Implementing an Information Commons in a University Library

by Allison Cowgill, Joan Beam, and Lindsey Wess

Changes in user needs resulted in Colorado State University Libraries' decision to turn a traditional library computer lab into an information commons. Issues raised during implementation are discussed, staff training modules are described, and the center's success is evaluated. Training quickly became a critical factor.

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In academic libraries nationwide, electronic resources have become an important and prominent part of library collections because of the rapid development of the Internet and the World Wide Web. The fundamental structure and organization of university libraries' services have been impacted by patron demands for accessibility to such resources. The Colorado State University (CSU) Libraries is certainly no exception. Some academic institutions have responded by establishing areas in university libraries, or elsewhere on campus, that are often described as "information commons." Although definitions of an information commons vary somewhat, it is generally a specific location designated to deliver electronic resources for research and production that is maintained by technically proficient staff.

At CSU, the Libraries' catalog is mounted on the Web, and numerous Web-based databases and indexes for all disciplines have been added to support the curricular and research needs of students, staff, and faculty. Almost all computer workstations are located in the main libraries' Electronic Information Center (EIC). When it was created, the EIC was a traditional library computer lab, designed to provide access to electronic library indexes, full-text databases, the online catalog, and the Internet. Staffed during all hours the building was open, assistance focused on helping users with those resources.

CSU Libraries, like academic libraries nationwide, is committed to meeting the challenges information technology raises. Providing ready access to electronic resources is certainly a critical part of the research process for students and faculty. Adding productivity software to library workstations decidedly helps students compile, compose, and complete the papers, take-home examinations, and other assignments their coursework requires. Numerous students, in fact, asked library staff daily for access to such software. Responding to these student requests, library administration instructed Reference Services to add such software so the EIC would truly be an information commons, and create a training plan that would provide staff with the technological skills the EIC would now require. Many steps were involved in this process. The following corollary project goals were developed in the first month of the process, as the requisite steps became increasingly apparent. They were to:

- Obtain staff commitment to the concept of an information commons;

- Teach staff the skills needed to provide technical assistance to users;

- Engage a team of highly trained personnel capable of handling more difficult hardware and software issues during the lengthy training period; and

- Ensure that a sufficient number of workstations are available to meet user needs.

A short description of major trends in higher education and a brief look at library literature on information commons are followed by a discussion of CSU's information commons implementation process and the many issues that occurred.

MAJOR TRENDS IN HIGHER EDUCATION

Academic libraries have faced unprecedented change in the last 10 years because of "advances in the information technologies available to students and faculty in the nation's higher education institutions."[1] Beverly P. Lynch states that the

"pervasiveness of information technology is transforming the forms and methods of instruction" and "requiring people in academic life to rethink the way they do their work."[2] Libraries have traditionally been responsible for acquiring, organizing, disseminating, and preserving information. Digital formats now dramatically affect how librarians perform those activities and how students and faculty use library resources. Major information technology trends affecting libraries and all other segments of higher education include dramatically increasing rates of:

- Personal computer use for research and writing, in homes and offices, by students, staff, and faculty;

- Internet use for research by students, staff, and faculty;

- Emphases on student, staff, and faculty computer literacy skills;

- Integration of information technologies into classroom instruction;

- Distance education programs because of significant changes in student characteristics, needs, and expectations;

- Administrative concerns about coordinating computer resources and services throughout campuses;

- Collaboration between campus-wide computer services units and smaller diverse groups of department-based networking/computer operations and laboratories on campuses; and

- Student reliance on information technology for study, research and dissemination with concurrent expectations about its widespread availability both on and off campus.

In this dynamic environment, academic libraries now face enormous changes in user expectations and information-seeking behavior. Library users routinely expect 24 hour seven days per week online access to library resources, including collections, databases, electronic full-text sources, and a variety of other library services.

THE INFORMATION COMMONS CONCEPT

Successful, vital libraries are redefining their roles in fulfilling the many goals of both users and higher education. They understand how the increasing importance of electronic resources affects collections, services, and staffing, how scholarship involves a continuum from initial research through the final project, and how information technology is now so essential to the entire process. While libraries have always been involved in academic research, they can now be engaged through its completion. For university students, this includes providing access to electronic library resources and productivity software applications in the same location, the basis of the information commons concept.

A review of library literature and academic library Web sites readily shows how the information commons has emerged as a new and important way to deliver resources and services to users. Donald Beagle, University of North Carolina, Charlotte, is a major proponent of the information commons. His compelling work, in fact, was central to CSU's implementation. Beagle states the "Information Commons, as a conceptual, physical, and instructional space, involves an organizational realignment from print to the digital environment."[3] He stresses that "change is the operative word, for successful implementation of an Information Commons involves functional integration of technology and service delivery."[4]

Beagle envisions an ideal environment that allows library users, accompanied by dedicated, knowledgeable consultants, to walk through the entire process of identification, retrieval, processing and presentation of needed information in whatever format exists.[5] Libraries must redefine the services traditional reference desks provide and librarians must redefine their roles in the academic environment. Such change is certainly challenging in this "rapidly changing and sometimes bewildering world."[6] Beagle, however, stresses that students "will be better served by an integrative, dynamic model that contextualizes information and that creates collaborative workspaces where group process can shape knowledge in ways that parallel the large-scale evolution of knowledge in the culture around us."[7] The information commons incorporates changes in user needs and expectations by creating an environment that wholly supports the whole research process from beginning to end.

Martin Halbert, Emory University Libraries, agrees with Beagle's definition of the information commons concept and what it involves. At Emory, a major building project included the creation of their Information Commons, "a collection of coordinated facilities providing comprehensive access to information technology" that resulted in a "dramatically new type of library."[8] Indeed, Halbert's descriptions of his library's experiences with their information commons closely parallels that of CSU's. At Emory, students now "can write papers, tabulate data, design Web pages, and collaborate in groups using computers, all without leaving the library. This leads to a different kind of one-stop shopping mode of research and learning that has greatly boosted library usage."[9] It also means traditional reference service models must be redefined. Halbert asks "does effective service delivery in the Information Commons require a 'hybrid' 'mixed skills' support staff, or one with increasingly specialized skills? The answer at Emory appears to be a little of both. Traditional reference staff will require new training and skills to be effective. That is inescapable."[10] Now, Emory "reference staff believes that the quality of their service has improved overall," as they "have stretched in new directions, taken on new responsibilities, and developed many new views about what students like to do in a library."[11] Ongoing staff training is a crucial component.

While Emory Libraries' Information Commons closely follows Beagle's conceptual model, there are variations in other institutions. The University of Arizona's Faculty Center for Instructional Innovation posted information on how 13 colleges and universities are setting up information commons. This Web site includes brief statements on original concepts, designs, equipment, staffing, management, hours, training, security, and maintenance for these American and Canadian institutions. In six instances, information commons were not found in libraries; instead, they were located in other buildings on campus. When the information commons were situated in libraries, seven institutions noted that management of the areas involved cooperation with staff from the universities' computing services or information technology centers. Four libraries were completely responsible for operations. In terms of staffing, five information commons had a mixture of librarians, technical assistants, and students, all working varying numbers of hours weekly. In the majority of cases, the information commons were staffed solely by computer technicians and student assistants; professional librarians were not involved.[12]

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The Web is now the best place to find practical information on library information commons. Numerous academic libraries have posted a wide variety of materials about information commons there. It is easy to find proposals, mission statements, planning documents, workstation configuration information, architectural designs, staffing patterns, and staff training plans. Examples include: Champlain College; Kansas State University; Lake Superior College; Lehigh University; Mesa Community College; Oregon State University; University of Arizona; University of Calgary; University of Missouri–Kansas City; University of New Mexico; University of Southern California; University of Iowa; and the University of Toronto.[13]

COLORADO STATE UNIVERSITY LIBRARIES

CSU is one of two flagship institutions in the state. Unlike the University of Colorado, Boulder, CSU is the state's land grant institution. There are 3,100 general faculty: 1,500 academic faculty and 1,600 administrative professionals. The student body has about 23,000 students; there are 3,900 graduate students and over 19,100 undergraduate students.

The University Libraries is composed of the main Morgan Library and two small branch libraries. Reference Services includes three units: Instruction, Collection Management, and Information/Reference, headed by three coordinators who report to the Assistant Dean for Public Services. The department is responsible for staffing six service desks: the EIC where the information commons concept is incorporated; the general Reference Desk; the Journal Room; the Information Desk; and both branch libraries. Reference Services has 21 professional librarians, 16 library classified staff, and numerous student employees, most of whom work in at least two of these areas. Morgan Library service desks, staffed 108 hours per week during regular semesters, are only closed seven days a year.

IMPLEMENTING THE INFORMATION COMMONS AT CSU

The foundation for the basic information commons concept was incorporated into Morgan Library's late 1990s expansion, becoming the EIC where almost all public computer workstations are now located. Before this building project, small clusters of workstations were located on two of the three floors organized by specific functions. Placing public workstations together in one easily accessible first-floor location was an integral part of the design and shows how CSU Libraries anticipated the major information technology changes that were ahead. Indeed, the explosive growth of the Internet, the implementation of a Web-based online catalog, and the proliferation of Web-based indexes and full-text resources soon followed. The purchase of electronic indexes and full-text resources was accelerated at CSU because of the disastrous effects of a massive July, 1997 flood on the Libraries' collections. In one year, the number of databases available on the Libraries' Web site increased from 50 to over 300. Users now had access to a wide variety of online databases, electronic journal collections, and academically sponsored resources on the Web. The EIC represented the Library's effort to make an important transition and it was one solution to Beagle's important question: ". . . how do we adapt the library that has grown up around the print tradition to manage service delivery in the highly complex and fluid digital environment?"[14] Information technology certainly altered the scope and nature of public service by redirecting reference services philosophy, expectations, and staff activities and allocation to meet user needs.

Unlike some other academic institutions, the CSU Libraries operates the EIC completely independent of input or support from any other University department. CSU's campus-wide Academic Computer and Networking Systems (ACNS) department is physically remote from the Libraries and does not offer any form of direct technical or personnel assistance. There is no cooperative agreement between ACNS and the Libraries for these services. The Libraries has an in-house Library Technology Services (LTS) office staffed by library personnel with backgrounds in computer science. These skilled technicians administer network services and assist with setup, operational functionality, and workstation maintenance in the EIC. They resolve issues involving online database connectivity, software installation, and the mechanical operations of EIC workstations. LTS staff is not trained to work on service desks and do not provide any direct assistance to library users. They have regular Monday through Friday daytime work schedules and are only available at other times if serious emergencies occur. The EIC manager, an experienced senior-level employee, is highly skilled in both technical and public service issues. There are also two knowledgeable library technicians assigned to the EIC who share a variety of technical responsibilities and are regularly scheduled to staff the service desk there.

From the beginning, maintaining the EIC decidedly affected Reference Services in two major ways. First, there was a new service point that required the same levels of staffing found at the Library's general reference desk. Many reference personnel were now assigned regularly scheduled hours in both locations, and additional support staff and student assistants were hired to ensure coverage. More importantly, working in the EIC required a whole new set of knowledge and skills that raised complex issues for everyone involved. First, some librarians thought the technical abilities the EIC demanded were too far removed from the traditional scope or role of the profession and increasingly expressed such concerns about working there. They wondered if it was the best use of their time and abilities. Although training became an immediately ongoing issue because of the rapid changes in digital technology, a complete training plan was not in place. Sessions were held intermittently and most people learned new skills while working in the area. In spring semester, 2000, the EIC had 120 workstations and provided:

- Library staff assistance during all open hours;

- Library public catalogs, online database, and Internet access;

- Assistive technology access in the form of screen readers, screen enhancement tools, dictation software, and Braille embossing;

- Electronic file management—download to disk, file transfer protocol (ftp), and file compression;

- Public printing on a pay-for-print basis;

- Geographic Information Systems (GIS) software and dataset availability;
- Campus e-mail access;
- Remote user assistance;
- WebCT access to instructor-designed tutorials, exams, and coursework;
- Multi-media capabilities including image scanning and the manipulation of Web-based sound and graphic files;
- Library services access including interlibrary loan and electronic course reserve access;
- Video instruction and class recordings access;
- Personal software loading available at various stand-alone workstations; and
- CD-ROM databases.

Despite these many services, every day numerous users asked for word processing, spreadsheet, and presentation application software that were not provided there. The Associated Students of Colorado State University, the student senate, even passed a bill supporting the installation of word processing software in Morgan Library. These requests were, of course, directed to the Dean of the Libraries who strongly believed that the EIC should offer productivity software because of these clearly stated user needs and the Libraries' role in the continuum of the scholarly process. In late spring 2000, the Dean met with Reference Services and asked that the new information commons concept, adding Office 2000 to EIC workstations, be fully implemented in the EIC in a four-month period. She stressed that identifying and arranging any necessary training to support this software, and all other EIC activities, were critical to implementation and service provision. Reference Services was responsible for deciding how this goal would be reached and what levels of assistance would be offered.

STAFF COMMITMENT TO THE INFORMATION COMMONS CONCEPT

Realizing there was some serious staff reluctance to add more software and technical support requirements to this already very complex environment, the Assistant Dean for Public Services and Reference Services Coordinators carefully set up a course of action that would encourage and ensure maximum participation in the planning process. A series of procedural steps was established. First, Reference Services staff were invited to two sequential discussions on the future of the EIC to identify staffing, training, and user access issues. At these meetings, the groups were asked to itemize services currently available in the EIC, as indicated in the preceding list, and outline possible scenarios for the future. They also focused on how to enhance services there. A good cross-section of professional and paraprofessional staff actively participated and openly voiced many opinions. In response to increasing and ongoing user demand, adding productivity software was unanimously supported. It was agreed that library research and productivity software are essential components of the scholarly process.

Despite this philosophical unanimity, there were serious reservations. The first concern involved the ability of library staff to provide adequately capable assistance on new software applications. Staff proficiency with productivity software would certainly involve further substantial redefinition of job activities and descriptions. This raised important, fundamental questions about the ways library staff work to fulfill the Libraries' mission and how library personnel define their public service responsibilities. Should library staff provide support service for such tools? Was that not the role of the other computer labs on campus? Here and in discussions in other Reference Services meetings, several librarians noted that most questions they received in the EIC were very technical and not necessarily at all related to their reference expertise, education, and experience. Students asked questions, for example, about file transfer protocols, downloading images, Web-based e-mail systems, and printing. They were not asking questions about setting up search strategies for specific databases or locating information on the Web.

Questions and concerns about public service were seriously considered. Colorado State University Libraries, like other academic institutions, has a very service-oriented approach to its community. When reference staff are unable to answer questions, they are expected to refer them to subject specialists in the department. Referrals are made directly to librarians in their offices when possible; if specialists are not available immediately, users are given business cards and instructed to telephone or e-mail and make appointments. The EIC has a different service model. Questions there require immediate answers, not referrals for later assistance and, as noted earlier, are increasingly technical in nature. Staff working at the EIC need different skills, skills that must change as rapidly as technology changes. Many shared the perception that adding productivity software would greatly increase that need for technological expertise. A combination of three factors finally resulted in widespread acceptance. Discussion following the Dean's directive increasingly focused on satisfying user needs and everyone knew how often students asked for productivity software in the Library. Also, many concerns about Office 2000 assistance were alleviated when in late spring, the Libraries began providing laptops for in-library-use only student checkout. Although these 20 units were fully equipped with Office 2000, there were very few requests for any kind of assistance at service points. This was somewhat surprising because it is so easy for someone to take a laptop to any service desk and ask for help. Nevertheless, everyone agreed further training was required; to provide user-oriented service, it was critical that staff felt comfortable and competent about the assistance they provide in the EIC.

INSTRUCTION ON MINIMAL TECHNICAL COMPENTENCIES

Identifying staff training needs was the next step in the information commons implementation process. Although requests for laptop assistance were minimal, Reference Services staff recognized they would have to answer a wide variety of technical questions when they worked in the EIC, questions about e-mail, hardware and software problems, and Microsoft Office. As noted earlier, the Libraries' Dean stressed that Reference Services staff needed to identify service expectations and the training those expectations involved. Though many people had some of the technical expertise the EIC now required, levels of proficiency varied widely. While almost everyone used Microsoft Word, the group had much less experiences overall with Microsoft Access, Excel, scanner use, or file transfer protocol. Even some people who were basically familiar with the entire Office suite were uncomfortable providing the technical assistance users regularly required. The need for a thorough training plan became readily evident. Also evident, however, was the time this kind of training requires. An explanation of the Libraries' training plan is followed by a

brief description of the Libraries' Tech Team, a special group of staff who assisted other staff and users in the EIC during the months everyone attended training sessions.

Keeping in mind the Dean's directive about training, the Reference Services coordinators agreed that everyone should be involved in identifying what minimal competencies and training the expanded EIC would now require. To begin the process, the EIC manager, the Libraries' Web librarian, and a Library Technology Services staff member drafted a list of minimal competencies. Meetings were held so everyone in Reference Services would have the opportunity to discuss the list and make revisions or additions. After those changes were made, it was presented to Reference Services as a whole and unanimously approved.

A series of seven in-house minimal competency-training classes was organized and scheduled for all Reference Services staff. Knowledgeable Library staff from LTS and Reference Services conducted the 90-minute classes, held multiple times to accommodate varying work schedules. They were:

Windows NT/Windows 2000
    Start Button Function
    Taskbar Function
    Explorer
    Managing Windows (moving, resizing, minimizing, maximizing, and closing)
    Familiarity with Accessories (Word-Pad, Imaging, Paint, etc.)
    Rebooting
    Log in
    Mouse functions (left and right click)
    Task Manager
    Keyboard shortcuts
File Management: Part I
    Using "My Computer"
    Selecting Files/Folders
    Changing Views
    Opening Files
    Cut, Copy, and Paste Functions
    Creating New Folders
    Moving and Copying Files/Folders
    Backup Files/Folders to Floppy Disk
    Renaming Files/Folders
    Deleting Files/Folders
    Restoring Files/Folders
    Recycle Bin
File Management: Part II
    Formatting floppy disks (Windows 98/NT)
    Printing Preferences (font size, margins, page orientation, default printer

selection, canceling jobs, adding networked printers, etc.)
    File Extensions, associated applications, useful Web sites (types: .doc, .ppt, .xls, .mdb, .pdf, .gif, .jpg, .bmp, .tip, .html, .txt, .rtf, .zip)
    Zip drive
Troubleshooting and Maintenance
    Printers—UnipriNT and staff station (toner cartridges, paper loading, and maintenance)
    UnipriNT system (Remote manager, back-up procedures), UnipriNT Troubleshooting Guide
    Virus Scanning
    Thin client (refreshing desktop icons, rebooting), Thin Client Troubleshooting Guide
    Internet status testing (ping and trace, test addresses)
Applications: Viewers/Plugins
    Adobe Acrobat Reader
    Netscape and Internet Explorer
    Shockwave/Authorware
    QuickTime
    Real Player
Applications: Utilities
    EnZip
    File Transfer Protocol (FTP)
    PrintKey 2000
    Splitter
    Telnet
Electronic Services: General
    Proxy server function (basic)
    Electronic reserves
    Interlibrary Loan (Zap, Webview)
    Campus Services (WebCT, RAMWeb, FAFSA)
    E-mail (basic knowledge of campus-based lamar or holly, WebMail, independent services, managing attachments)

While attendance was not mandatory, everyone was encouraged to go to sessions that would improve his or her skills. After each class was first taught, tutorial pages covering its content were posted on the staff pages of the Libraries' Web site. LTS also posted a Libraries Staff Tip Sheets Web page with links to explanatory text on applications, email programs, Windows 95/NT operations and plug-ins for Netscape. While working at the EIC, staff can quickly access one of these pertinent Web links from any workstation for solutions or answers to users' questions. Multiple copies of print manuals on the Microsoft Office 2000 products were also placed at the EIC staff station for staff and student use. It was agreed that scheduling additional classes would be continual and

ongoing to ensure that everyone's minimal competency skills remain current; content will be revised as technology changes. Evaluations for these well-attended classes were very positive. Staff frequently commented that the sessions helped them when they worked at the EIC and when they worked in their offices.

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The need for ongoing staff training is also mandated by the unforeseen problems that sometime occur in the EIC. These situations frequently require research and innovative problem solving on the part of EIC and LTS staff before other staff can be shown how to correct them. One such problem involved a little known, little documented incompatibility in floppy disk file formats. The Library's personal computers (PC) and thin client operating systems are Windows NT/Windows 2000 based. However, many students have home PCs that use Windows 95/98 operating systems. When a file is saved to a floppy disk using a Windows 95/98-based PC, that same file may not be accessible using a Windows NT. Since so many students were having difficulty with this incompatibility, it was decided to provide free floppy disks to all students with inaccessible files. A specially designated station was configured and added to the EIC so users could have their Windows 95/98 files copied to Windows NT formatted floppy disks. Users can keep these floppy disks as long as they need to access their files on EIC computer stations. In this kind of situation, it is critical to find quickly solutions that can be disseminated to staff immediately and then added to the minimum competency curriculum as required. Another technical problem that has emerged with the information commons involves the loss of data that users experience when using the public computer stations to open, modify, and save their document files. This problem is so common that library staff is now investigating data recovery software to assist users in rescuing their "lost" files.

The Library's Tech Team

To ease the transition to productivity software in the EIC before everyone had received minimal competency training, the Reference Services Tech Team was tapped as a user assistance resource. This team had long functioned as a troubleshooting and advisory group that focused on public service and technical issues in the EIC. It also works closely with Library Technology Services (LTS) to test and implement new software applications on the EIC workstations. Because the Tech Team is comprised of everyone who is primarily assigned to the EIC, it was natural that these team members would serve as a resource pool to be called upon by less experienced staff when confronted with questions or problems in the EIC they could not answer. Staff in the EIC frequently telephoned team members for immediate assistance. Others assigned to the EIC also began sharing the knowledge and experience they had with software applications or troubleshooting specific problems, and the referral pool subsequently increased.

Because of the effectiveness of the minimum competency training sessions, Tech Team members are now seldom asked to come to the EIC for immediate assistance, but they still quickly respond when unusual problems or difficult questions arise.

Workstation Availability

Finally, there was the question of workstation availability. Would productivity software on EIC workstations create too much demand for workstations? Because word processing is a popular and often a time-intensive endeavor, how could the Libraries' guarantee in-house users access to the online catalog and other databases at all times? The EIC physically encompasses an area over 8,500 square feet in size, a large portion of the building's first floor area. During the last year, over 80 workstations were added to help meet the anticipated increase in user demand that productivity software would create. The thin-client technology that made this affordable is described below. The EIC now has over 200 stations that offer the computing fundamentals essential to any lab, Web access and productivity software. To fulfill the role of a true information commons, EIC users must have all of the tools necessary to create knowledge. Towards this end, the range of computers in the EIC varies in design and function.

One hundred and four thin clients make up the majority of public Web stations in the EIC. A thin client is a server-based computer device with no local hard drive or CD-ROM drive. All software applications apparent to the thin client user are in reality run on a centralized server via a terminal program. At Morgan, thin clients are networked to an array of seven servers each with two 700 MHz processors with 2 GB of RAM and 18 GB of disk space running RAID 5. These seven thin client servers share processing and the client connection traffic is load balanced to maximize resources. To enhance the efficiency of the network response between the server and clients and provide audio capability, Citrix server software is installed in tandem with the Windows 2000. The Netier NetXpress XL1000 model was the thin client chosen for the EIC. At the time of purchase, Netier was the only company offering an inexpensive thin client that included a floppy drive, a feature deemed essential for the Libraries' users.

The thin client environment was an attractive alternative in the EIC for a number of reasons. First, the thin client stations themselves are roughly half the cost of a standard personal computer. Second, a thin client environment offers the network administrator and technology support staff an easy way to set-up and maintain each station. Unlike a PC, thins do not require the same time intensive configuration for each individual machine and any subsequent upgrade to an application or plug-in is accomplished on the server side. EIC software applications can now be upgraded as needed on our seven thin client servers in a fraction of the amount of time it would take to upgrade software on 200 individual PCs. And, finally, PCs found in any general computing lab are usually underutilized in terms of their processing power and storage capacity. Because the majority of EIC users are not "power users," thin clients are very well suited for Web navigation, word processing, and simple file management.

Thirty-eight personal computers are also available to library users and offer the same array of applications as the thin client stations. Many of these PCs are designated to offer users some additional capabilities such as CD-ROM databases, multimedia and scanning, GIS applications, assistive technology, and self-service software installation. In a continuing effort to meet the needs of users with disabilities, the EIC advances assistive technology initiatives by coordinating with the Assistive Technology Resource Center (ATRC) and the Resources for Disabled Students office on campus. Partnering with the Office of Instruction Services (OIS), the Libraries also provides space adjacent to the EIC where students access instructional videos and recorded class sessions.

Rounding out the EIC computer resources, there are two instructional labs with 20 and 30 student personal computer stations respectively. While these adjoining rooms are specifically designed for library computer instruction, they are opened up for overflow EIC use when library classes are not being held.

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Now the Library offers more computer resources to more students for more hours than any other department on campus. To compare, there are five campus computer labs available for everyone to use and many departments, such as Engineering and Natural Sciences, offer computer resources through labs located within their departmental buildings. Funding for these departmental labs comes from technology fees charged to students, the amounts depend on their majors, and access is restricted to those individuals who have declared majors in those departmental disciplines. Those five open-access campus labs are never open as many hours as the EIC. The Libraries does not receive any monies from student technical fees to support its computer lab resources; the funding comes entirely from the Libraries' already stretched operating budget. While it first appears that implementing the information commons adversely affected the Libraries' budget, the positive outcomes far outweighed the costs. The Libraries' commitment to an information commons and the very high level of student use significantly raised the profile of the Libraries on campus. Other departments began closely watching the Libraries' lead with new technologies,

such as thin clients, wireless networking, laptop accessibility, and pay-for-print technology. Funding became available from outside sources and special accounts to help support technology costs. The Libraries efforts to implement radical new services attracted its own fiscal rewards outside usual academic funding structures. Administrators from academic institutions statewide, in fact, have visited the EIC to learn more about the technological innovations it offers.

IMPLEMENTATION OUTCOMES

CSU Libraries administration and staff consider the implementation of the information commons concept a success. While a formal evaluation has not been done, this success is apparent in other ways that reflect the corollary goals developed during the process. First, the information commons concept was in place within four months as the Dean requested. Over that relatively short period of time, staff became committed to the information commons concept as a new, important service model that better meets student needs and expectations. Training sessions have definitely increased staff skill levels and people who work in the EIC are more comfortable and confident providing a wide variety of technical assistance.

The Tech Team eased the transition from the Libraries' traditional lab to an information commons by providing immediate, on-demand assistance when requested. While there were some initial technical problems, EIC thin clients now function smoothly. The cost of thin client technology allowed the Libraries to purchase additional workstations. Although the area is busier than ever and all workstations are normally in use during peak daytime and evening hours, students seldom wait for terminals for any length of time.

Increasing electronic resources and adding productivity software did not mean increasing the number of assigned staff. The EIC now functions with fewer librarians, library technicians, and student employees working there per hour than it did before implementation. Ongoing staff training has become a recognized commitment and, while the modules in place will continue, they will be modified or new ones will be added as changes in technology occur.

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CONCLUSION

The advent of the World Wide Web has changed the very nature and structure of society, impacting how people conduct their personal, social, professional, and academic lives. Tim Berners-Lee envisioned his creation as a tool for individual empowerment that would liberate people through free and open access to information. "In an extreme view, the world can be seen as only connections, nothing else."[15] Rapid changes in information technology are affecting universities and colleges in profound ways. Students and faculty increasingly rely on information technology for study and research, and academic libraries increasingly add electronic resources to their collections. While these resources offer many benefits, they also present many challenges. Viable, user-centered libraries analyze services and staffing patterns to anticipate and respond to the growing integration of information technology into the educational and research process. Information commons support the important relationship between information technology and academic scholarship by providing areas in libraries that provide a full-range of library resources and productivity software.

There are some issues that academic libraries should consider when making decisions about information commons. First, administrative interest and support are critical because there are difficult decisions about resources and staffing. There will probably be costly architectural issues. CSU was fortunately able to make the requisite building changes during a major remodeling project. There are certainly expensive equipment issues that are ongoing since hardware and software continually need to be replaced or upgraded. CSU continues to struggle with these budgetary realities. Redefining professional roles and responsibilities is a serious challenge. Administrators must sensitively handle the resistance some staff will have. Ongoing training is obviously an important factor; it is crucial that

staff feel comfortable with their new responsibilities and are able to provide solid assistance in this very technological and rapidly changing environment. The importance of ensuring staff participation from initial planning through implementation is crucial. Open discussion that encourages widespread input at every stage is essential to acceptance.

Today students increasingly require a continuum of service that draws from a variety of computer-based tools that can search, identify, retrieve, and assemble information. In fact, "the most profound attribute of the electronic revolution is that the means of delivering information have become inextricably bound up in the information itself."[16] Information delivery has also become inextricably tied to the continuum of scholarship from initial idea to final product. As Beagle notes, the information commons creates "a synergy between the user support skills of computer staff, the information skills of reference staff, and the productivity skills of media staff."[17] This dynamic invites staff retraining and role redefinition, and a fresh attitude towards identifying and establishing innovative library services based on the ways users look for and use information. Creating information commons certainly increases the many contributions academic libraries already make to their communities.

NOTES AND REFERENCES

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Lake Superior College, http://www.lsc.cc.mn.us/lib/infocom/home.htm; Lehigh University, http://lehigh.edu/helpdesk/locations.html; Mesa Community College, http://www.mc.maricopa.edu/its/lib/images/slicedmaps/Libld.htm; Oregon State University, http://osulibrary.orst.edu/computing/; University of Arizona, http://dizzy.library.arizona.edu/aboutlib/iif/iif.htm; University of Calgary, http://www.ucalgary.ca/IR/infocommons/ intro.htm; University of Missouri-Kansas City, http://www.umkc.edu/lib/renovation/; University of New Mexico, http://unm.edu/~libadmin/Projectoverview.htm; University of Southern California, http://www.usc.edu/isd/locations/undergrad/leavey/IC.html; University of Iowa, http://www.lib.uiowa.edu/commons/; University of Toronto, http://www.utoronto.ca/welcome.html (accessed July 20, 2001).

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