



STANDARD FIVE

LIBRARY AND INFORMATION RESOURCES

Library and information resources are the intellectual infrastructure that facilitates the achievement of the University of Washington's primary mission to preserve, advance, and disseminate knowledge. The development and maintenance of this infrastructure is the work of three key units: University of Washington Libraries, Computing & Communications, and the Office of Educational Partnerships and Learning Technologies. Through collaborations across the institution, an intellectual infrastructure has been created that supports teaching, learning, research, scholarship, and service.

University of Washington Libraries¹

The University of Washington Libraries (Libraries) has been called the "intellectual commons" of the University. The voices of scholars from throughout the ages speak to current students, faculty, and other users. At the same time, individual users pursue solitary intellectual inquiry or work with other students and scholars to explore new ideas. The role of the Libraries as a place for students and other researchers to access information, seek research assistance, do individual work, collaborate with other students and scholars, and engage in lifelong learning activities, will continue to be critical well into the 21st Century.

The Director of Libraries reports directly to the Provost and Vice President for Academic Affairs. The Director is a member of the Board of Deans and other University policy bodies. The Deputy Director of Libraries is responsible for budget, facilities, personnel, and staff development/training. The Director meets regularly with a Libraries Cabinet, composed of the Deputy Director and Associate and Assistant Directors in charge of Systems; Resources and Collection Management Services; Research and Instructional Services; Health Sciences Library; UW Bothell Library; and UW Tacoma Library. In addition, an advisory Libraries Council meets monthly to discuss matters of importance to the Libraries as a whole. The Council is composed of the Cabinet members, the managers, coordinators, and department heads of major programs and operations, and the Strategic Planning Team chair.

The mission of the Libraries is to enrich the quality of life and advance intellectual discovery by connecting people with knowledge. The Libraries works to achieve this mission through five key action areas:

1. Any Time, Any Place

The Libraries works to develop an integrated environment of content, tools, and services in a wide selection of formats and via a variety of delivery mechanisms in order to accommodate its user communities' diverse information needs, far-flung locations and different learning styles. This library—ideally available at any time and from any

place—supports and improves the ability of the University to meet its standards of excellence in education and research and to prepare its graduates for a life of learning and global citizenship.

2. Excellence in Collections / Digital Resources

The Libraries continues to develop and maintain its collections at the highest level possible across all relevant subjects and across an ever broadening spectrum of formats. Collections include not only the information resources housed by the institution but also remote information resources to which the institution provides access, whether via licensing of electronic resources, free Internet resources, or cooperative collection building and sharing.

3. Capacity Building

The Libraries proactively creates the means to leverage its priorities by reallocating resources, consolidating, and economizing. The Libraries devotes energies to supplementing the funds provided by the State of Washington and secures additional external funding to maintain and preserve collections, facilities, services, and to meet staffing needs.

4. Diversity and Organizational Culture

Respect for all human diversity is a fundamental value of the Libraries. Staff members who appreciate different backgrounds and perspectives provide a competitive advantage when solving problems and planning for services. This appreciation also allows the Libraries to serve the increasingly diverse communities more effectively and with more sensitivity.

5. Information Literacy

The Libraries is an active participant in the educational mission of the University. The Libraries seeks, through collaborations with educators on campus and beyond, to ensure that graduates are information literate, able to find, select, and assess information, and therefore prepared to succeed personally and professionally in a global, knowledge-driven society.

Computing & Communications²

Computing & Communications (C&C) is the organization charged with providing high-quality information technology infrastructure and related services to members of the University community in direct support of the University's teaching, research, health care, and public service missions.

Computing & Communications (C&C) is headed by the Vice President for Computing & Communications who reports directly to the President of the University. C&C is divided into eight organizational units: Business & Finance, Communication Technologies, Information

Systems, Networks & Distributed Computing, Planning and Facilities Infrastructure, Technology Outreach and Partnership, University Computing Services, and Video and TV Technologies.

C&C's mission is to provide convenient, secure, computer-based services and resources that improve the efficiency and effectiveness of the University's ever-broadening constituency, and ultimately add to the region's intellectual and economic capital. C&C's vision is to create the technology environment necessary to support leading edge teaching, learning, research, and health care, and to advance the University's most important goals — transforming teaching and learning, increasing educational opportunity, advancing human knowledge, and solving regional and global problems.

To achieve this vision, C&C has identified the following three critical goals:

1. Provide the expertise and infrastructure necessary to enable advanced network computing applications and rich information content.
2. Find new and innovative ways to leverage the convergence of voice, video, and data technologies in order to advance leading edge learning, research, and health care.
3. Enhance teaching, learning, and discovery by advancing the ability of faculty, students, and staff to do cutting-edge work through high-speed access to information resources, communications tools, and interactive multimedia experiences.

Educational Partnerships & Learning Technologies³

Educational Partnerships and Learning Technologies (EPLT) serves students, faculty, researchers, and clinicians by providing access to tools and resources; promoting fluency with information and information technology; and fostering innovation to meet their needs and goals. The methods by which information can be collected, assembled, edited, upgraded, archived, displayed, distributed, and accessed interactively are continuously improving. Networked information technology has the potential to support individual and group learning, enhance teaching, and make possible advances in research and clinical practice.

EPLT was established in 1998 and is headed by the Vice Provost for Educational Partnerships & Learning Technologies who reports to the Provost. The organization is divided into two subunits: 1) Educational Partnerships and 2) Learning Technologies.

The mission of EPLT is to ensure that the broadest range of communities have access to university research and education expertise; to forge reciprocal relationships

between the University and diverse communities; to create new opportunities for community-based research and learning; and to develop and diffuse learning technologies, both on- and off-campus.⁴ The following nine goals are intended to address this mission:

1. Support the development of educational partnerships linking the University of Washington to a diverse range of communities and organizations within Washington and beyond.
2. Increase access to and cooperation among higher education institutions in Washington State.
3. Further develop partnerships with specific rural communities in Washington State.
4. Provide UW students access to computing resources and training.
5. Develop, with and for faculty, technologies, resources, and services to enhance teaching and learning.
6. Conduct research to inform the design and development of learning technologies and teaching practices.
7. Support faculty access to and use of high performance networks and advanced applications to teaching, research, and clinical practice.
8. Further develop multiple partnerships to extend UW technology expertise to diverse communities.
9. Improve organizational infrastructure.

LIBRARY RESOURCES

The University of Washington Libraries (Libraries) provides library and information services to support the teaching, learning, research, and clinical needs of the University community. The Libraries' extensive on-site collections, access to networked information resources, and strong commitment to user-centered services have enabled it to achieve its stated mission of enriching the quality of life and advancing intellectual discovery by connecting people with knowledge and fulfill its vision of anticipating and meeting the information needs of our communities in their search for knowledge. The Libraries has nationally recognized programs of excellence in library assessment, information literacy, digital library initiatives, international studies support, integrated health information services, and in providing access to networked information. The Libraries is also known for its commitment to collaborative programs to facilitate teaching and learning at the University of Washington.

The Association of Research Libraries (ARL) composite index ranks the University of Washington Libraries 12th among its 120 academic research libraries in North America. Yet beyond the strength of local collections and networked resources, excellent service programs, knowledgeable staff, diverse facilities, and size of budget, the Libraries is known for innovation, responsiveness, and an integrated planning and assessment process that makes the user-centered library not just a goal, but a reality. Students and faculty recognize the value provided by the Libraries and rank the Libraries as the most important source of information for their work. The Libraries also receives the highest satisfaction rating of any academic service on the surveys of graduating seniors conducted by the Office of Educational Assessment.⁵

FACILITIES

The Libraries consists of 25 facilities, three of which are designated for remote shelving and are closed to the public. These facilities occupy a total of 680,376 assignable square feet. The major Libraries facilities on the Seattle campus include the Suzzallo and Allen Libraries, Odegaard Undergraduate Library, and the Health Sciences Library. The Law Library, part of the School of Law, will be relocated with the School to the new Gates Law School Building when it is completed in 2003. Each of these libraries contains at least 50,000 square feet of space. In addition, there are 14 subject-oriented branch libraries located near academic departments throughout the Seattle campus and two more, K.K. Sherwood and Friday Harbor, which are located in downtown Seattle and on San Juan Island, respectively. The UW Bothell and UW Tacoma campus libraries support their respective campuses.

The Suzzallo Library was built in 1925 and includes additions constructed in 1935, 1949, and 1963. The Suzzallo Library now has a total of 218,400 assignable square feet. The Allen Library, comprising 150,400 assignable square feet, was completed in 1990 as an addition to Suzzallo. The two buildings function as a single library that contains the main social sciences and humanities collections, a large science library, specialized collections and services such as Government Publications, Manuscripts, Special Collections and University Archives, Maps, Microforms-Newspapers, administrative offices, and technical services processing. Specialized use space includes six group study rooms; two instruction rooms with projection capability; two 16 carrel rooms, dedicated for use by PhD students engaged in long term library research projects; and 42 faculty studies.

The Odegaard Undergraduate Library (OUGL) was constructed in 1972 and contains approximately 97,112 assignable square feet. When OUGL was built, it supported the needs of undergraduate students very well by pro-

viding a discrete collection of print materials and study space designed for independent work. Over time, OUGL has diversified study, work, and learning spaces to better support the needs of students. During the past decade, extensive collaboration with other campus units resulted in the establishment of the largest general computing lab on campus, wired instruction space, and an instructional technology and support center. OUGL has evolved into one of the nation's premier student-centered undergraduate libraries. Specialized use space includes 12 group study rooms and four instruction rooms with projection capability.

The Health Sciences Library (HSL) supports the teaching, research, and clinical needs of the University's large Health Sciences community.⁶ The HSL has more than 60,000 square feet on two floors with study seating for 490 people and 45 public computers/email stations. The Microlab Learning Commons has an additional 151 workstations where students gather to work on assignments, research, and other collaborative learning projects. Specialized use space includes 16 group study rooms and four teaching rooms.

The newest branch library facilities on the Seattle campus are the Physics-Astronomy Library and the Foster Business Library. The Physics-Astronomy Library opened in 1994 with 4,078 assignable square feet in the new Physics-Astronomy building complex. The Foster Business Library opened in 1997 with 16,137 assignable square feet and is a "below garden" facility with an 800 square foot skylight above the reading area. Specialized use space includes 7 group study rooms.

The Tacoma campus library is located in a renovated historic building and has 29,081 assignable square feet. It has study seating for 145 students, including one group study room, which accommodates eight students. Special collections include a children's and young adult literature collection, the Foundation Center's Cooperating Collection for nonprofit research, and collections on Russian and English literature. The Bothell campus library moved into a newly constructed facility in 2001 and has 42,739 assignable square feet. It has study seating for 829 students, including a 72 seat Reading Room. Students can plug in laptop computers at many seats in the open seating area of the Library, as well as make use of the Library's wireless areas. Twenty group study rooms, which accommodate 10 to 18 students, are available to students for group projects. Students needing to practice media presentations may reserve equipment and other materials for use in the group study rooms.

The Libraries are guided by a Facilities Master Plan⁷ as it looks to the future. The past ten years have seen tremendous changes in how Libraries facilities are used and the pace of change is likely to accelerate in the future. The nature of collections will continue to move more toward

electronic access, but there will still be significant collections of print materials. As more library collections are moved off-site, library space will be renovated and converted from “book space” to “people space,” with group study rooms, instruction space, and general improvements in the quality of the spaces to make them more people-oriented.

Because of increasing capacity to deliver resources electronically, rising operational costs, and stagnant state budgets, the Libraries will continue to seek opportunities to consolidate service points into fewer, but larger, facilities. The University’s Capital Campaign will afford opportunities to secure funding for facilities that include consolidated library spaces. One opportunity currently being considered by the University is a Fine Arts facility, which would contain a large Fine Arts Library and allow us to consolidate the Art, Drama, and Music libraries. Another Capital Campaign target under consideration is a new Biomedical facility, which could include all or parts of the Health Sciences and Natural Sciences libraries.

COLLECTIONS AND INFORMATION RESOURCES

Teaching, learning, and research at the University is supported by one of the premier library collections in North America, consisting of over 6 million volumes and government documents (12th in the ARL ranking), 7 million microforms (4th in the ARL ranking), in addition to manuscripts, technical reports, maps, architectural drawings, photos and slides, audio materials, films, and videos. Beyond the onsite collection, the Libraries provides access to more than 10,000 electronic publications, many of which include additional thousands of journals in electronic form. These electronic resources are available to the academic community anywhere and anytime.

Collections shelved on campus in on-site library facilities are generally heavily used and are in “open stacks,” that is, faculty and student researchers are able to browse or retrieve material directly from the stacks without mediation by Libraries staff. Most of the Libraries’ collection space is devoted to general stacks, or material that may be checked out from the Libraries. Manuscripts, Special Collections, and University Archives materials are shelved in secure areas, must be retrieved by staff, and are only available for in-library use.

Collection growth has outstripped the Libraries’ capacity to provide shelving in traditional campus library facilities. Lesser-used materials have been moved off-site and are retrieved on a regularly scheduled basis when requested by students and researchers. Following a growing trend in academic libraries nationwide, the Libraries developed several remote-shelving facilities to help house and man-

age its collections. The Libraries first remote shelving facility was established in 1985 in the basement of Kane Hall on the Seattle campus. The installation of compact shelving in 1988 provided space for more than 300,000 volumes. The other large remote shelving area is located off-campus at the University’s Sand Point facility with approximately 200,000 volumes. Other smaller storage areas are in commercial space located in north Seattle. Nearly 600,000, or 10%, of the Libraries’ collections, as well as 27,000 linear feet of boxed manuscripts, are shelved in remote facilities.

The Libraries houses the largest array of information resources in the Pacific Northwest and several nationally preeminent collections. For example, a number of our area studies collections (e.g., Canada, East Asia, Russia/East Europe, Scandinavia, South Asia, Southeast Asia) rank in the top tier nationally, as evidenced by rankings given in the Department of Education National Resource Center competition, among other indicators. The holdings of our Manuscripts, Special Collections, and University Archives division are unsurpassed for documenting the history of the Pacific Northwest from the Oregon-California border to the Far North of Alaska and the Yukon. Use of the Libraries’ special collections is not limited to published scholars or to doctoral candidates. With the increased emphasis on research on the part of undergraduates, primary source materials such as manuscripts and photographs are becoming even more important to the University’s instructional mission.

The Libraries resources in scientific, technical and medical journals are especially strong, with serials expenditures generally ranking in the top ten of ARL libraries. These journals are critical to the support of teaching and learning in these areas, as well as to the extensive program of sponsored research. Where possible the Libraries has acquired electronic access to these journals for use by the university community from any of the many locations in which they work.

Collection Development and Management

The Collection Management Services (CMS) unit supports all Libraries units and coordinates collection development and management, the building of on-site collections through purchases, gifts, or deposit arrangements, and provides operational oversight for electronic resources development and access. Subject selectors and library liaisons play a key role in acquiring materials for their discipline, staying in touch with the needs of their constituents, and engaging in instructional and advisory support to their constituency. The Information Resources Council, which is composed of 26 librarians from across the system (including UW Tacoma and UW Bothell), acts in an advisory capacity on issues related to information resources development and management. Decision-making responsibility, policy formation, and broad information

resources allocation recommendations are vested in a ten-member Steering Group. Both are chaired by the Associate Director for Resources and Collection Management Services. The Libraries' Strategic Plan and a statement of Guiding Principles and Assumptions provide the focus for this committee's efforts and initiatives.

Participation in consortial initiatives broadens the array of scholarly resources available to University students, faculty, and staff. Some consortia efforts focus on particular areas of the world (e.g., Association of Research Libraries Global Resources program), or a mix of formats and areas (e.g., Center for Research Libraries), and may also include cooperative acquisition of materials in digital formats. The head of CMS chairs the Washington State Cooperative Library Project's Databases Committee and oversees its competitive bid processes, which have resulted in favorable group purchase terms for databases from the Institute for Scientific Information and ProQuest, among others. The Libraries is also represented on the Administrative Committee of the Washington State Library's Statewide Database Licensing Project, and is a member of the Greater Western Library Alliance (GWLA), a group of 30 research libraries in the western U.S. GWLA is currently pursuing group purchasing opportunities and strategies to help reform the system of scholarly communication. The Libraries was a founding member of the Pacific Rim Digital Library Alliance (PRDLA) and the Digital Library Federation (DLF).

Collection Preservation

Preservation of the information resources the Libraries has acquired is a challenge. The Libraries faces issues of deteriorating books and serial volumes, not to mention maps, manuscripts, and graphic materials such as photographs; reformatting needs pertaining to audiovisual materials that can only be viewed or heard with obsolete technology; and preserving digital materials, including in-house produced as well as commercial or other publications. Guaranteed affordable long-term access to electronic books or journals, for instance, requires collaboration on the part of many stakeholders on the national scene.

The Preservation Office is responsible for activities such as preservation planning and policy, grant writing, disaster planning and response, environmental monitoring, preservation replacement, and preservation education.⁸ The Preservation Office also assists with digital projects such as the American Indians of the Pacific Northwest Library of Congress/Ameritech Digital Library Grant Project.⁹ Operational activities such as binding, conservation treatment, and microfilming are decentralized and the responsibility of individual units. In 2001-2002, total preservation staff was 15.67 FTE and expenditures totaled \$815,068, primarily in staff costs and binding.

In 2000, a preservation assessment report entitled "Preserving Washington's Collections: Strategies for the New Century," which included 27 recommendations, was prepared by the Preservation Office. In response, a number of actions have been implemented. In 2000, a Preservation Program Advisory Committee was appointed. In Summer 2002, a pilot mass de-acidification program was implemented. Environmental monitoring with IPI data loggers was implemented in the main off-site storage facility. Revisions to the disaster plan have been initiated.

The lack of adequate financial resources and organizational dispersal of current preservation resources are major ongoing problems. According to the 2000-01 ARL national data, the Libraries ranks 45th in the percent of total library expenditures devoted to preservation and 44th in preservation expenditures as a percent of total materials expenditures. The Libraries is currently evaluating preservation needs and establishing preservation priorities with the goal of better aligning financial resources with those priorities.

Digital Initiatives

The Libraries Digital Initiatives Program (DI Program) arose from a 1996 collaborative effort with the Center for Information Systems Optimization (CISO) in the Department of Electrical Engineering to work on software for digital collections. Digital Initiatives has moved from a project-focused effort with one librarian to an operational program with a secure funding base and placement within Resources and Collection Management Services. The DI Program has specialized in creating image collections and developing extensive metadata expertise. The scope of Digital Initiatives has expanded beyond its original focus on images to include more textual, audio/visual, and other forms of information.

The main product has been the Digital Collections web page, which received approximately 150,000 discrete visits in the first quarter of 2002.¹⁰ There are more than 40 collections online, with over 20 more in production. Over 44,000 objects have been scanned, primarily images, although gray literature and monographs have been digitized as well. The digital collections are a mix of Libraries resources, faculty projects, and multi-institutional collaborative projects. Collections are integrated into the Libraries online catalog and input into OCLC's WorldCat. The site is used in University teaching and research and the emphasis on Pacific Northwest materials makes it popular for K-12 instruction.

The DI Program also advises faculty and staff on a variety of projects with digital components. The Metadata Implementation Group, which has been cited as an exemplar, was born out of the DI Program. This group advises others in the creation of metadata and keeps abreast of metadata standards. Early on the program joined forces

with Professor Greg Zick of CISO to provide input into and be a test bed for what is now the successful CONTENTdm software, distributed by OCLC. A Digital Initiative Steering Committee with representation from different areas within the Libraries provides guidance.

Funding the Collection

Careful stewardship over time has developed the breadth and depth of the Libraries' information resources. Not unlike libraries across the country, the Libraries is challenged by the inflationary costs of maintaining, expanding, and diversifying its collections. In the last six years, the Libraries' purchasing power has eroded significantly despite increases in actual dollars allocated from the University – attributable primarily to price increases for journals that substantially exceed the Consumer Price Index. The University's commitment to the Libraries' premier collection is exemplified through its inflation funding for collections and resources:

1997-99	\$900,000 (permanent addition)
1999-01	\$400,000 (one-time addition)
2001-03	\$800,000 (permanent addition)

The expansion of electronic information in the Libraries' collections is budgetarily significant. In 1995/96, less than 5% of the resources budget went toward electronic purchases, most of which were indexes and abstracts. By 2001-03, the figure had increased to 23% and covered a broader range of materials. Except for bibliographic databases, until recently electronic access enhanced rather than substituted for print ownership. In the case of most full-text journals, for instance, electronic access was inseparable from a print subscription. Publisher practices, accompanied by librarian and faculty concern about permanent access to electronic information, dictated that the Libraries pay for the print title along with the electronic version of the same content. Pricing of electronic journals remains volatile and inconsistent, with no one pricing model emerging. A worrisome trend for a large research institution is the movement by some publishers toward pricing based on the number of students enrolled. In such cases, the cost of electronic access is almost always much higher than the print. The cost for electronic access to bibliographic databases, reference works, and books far outpaces print prices.

The combination of these factors –insufficient funding to keep pace with inflation and proliferation of new and costly forms of information – has challenged the ingenuity of selectors and reshaped the nature of the collection. Since 1997, approximately 5,200 subscriptions have been cancelled, recouping more than \$3 million during the past 5 years. The Libraries has also taken the risk of subscribing only to the electronic version of journals despite the lack of resolution on long term archiving. Yet

the percentage of the resources budget going to serials has increased. After many years when the serial to monograph expenditure ratio was about 70:30, in fiscal year 2001 it was 75.8 % serials to 24.2% monographs in the combined Main/HSL budget.

The Libraries has made significant progress in the area of development and fund raising. With a full-time Director of Development and support staff, the Libraries has created an active Friends organization, a group of generous donors and supporters, and a long list of operating and endowed funds. The Friends of the University of Washington Libraries aim to further the appreciation of books, encourage an awareness of the importance of the Libraries to the community and to the state, organize programs based on library collections and interests, and help to stimulate private support for the Libraries. With more than 1,650 members, the Friends organization publishes a newsletter, *Just Friends*, sponsors an endowed lecture series, a book sale, and other programs about books, libraries, and collections. During the 2001-02 fiscal year the Libraries had received private gifts of \$1,584,825 from 3,084 donors, a 135% increase over the previous year. Recent grant and contract funding has been awarded for digital initiatives, preservation, international studies, and the Regional Medical Library operated by the HSL.

PERSONNEL

The Libraries (and the Law Library) employs 162 librarians (12th among ARL libraries), 25 professional staff, 220 classified staff (15th in ARL), and more than 500 part-time student employees, 143 full-time equivalent (6th ARL), all who work collaboratively to support the teaching, learning, and research missions of the Libraries and the University. Seventy-two percent of the librarians are female and 11% are minority. The Libraries recognizes the desirability of having a work force that can work effectively with a diverse academic community. A Diversity and Organizational Culture Committee was reformed in 2002 that will take the lead in highlighting issues of interest and putting together a Diversity Plan. A diversity forum for all library staff was held in August 2002 and featured D'Etta Jones from the Association of Research Libraries.

Librarians hold appointments as academic personnel at the University. The chief academic officer, the Provost, is responsible for the interpretation and implementation of University policies and procedures for academic personnel and has delegated to the Director of Libraries the responsibility for administering the Librarian Personnel Code.¹¹ The Code has been in effect since 1999 and is patterned on the faculty model, which relies upon peer assessment for appointment and promotion. The appointment and promotion policies of the Code are designed to contribute

to the academic and scholarly excellence of the University by the maintenance of high standards of librarianship. Librarians are expected to be active in scholarly pursuits and professional activities that advance librarianship and higher education. The Code also incorporates procedures and policies for performance evaluation; merit salary increases; resignation, retirement, involuntary termination; professional leave; and proceedings for resolution of differences.

Librarians are responsible for developing collections, providing access to information resources worldwide, and facilitating use by the Libraries' clientele. Librarians also provide reference/information services and offer user education programs. Librarians serve on University and Libraries committees, councils, and task forces, and act as partners in the academic enterprise and learning community. A graduate degree from a program accredited by the American Library Association or an equivalent library science/information studies degree constitutes the primary credential for librarians and is considered the terminal degree. Many hold advanced degrees and specialized training.

The noncompetitive nature of librarian salaries continues to be an exceedingly serious problem. Low salaries are not only a source of dissatisfaction among librarians, but they also pose a serious impediment to recruitment. Among the 111 academic libraries that are members of Association of Research Libraries, the University is 56th in average salary and 56th in median salaries. When the Libraries is compared with ARL libraries in other aspects of the library – for example, size of collection, number of staff, volumes added each year, number of journal subscriptions – the Libraries normally rank in the top fifteen.

The Association of Librarians of the University of Washington (ALUW) promotes library service of the highest quality; promotes professional standing for members and encourages professional development; helps to improve librarians' working conditions and benefits; and promotes informal communication and fellowship among members. ALUW is active politically and employs a lobbyist to bring issues of concern to state legislators. ALUW is also responsible for selecting librarians to serve terms on Faculty Senate Councils.

Communication across the units in this geographically diverse system is enhanced by the Libraries Staff Web.¹² Other methods of communication include two important online newsletters that are sent to all staff each week. The *Weekly Online News* from the Director's office includes announcements and reports of staff activities. The *Personnel and Staff Development Update* from the Personnel office includes staff development announcements and personnel information about job openings, staff changes, and other personnel related matters.

Each month, the Libraries holds an InForum meeting that is open to all staff. At the InForum, new staff members are introduced, one or more library units give a presentation about its services and operations, announcements are made, and the Director has a segment in which she talks about current matters of importance and answers questions. The attendance at the InForum averages between 90-100 staff members each month. "Town Hall" meetings are also held by the Director for library staff as needed to discuss important issues as they arise.

The Libraries has made a significant commitment during the past ten years to providing its staff with training and development opportunities. The program was selected in 2001 as an Association of Research Libraries¹³ "Best Practices" example. In addition, the program was chosen in 2002 to participate in the Cornell University Library Benchmarking Program of staff development at 20 top research universities.

A minimum of 60% of the Libraries staff participate in some sort of training and development program each year. Many units at the University offer important, excellent training that staff may attend. When there is a cost involved, the Libraries pays for staff to attend. Among the departments that offer training are: UW Training and Development; Computing & Communications; Environmental Health and Safety; Work/Life Office; and Women's Center. In addition, the University offers a Strategic Leadership Program. Supervisors (those who supervise at least one FTE employee) new to the University must attend a week long intensive training about the University and expectations for management and supervision. Experienced supervisors are attending a 3-day intensive workshop of the same nature.

The Libraries has official guidelines and application procedures for work-related travel and participation at professional meetings. Travel funds are available not only to librarians, but also to classified and professional staff. Librarians with provisional or non-continuing appointments who are newer to the profession may receive an additional amount to provide professional support. During the 2001-03 biennium, staff allocations are \$1,200 for librarians with permanent status and professional staff and \$1,400 for those with provisional or non-continuing appointment. Classified staff members are eligible for \$600 per year upon application and approval by the Director of Libraries.

USER SERVICES

The Libraries provides a full range of user services in both physical and virtual settings. Reference assistance, research consultations, check-out and interlibrary borrowing, and bibliographic access to information resources are

just some of the services offered. The Libraries developed and adopted a service policy in 1995 that differentiates levels and types of services provided to the University (students, faculty, and staff) and those not affiliated with the University. This policy guides service delivery and emphasizes the need to focus the Libraries service program on the primary user group – the University academic community.

Hours of opening for library units range from approximately 50 hours per week in smaller branch libraries and individual service units within larger libraries to 135 hours per week in the Odegaard Undergraduate Library, which is open from noon Sunday through 6:00 p.m. Friday, and from 9:00 a.m. to 6:00 p.m. on Saturday.

Reference and Information Services

While reference and information services from a staffed service desk is still the primary method for user assistance, there is increasing use of electronic and other virtual means of communication.¹⁴ In-person reference and information service is available at each of the Libraries' 43 service points. Designated "reference" points staffed primarily by librarians and Information School graduate students are located in the Engineering, Foster Business, and Odegaard Undergraduate libraries as well as at a number of service points within the Suzzallo-Allen Libraries, including Manuscripts, Special Collections and University Archives, Natural Sciences, and Reference and Research Services. In other library units a consolidated service desk staffed by librarians, staff, and students handles reference and information queries. Reference and service points also handle telephone inquiries.

Electronic reference service is offered in several modes. Asynchronous service is provided through electronic mail to a designated library unit address, library staff person, or through LibQuest. The latter is a web-based question form that is available through the Libraries' web site with responses normally sent within two working days. Real-time, online reference service can be obtained through "Q&A Live," which is available (except holidays) Monday through Thursday from 7:00 am to 9:00pm, and Fridays from 7:00 a.m. through 5:00 p.m. This is a joint pilot project with Cornell University with librarians at Cornell covering the morning hours and University of Washington librarians handling afternoons and evenings. Approximately 5% of total user inquiries are received electronically. However, when directional questions are omitted, the proportion of questions received electronically is about 10%.

Information Access

The UW Libraries Catalog contains the holdings of the Libraries including Bothell and Tacoma. Included are records to books, journal titles, government documents,

maps, media, and selected web resources. The catalog is part of an integrated library system that uses Innovative Interfaces Inc. software. Users can search by author, title, author/title, subject, key words, and numbers (e.g. call numbers and ISSN). As part of an integrated system, records will show if an item has been ordered (acquisitions system); a periodical issue received (serials control); and an item is checked out with corresponding due date (circulation system). Hot links to Internet accessible information resources also appear in the catalog record.

The Libraries also maintains Cascade, the consolidated catalog of the libraries at the public baccalaureate institutions in Washington; including Central Washington University, Eastern Washington University, The Evergreen State College, University of Washington, University of Washington Law Library, Washington State University and Western Washington University. Cascade allows users to simultaneously search the holdings (more than 11 million items, books, journals, videos, and other material) of all seven libraries. There are over 4.3 million titles in the Cascade catalog. Of these, more than 3 million (70%) are held by only one participating library. Cascade enables patron initiated borrowing of book materials from one site to another. Authorized users (current faculty, students, and staff of the six member institutions) can easily request delivery of books located at one of the participating libraries. Turnaround time for such requests is 2-3 days. Cascade borrowing began in July 2000. During the first year of operation over 28,000 items were lent to patrons; this figure increased by approximately 20% in 2001-02.

On November 1, 2002, a merger was announced between Cascade and ORBIS (Oregon higher educational institutions and some Washington private colleges), which will create the Orbis Cascade Alliance (ORCA).¹⁵ This Alliance will offer a shared catalog of 22 million items and courier service with daily pickups at all participating libraries.

The Libraries have licensed access to a wide array of bibliographic databases that provide coverage of most subjects as well as more generalized ones that contain full-text.¹⁶ WebBridge provides the links between the bibliographic databases and library holdings and full-text connections.

Circulation Services

Most material in the Libraries can be checked-out by University faculty, students, and staff as well as by non-affiliated users who have borrowing privileges. In general, reference materials and items in Manuscripts, Special Collections, and University Archives do not circulate. Some library units restrict the circulation of periodicals. While there is some variation in loan periods, books usually circulate for 28 days (undergraduates) or an academ-

ic quarter (graduate students and faculty), while the check-out period for periodicals is 3 days. Renewals are generally permitted.

Course instructors may request material be placed on reserve for class use in most library units. During the past several years, a number of libraries have moved from closed (mediated) reserves to open (non-mediated) reserves. This change supports the collaborative learning model favored by most University classes by eliminating individual responsibility for checking out reserve materials, allowing longer in-library use of materials, and effectively avoiding most reserve fines. Electronic reserves have also grown substantially during the past two years primarily through the use of Docutek's ERes software. The shift to open course reserves and electronic reserves has provided far greater access to this material for students. Traditional reserve usage declined significantly from 229,337 in 1996-97 to 92,887 in 2001-02, while electronic reserve use was 328,687 in 2001-02.

Circulation services are offered in every library location that circulates material. Initial check-outs must be done within the library. However, subsequent renewals can be done remotely without staff mediation. The Health Sciences Library currently provides a "self check-out station" that enables borrowers to borrow without staff mediation. Through the Libraries web site, users can see what items they have checked out, have on hold, or have borrowed through interlibrary loan; they can renew the books they have checked out; and place holds on books that are checked out. Users can also request through the Catalog that circulating books at any site (including Bothell and Tacoma) be sent to another library unit for pickup.

Interlibrary Loan/Article Delivery

The Interlibrary Borrowing Services and the Health Sciences Library supply photocopies of journal articles and borrows books not owned by the Libraries for University-related research or coursework. These services are available only to currently enrolled students, staff, and faculty of the University of Washington. Requests can be submitted through a web form. Articles can be mailed to campus offices or, in some cases, made available electronically. The Libraries remains a strong net lender, loaning three times as many items as it borrows.

Library Resources & User Satisfaction

The Libraries has made delivery of services and resources "any time and any place" its top priority. The University community can already perform a number of library-related activities without coming physically to the library. There has been a significant decline in the in-library use of material from more than two million items in the 1995-96 year to just over one million in 2001-02. The decline has been most pronounced in those libraries

where a significant proportion of information resources are now available electronically such as business, newspapers, scientific, and medical journals. Survey data shows a corresponding decrease in the frequency of library visits by faculty and graduate students who have used libraries primarily for collections. Undergraduate students appreciate the ease of access afforded by electronic information, whether they access it from computers in the library or from other campus locations or residences.

Students and faculty acknowledge the importance of the Libraries' information resources to their work and express a continued priority on maintaining the existing collections while expanding resources in the future. In the 2001 library survey, 96.4% of the graduate student respondents and 95.0% of the faculty respondents rated the Libraries as a "very important" source of information for their work, while only 2.2% of faculty and 1.6% of graduate students ranked the Libraries as not important. Journals were the most important information source overall, while books remained high in importance for those in the Arts, Humanities, and Social Sciences. When asked to name their top priorities for the Libraries in the next two years, both groups gave by far the highest ratings to three information resources related priorities: deliver full-text to the workstation, maintain quality of print collections, and provide electronic access to older journals. In a 2002 survey, 79.1% of undergraduate respondents ranked the Libraries as very important and only 6.3% as not important. The top priority for undergraduates was the same as that for faculty and graduate students: delivering full-text to the desktop computer.

The Libraries has participated in the LibQUAL+ surveys in 2000, 2001, and 2002. The results show University faculty and students consistently rate their satisfaction with collections and resources higher than those at other institutions. In particular, library support for teaching, learning, and research was among the highest for graduate students and faculty. In 2002, University faculty rated satisfaction with library support as 7.29 (on a scale of 1 to 9) compared to 6.60 for faculty at all ARL institutions participating in the survey. The graduate student satisfaction rating of library support was 7.32 compared to 6.83 for all ARL institutions.

The quality of the Libraries' information resources is not only acknowledged nationally, but is strongly valued by the Libraries' primary clientele, the campus faculty and students. In the 2001 survey, more than 83% of faculty and graduate students indicated that they were very satisfied with library collections, while less than 2.5% of faculty and graduate students were not satisfied. A similar result was found among undergraduates. When asked about satisfaction with specific elements of the collection and services, faculty and graduate students were overwhelmingly "very satisfied," while only 6.4% of faculty

and 5.9% of graduate students were “not satisfied”. Satisfaction with the journal collection was even higher.

LIBRARY COMPUTING

The Libraries has used networked computing technology to expand the resources available for education and research for almost two decades. The infrastructure needed to provide access to this array of global resources is jointly supported by the Libraries and Computing & Communications (C&C). The computing infrastructure supporting library services at the University is robust and extensive. C&C has a long history of working with the Libraries and their network services are critical to the delivery of digital information resources.

Public access to networked information resources is provided through both remote servers around the world and locally mounted databases. Library systems host over 200 databases on clustered Dell servers running Windows 2000. Data is kept on a Storage Area Network (SAN) and all systems are UPS protected. This combination provides outstanding performance and reliability, as there is no single point of failure in the entire server system. This fully redundant server environment is capable of storing several terabytes of data. Besides commercial databases, this server environment hosts the Libraries' web site, electronic reserves, and some special collections.

Part of the recent server upgrade has supported the expansion of electronic reserves. Three servers (one on each campus for Seattle, Bothell, and Tacoma) all use the same vendor product (ERes) to provide online text and image data of course materials. The Seattle system can also support streaming audio and video. An example of the new kind of services that can be built in this environment is the Washington State Geospatial Data Archive.¹⁷ This is a repository for geospatial data for the State of Washington, collected by numerous sources around the state and hosted by the University.

These resources can be located through the Libraries Web Gateway.¹⁸ This service has over 4,000 pages that are automatically updated each night, based on a database of electronic resources extracted from the catalog. Many of the licensed full text resources are housed remotely, and the vendors limit use outside of the Library facilities to University faculty, students, and staff. In order to provide remote access for these users the Libraries runs a proxy server.

The catalog database is part of the Integrated Library System (ILS) that uses Innovative Interfaces Inc. software running on an IBM AIX server. This is maintained by C&C and is also protected with redundant disk storage, off-site backups, and emergency power. C&C also maintains a second computer using software from the same vendor

(INN-Reach) to provide a union catalog and statewide lending service for the 6 public baccalaureate institutions.

The public can access these resources in any library unit from over 300 public access workstations running Windows 2000. Some applications requiring older operating systems are provided on stand alone units. Staff computing is supported with over 500 desktop PC's that are being migrated to Windows XP during the 2002-2003 timeframe. The Libraries uses the same robust server environment throughout the libraries network to facilitate collaborative work through stored and shared documents. Access is coordinated via a staff web intranet.

ODEGAARD UNDERGRADUATE LIBRARY: A CENTER FOR COLLABORATIVE LEARNING

As a heavily wired, and now wireless-ready, networked environment, Odegaard Undergraduate Library (OUGL) has made great progress toward adopting the best of technology to enhance teaching and learning at the University of Washington. Offering 24 hour access to a large 356-seat computing lab, two wired classrooms, a wireless network, on-site technical and reference consultation, multimedia production and viewing facilities, laptops, and the largest reserve (print and electronic) collection on campus, OUGL has undergone dramatic changes in response to the ever increasing demands for a digital educational environment in 21st Century and become an active student learning center.

In 1994, the Libraries and OUGL were open to innovative uses of space and staff to support student learning in the most effective ways. OUGL was to serve as the gateway, the entry point for the undergraduate student, the novice researcher, and the inexperienced user of information technology. The 1997 Odegaard Undergraduate Library Master Plan program statement further asserted the need for change: “The library as a place is still critical, but that place needs to be redesigned to accommodate the changing nature of the provision of information and library services.”

Through a distinctive partnership with the Office of Undergraduate Education and Computing & Communications, the University Libraries formed UWired,¹⁹ a collaborative effort to develop and support effective uses of technology in teaching and learning. UWired's comprehensive approach aimed to improve access to information technology and resources, improve fluency with information technology and resources, and promote and support innovation in technologically-enabled teaching and learning. These goals were addressed by creating and operating facilities and infra-

structure for students and faculty, developing and implementing new curricula, and working with faculty and users to foster instructional innovations. One outcome was the creation of the Center for Teaching and Learning Technology (CTLT) to assist faculty and other instructors in learning and incorporating appropriate information technology for their courses.

One of the most significant developments from this partnering was the dramatic increase in entry gate statistics. From an average of 5,000 to 6,000 entries per day, the gate counts are averaging 9,000 to 10,000 per day and some peak days reaching over 13,000 entries. The statistics for logins in the computer lab are about half of the total entries, which indicates that the students are coming to the library, not only to use and check out the collection, course reserves, and to study, but to use the computer lab. The importance of the *library as place* for academic coursework and research is evident in these high entry numbers. In addition, providing 24 hour access, Sunday through Thursday during the academic year to students, faculty, and staff in OUGL's central, convenient location, has made a big difference for students. Use of OUGL between midnight and 8:00 a.m. is as high as 600-700. Building on the concept of *one-stop shopping*, OUGL combined the computing help desk, printing, and reference services into a single point of service in 2001.

The OUGL partnered with the Computer Science and Engineering (CSE) Department to create a *cultural laboratory* supporting digital animation. The library provides the space and information specialists to research aspects for the animation subject. The partnership is mutually reinforcing. For the future, the Libraries and CSE imagine integrating even more -- physically and intellectually.

In the coming years, OUGL will seek to enhance its library as student learning center philosophy by:

- Expanding 24-hour access to include Friday and Saturday nights.
- Creating more adaptable spaces to support group collaboration and project production.
- Maintaining the right balance of dedicated space for quiet study, collections, interactive work, consultation, development, teaching, and learning.
- Creating a new media storage, viewing, and production space for this growth area of resources and usage.
- Upgrading the facilities to include a new carpet, enhanced lighting, and improved furniture.

INFORMATION LITERACY

The Libraries has offered instruction to University students, faculty, staff, and to a lesser extent to the non-affiliated community (including students and faculty in K-12 schools and higher education institutions throughout Puget Sound) in a variety of modes for decades. Over the past ten years, however, significant changes in the educational and societal environment have prompted reexamination and experimentation in the mode and objectives of these educational programs.

Through a series of collaborations the Libraries is seeking innovative means to shift the vision for its educational mission from one focused internally upon the tools and resources provided by the Libraries to a vision that embraces the larger, and rapidly changing, learning and information environment. The Libraries' goals for its instructional efforts in the 21st Century are to ensure the information literacy of University graduates, to enhance their ability to function as scholars and citizens in a rapidly changing, knowledge-based economy. Information literacy is defined as a set of abilities requiring individuals to "recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information"²⁰ and is further elucidated in the *ACRL Information Literacy Competency Standards for Higher Education*.²¹ Information literacy is not a static skill set, but is developmental over the course of a degree program and indeed, the lifespan. Shapiro and Hughes describe information literacy as a multidimensional liberal art that, "equips people not only with a bunch of technical skills but with a broad, integrated, and critical perspective on the contemporary world of knowledge and information, including its origins and developmental trends, its redefinitions of experience and social life, its philosophical justification, biases and limits, its potential for human emancipation and human domination, and for growth and destruction."²²

To achieve these ambitious educational goals, the Libraries is positioning itself to pursue instructional activities differently than in the past, emphasizing curricular-integration of information literacy learning. A curricular basis for information literacy learning requires collaboration with individual faculty as well as with departments, schools, and colleges in order to identify the appropriate information literacy learning outcomes for the individual discipline/program, and to situate information literacy learning opportunities throughout the curriculum. Current modes of instruction provided by the Libraries include tours, orientation sessions, individual and small group consultations, drop-in workshops, course-related instruction, credit courses taught by librarians either as part of Informatics 220, General Studies or courses offered through academic departments, web-based tutorials such as UWILL (UW Information Literacy Learning), online

help, and interactive “chat” which addresses point of need assistance.

Course-related instruction remains the primary means of providing library instruction within the academic curriculum. Faculty members frequently direct requests for instruction for their classes directly to the appropriate subject selector or library liaison. Telephone numbers and web forms are another means of capturing instruction requests and are advertised through the *UW Libraries Faculty Handbook*,²³ brochures, and the Libraries Information Gateway. Instruction requests received through the web form are directed to the appropriate unit or individual: lower-division undergraduate courses are referred to the User Education Coordinator at the Odegaard Undergraduate Library; graduate and professional courses and those upper division courses requiring instruction in discipline-specific resources are referred to the selector/library liaison for that subject area.

Instructional strategies must change in order to address the changing educational needs of students. Graduates provide evidence supporting the need to change the strategy for providing these instructional opportunities:

At the University of Washington, the results of a senior survey in 2000 reported that more than 95% of the students rated working with computers and locating information as “important” to “essential.” But almost 50% were “not at all,” “little,” or “somewhat satisfied” with the UW contribution to their learning in those areas. Approximately one-third rated the sufficiency of their exposure (compared to need) to finding information in libraries/networked resources as “none,” “not enough,” or “barely adequate.”

Results of this survey indicate that the libraries and information technologies receive plenty of use by students. However, the UW’s contribution to learning in these areas isn’t reaching even half of the students.

Enhancing Student Learning TF Report, July 2001, p.32.²⁴

There are many challenges that the Libraries face in achieving a curriculum-based approach for information literacy learning at the University. The curriculum structure at the University is highly decentralized, as are the curriculum development and approval processes. The challenge for the Libraries is to make connections with multiple departments, programs, and instructors in order to identify and negotiate the curricular location for library research instruction. For lower division undergraduate courses, efforts have been concentrated on the various English composition courses, and several of the social science gateway courses.

The lack of standardized and ongoing linkages with the curriculum and curricular development has contributed to

the inconsistent integration of the use of library and information resources into the learning process. Statistics shown in Table 5.1 indicate that instructional programs reach a large population. However, the pattern to these contacts and their placement in the learning process are not consistent.

Library Instruction		
	Number of Participants	Number of Sessions
7/1/01 – 6/30/02 TOTAL	28,414	1,658
Instruction	25,024	1,477
Orientation/Tour	3,390	181
7/1/00 – 6/30/01 TOTAL	24,007	1,250
Instruction	21,263	1,105
Orientation/Tour	2,744	145
7/1/99 – 6/30/00 TOTAL	17,906	1,032
Instruction	14,688	842
Orientation/Tour	3,218	190

Table 5.1

LIBRARY ASSESSMENT

Since 1992, the Libraries has conducted extensive assessment work with the user community, focusing on users needs assessment, priorities, library and information use patterns, and user satisfaction with the quality of library services and collections. The approach to assessment is user-centered, in alignment with the Libraries’ strategic goals and directions. The Libraries has employed a variety of methods to obtain information from faculty and students, including large-scale surveys, targeted surveys, focus groups, observation studies, usability testing, guided interviews, meetings and both traditional and electronic suggestion boxes. Assessment results guide and inform development of services and resources and results are used to improve service quality and library performance, and to better address the needs of our users.

The Libraries program of user surveys is unique and unparalleled among academic research libraries. Since 1992, the Libraries has conducted large-scale surveys of students and faculty on a three-year cycle. These triennial surveys have provided invaluable information about how students and faculty use libraries, their library and information needs and priorities, and the importance of and satisfaction with the Libraries during a period of rapid change in the information environment. Surveys are sent

Triennial Survey Response Rates						
Group	2001 Sent	2001 Returned	2001 % Returned	1998 % Returned	1995 % Returned	1992 % Returned
Faculty	3,720	1,345	36%	40%	31%	28%
Graduate Students	1,500	597	40%	46%	41%	56%
Undergraduates	2,000	497	25%	39%	23%	41%

Table 5.2

to “all” faculty and a sample of students and return rates generally range between 25% and 50%. See Table 5.2.

Survey instruments, results, and basic analysis are provided on the Libraries Assessment web site.²⁵ Triennial survey results show that the Libraries are important to the work of students and faculty, that satisfaction with services and collections is extraordinarily high, and that while desktop access to full-text resources is the highest priority, there is significant variation in information needs between different academic areas. Surveys also reveal that undergraduate students use libraries very differently than faculty, with students being more workplace-focused and faculty being collections-centered. The Libraries has used survey results to improve library services and resources based on user needs. Such changes have included:

- Renovating library facilities for student use – maximizing user spaces and services with less space given to housing print collections;
- Extending hours of opening on weekends and interim periods for branch libraries and 24 hour access for the Odegaard Undergraduate Library;
- Installing additional public access computers for student use;
- Moving more rapidly to desk-top delivery of full-text resources, especially in the sciences and health sciences and for undergraduates;
- Identifying a need for supporting students in their use of information technology and working with UWired/Educational Partnerships to provide that support; and
- Providing better training for library staff and students working with users.

The Libraries has also worked and collaborated with related groups on campus to include survey questions of mutual interest (especially information technology and student learning) as well as contributed library-related questions to such campus surveys as the Senior Survey and Student Technology Survey.

The Libraries is one of five academic libraries that has participated each year in the three years that the

Association of Research Libraries sponsored LibQUAL+ survey has been run. This survey, based on the ServQUAL methodology developed by Parasuraman and others, seeks to place satisfaction with different services and resources within the context of minimum and desired service levels. From an initial 12 academic research libraries in 2000, the survey was administered to more than 150 libraries in 2002. UW Libraries faculty and student satisfaction scores consistently rank high compared to other institutions taking the LibQUAL+ survey. Desktop delivery of resources and the ability to find resources and initiate actions without library mediation emerge as the most important service measures and students and faculty generally ranked the Libraries significantly above their minimum expectations.

The Libraries conducted exit surveys in 1993, 1996, and 1999 to determine the degree and type of use by those not affiliated with the University. The proportion of non-affiliated users steadily declined through each survey and in 2002, surveys were distributed to all those entering libraries during specified time periods. The short survey asked users what they did in the library during their visit, why they came, patterns of library use, and what the Libraries could do to better support their work. The results were consistent with findings from the triennial survey: undergraduate students primarily use the library as a workplace while faculty visit to use collections as shown in Table 5.3.

Since 1998, the Libraries has conducted focus groups on an annual basis with faculty and students (primarily graduate students). Topics have included:

- 1998 Finding information in the biosciences; space needs for a new Fine Arts Library;
- 1999 Interlibrary borrowing;
- 2000 Library and information needs in Education, Engineering, Mathematics and Psychology;
- 2001 Transforming collections and information resources; and
- 2002 Impact of online library information and services on teaching, learning and research.

Focus groups have provided powerful context to enrich and complement other assessment efforts. Focus group

Patterns of Library Use					
Activity	Undergraduates n=2,304	Graduate n=986	Faculty/Staff n=251	Other n=337	Total n=3,878
Asked for help	9.3%	14.9%	19.2%	17.6%	12.0%
Looked for/used library material	21.8%	44.4%	59.6%	53.5%	32.6%
Borrowed/returned material	11.2%	27.5%	23.6%	15.4%	15.3%
Photocopied	18.1%	26.3%	25.2%	22.4%	21.0%
Studied/worked individually	58.5%	49.1%	19.6%	39.1%	52.0%
Studied/worked in groups	13.1%	13.3%	2.0%	7.1%	12.0%
Used a computer	63.6%	58.0%	35.2%	37.8%	58.2%
Used a printer	16.1%	14.9%	2.0%	6.4%	14.1%

Table 5.3

discussions have identified potential problem areas and contributed direct user input on such areas as information seeking behavior and use, library barriers, and support needs. However, focus group analysis and interpretation can be time-consuming and difficult. Analysis of the 2002 focus groups was assisted through the use of a qualitative software package.

Both library and institutional surveys show that faculty and students perceive the Libraries very positively and seem quite satisfied with library services and resources. The Libraries receives the highest satisfaction rating of any academic service (including instruction) on the annual Senior Surveys and our triennial surveys show that about 90% of faculty and graduate students are very satisfied with the Libraries, while less than 2% are dissatisfied. Similarly, the LibQUAL+ surveys show that UW faculty and graduate student satisfaction with scholarly support, overall services, and service affect rank in the top 5% of academic research libraries. The Libraries continues to be the most important source of information for faculty and students. In addition, surveys and focus groups have provided invaluable information on changing patterns of library use, user needs and priorities, yet, the Libraries is still grappling with devising effective methods to measure the impact of library services and resources on teaching, learning, and research.

MARIAN GOULD GALLAGHER LAW LIBRARY

The primary purpose of the Marian Gould Gallagher Law Library is to support the curricular and research needs of the School of Law. The law library's collections and services are available to the University community at-large. As a publicly supported institution, the law library makes its resources available to the general public, including the legal, business, and academic communities of Washington State and to all libraries through cooperative agreements.

The Gallagher Law Library is organizationally separate from the University Libraries as required by the ABA Accreditation Standards. The Library Director reports directly to the Dean of the School of Law and is a tenured member of the law school faculty. The University Libraries and the law library collaborate in many ways, including resource sharing projects such as ORCA, collection development decisions, and training and development opportunities.

The permanent staff of the law library totals 32.85 FTE with another 5.4 FTE in student assistants. The law library is an active force in the life of the law school. It provides research, reference, and training support to law school faculty, students, and staff. Its public website includes over 70 legal research guides.²⁶

The Gallagher Law Library collects legal materials in all formats, including digital, for use by the law school community, the UW, and the public. The research collection consists of 552,375 volumes and volume equivalents. In particular, the law library has impressive collections of Japanese, Chinese, and Korean law books in print supplemented by access to a broad range of electronic resources to support our Asian Law LLM Program and the Asian Law Center. The Gallagher Law Library ranks 34th out of 185 American Bar Association accredited law schools based on collection size and 58th based on expenditures for library materials. With inflation in law library materials rising more than 10% per year, shrinking acquisitions budgets, and a proliferation of expensive electronic legal research services, our challenge is to provide the collections and services demanded by the law school community and to continue to share with the University and beyond.

The law library will move to its new home, William H. Gates Hall, over the Summer 2003. This new facility will provide access to the entire collection in open stacks, remove the physical barriers to people with disabilities, give the collection the security it requires for maximum use, provide spacious work areas, and support access to technology in every corner.

UNIVERSITY OF WASHINGTON, BOTHELL

The University of Washington, Bothell (UWB) Library and Media Center serves two institutions—UWB and Cascadia Community College—co-located on the same campus.

UWB Library and Media Center support and enhance teaching, learning, and research at UWB through the provision of media services, information, and resources. As a unit of the Libraries, it acquires and manages material and virtual resources, and promotes the creation and use of knowledge in an atmosphere where information and ideas are readily accessible and freely exchanged.

UWB Library's core collection is defined as the materials housed on-site that directly support the curriculum of UWB. Collection decisions are informed by the collections of the UW Seattle and Cascade. UWB Library currently holds approximately 40,000 monographs and has a total of 2,179 serials subscriptions. With 2,634 linear feet of book shelving (maximum capacity of 124,705 volumes) and 210 linear feet of periodical shelving, UWB Library is in an excellent position to accommodate collection growth.

Materials owned by the Libraries are available through a daily courier service; journal articles can be delivered electronically to the desktop, or via the courier. Additionally, access to materials at institutions throughout the nation is provided via the UW Libraries Interlibrary Borrowing Service.

UWB Library has access to most of the information and services of the Libraries. Students can search the online catalog to identify books, periodicals, and other media available at UWB as well as those available from other sources. Students can request materials from the Libraries collection and usually receive the information within two days. In addition, students, staff, and faculty at UWB have access to the Washington State Cooperative Library Project joint catalog (Cascade). UWB faculty research needs are served by the entire Libraries collection.

The Library has defined processes for faculty desiring to place both print and electronic materials on reserve. Electronic reserves are made available using the ERES system, which provides web based course reserves, and includes copyright management services. One copy of each assigned textbook is purchased by the Library and placed on reserve. Print materials are available in an open reserve area so that students may browse available materials.

Librarians regularly monitor review sources and media catalogs, especially in the areas of film, ethnic studies, gender studies, American culture and history, human rights, education, and culture studies. In general, there is a

higher degree of duplication in media across the three campuses due to course reserve use.

In support of this collection, twelve viewing and listening stations are available in the Media Center for users to preview media. These stations are equipped with playback devices of multiple platforms ranging from traditional VHS and audiocassette, to Laserdisc and DVD. Stations are also available for viewing and listening to media generated by computer files.

The media collection is developed in consultation with faculty in support of the curriculum, either for use in classes, as reserve items, or as supplementary material. The UWB media collection currently numbers 2,689. Media in the Libraries collections is available to faculty and students via courier service. Media titles are searchable on the web and may be requested via the Media Center website.²⁷ In addition, UWB faculty, staff, and students users may borrow titles from the University Educational Media Collection.

Faculty and students have access to the UWB Slide Library (not part of the UW Libraries, but housed in the Campus Library), which houses a collection of 35,000 slides. The Slide Curator provides image research services, and will acquire and catalog slides as requested by faculty in support of their teaching.

Personnel

UWB Library staff consists of twelve librarians (including the Director), 10 technical staff, 1.5 office support staff and one budget manager. The Director of UWB Library is also the Director of Academic Services, which includes the Library, Media Center, Slide Library, UWB Information Systems Department, UWB Writing Center, UWB Quantitative Skills Center, and Educational Technology.

Librarians serve as liaisons to the faculty and are assigned by subject area.²⁸ Four librarians are affiliate faculty in their subject areas: Interdisciplinary Arts and Sciences, Business, and Computing and Software Systems. Librarians provide specialized reference, instruction, and collection development services in their areas of expertise as well as more general reference and research services through the Information Commons desk and the Ask Us online reference service. The librarians are also involved in the development of the new Teaching and Learning Center.

UWB Library staff is assigned liaison responsibilities with functional units at UW Seattle to ensure that services are maintained and communication takes place. Additionally, librarians serve on a variety of Libraries planning committees, such as Strategic Planning, Libraries Cabinet, Libraries Council, Information Resources Council, and Digital Reference Task Force and represent the interests of UWB faculty, staff, and students in those venues.

User Services

UWB Library and Media Center are open 85 hours a week during each academic quarter and 45 hours a week during quarter breaks. UWB Library facilities include an Information Commons with 50 computers, providing Internet access, email services, and productivity software including Word, Excel, and Power Point, and writeable CD drives.

UWB students, faculty, and staff can access the full range of electronic services from the UWB buildings, including the UWB Computer Labs, and faculty and staff offices and work areas. Additionally, remote access to all electronic services via modem or DSL is available for students, faculty, and staff. Electronic services include, but are not limited to, searching the Libraries' Gateway, accessing full-text resources including electronic journals and books, searching the World Wide Web, renewing books, submitting reference questions, accessing electronic course reserves, reserving media equipment, or ordering books and journal articles.²⁹

The UWB Library homepage provides instructions to students about accessing available resources and services including search methods and tools, how to connect to the library system from home, an online virtual tour of the library, basic information about the library, and how to obtain further information.³⁰ UWB Library also implemented a service called "Ask Us a Question." This is an e-mail reference and referral service available to students, faculty, and staff through a link from the UWB Library homepage. This service is designed to provide the campus constituency with another means of communicating with reference library staff and to pose inquiries about their information needs, in addition to the continued reference service provided by phone and in person.

UWB Information Systems provides necessary and critical support to faculty, staff, and students by ensuring adequate computer classrooms and labs to support the educational goals of the institution; providing technical assistance to faculty for both teaching and research; providing a web environment that helps with publicity, databases, educational technology efforts, and administrative access to information; and maintaining a robust, secure, and stable networking environment providing email, file storage, and back-up services.

Information Systems operates the IS Helpdesk as a technical support resource for faculty, staff, and students. Computing questions, problems, and requests reported to the Helpdesk are answered immediately by the helpdesk staff on duty, or are referred to a support technician or analyst who has expertise in specific computing areas or supported software.

Information Systems also maintains and supports several computer labs and classrooms. There are two general

purpose drop-in labs staffed by lab consultants who answer questions and help maintain the equipment. These labs have 86 Intel-based computers running Microsoft Windows 2000 and MS Office 2000, and 4 Apple G4s running MacOS 9.2.2 and MS Office 98. All lab computers also offer Internet and web tools along with other class-specific software packages.

Within Information Systems, the Web Services team designs and maintains the UWB web site, provides web integration for databases, provides training to faculty and staff in web design and implementation, and offers consultation services to campus departments and programs on web design and technique.

The Network Services group supports 6 campus buildings using a high-speed gigabit backbone with 100 Mb/s to each workstation and provides leadership in planning and managing campus network capacity and security requirements to meet current and emerging needs. Twenty production servers support this infrastructure, providing network services to the entire campus community, as well as off-campus access to selected services. Network Services also manages UWB's email system, provides computer accounts for access to campus computers and printers, and offers file server space for all faculty, staff, and students.

UWB Media Center provides a variety of services to students, faculty, and staff. In addition to maintaining and circulating the local media collection, staff also provide media research and procurement services. The Media Center assists in the development of media-related materials for instruction and provides training to faculty and students in the use of media and technology. Additional services include audio and video production as well as photographic and digital imaging production.

The Media Center's Multimedia Lab is a setting where students and faculty can develop various multimedia-related projects with state-of-the-art hardware and software. In support of teaching and learning, the lab houses twelve powerful computer workstations on both Microsoft Windows and Apple Macintosh platforms. The flexibility of platforms saves time as not all users come to the lab with experience of more than one operating system. Each station includes various multimedia software applications and has specialized peripheral equipment.

Media Center facilities include a public service desk at which service and assistance are coordinated, a media collection room with high density shelving to store the campus media collection (DVDs, Videos, Laser Discs, CDs, and other media), 12 viewing/listening stations for students and faculty to preview traditional and computerized media materials related to their coursework, and a twelve-station multimedia studio and three video editing booths where dynamic media-enhanced materials are cre-

ated to support student presentations and e-portfolios as well as faculty lectures. Additional facilities include a graphics production room, a photography darkroom, an audio studio, and a photo/video production studio where projects are created to support teaching and learning. The photo/video production studio shares a control room with the media classroom where workshops and media-related instruction and large-group media previews occur. The Media Center also has an equipment maintenance shop as well as equipment storage rooms throughout the campus for portable technology.

Classrooms at UWB are equipped with technology to enhance the learning environment. Each room is outfitted with an electronic podium (e-podium) designed with direct input from the faculty. The e-podium technology includes an on-board instructor computer and an interface for external laptops. Video and audio playback devices are also housed in the e-podium (VHS, DVD, and CD) that are controlled by an intuitive touch-screen control system linking all devices to projection and audio playback systems. These systems are also equipped with connections for wireless and standard microphones as well as document cameras should they be required. Each e-podium comes equipped with a motor to raise and lower it to the appropriate height of a given presenter. Finally, each e-podium is equipped with a telephone to summon immediate technical support should a problem arise. The Media Center is staffed to respond to tech support calls. All classrooms are wired with assisted listening systems. For the hearing impaired, these systems include wireless headphones that receive an infrared signal of all audio generated by the e-podium (media playback or instructor microphones). If instructors or students require technology not permanently housed in the classroom, media staff will schedule and deliver non-fixed equipment. The Media Center also coordinates the distribution of cable television throughout the instructional areas of the campus.

The Media Center operates two interactive television (ITV) classrooms for UWB. These rooms provide synchronous audio and video communication between two sites or multiple sites. The ITV rooms utilize the Washington K-20 network to access multiple locations throughout the state (including many high schools, colleges, and universities) or to similarly equipped classrooms around the world. Two additional spaces (Administrative Conference Room and the Photo/Video Production Studio) are fully equipped for videoconferencing to support instruction and institutional/administrative meetings. Infrastructure is in place throughout the campus for a future media distribution system which includes two satellite downlink capabilities.

Information Literacy

UWB Library and Media Center are extensions of the classroom in that the staff are committed to supporting

students and faculty in the learning process. Librarians team teach with faculty, and information literacy is an acknowledged goal for students. Librarians work with students and faculty in many classes throughout the curriculum but are particularly involved in the Core, Program core, and Senior Seminar courses.

In addition to the formal Library Instruction program, the Library and Media Center provides workshops to UWB students as an opportunity to increase knowledge surrounding services available and to provide skills necessary for working independently in an academic environment. Training includes formal tours of the Library and Media Center programs and facilities, navigating and using electronic library resources, introduction and advanced Microsoft PowerPoint, and electronic imaging.

The information literacy instruction program at the UWB Library focuses on a problem centered approach to developing students' research and critical thinking skills. Faculty and librarians work together to ensure that students are provided opportunities to develop and refine the skills necessary to succeed within an upper-division interdisciplinary curriculum in which students are often expected to solve complex "real world" problems, a process that necessitates crossing disciplinary boundaries both in terms of accessing and analyzing information. To accomplish this, the Library has established strong collaborative relationships with the academic programs and faculty, through "team teaching" within specific courses, as well as through discussions at the discipline or Program levels. These relationships have enabled faculty and librarians to begin to identify ways in which information literacy (defined by the Association of College and Research Libraries as "a set of abilities requiring individuals to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information") can be integrated into and across the curriculum, targeting strategic points at which to provide intensive instruction, as well as embedding and infusing these skills and concepts more broadly throughout a student's learning experience so that the processes and skills students are learning are applied within the context of subject-based problem solving experiences.

The Library is also actively involved in the curriculum of Cascadia Community College. Librarians work with faculty to develop workshops and assignments to assist students in developing their critical thinking and evaluative skills, and in navigating the many resources available to them via the UW Libraries. Librarians also serve on each of the four Learning Outcome Teams, which have been charged with developing assessment rubrics for each of the outcomes: Learn Actively; Think Critically, Creatively, and Reflectively; Communicate with Clarity and Originality; and Interact in Diverse and Complex Environments. A librarian has also been appointed to the Student Learning Council, which deals with curricular

issues, and the Teaching & Learning Academy, which is responsible for developing programs to support teaching improvement. It is also important that information literacy be embedded within the curriculum and subject knowledge, so that the processes students are learning are applied within the context of subject-based problem solving experiences.

UNIVERSITY OF WASHINGTON, TACOMA

University of Washington, Tacoma (UWT) Library supports and enhances teaching and learning at UWT through the provision of information, instruction, and resources. As a part of the University of Washington Libraries, UWT Library staff acquires and manages material and virtual resources, and promotes the creation and use of knowledge.

The UWT Library facilitates linkages between the campus and South Puget Sound communities. UWT Library is dedicated to providing access to information, helping patrons become independent learners, and maintaining a physical and intellectual environment that contributes to an interdisciplinary spirit of learning and growth. As an integral part of the educational mission of the UWT, the Library is committed to helping patrons develop the critical skills and knowledge for: 1) continuing life-long learning; 2) pursuing engaged, responsible lives; 3) respecting diversity; and 4) contributing positively to society.

UWT Library's core collection is defined as the materials housed on-site that directly support the curriculum of UWT. Collection decisions are informed by the collections of the UW Seattle and the other four-year state institutions accessible through Cascade. The Library currently holds approximately 42,000 monographs and has a total of 798 serials subscriptions. The UWT Library has also established a children's and young adult literature collection with over 3,000 titles to support the Education program. UWT Library has 4,434 linear feet for book, periodical, and reference shelving.

Materials owned by the Libraries are available through a daily courier service; journal articles are also delivered via the courier. Additionally, access to materials at institutions throughout the nation is provided via the Libraries' Interlibrary Borrowing Service.

UWT Library has access to most of the information and services of the Libraries. Students can search the online catalog to identify books, periodicals, and other media available at UWT as well as those available from other sources. Students can request materials from the Libraries collection including UWB Library, and usually receive the information within two days. In addition, students, staff, and faculty at UWT have access to the

Washington State Cooperative Library Project joint catalog (Cascade). UWT faculty research needs are served by the entire Libraries collections. UWT Library has defined processes for faculty desiring to place both print and electronic materials, and other materials on reserve. Electronic reserves are made available using the ERES system that provides web based course reserves, and includes copyright management services.

Personnel

Library staff consists of 5.35 librarians (including the Director), 5.5 technical staff, and 1.0 office support staff. The Director of UWT Library is a member of the UWT Academic Directors, and is an ex officio member of the Faculty Committee on the Library. This committee is a forum for faculty and library staff to discuss issues regarding library collections, budgets, facilities, and services.

Librarians serve as liaisons to the faculty and are assigned by subject area.³¹ They provide specialized reference, instruction, and collection development services in their areas of expertise as well as more general reference and research services. Librarians consult with faculty on a regular basis regarding the collection and resource development.

UWT Library staff is assigned liaison responsibilities with functional units at UW Seattle to ensure that services are maintained and communication takes place. Additionally, librarians serve on a variety of Libraries planning committees, such as Strategic Planning, Libraries Cabinet, Libraries Council, Information Resources Council, Information Literacy Steering Committee, Staff Development and Training Committee, Web Services Committee, and Digital Reference Task Force; and represent the interests of UWT faculty, staff, and students in those venues.

User Services

UWT Library is open 80 hours a week during each academic quarter and 40 hours a week during quarter breaks. UWT Library facilities include 29 computers with an additional eight wireless laptops available for check-out, providing Internet access, email services, and productivity software including Word and Excel.

UWT students, faculty, and staff can generally access the full range of electronic services from UWT buildings, including the computer labs, faculty and staff offices, and other work areas. Additionally, remote access to electronic services via modem or DSL is available for students, faculty, and staff. Electronic services include, but are not limited to: searching the University of Washington Libraries' Gateway, accessing full-text resources including electronic journals and books, searching the World Wide Web, renewing books, submitting reference questions, accessing electronic course reserves, or ordering books

and journal articles.³² The UWT Library homepage provides instructions to students about accessing resources and services including search methods and tools, how to connect to the library system from home, basic information about the library, and how to obtain further information.³³

Information Literacy

The UWT Library's orientation and education program is designed to support the curricula of the institution by providing a range of instruction from the basics of accessing and retrieving information to advanced levels of resource evaluation and critical thinking. The program's primary goals are to help students develop habits of critical thinking about information/research sources and to build students' levels of comfort and expertise regarding their status as researchers.

The formal program consists of three levels of instruction. Orientations and tours, available throughout the academic year, provide an overview of the facility and services of the UWT Library and explain its position within the University Libraries system. Class specific and/or course integrated instruction sessions focus on research strategies and information evaluation and are tailored to specific programs, assignments, and/or research projects. During 2001-02 Library staff taught about 100 class specific and/or integrated course instruction sessions. Reference services, available in person, by phone, and through email, provide one-on-one, applied instruction pertinent to the student's particular research and learning needs. Reference services are also available to faculty and staff to address specific research or pedagogical questions and strengthen faculty's knowledge of new or different research resources available through the UWT Library in their disciplinary specialties.

The ACRL (Association of College and Research Libraries) information literacy standards form the basis of all curricular and reference-based instruction at UWT Library. To strengthen students' abilities to become expert researchers, UWT Library is drafting an articulation agreement with the Tacoma Community College (TCC) to systematize TCC approaches to information literacy and research skills in coordination with those offered at UWT Library.

Information Technology

Information Technology (IT) at UWT is a separate administrative unit that works collaboratively with the various Computing & Communications directors with respect to network standards, security and monitoring, network user validation, the campus portal, administrative systems, and site license coordination.

IT is dedicated to innovative support and professional leadership in computing and media technologies for the campus. Commitment to providing information systems and services based on well-defined requirements and customer needs, a group of dedicated staff strengthens the link between teaching and learning through current and emerging technologies and facilities. From technology infrastructure to applications and customer services, IT provides leadership and services for campus-wide activities, as well as the support required for academic and administrative uses.

IT, consisting of Computer Services and Media/Classroom Services and Academic Technologies, supports the 'access to education' aspect of UWT's mission through the ongoing development and administration of a prospective student communication management system (Recruitment +) and the Student Information System (SIS), a 'front end' for the UW Student Data Base. IT also collaborates with staff to create and generate reports to analyze recruitment and retention data, as well as more specialized reports necessary for accreditation self studies, for example. IT is responsible for web hosting and for support and campus-wide training related to educational technology (Blackboard, electronic reserves) used to support that aspect of UWT's mission emphasizing excellence in teaching.

IT is responsible for all technology strategies, provisions, and deliveries for UWT. IT provides the infrastructure necessary to administer the wired and wireless LAN environments, from wall plates to desktops and laptops; engages in campus network planning, including tracking network traffic, documenting network typology, and management of fiber, CATV and coaxial cable plants; and manages tape back up and plans for disaster recovery. IT is also responsible for local server resources, including those for print and file sharing; remote access; databases and applications including VPN, E-reserves, Mainstar, Blackboard, SIS, and SQL; and the web. In addition, significant planning and coordination for installation and maintenance for voice (phone and fax) are required.

IT provides campus-wide support for a range of applications, including software products for administrative and academic uses. IT also provides training and development activities for faculty and staff, coordinates and manages student computer camps and workshops, provisions of online tutorials for self-paced learning, plans for effective use of information and instructional technologies, and collaborates with the campus community to establish technology guidelines and standards.

Open labs for general student use are equipped with scanners, CD writers, color printers and zip drives. IT supports labs for specialized uses in Business Administration, and Nursing, as well as a GIS lab. A multimedia lab and video/digital imaging production services are available and a media collection, located in the

library, has been developed and maintained by Media Services. Videoconferencing facilities support coursework across campuses as well as conferences and meetings across campuses. IT provides the support for course management software (Blackboard), used in distance learning situations as well as with traditional face-to-face courses in the classroom; IT hosts the Blackboard server and the Geo Calendar software for Bothell campus.

An online TACHelp system is used to report and respond quickly to IT-related service needs; a 'SWAT' team is available to support online course development and home access users. An online TACMedia system is also used to report classroom equipment needs.

LEARNING TECHNOLOGIES TRANSFORMING EDUCATION

Learning technologies are transforming teaching and learning at the University. Collaborative efforts across the institution combine the best with the best to create an unparalleled teaching and learning infrastructure.

UWired

In 1994, three top-level administrators at the University of Washington were charged by the Provost to "do something about technology." Collaborating with faculty, librarians, technologists, and students, they quickly rounded up more partners and gathered resources to focus on bringing technology into the service of teaching and learning in a more systematic way through UWired. The key to the success of UWired was to make it as easy as possible for instructors and students to use technology—through accessible computing labs and classrooms, well-designed, easy to use tools, clear "how-to" documentation, thoughtful design of web resources and carefully constructed workshop curricula. UWired was based on a collaborative model: every tool built, workshop offered, or support document written is based on the changing needs of campus educators and students.

UWired supports innovative educational technology projects on campus and serves as a model of how collaborative efforts can produce large-scale solutions for teaching with technology. The UWired Health Sciences Initiative, forged through a partnership among C&C, EPLT, the School of Medicine, and Health Sciences Administration, now supports teaching, learning, technology, and research throughout the Health Sciences.³⁴ Through the new UWired Health Sciences Center at the Locke Computer Center, faculty, staff, clinicians, and researchers from across campus can receive help for online projects, workshops about Catalyst and other teaching technologies, and fee-for-service work.

Catalyst

In 1999, UWired developed the Catalyst Initiative—a scalable support strategy for instructors who want to incorporate technology into their teaching. Prior to 1999, UWired was offering support for faculty through custom programming, one-to-one consulting, and workshops. Catalyst is an integrated collection of resources, training, tools, templates, and support designed to help educators make effective use of technology in teaching, and the Catalyst team serves as the central support mechanism for teaching with technology at UW. Catalyst has increased the quality of technology support by focusing on only those solutions that are scalable enterprise-wide and by developing partnerships with other campus units that allow the elimination of redundant resources. The support model is based on four interrelated resources.

Web Tools. This suite of web-based tools was created in response to the needs of University instructors and is designed to help them add complex web content and online communication and collaboration capabilities to their course web pages. The tools were all developed in-house and created to meet specific pedagogical needs expressed by University instructors. All the tools are written in open-source programming languages and can be accessed via a web-browser without installing special software. The current suite of ten tools includes: WebQ, a survey, quiz, and questionnaire generator; Epost, a threaded discussion board; Peer Review, a forum for students to critique each other's work; and VirtualCase, a problem-based learning environment. The newest tool, Portfolio, released in September 2002, allows students to collect, annotate, arrange, and display on the web a variety of digital 'artifacts' that illustrate their accomplishments throughout their university careers.³⁵ They make online portfolios for a variety of reasons: for their courses, for prospective graduate schools, to help them choose a career, as part of a job search, or to reflect on their time at the University. More than 4,500 instructors have used these tools over the last three years.

Web Resources. The Catalyst web site provides anytime, anywhere resources to link University educators with instructional technologies.³⁶ Faculty and staff view over 60,000 pages of resources every month. The Catalyst web site contains the following resources:

- Profiles of University instructors using technology to enhance their teaching;
- Teaching Pages providing a perspective on technology grounded in instructional practice and pedagogy;
- Action Plans that are project-oriented road maps for integrating technology into teaching;

- How-to Guides giving step-by-step instructions, hints, and cautions for completing technology tasks; and
- Learning Pages providing information about Catalyst workshops and professional development opportunities.

Workshops. Over 900 faculty members, instructors, teaching assistants, and staff members attend Catalyst workshops each year, including a standard workshop series on instructional technologies, new offerings created in response to client requests, and custom presentations and training sessions for departments and units at each of the three campuses. The workshops offer both pedagogical and practical advice for using software (including the Catalyst web tools) to achieve learning goals. Current workshops focus on a wide range of topics from accessible web design, to distance learning, to HTML programming.

Consultation. One-to-one consulting in the Center for Teaching, Learning & Technology for faculty remains a core service.³⁷ Professors can drop in and receive personalized instruction from a graduate or undergraduate consultant. The consultant works with the professor as long as he/she needs help in learning a technological skill or working through a pedagogical problem. All of these resources allow instructors at all levels of technical ability to obtain consistent support in a way that is most convenient for them. In this drop-in workspace with 15 workstations, instructors have no-cost access to a wide variety of software and equipment, including web-editing software, digital cameras, scanners, and digital-video editing equipment. There are also on-call consultants for both technical and pedagogical support. UW faculty members visit the center 1,700 times per year.

Computer Classrooms

Five wired classrooms, specially designed for computer-based instruction, are available for experimental approaches to education, and to support student collaboration. These classrooms house 175 computers and serve over 200 faculty and instructors, representing nearly every UW college or school. Approximately 5,000 students per week receive instruction in these facilities, located in Mary Gates Hall and the Odegaard Undergraduate Library.

Collaborative Technology Development Projects

Working in partnership with departments and units across campus, the following technology tools and resources have been created:

- MyUWClass: A customized teaching portal for every University course, developed with C&C, the Office of the Registrar, and the Libraries.
- UW MediaWeb: A searchable online archive for digital sound, digital video, and other electronic file types, developed by C&C.
- Catalyst Partners: Catalyst teams up with University teaching and learning practitioners to create new web-based resources for UW instructors. Partners include the Program for Educational Transformation through Technology, C&C, Libraries, UW Educational Outreach, and WebEd.
- Open Knowledge Initiative: In partnership with other universities, including MIT and Stanford, UW is contributing to the development of coherent, easy-to-use, web-based environments for assembling, delivering and accessing educational resources and activities. This open source software will greatly expand the range of web-based teaching tools available to UW instructors.
- Electronic Portfolio Action Committee: This consortium of university partners sponsored by the National Learning Infrastructure Initiative focuses on the development and integration of online student portfolios. The University, with its Catalyst Portfolio Tool, is a leader in the initiative, which brings important advances in research and design of electronic portfolios back to the University community.

INFORMATION TECHNOLOGY INFRASTRUCTURE

Information technology is rapidly transforming higher education, breaking down the barriers of time and place and making it possible to deliver education, tailored to the individual learner, anytime and anywhere. New and emerging technologies offer the potential for colleges and universities to change almost every aspect of what they do, from the way they discover new knowledge and educate students to the way they operate their businesses and serve their communities.

Some of these changes can already be seen at the University of Washington. Students go online to register for classes, view their grades, see simulations of complex phenomena, and conduct research in libraries throughout the world. Faculty use tools to help them build web sites where they post class syllabi and lecture notes, host class discussions, and give quizzes. Employees go online to view earnings, benefits, and other personal information, as well as perform work such as updating payroll records or tracking grant applications. Arthritis patients find comprehensive information to help them understand and manage their condition. An advanced technology environ-

ment at the University makes all of the above possible today and that is laying the groundwork for tomorrow.

Computing & Communications

Computing & Communications employs approximately 425 FTE and is divided into eight organizational units:

Communications Technologies is responsible for telecommunications equipment and services including local and long distance telephone service, voice mail, pagers, cellular phones, cable TV, fax, videoconferencing, and wireless services.

This unit is also responsible for the installation and maintenance of the wiring infrastructure for voice, data, and video services on the Seattle, Bothell, and Tacoma campuses, as well as at numerous remote locations.

Information Systems is responsible for the development and support of the University's core administrative applications such as student, financial, purchasing, accounts payable, alumni/donor, and human resources systems, as well as many campus business systems including facilities, transportation, lab safety, and parking services.

This unit is responsible for developing the systems and applications necessary to support the University Systems Renewal (USER)³⁸ initiative, a series of projects that use web technologies to streamline administrative support services such as payroll, grant & contracts, and purchasing. This unit develops the infrastructure and services necessary to support the University's Internet portal, MyUW,³⁹ and the University's e-commerce efforts.

Information Systems also is in charge of special projects including DO-IT⁴⁰ and AccessIT,⁴¹ the Adaptive Technology Lab⁴² and the UW Internet Connectivity Kit (UWICK).⁴³ In addition, this unit is responsible for C&C Client Services, which provides project consulting, training, and customer support.

Networks & Distributed Computing is charged with design and support of the University's network computing infrastructure, including data networking, desktop computing technologies and maintenance, messaging and multimedia tools, scalable distributed system architecture, and distributed system security. This unit also develops and supports Pine⁴⁴, the University's primary email client, WebPine,⁴⁵ a web-based email client, and IMAP (Internet Message Access Protocol), a standard that allows email to be accessed anytime and anyplace by different computers and email clients at different locations. Development of IMAP⁴⁶ was led by the University and the protocol has become the preeminent international standard for enterprise-class email systems.

This unit is responsible for the design and operation of the statewide K-20 data network for the Washington Department of Information Services. It also supports the

UWPN data network and runs the Pacific Northwest Gigapop⁴⁷ and Pacific Wave⁴⁸ international network peering point. Other unit activities include the UW Network Information Center, Pine Information Center, IMAP Information Center, and the Computer Maintenance Group.

Planning and Facilities Infrastructure is responsible for administering a university-wide approach to long-term technology infrastructure requirements (voice, data, and video) for new and existing University space. Responsibilities include capital budget development, funding acquisition and maintenance, space management, and coordination with other university units such as Libraries, Capital Projects Office, Capital & Space Planning Office, and Facilities Services.

Technology Outreach and Partnerships acts as the C&C liaison to the Office of Educational Partnerships and Learning Technologies and works with Pacific Northwest Gigapop and Pacific Wave.

University Computing Services is responsible for systems programming and database administration for the computers and servers that support University administrative applications, email, individual and departmental web publishing and streaming media, Libraries catalog, hospital payroll and billing, Catalyst, MyUW, and the UW NetID infrastructure. This unit is responsible for around-the-clock operation of these computers and their environment, including disaster recovery. University Computing Services monitors and troubleshoots more than 1,200 servers and thousands of applications.

This unit is responsible for creation and promulgation of University security policy and practices, usability testing, and technical communications including production of University, C&C, and student web pages, C&C documentation, as well as C&C publications and other communications with the University community, such as *Windows on Technology*,⁴⁹ and *OnTechNews*,⁵⁰ a monthly email newsletter. This unit is also in charge of the John Locke Computer Center in Health Sciences, and University visualization lab. It supports C&C internal functions, including facilities, courier, inventory control, hardware and software purchasing for central systems, personal safety and business protection/recovery, and disaster planning.

Video and TV Technologies provides video production, video conferencing, satellite downlinking, and traditional cable and satellite television distribution services for the UW community. This unit works with the rest of C&C to integrate streaming media technologies into teaching, learning, and research activities.

Video and TV Technologies operates UWTV,⁵¹ a television station offering UW faculty and departments the capacity to distribute programming via cable television, satellite, web-cast, and streaming on-demand viewing for most of

Washington state and nationally. UWTV programming often is produced through the Video Production unit, which offers broadcast-quality and related fee-based services to meet the multi-media needs of faculty and departments.

This unit is also involved in developing and integrating technology and techniques for distributing high-quality video over the Internet in support of the UW-led Research Channel consortium and the Internet HDTV project.

Business & Finance is responsible for financial, business and resource planning, human resources, software licensing, resource management, and other management control activities.

Computing Environment

In the late 1980's and early 1990's the University made several critical strategic technology decisions that have shaped its current technology environment and enabled technology advancements that have given the University a competitive advantage in learning and research, and have been critical to its success. One of the most important decisions was C&C's focus on creating an institution-wide infrastructure, with the top priorities being universal networking, messaging, web services, and other electronic forms of collaboration based on Internet protocols (long before that was commonplace). This strategy has allowed the University to build a cutting-edge infrastructure that provided all of its constituents with access to email, web services, and other electronic forms of electronic communication and collaboration long before it was commonplace. As part of this strategy, the University also graduated from five separate, constituency-based networks that could not communicate with one another to a single, institution-wide, high availability, high performance "network utility" that has enabled communication and collaboration both within the institution and externally. At the same time, campus units took on the responsibility for their own locally-based operations supported by college and/or departmental computing staff.

This approach has enabled collaborations between C&C and other University units and external partners that have enhanced teaching and learning and resulted in the following achievements:

- Introduction of the Internet to the Northwest and establishment of the University and Seattle as an integral component of the international network fabric;
- Pioneering of the "cluster" computing model;
- Creation of UWired,⁵² Catalyst,⁵³ DO-IT,⁵⁴ MyUW,⁵⁵ USER,⁵⁶ R1edu,⁵⁷ IMAP,⁵⁸ and many other award-winning initiatives and models;

- Creation of Washington's K-20 network, which delivers premium Internet access to all Washington state schools;
- Establishment of statewide cable TV channels and peer Internet-over-cable access to millions of people in their homes; and
- Enabling a new generation of continuing education and outreach opportunities for University academic departments and students.

Over the past decade, the University has evolved from an environment with limited email use and few transactional services to one with a full multimedia, interactive web presence and numerous transactional services. The growth in demand for computing services has been exponential. Network packets, transaction volumes, the number of email messages and web pages, time spent online, and the frequency of access to web services all have skyrocketed. Today the University has over 1,200 computer servers that are managed centrally by C&C, over 55,000 computers on the campus network, and 3,000 miles of fiber optic cable transmitting over 1.6 trillion bytes per day of information. Indeed, the University encompasses all the technologies of a small city, with police, sports, and performance venues, multiple major hospitals and clinics, and a major research university with three campuses plus external experimental sites and regional partnerships.

Added to this growth is the evolution of new technologies such as video streaming, voice over Internet, high-quality audio and new tools for video conferencing, all of which are placing tremendous loads on the network and servers. In addition, the University is starting to use the Internet to reach new populations of users, including potentially hundreds of thousands of alumni, retirees, and patients.

Student Technology

The University administration and students jointly fund student technology. In the mid-1990's, the Student Technology Fee (STF) was created by University students to provide funds for the improvement of technologies used by students. A dedicated group of volunteer students comprise the STF Committee, which is the final arbiter of funding decisions from the STF. Campus units respond to a yearly request for proposals from the STF Committee, who then determines appropriate expenditure of the fee. At UW, requests for funding are managed locally.

University students are committed to the improvement of campus student technologies such that they recently voted to raise the fee from \$37 per quarter to \$40. The fee has provided most of the funding for equipping student computing labs and supporting the student modem pool. The fee does not support funding for staffing, ongoing maintenance, and infrastructure. These come from

institutional resources. Examples of recently funded proposals include: laptop computers and a LCD projector for computer-based presentations made by Neurobiology and Behavior graduate students; adaptive technologies and software for students with disabilities; resource and access requirements for the student computing cluster in three functional areas: improve mobile access to files and directories, increase storage for student audio and video streaming, and technology upgrade of the mail inbox and folder service; computerization upgrade of electronic kilns in the Art Department; a professional grade digital audio workstation lab; and global positioning systems for students conducting basic or applied research in the collection of geospatial data in fields such as archaeology, botany, business, engineering, epidemiology, fisheries, geography, geology, and zoology.

Facilities

Maintaining the facilities infrastructure that supports the technical operations of the network and meeting the space needs to accommodate C&C personnel and equipment is an ongoing institutional challenge. Information technologies require a continuous cycle of installing, maintaining, and upgrading the network infrastructure, and concomitantly a continuous stream of resources. The network infrastructure needs include space for conduit, raceway, communications, entrance and router rooms; multiple types of wire and fiber running both within and between buildings; network devices such as routers and switches; antennae, access points, and access control for wireless; phone lines, modems, and communications servers; and various other types of network support equipment and services. The University has creatively and resourcefully used existing resources and periodic infusions of funding to build the existing infrastructure.

These incremental investments are no longer sufficient to remain on the cutting edge and the University now faces the urgent need to replace most of the cable and physical cable distribution infrastructure in order to support the next generation of networked-based tools, approaches, and programs. Current cost estimates put the need for required infrastructure at approximately \$60 million. Beginning in the 2001-03 biennium, the University developed a three biennia capital plan to fund the necessary requirements. This plan called for \$20 million in capital funds from the State Legislature each biennium between 2001-03 and 2005-07. Unfortunately, in its first biennial request, the University received only \$2.5 million of the \$20 million requested. While a similar plan will be submitted for 2003-05 through 2007-09, at this slow pace many buildings and departments at the University, some of which are not even at *current* technology levels, will be unable to benefit from technological advances.

C&C staff is spread over approximately 142,000 square feet in nine different locations. Four of these locations, or more than 50 percent of all C&C space, are in rental facilities off campus. The most troublesome of the rental facilities is the 4545 building, which houses the University's central computing facility. The fact that the University does not own the building that houses the nucleus of its computer network puts the institution at great risk. The University is currently investigating the possibility of purchasing the 4545 facility, or building or buying another facility to house its data center.

Environmental Pressures and Planning

In addition to resource challenges, there are a number of on-going pressures that are endemic to an IT environment of the magnitude and sophistication of the University's. These include the growth in network access and network traffic; rising volume of IT applications and users; increased requirements associated with the acquisition, deployment, management and overall care and feeding of a large number of devices in a complex, 7x24 environment; and urgent and unmet need to assist University units in protecting University data and computers from unauthorized access or tampering. These pressures are exacerbated by some of the following elements and requirements.

Software prices have sky-rocketed over the last decade. The cost involves not only the initial purchase price, but also ongoing licenses and maintenance fees. For most systems, these fees are mandatory. Ten years ago, software costs were about 20 percent of the total cost of a system (hardware plus software). Today, the reverse is true.

Maintenance is ongoing, and even though the hardware is fairly reliable, the need for software bug fixes, security patches, and upgrades is growing.

Network complexity is increasing. Business requirements are becoming more diverse and complicated, which translates into the need for more sophisticated services and custom configurations in the network infrastructure. Each of these drives up engineering and support costs. The difficulty of troubleshooting problems continues to grow as troubleshooting tools fall behind the complexity of contemporary networks.

Computer and network security is perhaps the biggest "growth area" within information technology. The increasing population of Internet users and the growing geographic and sociological penetration of the Net have resulted in a very hostile cyber environment that demands major investments in defensive strategies and technologies. Resources are being expended on security infrastructure design; network security consulting; development of security tools, technologies, policies, and network

security strategies; as well as institution-wide probing, intrusion detection, damage analysis, and cleanup.

Middleware provides a common set of essential services necessary for virtually all modern applications, and especially for web-based and e-commerce initiatives. Middleware refers to the infrastructure components necessary to verify an individual's identity for entry into a computing system (authentication), determine which applications and resources that person is permitted to access (authorization), and provide services customized specifically for that individual (personalization).

One of the University's goals is to establish a single university-wide access control infrastructure, based on the UW NetID. This would reduce the need for multiple passwords and user IDs. Currently, the University's middleware infrastructure is incomplete. A number of critical initiatives, including the administrative and USER projects, are dependent on development of the next phase authorization infrastructure and on the continued expansion of features and services within MyUW.

Computing & Communications recently developed a draft document entitled *University Information Services Strategy (ISS)*, which outlines the University's current strategy for providing information services.⁵⁹ The *ISS* offers a framework for creating the technological and organizational environment necessary for the future, while providing the University flexibility to respond to new technological developments and institutional priorities. The draft document is intended to provide a basis for a university-wide discussion on future technology directions.

The crux of the strategy is to develop a single, institution-wide approach that will enable the University to deliver customized resources and services to its constituents over the web and to realize the full promise of emerging Internet technologies. This approach will be flexible enough to allow individuals and groups within the University to adapt these new technologies to their own needs. The key objective is to improve the effectiveness and efficiency of all the University's constituents and to advance the University's learning, research, and service missions.

The strategy begins by focusing on the user. But unlike commercial enterprises with simple client-provider relationships, universities have complex sets of relationships with a wide variety of constituents, or users. The University community includes students, prospective students, extension students, certificate program students, graduate and professional students, parents, alumni, faculty, donors, sports fans, medical patients and their families, business and political leaders, medical practitioners, medical residents and post-graduates, members of the media, career planners, neighborhood and community

groups, staff, administrators, prospective employees, researchers, and many others.

These individuals often fall into more than one category, such as alumni who are parents, staff who are students as well as medical patients, or parents who are donors as well as sports fans. To make things even more complex, these relationships change over time. A high school student may take a summer course at the University, eventually become an undergraduate student, an alumnus, and a patient, and then take continuing education programs while also becoming a sports fan and a donor. The possibilities for overlapping and ever-changing relationships are endless.

Under the proposed strategy, users can tap into the web and instantly receive customized information, tools, and services conveniently pulled together in one place. These resources will encompass all of a user's association with the University and will be automatically updated as that person's needs and relationships with the University change. In addition, users will be able to add, delete, or modify their resources to suit their individual preferences.

A fundamental part of this strategy is developing the security measures and policies necessary to protect the privacy of personal and other confidential information and to ensure the integrity of University systems and resources. Providing for security is an integral part of every computing project at the University. To underscore this point, a Privacy Assurance and Systems Security Council (PASS) was created to establish a University-wide approach to systems security and integrity issues.

The idea of delivering customized services over the web is not unique. Indeed, scores of universities and commercial enterprises are using this approach. What distinguishes the University of Washington's strategy from these others is that it does not focus just on one relationship, such as customer, student, alumnus, or sports fan. Instead, it supports all of its constituents and recognizes the full range of their relationships with the institution, even as they change over time. This powerful concept initiates a new way of thinking about the Web environment and university structures and practices and opens up tremendous possibilities for the future.

C&C developed the *ISS* document to communicate its overall approach to information services and begin a dialogue on what strategy the University should adopt for its future. C&C has initiated a high-level Computing Directors Group to exchange information and discuss strategic information technology issues. In early 2002, C&C administrators met with each dean and his/her key administrative and computing representatives to review school/college needs and seek their perspectives on the school/college relationship with C&C. C&C has deployed each of its directors to two or three schools or colleges as

personal ambassadors. The intention of this effort is to create and maintain a direct and regular communication link between a C&C director and a dean. A new three-tiered structure of university-wide advisory committees has been proposed to improve information technology planning, services, and functions through enhanced communication, participation, and exchange. The membership of these committees is designed to reflect the reality that traditional barriers among academic, administrative, research, instruction, library, and clinical functions have been largely dissolved in the technology domain.

The University has made great strides in information technology over the last decade, in the context of either modest or diminished resources. With a sound vision and focused priorities, the University has in many ways outdistanced its peers in IT architecture and design.

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