A University/Community Partnership to Bridge the Digital Divide

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INTRODUCTION

Companies want employees with core values who ascribe to corporate values. Emotional intelligence (EQ) is used by companies in recruitment (Foote, 2001), and guides managers in dealing with team performance problems. Similarly, leadership requires refocusing on core values, which over time builds character (Badaracco, 1998). Thus, educational institutions should devote considerable attention to character building (Foote, 2001).

Service-learning is designed to help. Jacoby (1996a, p. 5) has defined service-learning as "…a form of experiential education in which students engage in activities that address human and community needs together with structured opportunities intentionally designed to promote student learning and development".

Service-learning is important in information technology where students need technical skills and experience, and a strong ethical foundation. Legal aspects of technology have not kept pace with technology; often IT people are confronted with complex ethical decisions. It has been argued that service-learning represents a "unique pedagogy…that enhances the ability of private sector managers to be effective stewards of society's moral authority" (Godfred, p. 364). Service-learning in colleges is tightly linked with K-12 education (Jacoby, 1996B) due to the growing number of at-risk children, a vested interest for colleges to improve the future students, and because students will view service-learning as an appropriate college activity if they benefited from it prior to college (Jacoby, 1996b).

A policy concern in the information age is the "digital divide," a gap between those who have easy access to technology and those who do not. References are made to information "haves" and "have-nots" in an age where information is equivalent to wealth (Holloway, 2000). The "have-nots" are in danger of exclusion from the new economy and marginalization into low-wage jobs (Dunham, 1999). In 2000, the President of the United States asked the IT community to help close this digital divide for moral reasons and to ensure that the economy flourishes with the availability of skilled workers (Shewmake, 2000).

This overview summarizes a five-phase service-learning project accomplished through a partnership between the University of Toledo and a local K-8 parochial/nonprofit school. The students were primarily enrolled in a Systems Analysis, Design and Implementation course (SAD). This longitudinal project was undertaken to plan, design, and wire a network for the school and to assess and implement continuing and future computer needs. It allowed students to gain "real-life" experience while contributing to the growth of IT among children in a nonprofit setting.

BACKGROUND

The school is a parochial school enrolling approximately 200-250 students. All grades have a dedicated classroom; a computer lab and library are also provided.

Existing computers consisted of a classroom set of older Macintosh computers in the 8th grade room. Each classroom had an older Macintosh computer for the teacher, all with unused LAN capability. The computer lab contained older Apple computers used in the primary grades for computer literacy and keyboarding skills.

Phase 1

The school had accumulated technology funds and hired a teacher with a Master's degree in Educational Technology. The teacher and principal agreed to participate in the project since an estimate from a local company exceeded the funds accumulated. While the teacher had pedagogic knowledge of computers, he did not possess the expertise to evaluate the quotation or analyze the technical aspects of the network. The school indicated that it hoped to apply for a grant, but needed technical information.

Students self-selected into the project: *The goal of the project was to educate themselves as to alternatives, costs and provide background information concerning networking to prepare a grant application.* They had the opportunity to examine the existing environment and interview stakeholders.

The instructor and students toured the building, including attic and closet locations where existing asbestos could not be disturbed. The stakeholders were asked to determine the number of "drops/connections" required in each room based on immediate and future use. Two drops were requested in each classroom — one for the teacher's computer and another for a classroom network. The group submitted a plan to the school including alternatives, costs, and technical information for the design of the campus network to be used for grant preparation.

Phase 2

Phase 2 included completing a grant proposal and the physical networking of the building. The wiring project was popular among students and required instructor selection to participate. Two students had experience, while others were chosen based on enthusiasm and desire to learn the "hands-on" aspects of networking.

Using the plan, a grant proposal was submitted providing evidence of the school's commitment and a plan for the educational use of the network. The university students' involvement was documented, and the authors were listed as consultants.

The grant writing was divided among the authors, the teacher, and the principal. Guidelines required a technology plan and a specific grant request. The accumulated funds were sufficient to wire the building without grant funding. Subsequently the maximum grant was awarded for continuation of the project.

The wiring plan included an Ethernet LAN in the 8th grade room and a campus LAN with connections in all classrooms and offices. Microsoft Windows NT Server 4.0 with Services for Macintosh (SFM) was chosen as the network operating system (NOS) based on the requirements of the heterogeneous network. With SFM, the Windows server appears as an Apple server to Macintosh clients.

The NOS was installed on a computer with a dial-up Internet connection, a temporary arrangement until high-speed access was available. Proxy server and content-filtering services were installed, providing low-bandwidth Internet access to all clients in the 8th grade classroom. Secure storage for network users was provided.

In wiring the building, a storage closet was used as the wiring closet where hubs were installed and all building wiring runs terminated. Since the computers were regularly used, work was partitioned into elements that could be done over a weekend to maximize availability for students and teachers. A file server for administrative applications and intranet e-mail was installed in the wiring closet with a tape drive to provide network backup.

Phase 3

The next step was to install high-speed Internet access for which the school receives state funding. The authors recommended the installation of a T-1 line (1.544 Mbps).

In 2001 the network consisted of three servers, each running Microsoft NT Server 4.0. A laser printer was available to over 50 network clients running various operating systems.

Phase 4

We now needed to recommend replacements for outdated equipment and provide information for equipment grant applications. Students self-selected into this project, and met with the stakeholders. The main issue was whether the replacement equipment should be Apple or Windows-based. Pertinent factors were educational needs, existing equipment, and available expertise. The group analyzed these factors together with their survey of surrounding schools to determine local norms. Their recommendation was Apple equipment.

After network completion, it was obvious that the computers were outdated. An early goal was to minimize expenses by leveraging existing equipment. An obsolete Web browser was installed since the machines' capabilities prohibited current versions. While slow, the clients provided Internet access where none existed before. In today's world, fast access is a necessity. Revenaugh (2000) suggests that access does not equal equity; just connecting a wire to a school does not mean it will be used well. Also, the browser security certificates had expired, so secure Web sites could not be accessed.

Phase 5

Using this recommendation, a second grant proposal was prepared requesting the maximum award to purchase new computers for the teachers. The replaced computers will be placed in the classrooms in small networks for student use.

Another group of students worked on designing a Web site for the school. A preliminary school Web site, created 2 years earlier, was out-of-date and the students were asked to produce an up-to-date, easily maintainable Web site.

CONCLUSIONS AND LESSONS LEARNED

There must be a close working relationship between the community organization and the university faculty. Trust