus the Board will be in a position to capitalize on the introduction of computerization for improving its internal and external productivity.

The existing staff have the requisite educational and attitudinal characteristics to adapt easily and quickly to a new mode of working. There are presently only a few computers within the Board, and several of those suffer from unrepaired faults. However, the available computers are very heavily used, and a common complaint during interviews was the difficulty in getting adequate

access to the existing machines. The high level of demand reflects the fact that many of the JNFPB staff are computer literate, either as a result of training received on the job, or because of personal interests. It bodes well for the smooth introduction of a much higher level of office automation in the near future. However, a number of the existing machines are reported to have been fully or partially inoperable for extended periods because of unrepaired problems. This points to a clear institutional need for better management of the information technology resources, both by clearly designating responsibility for equipment maintenance, and by allocating budgetary resources to ensure that machines are kept in good working order.

The physical plant of the headquarters building is amenable to the installation of a network, but will require some significant work to accomplish it. There is currently no network cabling installed in the building, nor is there any existing allocation of secure enclosed space for computer or telephone hardware. The electrical infrastructure may not be adequate to support a large additional demand for clean power. The building is a large, cast-concrete structure with multiple floors and with an interior design that is segmented into separate working areas. Most of the interior space is dedicated to open work areas with cubicles, while the outer perimeter of the internal space is primarily configured as enclosed offices. Much of the internal space is fitted with a drop ceiling of acoustical tiles. It will be physically possible to run conduits for cables to the workspaces, but it may not be possible to conceal the conduits. The need for secure enclosures for network servers and hubs will need to be addressed by the technical network designer in a subsequent visit.

The adequacy of the power system will also have to be addressed at that time. In informal conversations some of the staff reported that the circuit breakers occasionally trip under the existing equipment load. There appears to be an undersupply of wall outlets for power, and incandescent lights on the same circuits as printers and copiers were observed to dim as the appliances drew power. These indicators may point to a need to install additional power capacity to support the computer network.

The JNFPB has a dozen field sites scattered around the island which are engaged in service delivery, education and outreach, and management. It also has a warehouse site in Kingston which, while nearby (said to be less than a 5 minute walk), is not physically contiguous with the headquarters location. The amount of anticipated traffic between the headquarters and the remote sites is quite low, and is described primarily as communications and file distribution through E-mail. The traffic between the warehouse and the headquarters is also low, but it includes some data manipulation for tracking distributions of contraceptive supplies to Ministry of Health clinics (300-plus locations) and for inventory monitoring at the warehouse, in addition to E-mail connectivity.

The means of connecting remote sites has only been partially investigated during this visit. Anecdotal information indicates that the costs of dedicated circuits in Jamaica will be prohibitive for connecting remote locations, with the possible exception of the warehouse. The reliability and transmission quality of the public switched telephone network is said to be adequate for data connections in the 9.6 to 28.8 Kbps range from many lines in Jamaica. This has not been empirically tested from any of the actual locations, and other anecdotal reports indicate that there is high variability from line to line and central office to central office.

The tariff structure for telephony charges is based on timed charges for all calls, with different rates for intra-parish and inter-parish calls, which raises the possibility of considering a virtual private network (VPN) carried on internet links as a means of connecting the remote sites. There are a number of different Internet Service Providers (ISP) in Jamaica, although all are said to use lines leased from Telecommunications of Jamaica (TOJ), which is also a provider. Definitive information has not yet been collected, but a number of interviewees have said that at present, the ISPs do not have local dial up numbers in the parishes, so VPN via internet would necessitate calls at the higher inter-parish rates. Even without full information, the tariff structures and traffic demand would seem to indicate that full time connection to the headquarters would not be cost effective, but it remains an open question whether it would be preferable to use straight dial-up or whether to pursue internet mediated linkages.

The objective of this initial visit has been the investigation of the organizational needs and readiness of the JNFPB, in order to plan the basic structure of the information technology intervention and to identify the needs for technical input to specific questions for the next phase of technical assistance. That objective has been accomplished. The remainder of this report summarizes the initial conclusions about specific technical or organizational issues, and delineates the questions to be resolved in the next phase.

FUNCTIONAL REQUIREMENTS

The interviews with the JNFPB personnel focused strongly on what they did and wanted to do in their jobs that might benefit from computerization. Most of the staff were quite aware of the capabilities of specific application software categories, and were able to describe their needs in terms of the kind of software they needed to do their jobs. In this section, the functional requirements for the network are described in terms of the applications software the network should support for particular categories of workers. Network and operating system software are described in a different section.

Applications Software

The vast majority of information technology needs identified in the interviews with JNFPB staff fall into the category of office productivity applications, such as word processors, spreadsheets, and personal information managers. However, there is also a broad range of applications software that is either more specialized or more idiosyncratic that also needs to be accommodated. This section will discuss the needed applications, and offer guidance about choices among different packages. These comments should be taken as input to an internal discussion within the JNFPB about which software titles they want to standardize on and support. Ultimately, the decision about which software to use lies with the Board, but they will have to make their choices fairly soon so that the software requirements can be included in the procurement cycle. Communications and internet software is less familiar to the respondents, and elicited fewer comments, but will ultimately be a major component of the activity; it is treated in a subsequent section.

Office Productivity Applications

Interviewees were virtually unanimous in their identification of word processing as the major current use of information technology. The current machines at JNFPB are generally loaded with some version of WordPerfect; only a few machines have Microsoft Word loaded; no other word processor packages were mentioned. People complained about incompatibility of files from different versions of WordPerfect as a problem as they switched from machine to machine, a problem that should be alleviated by a network providing a single, centrally loaded version of the word processing software. As a practical matter, JNFPB should not consider any other word processors besides WordPerfect or Word. The majority of the JNFPB staff with any experience in word processing already use WordPerfect, which would help with training and compatibility with existing documents. Modern versions of WordPerfect and Word are probably functionally equal in terms of features, although most comparative reviews give the nod to Word. In terms of market share, Word has a strong advantage. The choice between the two titles, considered alone, is largely a matter of personal preference. However, JNFPB will want to consider the titles as parts of a suite of office applications, rather than alone, since there are strong implications for cost and degree of integration across applications. Considered as suites of applications, there are significant reasons to choose Microsoft's Office Suite, and with it, the Word word processing application.

Spreadsheet use at the Board appears to be done entirely in Lotus at the present. Lotus' office suite is not strong enough to be considered a contender, so the Board would face a decision about buying additional titles in order to stay with Lotus. In choosing between Microsoft's Excel or WordPerfect's Quattro Pro as parts of their respective suites, Excel is by far the stronger choice. In choosing between Excel and Lotus, JNFPB should consider their current investment in spreadsheets and the inconvenience of learning a different program, versus the cost and integration advantage of sticking within an office suite.

Presentation software is used primarily by the IEC and Training Division, and they currently use PowerPoint, the Microsoft Office program. WordPerfect's suite includes Presentations, a markedly less convenient and powerful program. The logic of staying with PowerPoint is strong, and would point in the direction of choosing Microsoft's Office Suite.

The office productivity suites include a small assortment of other software C personal information managers, internet browsers, viewer programs, etc. C that is valuable, but not central enough to JNFPBs work to influence the decision. The Board should convene a committee to consider the implications of choosing one or another of the software suites or titles, and be prepared to recommend a course of action when the technical design consultant comes to Jamaica, since one output of the design activity is a list of hardware and software to be procured. Given that the installed base and experience levels are relatively low, I would be inclined to recommend to the Board that they adopt the Microsoft Office Suite as their standard, and go ahead and make the change from their current practices.

Database Software

The only database application reported during the interviews was the use of Contraceptive Tracking Software (CTS) to manage the distribution of contraceptive supplies to JNFPB and Ministry of Health clinics. This software is a custom product structured to track the maintenance of stocks in the clinics of various contraceptive supplies, to monitor consumption of stocks, and

to forecast the quantities that should be delivered to each clinic to maintain an appropriate reserve level. The application is said to run as a custom shell on top of FoxPro, a well-established, powerful database engine. Given that there is relatively little call for database software at the moment, and given that FoxPro is required by CTS, the best path would seem to be to provide FoxPro as the standard database for the Board. This would enable the Board to meet its CTS requirement, and have a database engine if needed. The adoption of FoxPro would also permit the use of the normal level of the Microsoft Office Suite (as opposed to the more expensive Professional version which includes Microsoft's Access database).

Statistical Software

Current statistical analysis is done within the Project Coordination and Management Information Systems Division (Projects, Research, and Statistics) and by the Logistics Manager. Typical data sources include:

- monthly reporting on clinic activity, based on MOH-supplied data;
- contraceptive prevalence survey data;
- private sector contraceptive distribution data;
- vital registration data;
- warehouse data.

The software currently in use is Servstat, a specialty package developed by FPMD, a unit of Management Sciences for Health in Boston. It provides access to data sources that now are analyzed elsewhere and furnished in tabular summary form. Acquisition of a stronger data analysis package would permit more specialized analyses to be performed. In discussions about alternative packages with greater flexibility, both the Statistical Package for Social Sciences (SPSS) and the Statistical Analysis System (SAS) were considered. Of the two, SPSS is the more appropriate choice. It is a flexible, powerful package oriented to analysis of data from diverse sources, whereas SAS is oriented towards a mainframe environment for management of massive amounts of data. Another difference in favor of SPSS is that SPSS is licensed by purchase of user licenses (that is, a user-license buys a copy of the software for use in perpetuity), while SAS is licensed on an annual site-license basis (where the organization pays an annual fee to use the software).

Accounting Software

Accounting is presently performed on a manual basis at the JNFPB. Many of the prerequisites for conversion to computerized accounting are already present. The volume of transactions and checks each month has become difficult to keep up with manually. Divisional budgets are tracked for variances from current expenditures. However, an earlier attempt to use a stand-alone personnel package for tracking employees work time and vacation accruals has been abandoned.

A move to computerized accounting seems logical and timely for the Board. It will require careful articulation of functions among different parts of the Board. Some functions that feed into accounting and financial reporting are tracked in different divisions. For example, personnel

records up to the point of computing paychecks are tracked in administration, and inventory is tracked in stores. The conversion to computerized accounting is a good opportunity to consider all aspects of internal procedure, in order to identify possible cases where more or fewer checks and balances might be appropriate, or where processes might be made more efficient.

The timetable for technical assistance under this activity is too short to design and install a computer network and make a full conversion to a computerized accounting system. The accounting system is **mission critical** in the sense that the organization cannot operate successfully without it. Design of a chart of accounts suitable for a computerized system and choice of a suitable job cost tracking structure should be based on careful consideration of the Board's customary business practice and anticipated reporting requirements. The process of evaluating different software options, determining how to structure them, installing and setting up the software, and running it in parallel with the manual system for one or two quarters will extend well beyond the expiration of this technical assistance contract. In addition, the Board will need to cultivate a relationship with a local firm that supports the software chosen, so that design and troubleshooting help are available to them in the long haul.

For these reasons, my recommendation concerning accounting software is that the process be begun under this activity, but with the expectation that the process cannot be fully supported by the technical assistance available. It will be better to make a deliberate transition with long term local support available than to make a hasty transition in order to complete it within the timeframe of the technical assistance contract. The Board should consider establishing a working group to investigate and compare the commercial integrated software packages that are available with in-country technical support, and choosing from among those options.

Special Purpose Software

Graphical and multimedia software for creating animated presentations and digitally edited videotape productions also emerged during the interviews as desired applications for one or two users. It appears from these discussions that the relevant software and hardware will be requested from Japanese assistance, and thus would be outside the range of this activity. Nonetheless, it might be worthwhile to include a video capture board and image editing software to support the creation of still graphics or the creation of interactive instructional materials. The specific software and hardware should be determined in conjunction with the decision about whether to establish the network as an intranet and/or whether to create a web site to represent the JNFPB's interests to the outside world.

Another category of specialized application software discussed with several people was the category of groupware, as exemplified by Lotus Notes. The typical strength of such groupware is in improving the functioning of ad hoc groups, which collaborate for a relatively short period on novel tasks, or of work groups that operate without geographic **colocation**. **Exploration of** the working style within the workgroups of the Board revealed that the teams typically work on their objectives in relatively easy face to face cooperation, without major obstacles of separation in space or time. This kind of work style is extremely well supported by E-mail exchanges, without the high maintenance demands of more extensive groupware applications. It is thus recommending that a very capable email application be adopted, rather than groupware per se (see subsequent section).

A third type of special purpose software that was discussed was subscriptions to online information databases that require their own proprietary search software. The two databases that were mentioned in this context were MedLine and PopLine, large bibliographically-oriented collections of scientific literature with strong search interfaces. Both of these would provide useful inputs to Board work, and could be supported even now, prior to the implementation of a computer network, through dial-up access. (In fact, dial-up access might still be the best method of searching these databases even with a network.) Both databases have, in the past, levied a subscription or usage charge on organizations. The JNFPB would have to determine whether the charges for access and communications could be supported from existing budgets.

A final category of software that could offer assistance to the Board in performance of its work is document management software, which was mentioned in interviews in the context of helping the Registry with its responsibility to control the file system for the organization. Document management tends to focus on an environment in which the quantity of paper is too great to store and needs to be reduced in bulk by scanning and/or optical-character-recognizing documents, and in which searching through the computer data base of file contents might offer advantages to the users. The support sought here is somewhat different from a typical document management application, in that the management of the updating and circulation of the Board's files is as much a **Apeople@management** task as a **Adocument@management** task. The issue is closer to a circulation management program such as might be used in a library environment. More research is required to identify programs that could efficiently support such a need.

Connectivity Software

In general, communications software can be said to support processes, rather than specific task automation, as is done by the categories of software previously mentioned. In the long run, it will probably have among the most significant impacts on the functioning of the Board. It requires tight integration with the server architecture and protocols, and with the choice of whether to structure the internal accesses as intranet accesses. Most of these decisions will be best made in conjunction with the technical network designer who arrives as the second stage of technical assistance under the LearnLink activity. A few salient issues are raised here in anticipation of that decision-making cycle.

E-Mail Functions

If the experience of the JNFPB is similar to that of most other organizations, they will find that the implementation of a network (as opposed to stand-alone computers) will have its biggest impact through the arrival of e-mail. The email program chosen for the Board needs to be one of the more capable, integrated programs, since it will be relied upon to **provide many of the** functional advantages of groupware, without the complexity and cost of implementing a full groupware application. The kind of extended features that the Board should seek are those that support internal work processes:

- shared calendars with busy search, to permit easy scheduling of meetings at times when all members can be detected to be available;

- task management, which permits tasks to be assigned and delegated and tracked for completion as a type of message within the email system;
- to do lists, so that people can manage their own work effectively;
- powerful file attachment features, so that draft documents, spreadsheets, and other files can be sent along in native format with email messages;
- flexible group addressing, so that distribution groups can be easily established to allow convenient information sharing within workgroups; and,
- full remote access, so that field office staff (and headquarters staff who have modems at home or on laptops) can be fully involved on a dial-up basis. The specific package to be used should be chosen during the visit of the technical designer, to ensure an optimal balance between features and network efficiency.

Internet Connectivity

There are three separate types of issues about Internet connectivity software, each of which requires involvement of technical design issues for a final decision. The first of those is whether (and if yes, how) the Board will be represented to the public on a World Wide Web site. The options for Internet connection for this service have not been fully investigated during this initial visit. Many of those interviewed felt that the provision of information to the public was an important role for the Board to play, and might reduce some of the demand on staff members to fulfill information requests from the press and the general public. The Board also has a valuable contribution to make in framing public policy issues and representing Jamaica in the worldwide flow of information about family planning.

The second of these is whether to structure the internal network as an intranet, which is essentially a private internet. This can allow easy access to information internally, and may also provide a convenient method for interconnection of field sites when the physical infrastructure in Jamaica improves.

The third is how to provide Internet access for external browsing from the Board, so that staff can access information to support their work. This is in part a question of browser software, and in part a technical question of how the Board's network links to the broader Internet.

Each of the three issues has partial dependencies on the others. The final resolution of the best balance of functionality and choice of software should be made during the technical designer's visit.

Remote Access

As was mentioned earlier, remote access is crucial to the involvement of the field sites. The levels of access provided could range from simple dial-up to the email system to full network connectivity via phone, Internet, or dedicated lines. Due to the limited development of the infrastructure for Internet backbone in Jamaica, the initial methods chosen may be limited by the available technology. However, it is imperative that the current network design take into account the inevitable future growth of technical capability in Jamaica, in order to permit a smooth growth

path for increasing the level of access as the infrastructure matures. The assessment of the tradeoffs in this context must be made by the technical designer.

III. TECHNICAL ASSESSMENT AND DESIGN PHASE

Glenn Strachan visited Jamaica from 12/1/98 to 12/12/98 to do a complete technical assessment of JNFPB offices and site infrastructure. During that time he conducted extensive interviews with JNFPB management, Cable & Wireless of Jamaica, local electrical and cabling contractors, computer vendors and Internet Service Providers. The design of the computer network for the Board was completed during this visit.

The networking requirements for the Jamaican National Family Planning Board (JNFPB) were simple, and very straight-forward. Thirty-five persons within the main office were to receive a computer system.¹ These computers would all be connected to a network file server which will provide each one of those people with access to centralized applications such as Word Processing, Spreadsheets, e-mail, the Internet and various other programs tailored to meet end user requirements.

The real challenge of this project will be for JNFPB staff who will require a great deal of patience as they transition from the familiar to the unfamiliar. Staff members may initially find that the new systems make their jobs more complicated and may return to doing simple tasks the old way until they feel comfortable with the new computer system. For some, that level of comfort may never be realized while others will soon wonder how they ever lived without computers.

Imperative in the adoption of computer systems is an examination of work flow patterns and traditional methodologies for getting things done. Humans often retain certain behaviors because they are comfortable, tried and tested. Often times, as computers are introduced into an uncomputerized environment, end-users will simply overlay old behavior patterns onto these new machines and never truly realize the benefits of computerization. The real challenge for JNFPB will be to analyze virtually everything they do and see how computers might be able to streamline a process, or perhaps even eliminate some processes.

There is another concept that is also important - sustainability. There is a story about a man who bought the boat of his dreams and people always saw this man cleaning and **maintaining his** boat but never taking it out for a sail. Someone finally asked him why he never took his boat out for pleasure cruises and he answered that he spent so much money buying the boat that he could not afford the gas. All networks require maintenance, some more while others need less. Having a network manager on staff is a cost. Buying paper to support printers is a cost. Buying tapes for the backup system is a cost. The challenge for me is to design a network system, which will not burden the JNFPB with unanticipated costs. For this reason, every piece of equipment has been chosen with the intention of ensuring long term viability of the networking systems. Although a file server might have been purchased for less money, it would have meant sacrificing a crucial

¹ In addition to this total, one computer is to be placed in the Kingston Warehouse, while the remaining four computer systems are to be placed into the outlying JNFPB regional offices. These systems will not be networked. Further discussion covering these systems can be found in Workstation Requirements Section and the Communication Requirements Section.

element which is going to extend the life of that file server such as a redundant power supply, or a system which will still run when a hard drive dies. If ever there was a time to avoid being penny wise and a pound foolish this is it. At the same time, cost constraints are a reality, so every effort was made to achieve a balance between the ever-present pressure to buy affordable while also buying smart.

INFRASTRUCTURE REQUIREMENTS

Server Room Environment

It was necessary to select a room to serve as the home for the new networking systems. The JNFPB selected their previous computer room to serve as the site for the new file server and ancillary services.

The file server selected was a Dell PowerEdge Model 4200 with redundant a power supply to help reduce the chances of power supply failure. The file server is also equipped with a RAID system (Redundant Array of Inexpensive Drives) to further insure against system failure and the lost of data should a hard drive fail. This file server also possesses two Central Processing Units to provide the greatest response to end users needs plus be able to run communication and backup sessions in the background without system response degradation.

Network Infrastructure

The main building required the installation of cabling to allow it to support the installation of the network systems.

The networking infrastructure was installed by Management Control Systems. It is all IEEE Category 5 cabling throughout configured in a 10Base-T pin out. All connections have been home run from work station to the Category 5 patch panel located in the file server room. All users are using 3Com 3C509 10/100 Fast Ethernet TX Cards running at 100mb.

Work Station Environment

Each workstation must be configured specifically for each user.

All users received a Pentium-based computer system running the Windows 95 operating system.

Applications Environment

Software selection was based on interviews with Board staff and designed to meet the specific needs of the staff.

All users have access to the Microsoft Office 97 Professional Office Suite product, which has been centrally installed on the file server. The MS Office Suite provides Word Processing, Spreadsheet, Presentation Graphics, Access and a Personal Information Manager (PIM). Selected individuals also have access to additional software packages including MS Project, SPSS, and Graphics oriented software. All users also have access to an e-mail system that provides access to both internal users and external addresses on the Internet. Users may also access the World Wide Web (WWW) via the use of Netscape Professional Edition 4.04.

Microsoft is the world leader in many areas and their Office Suite controls 85% of the world market. Providing the end-users with a 100% totally Microsoft environment helps insure compatibility between applications and the Operating system.

Refer to Appendix A for a complete listing of software applications selected for installation on the Board network.

Communications Environment

Requirement: Determine the best method for providing remote offices access to e-mail and the Internet. Also determine best method for providing Internet and e-mail access to home office staff.

The impact of the growth of the Internet has been a major factor in the design of the JNFPB network. The new network has a built-in communication system capable of providing eight people with simultaneous access to an outgoing phone line. This communication system permits people to send faxes from their desktop, or connect to the Internet, all at the same time. Once connected to an Internet Service provider using an established account, staff members at JNFPB will be able to explore the Internet, and search for information. In addition, the file server itself can also serve as a Web Server and provide for the transfer of e-mail to and from the Internet.

Network Manager

The selection of a person to serve as the manager for this networking installation is absolutely imperative to the life of this project and the sustainability of the network. Once installed and functioning, the network will require someone to provide full time maintenance and support. Someone needs to take ownership of the network and make it his own if it's usefulness is to be sustained and maximised.

IV. NETWORK INSTALLATION

Clint Tokash and Sandra Tokash visited Jamaica from 5/13/98 to 5/28/98 to install the computer network in the main building of the JNFPB and outfit the additional five workstations and printers that would be installed at the remote locations.

OBJECTIVES

- Install Windows NT file server along with 6 fast ethernet hubs, 1 10/100 switching hub, and a shiva lan modem/E device.
- Configure and install 34 node local area network on the premises for the Jamaica National Family Planning Board (JNFPB). Pus outfit an additional 5 workstations to be used at remote work locations in Jamaica.

Montego Bay (1)
Warehouse (1)
Madeville (1)
St. Thomas (1)

Portland (1)

- Assure that all workstations have Windows95 software, Microsoft Office97, Netscape Communicator, and Microsoft Outlook98 loaded and operational.
- Setup 2 temporary training rooms for computer training. Room 1 should have 8 workstations and room 2 should have 5 workstations. These workstations should be networked to allow for training in MS Office, Outlook98, and Netscape.
- Work with newly hired local network administrator, Devon Sterling, to familiarize him with the architecture and maintenance of the network.
- Deliver and install one remote location in Montego Bay.
- Install and configure Internet connections for all workstations and NT File Server.
- Prepare report detailing the successful installation and configuration of LAN at main office and installation of remote site at Montego Bay.

ACCOMPLISHMENTS

Equipment Deployment

All of the computer equipment was unpacked and moved from the warehouse to JNFPB. The computer equipment was unboxed and assessed. All damages during shipping were documented with copies given to Devon Sterling and Maria Francescon. JNFPB floor maps and an inventory spreadsheet were created detailing the physical location of all computer equipment. Copies of these documents were left with the Network Manager

Training

Training room alternatives were discussed with Mr. Deane and the trainers and 10 training workstations were set up. Due to room availability, initial plan for 2 training rooms of 8 and 5 computers was modified to 2 training rooms of 6 and 4 computers. The trainers said this configuration would still accommodate the training groups.

Network Documentation

The network topology was documented (floor maps and Computer Room details), IP Address list, Inventory list, Internet information, Server Room notes, and damaged equipment were also documented. Refer to Appendices B-D details.

Additional Equipment Needs

The following list of equipment was necessary to complete the network installation and training. These minor items were procured locally and are in addition to the complete equipment list included as Appendix B.

- Keyboard, mouse, monitor, and power cable extenders
- Surge suppressors
- Printer cables

- Network cables
- Cross-over cables
- Mouse pads
- Internal modem

Computer Room Setup

The patch panel, hubs, switch, and Shiva device in the computer room were set up and configured first. The NT server, which was pre-configured in Washington D.C., was attached and the network was brought online. Finally, temporary workstation, the multimedia workstation, and the printers were set up and configured. The Computer Room was used as a base of operations for setting up and distributing all the JNFPB workstations. It was agreed that the multimedia workstation and one other workstation would remain in the Computer Room for general use.

Server Setup

The server setup and configuration was done in Washington D.C., so only minor configuration changes were necessary in Jamaica. The server runs Windows NT Server 4.0, email (Exchange Server 5.5), and backups (Backup Exec). The server also allows file and printer sharing, data security, and Internet connectivity.

Workstation Setup

The CODEBLUE program was used to create desktop images in Washington D.C.. These images facilitated the installation and configuration of the workstations in Jamaica and allowed for the setup of all workstations in about 3 days. The images did require minor adjustments in Jamaica, but overall, the setup and distribution of workstations went very fast. Instructions for using these images were included as an appendix to the installation report. The installation team also worked with the newly hired Network Manager, Devon Sterling, to show him how to setup a system using the CODEBLUE software.

The following list details the type and number of workstations that were setup:

- Multimedia – 1
- P233 (basics HQ) – 24
- P266 (high-end HQ) – 12
- P233 with modems (remote) – 4
- Existing workstations - 2

Remote Sites

Montego Bay

The installation team traveled by car to Montego Bay to setup a remote workstation and printer. The work took about 1½ hours. For some reason, the modem that worked in DC would not dial, so the problem required troubleshooting. Power was also a problem. A 9' power extension was included with the equipment, but a longer one was required. Everything was installed, except the

UPS unit due to the power cord restraint. Also, from Montego Bay, it was initially impossible to dial a local number to check email. The ISP has provided the JNFPB with a local number to connect with them to download mail or dial into the Internet.

Warehouse (the Stores)

A remote workstation and printer were installed at the warehouse. The system is operational, but a line coupler is needed to plug in the modem on a permanent basis.

Basic Network Administration Training

The team spent time with Mr. Sterling talking about the network setup and answering any questions he had. Mr. Sterling assisted the team throughout the network installation and seemed to have a good grasp of workstation support and troubleshooting as well as basic network concepts; however, he has no experience administering a server or network. The team made every effort to show him everything he would initially need to know (like how to create new user accounts or share folders), but time was extremely limited and it was impossible to cover everything. It is strongly recommend that Mr Sterling attend an MSCE course available in Kingston. He seems very bright and asks excellent questions, but he will need additional resources to perform his job properly.

V. TRAINING

Tawna Lawrence and Jeffrey Baker visited Jamaica from 5/18/98 to 7/17/98 to conduct the computer application and organizational training for the Board.

This training component occurred over a nine-week period following the installation of the new Local Area Network in mid-May, 1998. The training was intended to teach computer skills to the JNFPB staff in an effort to enhance their daily efficiency, improve the flow of information in and through the organization, and provide a comfortable transition for the employees in the use modern information technology.

DESIGN OF TRAINING

Initial Design

Before arriving at the JNFPB in Jamaica, the LearnLink core team and the instructors sub-contracted to provide the computer training met in Washington DC to develop an overall training strategy. A pre-registration survey was distributed to Board staff several weeks before the training was scheduled to begin in order to obtain a baseline reference of the staffs computer skills and experience. Based on responses to this survey, it was apparent that the majority of the staff had little or no experience with computers and/or recent versions of the software packages that would be provided. Therefore a training plan was designed to provide all students with basic, comprehensive skills in several software applications, regardless of prior skill and experience. The applications included the five core programs of Microsoft Office '97 (Word, Excel, Outlook, PowerPoint, and Access), Windows '95, and Netscape Navigator in addition to an introduction to the PC to familiarize the staff with the terminology and basic hardware of computers. The team

also planned to offer brief introductory courses for SPSS, MS Project, PageMaker, and PhotoShop, contingent upon demand and time available at the end of the training period.

The trainers planned to teach approximately 50 employees in two small training class rooms (one allowing 8 students, the other 5 students) using a software manual provided by Softek Systems, Inc. The manual included fundamental definitions of terms and functions in each program, step-by-step instructions in the core software skills, and basic hands-on exercises. The trainers also planned to provide individual tutoring and help-desk periods for personal instruction, particularly in applying the computer skills learned in class to the employees' task needs.

Based on the computer experience and knowledge described in the pre-registration surveys, the JNFPB's staff members were divided into 10 groups of four to six students. The groups were separated into the following sections:

- Level 1: No prior computer experience/knowledge;
- Level 2: Limited computer experience/knowledge;
- Level 3: Basic computer skills but no formal training;
- Level 4: Familiarity with computers and various applications;
- Level 5: Considerable/advanced experience with computers and software.

The instructors planned to tailor the pace of the training to each group's particular needs- faster for the more advanced students, slower for the less experienced students. Each class period was expected to span 3 hours, including a short break. The class schedules were systematically rotated each week to allow all students the same access and exposure to the full series of software modules in the manual. Additionally, the instructors intended to maintain an open, flexible training atmosphere that would accommodate the daily work demands of the employees as well as preserve the implementation of the training schedule, and also incorporate as much material as possible for all levels, in all programs.

On-Site Modification

The trainers arrived on-site in Kingston a few days after the arrival of LearnLink's network installation team. At this point the equipment and the site's environment required additional considerations to be incorporated into the training strategy. The equipment was installed successfully in the training rooms and on desktops with only a few trouble-shooting issues.

Some equipment issues evolved as a result of smaller than anticipated training rooms and therefore fewer PCs available in each training room. Initially the trainers expected to have 8 seats available in one classroom and 5 seats in the second. Upon evaluation the rooms could only hold 5 and 4 PCs respectively. The instructors thus modified the groups and schedules slightly to accommodate the reduced space. Another issue requiring some attention was the lack of an Internet connection. The trainers initially limited the email sessions to in-house email and then postponed the Internet module until the outside connection was secured.

An environmental element the trainers soon encountered was the initial expectations from the JNFPB. The Deputy Director, Mr. Deane, was concerned that the training not interfere with the

work of the employees. In an effort to accommodate this concern, the trainers modified the length of the training sessions to two-hour blocks (with no break) and scheduled only the first 3 weeks of class. This draft allowed the trainers some flexibility with the schedule and/or training design depending how well the strategy met the needs of all parties. Having this option became immediately useful when Mr. Deane suggested that the trainers conduct several day-long training sessions for field staff in order to minimize their traveling into Kingston. This required only a minor reworking of the schedule in the third week, and subsequent weeks were scheduled to account for the Field Staff's particular class needs.

In handling these and other issues, the instructors promoted a training strategy that maximized all students' learning. Moreover, as professional and personal users, the instructors hoped to instill an attitude that technology could be both comfortable and fun, and that often stumbling blocks could teach the student as much as any classroom session.

Applied Training

After the first few sessions with the students, it was apparent that certain issues would define particular aspects of the training.

Attendance

Of special note was the enthusiastic outlook of the actual students. Initially the majority were somewhat anxious about their lack of knowledge and expressed some fears (e.g., will it hurt my eyes, maybe I'm not smart enough to learn it, is a computer really useful for me). Yet, they were obviously willing and eager to attend the classes despite their concerns and busy schedules. The instructors appreciated this positive attitude and tried to create a favorable training atmosphere for them. (For example, students were let out for a quick break when the A/C wasn't working; also, more class time was dedicated to interesting and useful topics such as document formatting and email.) In many cases when a student missed a class, she took the time to meet with one of the instructors and review the material she'd missed, revealing again her interest and commitment to learning the computer skills.

One drawback from the beginning was that, despite their desire to learn, the students had a distinct tendency to be late for class (there were some notable exceptions). This created a problem with having enough time cumulatively in the classes to present all the material in the manual. The instructors had already shortened the class from three to two hours (although the average class length lasted 2.5 hours), so after the third week, the instructors officially made the class length 2.5 hours. Eventually, as the students became more comfortable with the computers and accepted the training as part of the daily routine; they were less tardy and the instructors were able to cover more material.

Another attendance issue throughout the course of the training was that it occurred in the summer as many of the staff took extended leave from their jobs. This meant that about 1/5 of the students missed either the first or last portion of the nine-week session, and a couple missed out on training altogether. However, other students remained extremely enthusiastic, and actively sought out their training classes even during a period of leave.

PACE OF TRAINING

The training pace the instructors developed with each group generally became the defining factor for implementation. As discussed above, the general goodwill towards learning the material indicated that interest remained high throughout the project. However, as with any large group of students, certain individuals had a greater aptitude for learning the computer skills and concepts than others, and this had a significant impact on the speed of the trainers' presentation of the material.

Beginner

Of the beginners (Levels 1 & 2) approximately 25% had above average retention and ability for the training and progressed through the material very quickly once they moved beyond the introduction modules (Intro to PCs and Windows '95). Their initial lack of confidence noticeably decreased within the first three weeks of training and they continued quickly through the subsequent lessons. They immediately began to apply their new computer skills to their daily responsibilities.

Most students proceeded at a slower but steady pace and retained the basic information after several reminders. Their confidence increased as well by the 6th week and in the last weeks they began venturing out into independent use of the computer programs for their own tasks.

The lower 25% had below average aptitude and retention and required (up to the point of trainers' departure) significant guidance through the material and any tasks associated with the computers.

Intermediate

The intermediate level learners (Level 3) also had their differences in aptitude, but these were less dramatic and no one required constant supervision as did some beginners. Like the previous groups they had less confidence in the early stages of the training, but soon overcame their reserve and continued steadily with the modules and used the computers fairly quickly for their daily tasks.

One issue that emerged for the quicker students in this level was simple boredom. Many of them already had experience with the software programs, or ones similar to them (e.g., familiarity with WordPerfect translated easily to Word). Thus, the basic concepts and skills the teachers covered in all classes were not new to them and their attention wandered during class. When possible, the instructors assigned these students independent projects to keep their minds engaged. In this way they gained experience with the new software and soon began using the help-desk periods for individual help on class assignments and daily work.

Additionally, unlike the beginners who were eager to learn anything they could in any program, some of the intermediate students assumed they only needed sessions covering certain types of applications. For example, those most comfortable with the word processor saw little use in learning how to use spreadsheets, while those comfortable with spreadsheets saw little need to learn the word processor. The instructors worked hard to explore the various utilities in the programs, and discussed how they could be used for a variety of tasks, such as creating tables in Excel that could then be imported into Word. Some students accepted these utilities while others did not. Most, however, did learn new functions in their preferred software and managed to get

through the others with a minimum of annoyance. And, fortunately, just as many intermediate students were eager to learn all the programs, and proceeded to use them whenever they saw a use for them.

Advanced

All the students in this level (Levels 4 and 5) had no trouble with the concepts presented in class and only lacked exposure to different types of software (e.g., the accounting staff were familiar with spreadsheets but not familiar with word processors). Like the intermediate level students, the “basics” tended to bore them since they were already familiar with these skills, but they were eager to learn the more advanced functions in all the programs. The instructors spent quite a bit of time showing them material beyond the scope of the manual, usually applied to daily work projects.

Field Staff

At the beginning of the training project, Mr. Deane requested that the Field Staff be included in the training sessions. Because they had to travel to Kingston from other parishes, Mr. Deane requested they have an all-day training session. The trainers fit this easily into the schedule, and in the nine week period gave them four entire days of training sessions.

The seven students in this group ranged from beginner to intermediate levels. However, for the group, the trainers presented the material at a pace for above-average beginners; this meant it was fast for some, slow for others and on pace for most. As with the other students, the Field Staff was very enthusiastic about learning the computer skills and eager to learn as much as possible. At one point they asked for an extra class (the fourth) so they wouldn't have to rush through the material in order to finish the modules by the end of the third session.

Make-up

Because a few students were on extended leave during the training period, they obtained only partial instruction in the computer modules. The instructors scheduled additional classes and special tutorials when possible to make up for the missed material.

Individual Tutoring

There were three students who received individualized sessions outside of the standard group lessons. These included Mrs. Chevannes, the JNFPB Director; Mr. Deane, the JNFPB Deputy Director; and Dr. McDonald, the JNFPB Medical Director. As senior level management, these students had extremely tight schedules and needed the flexibility of personalized sessions when they had time available. In addition, Mr. Deane and Dr. McDonald both had extensive experience (Level 5) with computers and software, and needed only brief instruction on particular modules that were new to them, such as Outlook, or additional training in applications outside the scope of the basics modules, such as MS Project.

Network Support

Jeff Baker, also trained Mr. Devon Sterling and Mr. Augustus Moodie in many technical, administrative, and trouble-shooting tasks associated with the LAN. For example, he

demonstrated how to administer network accounts, use the server tape backup system, how to trouble-shoot hardware and software problems, how to configure separate profiles on computers being shared by two people, and how to setup shared resources. These sessions were scheduled during the help-desk hours as well as during extra time before or after the workday.

MODIFICATIONS TO THE TRAINING STRATEGY

In addition to the modifications of the training schedule discussed above, the instructors integrated several other options. First, after becoming familiar with the students' aptitude for the computer, the trainers opted to shift several students to different groups. This allowed those students able to learn at a faster pace to cover more material with a group of students with similar capabilities. Likewise, other students who needed more time to master basic concepts and skills were moved to groups more suited to their learning pace. Overall this had a positive effect on both types of students.

This had an unanticipated byproduct for the trainers, however. It seemed that the quicker students had assisted the slower students in class so the instructor moved through the material at a faster pace. But, after consolidating the groups, the instructors were able to spend more time assisting the slower students with the development of basic computer skills. This, in the end, was the better option because it gave the slower students the opportunity to truly understand what they were doing rather than letting them simply follow the lead of their peers. And, the quicker students were able learn at a pace more suited to their abilities. This relieved them of boredom and provided them with a more engaging learning experience.

Another option the trainers implemented was to spend less time tutoring the homework and more time helping the students apply the course skills to their daily tasks. The trainers expected this concentration on the practical applications of computer skills to assist the students' overall development, rather than having the students simply regurgitate lessons from the manual. Thus, in the future, this type of skills' application would support the students' independence with the computer technology.

The trainers also devised the following activities to encourage the students to retain and utilize their new skills:

Activity	Presentation	Content
Review games	Oral	Matching/Multiple Choice
Quizzes (2)	Written	Multiple Choice/Short Answer
Mid-Term Survey	Written	Short Answer
Treasure Hunt	Posted	"Clues" to MS Word Functions

These had varying levels of success with the students and the instructors, which will be discussed in following sections.

SOFTWARE MANUALS

Computer manuals were provided for each student that would act as both a text and serve as a reference once the training had been completed. The material was presented in a concise and organized fashion and was easy to follow. The instructors used the course outlines and basic instructions as a guide and supplemented it with their own personal observations and experience during classes. Also, homework assignments were included that were based on the class discussion and reinforced the lesson's skills for the students. In the mid-term survey, most of the students responded favorably to the manuals.

ORGANIZATIONAL TRAINING

Organizational training was formalized into "lessons" when possible. This proved to be the most challenging aspect of the training because the technology was too new and the organizational concepts of using a network were initially beyond a majority of the students' frame of reference. A few of the advanced students from senior management saw the utilities of the network (i.e., sharing files from the I:\), but even they needed constant coaching over the training period to integrate organizational ideas into their daily computer use (e.g., actually saving files on the I:\, instead of the C:\ or A:\ and then not seeing it on the I:\- where was it?).

Consequently, the instructors integrated organizational issues into the application training and help-desk sessions whenever possible. Emphasis was placed on the following:

- class demonstrations (e.g., all class exercises were saved on the I:\ in the students' personal directories, so that they had to navigate to the drive for each lesson from whatever computer they were using);
- discussions of how to use email and appointments to facilitate communications among the staff, including and especially the off-site staff (e.g., several of the more experienced students used email immediately);
- all individuals were responsible for centralized equipment (e.g., all users must maintain the printer, such as loading up the paper bins regardless of who "uses" the paper);
- certain resources were shared across the organization and not the attached to a department or individual (e.g., using an internet connection meant that another person could not);
- staff accepted an accountability for resources (e.g., misuse and overuse of paper, keeping track of computer resource materials, etc.).

Generally the interest in these topics was low, again because the students had little experience in dealing with these technological issues at an organizational level. The students were initially concerned with mastering the basic applications, but as they started using the computers in their daily work they began to see the inherent organizational change required in using the network. However, it must be emphasized that these issues are central to maximizing the usefulness of the network and every effort must be made to reinforce them if the network is to be a success.

Independent of the training classes given to the board, Mr. Baker provided attention to the matter of organizational training with Mr. Deane and the System Administrators (Devon Sterling and Augustus Moodie). He trained them to setup groups and secure shared files within departments; create and modify electronic mail distribution lists; and document procedures for the management of network accounts. He discussed the possibility of modifying the JNFPB job descriptions to include computer related skills and suggested that the system administrator be responsible for providing a weekly report to Mr. Deane concerning time spent on current network issues.

OUTCOMES

The short-term results of the training were most apparent at the individual level, but as the training progressed some of its effects on the organization became more noticeable. Tangible evidence compiled from samples of computer activities indicated levels of change and/or improvement in the students' day-to-day work. Furthermore, general observations suggested the trend of organizational change.

Individual Results

The most obvious change during the training was in the students' use and mastery of the computers and the varied software. As mentioned previously, the instructors developed several activities to encourage and measure the students' utilization of skills they learned in class. Each activity focused on separate aspects of the training strategy, and revealed varying levels of achievement by the students.

Quizzes

First, the Review and Quiz activities tested the students' retention of defined information from the classroom sessions. The Reviews were less indicative of the students comprehension since they were oral activities, and many students were reluctant initially to speak out in class even if they knew the correct answer. So, at the schedule's mid-point, the instructors created written quizzes (one for the beginners, one for the intermediate/advanced) that required a written response, and was a more measurable indicator of the students' grasp of the material.

The scores on the first quiz generally revealed that the advanced students had retained more information than the intermediate and the beginners- their scores averaged in the 70th and 80th percentile while the intermediates and beginners clustered around the 40th, 50th and 60th percentile. This was to be expected since the advanced groups had more experience with the technology, though several of the new users had an obvious aptitude for the material (a few received scores in the 80th percentile).

There was also a difference in their acquisition of skills versus knowledge. Though the instructors concentrated on the functional aspects of the modules, the quiz questions included elements of both conceptual and skills comprehension. In most cases the portions regarding concepts were less likely to be answered correctly than the skills questions. With one question, for example, most students understood the Cut/Copy/Paste skills and could repeat the basic procedures, but they were not necessarily able to apply the functions for editing a document, i.e. that the cut command allows the user to move information between applications and/or documents. In

another example the students understood the concept and commands for generally saving a document but less so the concept of saving on another drive or in a sub-directory (e.g., why and where to select the I:\ to save a document, how to open a directory).

After examining the students' quizzes, the instructors were able pinpoint weak knowledge and skills areas (particularly for the beginners) and concentrate on these in subsequent classes. Knowing that more familiarity with the material would likely increase the students' understanding even more, the instructors gave another quiz at the end of the training term to cover the later modules. Again the emphasis was on the testing of skills but there was testing of some knowledge as well. The students' scores increased at all levels, indicating more learning had occurred.

Interestingly enough, the quiz indicated to the students themselves how much or how little they actually understood from the course lessons. Most were disappointed in their performance, which subsequently encouraged them to focus on understanding the concepts and skills in later classes. Since the quiz was presented at the mid-term, this rejuvenated their ambition to learn the material and see the connections between the concepts of a lesson and the application of it through the development of their computer skills. They were less distressed about their performance on the second quiz, as by this time they were feeling much more comfortable with the material and equipment.

Surveys

Mid-term and final evaluation surveys were given to the students in the fifth and ninth weeks. The results of the mid-term survey indicated the students were generally happy with the training program, environment and instruction. It provided some feedback for making small changes to improve the training experience for the students. The final survey was given the last week of the program. However, the comments returned were extremely favorable and it was evident the students felt they had learned and accomplished more than they had expected prior to the computer training.

Teacher Observation

Much of the evidence showing the students' application of the computer skills came from the daily observations of the instructors as they worked at the JNFPB. The trainers implemented one other activity to gauge the students' performance (i.e., the Treasure Hunt), but there were several other areas that illustrated the acquisition of both knowledge and skills.

One observation included some students' perception of the material as a challenge to their ingenuity. From the outset of the training, this involved the students' independent application of the "new" skills to their daily tasks. The trainers noticed this attitude initially with the intermediate and advanced students, but several beginners soon developed this behavior as well, and continued to employ the lessons' skills to their own tasks.

After noticing this performance, the instructors hoped to encourage these students to look for functions outside of the lessons through the Treasure Hunt. In this activity the instructors created clues that would lead the students in exploring the Word application for more advanced commands for formatting techniques, templates, tools, etc. that would be applicable to their daily

work, but was beyond the scope of the approved classes. The clues were posted daily, and the students did notice, read, and have some interest in them. But, here the time constraints of their job requirements influenced their productivity and they did not have the free time to pursue these other subjects.

Another performance measure was often captured in the classroom, particularly with the beginner students that had some trouble retaining the material. This involved their spontaneous reactions to answer the rote questions of their *peers* before the instructor was able to do so.

At one point, about five weeks into the schedule, a student asked a question that was fairly repetitive by that time, "How do I make my window fill the screen?" One older student, who had had some trouble retaining skills without repeated guidance, spoke before the instructor and answered "Well, you *maximize* it of course!" For a moment everyone remained silent. Then both she and her peer laughed as they realized what she'd said- it had finally become ingrained enough in her mind that she understood the procedure without conscious thought and was able to answer and help her co-worker find the button to maximize the document.

Such minor incidents as this became more common as the weeks passed, and were noticed by the students as well as the instructors. These occasions were important for several reasons. One, it gave the instructors an informal gauge of the students' improvement (particularly those who took longer to learn the material). Two, it reinforced to the students themselves that they were learning the material. It was a natural boost to their egos and inspired them as much as any encouragement from the trainer. Lastly, it highlighted their comprehension of knowledge versus procedural skills- the student *knew* the concept and the terminology, and not just the functional action.

A third performance observation concerned the general attitudes of the staff over the training period. As discussed previously the JNFPB students approached the training with great enthusiasm and curiosity, and maintained this positive attitude throughout the course of the training. The instructors observed the tangible results of this spirit in the continued class attendance and requests for the make-up sessions to cover any absences.

As an extension of this attitude, the instructors found the majority of students eager to increase their knowledge and experience through expanded training classes. By the end of the term the instructors were able to demonstrate advanced functions in three of the basic programs (Word, Excel, and Access) and several optional programs procured for the JNFPB (PageMaker, PhotoShop, MS Project, OmniPage, the digital camera, and SPSS). Interest in the expanding their knowledge to other programs was high (the sign up sheets were quite long) and a few asked if there would be any follow-on training to cover material beyond the current scope.

As discussed above, the trainers observed the very basic progress of the students toward greater independence in using the computer skills. First, it allowed them to be independent from others who had used the few computers before the LearnLink project. Now that each individual had the capability to create their own products on the computer, many were thrilled to do so using their own time and skills.

Next, in most cases each student had a favored program and ideas for utilizing it for their tasks. A common pattern developed where a student would create a basic file using the skills developed in class. Then, s/he would extend it a step further using more advanced functions, for example

using tables in Word to present their reports in an organized manner. Before long another student would see the original file and want to develop a similar document, and s/he would extend it again with another step, such as creating a template for the monthly report in the table format.

In this way the students began to generate their products using their own knowledge base as well as their co-workers'. The peer training exposed a significant amount of learned material and encouraged less dependence on the instructors. And, though they often reached a point in the development of their product where they asked for help from more experienced staff/trainers, the primary intent and file creation were the result of individual student's increased autonomy with the computer skills.

Organizational Results

Because of the shortness of the training period, the instructors were able to observe only hints of the organizational change likely to occur at the JNFPB. As discussed above, there were two major factors that appeared to influence the pace of organizational change.

First, the students' lack of experience with computerization as a group initially made it difficult for them to understand the consequences of using computers for the JNFPB as a whole. Discussions of networking, sharing files and directories, or maintaining organization-wide appointments were distant to their frame of reference and were overshadowed by their ambition to learn the computer skills at the individual level. Thus, in practice the staff members utilized the computers more as individuals to master skills and create products, and less as a group accomplishing organizational responsibilities.

Second, the lack of attendance due to extended periods of leave created a disjointed use of the computers for the organization's needs. Functions such as sending electronic appointments, creating departmental directories on the I:\, and managing subordinates' tasks through the computer were only just being implemented at the close of the training period as people returned and used the computers in situations other than the training environment.

However, there was evidence that the environment would change in incremental steps. The trainers observed various issues that clearly affected the group and were being questioned by the staff members themselves. For instance, having the printer as a central unit for the entire organization brought out several points needing attention. Should paper become a central resource or should senior managers devise another method of submitting paper from each department budget and/or inventory? Who was responsible for filling the printer's paper trays when they were emptied? How would they manage paper waste- by individual, by department, or by the organization? How or could they recycle the paper waste?

At the time the training course was completed, these issues were being discussed or handled by the senior management staff. Some questions were answered: no, paper was not a central resource and would continue to be managed by each department; it was felt that too many people opening the paper trays would ultimately damage the computer so only one person should be in charge of refilling the paper tray. Other questions were still under discussion: who would be responsible for filling the paper trays; paper could be recycled through the printer, but since this could also damage the printer, should it be continued; etc.

As suggested, time and experience will continue to encourage the development of an organizational culture at the JNFPB to deal with issues such as these. Also, the conscious management of the process will support a cohesive shift in utilizing the computers to support the organization's as well the individuals' work. It must be stressed, however, that these issues must continue to be addressed as the organization develops with the new technology.

POST-TRAINING CONSIDERATIONS

As discussed in the debriefing, there were several issues requiring some attention upon the completion of the training.

The first point relates to sustaining the momentum of the students' utilization of the computer skills and equipment. The instructors made several suggestions to the JNFPB staff.

The organization might assign a particular staff member to manage procedural changes as the JNFPB continues to computerize its various tasks. This would include communicating with the staff about appropriate use of equipment (e.g., managing the use of the printer), following up on the management of shared network space (e.g., keeping the I:\ directories organized), encouraging staff to develop an organization-wide electronic schedule (e.g., using the Outlook appointment function), etc. This would support a coherent transition to using the computers in the most efficient and effective manner since one person would be responsible the JNFPB to manage the flow and organization of information with the information technology.

The JNFPB might also consider modifying the various job descriptions to include the necessary computer skills required in a particular position. This would help ensure that the computer skills are not lost if an employee leaves the organization. The new employee would then have the requisite skills, or be expected to learn them in order to maintain the position.

Consideration of further training for some staff members in the more advanced applications would be beneficial to both the individuals who will receive the advanced training and the Board as a whole. At this point the staff has all the skills necessary for them to work well independently. They now need to learn to troubleshoot on their own and explore the potential of the applications through their own problem-solving efforts.

In a somewhat related vein, it would also be advantageous to establish someone other than the current network administrator to serve in a help-desk capacity. This would allow the network administrator to concentrate on the technology and management of the network without the constant interruptions and having to respond to the individual questions of the general users. This help-desk could be either a formalized position, or an informal network of computer aides within the organization.

Finally, the issue of missing software has already become a concern. By the end of the training, the CD-ROMs for three of the software applications had gone missing. It is recommended that all software installation disks be kept in a locked cabinet controlled by the Network Manager. Software and reference books should be tracked on a sign out sheet so that the Network Manager always knows where things can be found. Replacements for these software installation CD-ROMS can be requested directly from the manufacturer if they are not found. Until then, they can be shared through the network from the computers that already had the programs installed.

TRAINING LESSONS LEARNED

The instructors learned several broad lessons about the process and implementation of the training strategy. These could be issues to consider in implementing future training strategies with the JNFPB, other projects in Jamaica, or other international LearnLink training projects.

Typing skills were clearly an asset to those students who had them; students without a typing background learned the computer more slowly because they had to master the keyboard in addition to learning the computer skills. This required more time and or training resources to accommodate the students without the typing skills so that they could focus on learning the computer skills.

The homework and quizzes were good measurements of progress for both the instructors and students. Future instructors should make an effort to emphasize the necessity of finishing the homework. If time is an issue, perhaps these assignments should be incorporated more deliberately as class exercises to reinforce classroom discussions.

The instructors should maintain a help desk as a daily resource for the students. This allows the students and instructors to see how the lessons apply to the staff's tasks and creates a broader foundation of experience the students would use beyond the training period.

The trainers should maintain a flexible environment to allow them to respond to circumstances as they unfold. The training skills themselves are constant, yet each context has different concerns, needs, etc. that will impact the implementation of the training. Expecting to adjust the strategy from the beginning allows any revisions to be proactive instead of reactive.

The strategy should emphasize the mastering of fundamental skills over completing a set volume of material. The students, particularly the beginners, will be more confident, capable and independent if they have a solid foundation in the basic skills. Too much material without the concurrent abilities to manage it could overwhelm and intimidate them, and subsequently curb their learning prospects.

Organizational training would be more effective if the trainers worked in conjunction with a designated staff member who has the authority to deal with organizational procedures affected by the computerization. Having a point person would allow the instructors to develop more relevant strategies for handling such issues and give them a way to implement them in the best interests of the organization.

CONCLUSION

It is impossible to predict definitively how computer technology will affect the JNFPB far into the future. However, it is possible to view the short-term results of the training project and make a reasonable forecast of its effects over time.

In general the new skills that have been acquired to utilize the information technology at the JNFPB shows definite signs of improving the flow of information for the organization and helping the staff to perform their responsibilities in implementing family planning programs in Jamaica. Employees are now able to:

- explore resources on family planning and reproductive health through the Internet;
- communicate with other professionals quickly, efficiently, and inexpensively by email;
- disseminate information to each other and the public through professional reports, presentations, and publications;
- and manage the administration and financial resources of the JNFPB more efficiently and cost-effectively using the software applications installed.

This has a positive impact at both the individual and organizational levels. The time saved by the staff in computerizing some repetitive tasks will leave more time open for them to pursue other activities, such as research, project development, and evaluation of programs. It also allows them more freedom and variety in implementing their tasks, which stimulates them and their audience. As an organization, the JNFPB can then augment the breadth and quality of their projects, manage them productively, and thus create a solid foundation for family planning in the country. This in turn positively contributes to the health of the children, women, and men of Jamaica, and thus to the welfare of the country as a whole.

VI. LESSONS LEARNED

What lessons have been learned from this project that can be of benefit to the Board as they move forward? This section is intended to emphasize lessons learned during the implementation of the project.

TELECOMMUNICATIONS

By far, Cable & Wireless Jamaica (C&W) has caused more problems for this project than all other environmental factors combined. Their affect has been felt on three levels; the ability to get phone lines into the Board offices; the costs associated with their services; and the role they play in on a national level with frustrating the growth of internet services in Jamaica.

Phone lines

It was originally intended that the Meridian telephone system at the Board be improved to support a modem pooling system. While this may be a very simple task when done in the United States, it proved to be a monumental task in Jamaica. It exposed the fact that C&W appears to be incapable of supporting the very switches they place in a business environment, and charge a great deal of money for the use thereof. If it had been possible to route our modem traffic through the Meridian switch, as had been originally envisioned, JNFPB would have been able to avoid the monthly costs associated with each dedicated business line. Unfortunately, C&W installed an analog card into the Meridian switch even though they knew that they did not have the knowledge to complete the link between that card and the modem pool. The Board now faces the costs associated with the installation of nine business lines, which were never intended.

Telecommunication Costs

C&W charges a toll for all calls whether being made to the building next door, or to Montego Bay. In essence, all calls are long distance. This is not a familiar concept in the United States where local calls are flat rated. This has become an issue because it adds an unknown expense for Internet connectivity. The Board accesses the Internet for two reasons; e-mail and Internet browsing. The File Server actually serves as the connection for e-mail dialing into the Internet Service Provider at specific intervals during the day. The calls should not amount to more than 13 per day with each lasting no more than 10 minutes for a maximum total of 130 minutes per day. If the rate is calculated using a basis of US\$.06 cents per minute, the daily cost for e-mail alone amounts to \$7.80 a day, \$39 a week, \$2,028 a year.

Browsing the Internet will also have a recurring cost, although it is difficult to estimate what it will be since the modem pool has the ability to support up to eight concurrent users. As an estimate, consider that eight people connect at the same time for 15 minutes each, the costs associated with that browsing are \$7.20. If we arbitrarily estimate that on any given day the Board will accumulate 300 minutes of connectivity for the express purpose of browsing the Internet it will cost the Board \$18 per day, \$90 per week, and \$4680 per year. These figures are intended to represent the highest possible estimate, but it does highlight the relationship between C&W and the relatively high costs associated with Internet connectivity.

Suppression of the Internet by C&W

During a recent visit, InfoChannel, an Internet Service Provider, was shutdown because C&W believed them to be “stealing” services, in this case Internet Services. The facts were that InfoChannel had put in place a separate Satellite transmission system allowing them to connect to the Internet without going through C&W which, they could in turn, provide clients with better, more responsive Internet related services. That C&W took this unprecedented step signaled to other ISP’s a need to be cautious in their growth. It also sends a message. World Telenet was selected to provide Internet service to the JNFPB for the exact reason that InfoChannel was closed down, because they had a Satellite-based connection to the Internet that allowed JNFPB to bypass the slow and expensive service associated with using C&W for Internet service. C&W was also rejected because they would not allow JNFPB to have a dedicated IP account for e-mail services, a service all other ISP’s in Jamaica, and the world, provide at little or no cost.

It is important to highlight this because it is difficult to predict the ultimate outcome of independent ISPs in Jamaica. If World Telenet is ever forced out of business by C&W, the JNFPB will have to establish a new Internet account with C&W to continue Internet services.

SUSTAINABILITY

This concept was introduced in the original assessment document but should be reintroduced. The JNFPB determined that the installation of computers connected to a networking infrastructure could provide manifold benefits to their operation. The Board now has a completed networking installation plus the responsibility for absorbing costs associated with the operation of the network. The boat-owners cost of ownership creed provides a good analogy. It states that the cost of buying a boat represents less than ten percent of the overall cost of ownership. The same axiom will hold true for the Board. The demands associated with the cost of ownership will affect

the sustainability of this project. The major cost centres can be grouped in three categories; PC/Networking, consumables and non-consumables.

PC/Networking

This is a comprehensive category for all computer related support issues. At the conclusion of this project, it is apparent that the importance of the role of the network administrator in fostering sustainability was not emphasized enough. The person filling this position will make the difference between the long term success, and failure of this project. In November, great lengths were taken to show that a full-time network administrator was required, and that anything short of that would be a formula for failure. More time should have been spent illustrating the role of the Network Administrator. It was assumed that a person with experience would be hired and, therefore, come with a predefined understanding of the position requirements. What actually took place is that a person was hired without the requisite skills. In order to overcome these deficiencies, the Network Administrator is presently attending Network management classes, but there will be a gap of time between the turnover of the system, and the point at which the Network Administrator has developed a strong understanding of the principles of network management.

The fact of networking systems, and computers, is that they do, sometimes, break down. The role of the Network Administrator is to determine why the event occurred and then attempt to remedy the situation. The Network Administrator needs to use a number of tools to resolve a problem, one of which may be a call to the manufacturer. It is imperative that the Network Administrator be free to make a call to the manufacturer via a Caribbean-based 1-800 access number (which does have a fee). The manufacturer requires that the Network Administrator “trouble-shoot” a problem over the phone prior to sending a technician resolve a problem. This subject generated a lot of conversation leading to a misunderstanding between AED, USAID and JNFPB. I believe JNFPB was not opposed to covering the cost of the telephone call but felt it was the responsibility of AED to fix the problem. AED was in the position of transferring ownership of the network to the JNFPB, and wanted to ensure that the Administrator felt comfortable enough in his position to take the necessary steps to resolve the problem. (Making a telephone call to the manufacturer to trouble shoot the problem and send out a technician if necessary.) In any regard, the issue seems to have been resolved, but it does point out the integral role the Network Administrator plays in resolving problems.

Another role the Network Administrator needs to play borders on being an Evangelist for the proper use of computer technologies. This person needs to have an understanding of the role each person plays at JNFPB and then show them how the computer can help them to perform their duties better, or differently. This suggests that the Network Administrator should not be dedicated to only waiting for problems to occur, but should take on a proactive role within the organization. This also requires that JNFPB management expand their view of the Network Administrator role.

Before concluding this section, it should be mentioned that Mr. Sterling, the Network Administrator, already possesses many of the skills required to be successful in this role. With additional training, it is felt that he will be able to strengthen his skills and grow into the requirements of the position. It will take some time before he will feel that he is on top of all the issues. However, it is important for Mr. Sterling to be proactive in his position rather than

reactive. It is also important that he be seen as the ultimate resource for computer related issues within JNFPB.

Consumables

This refers to items such as toner cartridges for the printers, paper supplies, floppy diskettes and other small items used on a continual basis by employees at JNFPB. There certainly needs to be a policy established regarding reasonable use of JNFPB equipment such as the color printer to avoid waste.

Non-consumables

This refers to an eventual requirement to upgrade the present systems after the warrantee expires. The warrantee coverage extends for three years, and the systems should certainly survive beyond that point. There will, however, come a point when systems fail and JNFPB should have a plan for replacement. This policy will need to cover printers as well.

Library and Software Access

Recently, a number of CD-ROMs have gone missing meaning that the Board will be unable to reinstall that particular software package until the CD-ROM is replaced. If the software, but also permits, the free use of the software manuals by end-users.

OWNERSHIP ISSUES

Every effort was made to anticipate every element associated with the cost of ownership for a networking system. However, there were several issues that were not stressed strongly enough. More fundamentally, it was not understood by the JNFPB how critical it was that the person filling the network administrator position be experienced enough to deal with the daily networking issues that will arise. This issue is central to the concept of *sustainability*. Moving forward, it is critical that the Network Administrator have full responsibility for the network and be given access to the resources that will be required to support it adequately. This will include:

- the responsibility to make telephone calls and acquire warranty service when technical support or repairs are required;
- keeping an inventory of hardware, software and reference materials, including items that can be used by staff on a sign-out basis;
- having a small budget to ensure a supply of network consumables such as back-up tapes and printer cartridges;
- and having other staff designated as local software or hardware ‘experts’ who can assist in answering regular staff application questions.

Allowing the Network Administrator this autonomy in his position will allow him to better perform his job and prevent bottle necks that could occur if he were required to request approval for each of these tasks.

NETWORKING ISSUES

As of this writing, which is taking place on the 29th of July, there is but one single item yet completed for the installation of Networking systems at the Jamaican National Family Planning Board (JNFPB) – the finalization of the delivery of final three phone lines by Cable & Wireless. This last element is emblematic of the greatest unknown associated with this project – the inability of Cable and Wireless to perform what was perceived as a very simple task. The fact that they still have been unable to complete this simple task portends bad omens for not only JNFPB, but also other businesses throughout Jamaica ill served by C&W. It is the intention of the contractor to finalize this service with C&W during Glenn Strachan's project close out visit 8/10/98 to 8/12/98.

VII. FINAL EVALUATION

Overall, this network installation and computer training activity should be considered a great success. A forty node network was installed with remote connections for five field offices. Comprehensive computer and organizational training was provided for the Board staff resulting in most of the staff having a strong understanding of the daily office applications. Organizational training was initiated to bring the staff's attention to issues that will change the way the Board handles information in the future. However, it must be stressed that, although the USAID funded activity has ended, ongoing education for the staff and maintenance of the network should be considered a priority for the continued upkeep and usefulness of the network.

The Board has now been outfitted with one of the foremost computer network installations in Jamaica and should be viewed by other government agencies as a prototype for future installations. The challenge for the Board will be to truly integrate the computer systems into the their everyday operations. The technology transferred to the Board presently exceeds requirements. As Mr. Sterling grows more comfortable in his position, he will be able to take greater advantage of technologies such as Web Servers, e-mail services and push technologies. The computer systems will prove to be an inexhaustible companion for the JNFPB in preparing promoting, and implementing family and population programs in Jamaica.

APPENDICIES

APPENDIX A

Application and Connectivity Software Chart

Category			
Office Productivity	Options	Selection	Comments
Office Suite			
Word Processor	WordPerfect Office; Microsoft Office	Microsoft Office 97 with Access 97	Purchase of entire suite rather than individual productivity applications offers strong advantages in cost, integration, and ease of use
Spreadsheet	WordPerfect; Microsoft Word	Microsoft Word	Decision driven largely by office suite cost and integration
Presentation	WordPerfect Quattro Pro; Microsoft Excel; Lotus	Microsoft Excel	Office suite issues plus quality
	WordPerfect Presentation; Microsoft PowerPoint	Microsoft PowerPoint	Office suite issues plus quality
Database			
	Paradox; Access; FoxPro; Others	Microsoft Access 97	
Statistics			
	Servstat; SPSS; SAS; Others	SPSS	Best choices for specific needs, power, flexibility, and cost
Accounting			

Category			
Special Purpose	Proprietary; Commercial Integrated Package	Not within scope of this project.	

Category			
Graphical and Multimedia			
Groupware	Adobe PageMaker, Adobe PhotoShop Microsoft Publisher	Adobe PageMaker, Adobe PhotoShop	Top end graphics and publishing packages designed for use on PCs
Online Database	Lotus Notes; Netscape Collabra	None – stick with capable email program	
Document Management	Many	Medline, Popline Free of Charge via Internet	If usage low or sporadic, method of charging may be most significant factor
Connectivity	Many		JNFPB requirement is largely for circulation control, rather than true document management
Email			
Internet	Many	Microsoft Exchange 5.5 and MS Outlook	Microsoft Outlook, integrated into MS Suite
Remote Access	Netscape's Navigator or Communicator; Microsoft's Internet Explorer	Netscape 4.04	Industry leader
	Many	Shiva Remote Access Device	Need remote access to email as a minimum; prefer remote access to network services for field sites

APPENDIX B

Equipment Specifications

Academy for Educational Development
Global Communications and Learning Systems (LearnLink)
USAID Contract No. HNE-I-96-00018-00
Delivery Order No. 802
Equipment Procurement for JNFPB Network*
Last edited 8/3/98

#	DESCRIPTION	QTY	Unit Cost	Total
1	DELL DIM/233 MMX /64MR/4.3GIG/12-24XCD/2MVR/33.6FM/3C905NIC/15"MON	4	1,872.00	7,488.00
	Serial Nos: DLHMQ, DLHMR, DLHMT, DLHNZ			
	3 Year on site Warranty	4	149.00	596.00
2	DELL DIM/200 MMX /64MR/6.4GIG/12-24XCD/Sound Card/AWE32/4MVR/33.6FM/3C905NIC/17"MON Surge Protector	23	2,101.00	48,323.00
	Serial Nos: DLVHB, DLVHD, DLVHG, DLVHH, DLVHM, DLVJG, DLVJH, DLVJK, DLVJL, DLVJM, DLVLC, DLVLG, DLVLJ			
	DLVLK, DLVLN, DLVMK, DLVMM, DLVMG, DLVMQ, DLVMS, DLVMT, DLVPH, DLVPJ			
	3 Year on site Warranty	23	149.00	3,427.00
3	DELL DIM/266/64MR/6.4GIG/14-32XCD/4MVR/3C95NIC/17"MON	12	2,425.00	29,100.00
	Serial Nos: DGSFG, DGSPV, DGSQ1, DGSMJ, DGSPX, DGSQ4, DGSPR, DGSPY, DGSQ8, DGSPT, DGSPZ, DGSQD			
	3 Year on site Warranty	12	149.00	1,788.00
4	DELL P-EDGE 4200 300/REDUNDANT P-SUPPLY/320MR/12-24XCD/2nd 300MH/15"MON/DLT4000-20 40GSCSI/BK SW			0.00
	RAID5w/CTLR W/16MR Software/5-9GB SCSI HD/3C900PCI/WIN-NT4.0 W/10 LIC. 56K F/M/SMART UPS 2000 110V	1	18,200.00	18,200.00
	Serial No: DGVZQ			
	3 Year on site Warranty	1	149.00	149.00
6	HP LASERJET 5SiMx Serial No: USLK208266	1	2,895.00	2,895.00
	Printer Cabinet	1	225.00	225.00
	200 Sheet Input Tray	1	785.00	785.00
	Envelope Feeder	1	340.00	340.00
	Replacement Toner Cartridge	1	136.00	136.00

	16MEG MEMORY	1	185.00	185.00
	HP JetDirect Card for ENET	1	295.00	295.00
7	Superstack II HUB 100 100BTX 48-PORT	1	2,850.00	2,850.00
	Superstack II HUB 100 Management Unit	1	825.00	825.00
	Superstack II HUB 100 Expansion Cable	4	45.00	180.00
8	3COM 3C905 10/100 PCI Ethernet Card	13	60.00	780.00
9	APC SMART UPS 2200 110V	1	817.00	817.00
11	HP SCANJET 6100C Flatbed Scanner/Controller included with Machine Serial No: SG76G140GM	1	675.00	675.00
	Paper Feeder	1	410.00	410.00
	Adaptec 2940 PCI Card (F-net included cable in this price)	1	172.00	172.00
12	HP Color LaserJet 5 Printer Serial No: JPHF165385	1	3,650.00	3,650.00
	Cyan Cartridge	3	30.00	90.00
	Magenta Cartridge	3	30.00	90.00
	Yellow Cartiridge	3	30.00	90.00
	Black Cartridge	3	10.00	30.00
	MS WINDOWS NT V4.0 SERVER w/5 Licenses	1	400.00	400.00
15	MS WINDOWS NT V4.0 20 LICENSE	2	175.00	350.00
	MS OFFICE PROFESSIONAL LICENSE	39	55.00	2,145.00
15	MS OFFICE PROFESSIONAL (FULL PAK)	1	155.00	155.00
16	SPSS V7.5.3 for WIN 95	1	625.00	625.00
16	SPSS V7.5.3 for WIN 95 Advanced MODULE	1	435.00	435.00
17	MS PROJECT 98 for WIN95	1	130.00	130.00
	NETSCAPE v4.04	40		0.00
18	HP LASERJET 4000 Printer	5	1,060.00	5,300.00
	Serial Nos: USEX103449, USEX013453, USEX013428, USEX13857, USEX082652			
19	HP LASERJET 4000 Toner Cartridges	15	75.00	1,125.00
20	SHIVA LANROVER e/PLUS 8PORT Ethernet w/ (8) 33.6 MODEMS	1	3,871.00	3,871.00
	SHIVA POWER SUITE KIT FOR ABOVE	1	1,831.00	1,831.00
21	3COM 12 PORT ENTRY LEVEL HUB	1	175.00	175.00
	HP JETDIRECT ETHERNET EXTERNNAL ADAPTER FOR 3 PRINTERS	1	363.00	363.00
23	AMERICAN POWER CONVERSION BACKUP 280VA	41	91.00	3,731.00
24	OMNI PAGE V6.0 for WIN 95	1	285.00	285.00
25	PAGEMAKER 6.5 for WIN95	1	139.00	139.00
26	FRONTPAGE 98 for WIN 95	1	50.00	50.00
28	DLT4000 TAPES	26	85.00	2,210.00
	ADOBE PHOTOSHOP V4.0 for WIN95	1	199.00	199.00
29	INTEL LANDESK VIRUS SINGE SERVER UNLIMITED CLIENT	1	899.00	899.00
30	CTX Expro 500 portable LCD Projector	1	1,995.00	1,995.00
31	Cannon Powershot 600 Digital Camera	1	609.00	609.00

32	3COM 10/100 switch 12 port	1	975.00	975.00
33	Microsoft Exchange with 40 user licenses	1	733.50	733.50
34	Duplexing Unit for HP 5si	1	380.00	380.00
35	8 mb ram for Cannon 600 digital camera	1	75.00	75.00
36	Academic license for Adobe PageMaker v 6.5 5 pak	1	420.00	420.00
37	Academ. License for MS Project 98	20	48.00	960.00
38	HP 5 Color Printer Opional 250 sheet rear feed with manual feed	1	260.00	260.00
39	Software Shelf's Print Manager Plus	1	495.00	495.00
40	SPSS base v. 8.0 for Win 95	3	495.00	1,485.00
41	Spss advanced module v 8.0 for Win 95	3	440.00	1,320.00
Total:				158,716.50

* Does not include miscellaneous cables and telephony connectors.

APPENDIX C

NFPB Internet and IP Information

Local ISP (Internet Service Provider) is World Telenet:

Worldtele.net DNS: 208.229.49.2

The file server ONLY uses the SMTP account for mail send/retrieve.

IP Address for server: 208.229.49.127

All Kingtson Internet email addresses are 1+7@jnfpb.org

(1+7 = 1st initial of first name plus up to 7 characters of the last name)

Each remote office is listed with an alias in the Outlook Global address list:

The Stores = jnfpb2@wtjam.net

MoBay = jnfpb3@wtjam.net

HuntsBay = jnfpb4@wtjam.net

PorMor = jnfpb5@wtjam.net

MayPen = jnfpb6@wtjam.net

8 Dial-Up Accounts

Login ID	Email Address	Password	Location	Phone Number
SMTP		3xmpq9	File Server	876-906-7718
Jnfbp1		4xk3mp4	Spare	876-906-1730
Jnfbp2	Jnfbp2@wtjam.net	x73mqw2	The Stores	876-906-1730
Jnfbp3	Jnfbp3@wtjam.net	7vmq6pq	MoBay	876-906-1730
Jnfbp4	Jnfbp4@wtjam.net	7k3mxp6	HuntsBay	876-906-1730
Jnfbp5	Jnfbp5@wtjam.net	3xmp968	PortMor	876-906-1730
Jnfbp6	Jnfbp6@wtjam.net	6wxm7p	MayPen	876-906-1730
Jnfbp7		8mqp6kx	Kingston (all)	876-906-1730

NFPB IP Address List

3Com Management Unit	172.20.0.7
3Com 1100 10/100 Switch	172.20.0.8
Shiva Modem Device	172.20.0.9
JNFPB_NT Server	172.20.0.10
HP5si printer	172.20.0.11
HP5 Color Laser	172.20.0.12
DHCP Server scope	172.20.0.20 - 172.20.0.254

APPENDIX D

Network Set-up Notes

Server Information:

- Computer Name = JNFPB_NT
- Domain = JAMAICA
- Administrator password = julian9
- C drive hold Windows/NT and NT specific files
- C:\fixes hold all NT service packs and fixes
- N drive holds user data files, application files, and nwtools
- Z drive holds the desktop image files and the codeblue (imaging) software
- Internal modem installed for internet email (IRQ 3, COM1)

The N drive (network drive) structure:

\apps
\users
\common
\nwtools

Tape Backup

- Internal Tape Drive – Quantum DLT 4000 on the AIC7870 internal scsi card
- Target ID = 6
- LUN = 0
- Scsci port = 1
- Bus = 0

Backup Software

- BackupExec v7.1
- S/N = 03-6322-0019-017632
- User = backup (password = julian9)

- Installed under c:\program files\seagate software\...

MS Exchange Server

- Organization = Jamaica National Family Planning Board
- Site Name = JNFPB
- Exchange Server User = exchange (password = julian9)
- SMTP addressing for internet email = username@jnfpb.org

Shiva Lan Modem

- Has 8 modem ports
- One DID line will be attached to the first port and roll over to the remaining 7 ports
- Shiva modem driver installed on each desktop for dialup access to use Netscape or other internet applications.
- Shiva username is dialout with no password

Standard Desktop Software

- Windows95
- MS Office97 Professional with SR-1 (service pack 1)
- Intel Landesk Vprotect v5.01
- Netscape 4.04
- Winzip 6.2
- TweakUI
- NT client software
- Shiva modem driver (for shared modem pool)

APPENDIX E

Contact Information

Academy for Educational Development
Global Communications and Learning Systems (LearnLink)
USAID Contract No. HNE-I-96-00018-00 Delivery Order No. 802
Vendor Contact Information for JNFPB Network Equipment
Last edited 8/3/98

Glenn Strachan	Software Shelf International
VP & Chief Information Officer	702 Marshall St Suite 611
AED	Redwood City, CA 94063
1875 Connecticut Ave, NW	http://www.printmanagerplus.com/products/
Washington, DC 20008	Printmgr/pmp.htm
gstrachan@aed.org	(800) 962-2290 voice
(202) 884-8018 voice	(650) 369-7012 (fax)
Maria Francescon	Jim Blakeslee
Procurement Specialist	SPSS Federal Systems Division
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(202) 884-8979 fax	

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jennifer_jeffries@compusa.com
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(703) 497-3398 fax

Detore Tenent
Management Control Systems (MCS)
Grenada Crescent, Kingston 5
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Fax: 929-5678

Dell Service Provider
Xerox
Michael Anderson
Technical Service Manager
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Tele: 906-4404
Fax: 920-1177

Xerox
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Kingston 5
968-6197 tel

Winston Gooden

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