Computer Science in the Community

Final Report

By Community Consultant Jesse Starflower

I. Introduction

My name is Jesse Starflower. Because of my interest in community service I became a brother in the national service fraternity, Alpha Phi Omega. I am a college freshman at Carnegie Mellon University, where I am studying Technical Writing with an interest in consulting and communicating technical ideas.

For this project I teamed up with David Nolan, a Computer Science student who is very knowledgeable about the technical aspects. We met with Roxanne Epperson and Gwen Thorn at New Beginnings Learning Center (NBLC) approximately twice a week for ten weeks. Each meeting usually lasted about two hours.

In the beginning we spent most of our time at the site repairing neglected equipment and introducing ourselves to the staff. As time progressed our contacts learned more about computer hardware and maintenance.

II. Profile of the Technology Program

Background

NBLC has been around since 1989. It was a spin-off from the successful youth programs of Friendship Community Church. The focus of NBLC was to assist and support the academic lives of youth in the urban community. Their desire was to make post-secondary education an accessible and feasible opportunity for the youth of the area. They are still affiliated with the Church, however, they are now a non-profit organization in their own right.

Program

NBLC currently teaches children of grade school age how to use word processors and how to feel comfortable around computers. They also do afterschool homework assistance and tutoring.

People

- Roxanne Epperson has been our primary contact at NBLC. She is the Program Director and her job is program coordination, design, and planning. She has some basic knowledge of how to get the PCs to work for word processing. She has also learned how to do hardware upgrades and searches for online software.
- Gwen Thorn was our contact while Roxanne was away. She is the Program Assistant, her job is mostly to handle the day to day office and secretarial duties and to coordinate both the regular and computer tutoring programs. Her level of operational knowledge is roughly equivalent to that of Roxanne.
- Baheejan Nicholson used to be the primary computer Instructor. However, she found employment elsewhere during the last couple of months.
- Priscilla Hawkins is the Clerical assistant. Her job is to take care of clerical duties and deal with all the odds and ends that Gwen needs taken care of.

Technical Environment

As one enters NBLC the front room is filled with round tables. To the right is a wall full of coat hooks usually filled by children's coats. To the left is a wall of books, a small library. On the other side of the room there is a window looking into a room full of computers, next to the window is a door. Through this second door is the Computer Lab.

The Computer Lab is a much larger room than the entrance room. There are built-in computer desks on three walls. There are ten PCs and five Macs in the lab area. This area is relatively clean and orderly. Above the computers there are cabinets with manuals, disks, CDs, and some amount of hardware.

(for a more detailed report see Appendix A)

Technology Management

At the time we started working at NBLC, there was nobody in charge of the technology. Baheejan was the person who dealt with the Macintoshes, while Roxanne and Gwen did what they could to keep the PCs in working condition. Their primary method of fixing more severe problems was to send the computers to their tech support company.

While there is still no one who is specifically in charge of maintaining the computers, the current staff of NBLC is better able to do the day to day management. However, there is still much organization that needs to be done.

III. Problem Statement/Needs Assessment

Before David and I started working with NBLC they had vague troubleshooting concept. There were important aspects of operational knowledge that were missing. Problems with the computers were often solved in this method:

1. Typically the problems are detected by the students, and reported to the instructor.
2. The instructor will then sometimes fix the problem directly if it can be resolved easily, usually by rebooting the machine.
3. If the problem can't be solved directly it will get reported to the director of the center, via a log book of problems.
4. The problem might just sit the in the log book for days without anyone noticing it was there.
5. Then, eventually, someone will see the problem in the log book and try to fix it.
6. If the problem couldn't be fixed it would eventually get referred to an outside organization which would try to fix it.
7. If they failed to fix the problem, it isn't clear what would happen.

This lack of knowledge base led to more advanced problems with the actual hardware and software. We tried to address all of these problems through these methods.

- Software Problems: These are problems we've seen which are software related. These range from minor problem, such as a piece of software not working quite correctly, to major problems, such as the necessary software to do a particular task is unavailable, or has been lost.
  - Installation Problems: Occasionally they run into problems attempting to install a new piece of software.

- Operational Problems: The software they have installed doesn't always work. It may work for weeks at a time, but then suddenly fail on one machine.
- Maintenance Problems: They don't really know what software is installed on which machines. There could be different versions on different machines, or some machines may have software they don't want installed.
- Missing Software: Some of the software they have installed (or had installed) they no longer have a copy of. This can lead to problems in the disks fail, or the machines need to be reinstalled.

- Hardware Problems: These are problems we've seen which are hardware related. These range from minor problems, such as running out of disk space and not being able to install more software, to major problems, such as failing memory which causes a machine to be unusable.
  - Problem Diagnosis: Sometimes problems which seem to be software are really hardware problems. This makes it difficult to ascertain the real problem. We found two machines with bad memory, which was the source of a host of other problems.
  - Failing Hardware: Once identified, failing hardware can be replaced, either via a warranty service plan, or new hardware can be purchased.
  - Obscure Hardware: Some of the hardware they have is sufficiently old that it is hard to find driver software for it.
  - Insufficient Hardware: In some cases they may simply not have the resources they need. (e.g. not having enough memory to run certain software, not having a audio card in a machine which needs one, or not having headphones for all the machines.)

We planned to address these problems primarily by adding to the operational knowledge base of the staff members of NBLC. This was accomplished by doing the daily maintenance and hardware upgrades with the staff of NBLC.

Operational Knowledge:
- Installation Problems: Learning what to do on the common problems.
- Operational Problems: Learning to look in the right places to find the source of a problem.
- Hardware Problem Diagnosis: Learning when to start thinking about a hardware problem, and being confident enough with computer hardware to be willing to swap parts between machines to see if it fixes the problem.
- Failing Hardware: Knowing what to replace, and how to acquire the replacement. Either via the original vendor under warranty, or acquiring it directly.
- Insufficient Hardware: Knowing when the problem simply can't be solved without a change in hardware, and knowing where/how to get the hardware.

Hardware and Software Inventory:
- Perform a complete inventory of the hardware and software installed at NBLC. Some of this data will be gleaned directly from a pre-existing database.
- Enter all this data into a database to provide easy accessibility.
- Teach them how to use the database, both for day to day stuff, and how to add new machines or software to the database. This is critical as it is apparent that the

database they already have hasn't been used in a while, and no one knows how to use it (or even how to find it).

- Teach them now to ascertain what hardware is in a machine, or what software is installed, so they'll know what to add to the database when they get new machines.

IV. Project

Much time was spent showing the NBLC staff how the insides of the computers were put together so that they could do hardware maintenance, upgrades, and inventories in the future. Roxanne and Gwen were the most active in these sessions. More time, however, was spent actually doing maintenance and searching for the necessary resources to do the maintenance.

We had some problems working while the students were being rowdy and uncooperative. However, most of the students were quite polite when dealing with us. Many problems were found with the machines Memory which had gone bad. Several machines had to have the RAM replaced.

Roxanne was very helpful in acquiring said materials and very quickly got the hang of doing the installations. She quickly grasped the concepts behind digital data and how hardware is upgraded. Her knowledge of how computers work has also been greatly expanded.

V. Conclusions & Recommendations

Our time at NBLC has been very productive. The level of operational knowledge within the staff has grown or been realized. They are now capable of most of the daily maintenance of the technology at the center. However, they do not have the time to do so along with their primary jobs.

The major recommendation I have for NBLC is to hire or designate someone to organize and maintain the computers and related materials. This position should be separate from any of the administrative positions due to the amount of time and effort involved. This position would also be useful in assisting the computer instructor during classes with children.

The person must be able to keep track of what machines are there, what machines are working, what software is on the machines, what software should be on the machines, which machines should have which software, where software is stored, and various other things of that nature. Other than the desperate need of someone who's specific job it is to maintain the technology base of NBLC, the organization deals with technology very well.

Appendix A

Organizational Map

of

New Beginnings Learning Center

Building/Layout

Main room with tables for tutoring and students waiting for their turn at the computers one wall has two rows of coat hooks opposite wall is one large bookshelf. The front wall has magazine rack with news and educational magazines. There are a window and door through to the computer room

Back room with the computers

- large room
- computer desks built into 3 walls
- power strip on walls just above desk level
  - power strip is surge protected
  - cable run just above power strip
- cabinets line the walls above the computer desks
  - some have locks and are used to store software
  - some are used to store the library of software manuals
- matching chairs for all computers

Roxanne's office upstairs

- small room
- one window
- table along one wall
- desks along two others
- NT server machine is in a full tower case beside her desk
  - monitor is precariously balanced on top.

security system on building

- Motion detectors in front room and computer lab area
- Alarms on doors and windows.

Technology Map

Hardware

- 13 IBM clones
  - 8 student machines
  - 5 administrative machines
    - 1 in the classroom
    - 2 in upstairs office

- •2 at staff-members' homes
- •5 Macintosh Performa 6299CDs
  - •Processor
    - •100MHz PowerPC603e
    - •Integrated FPU
    - •40MHz 64-bit bus
    - •256K Level 2 cache
  - •Memory
    - •Uses 72-pin DRAM SIMMs
    - •8MB RAM
    - •expandable to 64MB
  - •Storage
    - •Internal 1.2GB hard drive
    - •Internal Apple Superdrive 1.4MB floppy disk drive
    - •Internal quad-speed AppleCD 600i CD-ROM drive
  - •Communications
    - •Internal Global Village 28.8 fax modem
    - •Internal 10BaseT Ethernet card
  - •Monitor
    - •Apple 14-inch Multi-Scan Display
- •2 scanners
  - •inventory ongoing
- •3 printers
  - •1 Apple LaserWriter
  - •1 Epson
  - •1 HP

Operating Systems

- •IBM clones
  - •12 machines running Windows95
  - •1 machine running WindowsNT Server
- •Macintoshes
  - •all running MacOS 7.0.1

Networking

- • ISDN connection to hillhouse.org
- • all the Macintoshes and most of the IBM clones are connected via two or three Ethernet hubs
- • the Macintoshes are also connected via an Apple-Talk network
- • the LaserWriter is on this network

Software

IBM Clones

- MS Plus!
- MS Office97
- MS Works
- MS Kids
    - versions of MS-Works' word processor and paint programs that are specifically aimed and young children
- McAfee VirusScan
- various games
- inventory ongoing

Macintosh

- Netscape Navigator
- AtEase
- ClarisWorks
- MacLinkPlus
- Microsoft Office97
- inventory ongoing
- large library of CD-ROM education and entertainment software
- inventory ongoing

Other (non-computing) Hardware

- photocopier
- fax machine

Organization

- their *ex*-computer consulting firm is (as far as we can tell) incompetent
    - they were unable to diagnose simple problems
    - they failed to put the machines back together in a reasonable fashion

Traffic Patterns

- the machines are mostly used by the children/students
- classes are usually somewhat rowdy and disorganized
- main computer room has lots of open space for walk through
- tutors use the front room only
- from what we've seen the computers don't take much extra punishment from the kids.