

## **STANDARD SEVEN: LIBRARY AND INFORMATION RESOURCES**

### **Description**

The Information Technology (IT) Division is comprised of 76 full- and six part-time staff members and over 150 highly skilled work-study students. They are grouped into the following functional units: Computing and Communications Center (CCC), which includes academic and administrative computing, high-performance computing, networking, telecommunications and computer training; Gordon Library, which includes public and technical services, information literacy training, and the WPI Web development office; Instructional Media Center (IMC), which includes instructional technology support, audio-visual services, and multimedia productions; and the Advanced Distance Learning Network (ADLN), which includes technology and support required to deliver courses at remote locations. To create a closer relationship with IT issues in the academic departments, the position of manager of academic computing and departmental technology support, reporting directly to the vice president for information technology, was created. During the course of the 2000-01 academic year, the telephone operation came under the direction of the network and telecommunications area of CCC. The vice president and the library director are members of the President's Cabinet.

Evaluation and assessment of services is important to all segments within the IT Division. Departments have a variety of methods of measuring the success of the services and resources they provide. In CCC, daily tracking of traffic over the Internet is gathered and documented so near capacity may be identified and increases in bandwidth implemented. The CPU utilization on all major computers is tracked daily so use can be measured and upgrades implemented as necessary. CCC has implemented the Remedy helpdesk tracking system, which logs calls and responses and assists CCC in identifying areas for training, aging equipment in need of upgrade or replacement, and other areas needing attention. Through the use of an internally developed equipment management system, IMC tracks equipment usage to determine what changes need to be made to inventory levels and to ensure even use of equipment. A library survey of faculty and students in spring 1999 led to a number of improvements in library services and resources.

The library regularly and systematically gathers data from the Voyager system to determine the value of its services and resources. Data on use of the book collection is being thoroughly analyzed. Use of the print journals is tracked daily and statistics on electronic use are gathered regularly to assess the value of the resources to WPI. All library, CCC and IMC instruction sessions have evaluation forms by which attendees rate the value of the instruction and help the instructors revise courses or create new courses. The Web Development staff encourages feedback about the WPI Web site from community members and site visitors via an online form

and an e-mail alias. Reported problems are given high priority and quickly fixed, and viable suggestions for improvement are also acted upon quickly. IMC verbally surveys faculty on their experiences in the electronic classrooms and uses this feedback to implement new features, install upgrades and improve user interface design. Regular feedback from faculty using the Blackboard system helps staff know which features need more attention. This feedback is important for input to Blackboard's support team, which is instrumental in determining new features. Informal surveys of faculty delivering distance learning classes and students taking these classes is used whenever possible to improve services.

CCC maintains the campus networks and Internet connections. The central campus is now linked by state-of-the-art network infrastructure supported by dual redundant ATM OC-48 backbones and a dual redundant gigabit Ethernet backbones. In 1999, WPI began a three-year networking infrastructure upgrade for all academic and administrative buildings. It involves pulling multiple strands of single-mode fiber and gigabit wire to the desktops of faculty and staff members and to every classroom and meeting space, thus providing 10/100Mbit/s switched Ethernet connectivity. In 2000, *Yahoo! Internet Life Magazine* named WPI the 23<sup>rd</sup> "most wired" campus in America. WPI has been ranked among the top colleges every year; its rankings have ranged from 10<sup>th</sup> in 1998 to 28<sup>th</sup> in 1997.

WPI satellite campuses are connected to the main University campus through dedicated T1 lines. Four years ago, the campus Internet connection was a single T1 line, which grew to six T1 lines by the fall of 1999. By fall 2000, the campus had been upgraded to a full T3 connection to the commodity Internet in addition to a new OC3 connection to Internet2. Since then, the commodity Internet connection has evolved to a 100Mbits/s fiber Ethernet connection that enables WPI to adjust the throughput on demand up to the 100Mbit limit to address the exponentially increasing network use. WPI has been using 45Mbits/s of this 100Mbits/s pipe, which is equivalent to the T3 data rate. All the residences are wired to the network. Per pillow network connectivity is free to the resident students; 96 percent of WPI students in the residences have computers and are connected to the residential network. All of them have the choice of connecting to either 10 or 100 Mbit/s switched Ethernet. Student residents can configure network access for their PCs via the Web. They can bring more than one computer to campus and can connect these via a hub if they choose. In 1999, wireless links were installed to connect the fraternities and sororities to the campus backbone. Roaming wireless access is available in the Gordon Library, the new Campus Center, and portions of both Fuller and Higgins Laboratories. All students, faculty and staff are entitled to a login ID, which enables them to access multiple resources on the network. They may choose their own login name, which also establishes their e-mail address, via the Web so they can be set up before they arrive at WPI.

Numerous computer labs, maintained and operated by CCC, containing different kinds of computers, software, printers and peripherals, are available for student use in various buildings on campus. There are several other general-purpose public labs on campus, maintained by CCC, but operated by a specific department. There are 332 public lab seats available for student and classroom use. Additionally, there are 267 computers in labs controlled by academic departments. There are 32 network-accessible PCs in the library for student use. CCC maintains a cluster of computer servers, some for intense computing and research use, which are accessible from anywhere on campus. These UNIX and Win2000 servers provide a wide range of software and services, such as e-mail, newsgroups, Web pages and network printing to members of the

WPI community. Campus-wide licenses for Microsoft products enable all authenticated users to load Microsoft Office, Visual Studio, Front Page and new operating system versions on their PCs. The CCC manages the campus telephone system, which offers voice mail and other functions. It offers telephone access for students in the residences as well as maintaining the telephones in all administrative areas. All PCs across campus were upgraded to Windows98 in the summer of 1999 in order to be year 2000 (Y2K) compliant. An extensive Y2K effort, led by the IT Division during 1998 and 1999, and reaching all cross functional groups at the University, resulted in no significant Y2K-related problems.

In 1998, WPI expanded use of the SCT Banner integrated administrative information system with the implementation of the Finance System, which assured Y2K compliance in the University's accounting with the promise of more functionality in the future. The Human Resources/Payroll module went live on July 1, 1999, with the Admissions, Graduate Admissions, and Financial Aid modules being added in several stages during the 1999-2000 academic year. All authorized WPI members have access to online accounting information, community (including Alumni) directory information, and student schedules, as well as to their personal data, through this system.

IMC maintains a number of classrooms on campus that support the dissemination of most types of traditional and electronic information. These all have dedicated multimedia projection equipment and active Ethernet drops. Some classrooms also have dedicated PCs, document cameras and flex cams. The IMC created and maintains a 15-station Multimedia Resource Lab configured for graphic design and traditional and multimedia production. All computer stations in the lab have the hardware and software necessary for the production and editing of visual presentations. This facility was relocated to the library in May 2001 to take advantage of the synergies between the creation and dissemination of e-content. A fully equipped television production studio/classroom, complete with linear and nonlinear editing facilities, is available for recording and broadcasting of academic content. IMC also maintains a large, comprehensive inventory of equipment available for loan to members of the WPI community for academic use. Faculty and students at off-campus project centers are supported with WPI-owned laptop computers loaded with software necessary to complete academic work and digital cameras to record their experiences.

The IMC provides professional-quality video and audio editing services to the WPI community for projects and presentations. Two-way audio and video communication is available through a PictureTel videoconferencing system. A 3.7-meter and Ku-band satellite dish for down linking satellite programming is maintained by IMC and is available to the community to receive teleconferences and other special interest programming. The WPI Video Bulletin Board, which airs on channel 11 of the WPIC cable system, provides a continuous display of announcements of interest to the WPI community. Cable television service is provided to all students in the residence halls and lounges around campus free of charge.

In fall 1999, Blackboard's course management tool, CourseInfo, was purchased and installed on a dedicated server. CourseInfo enables faculty to monitor, control and customize their course Web sites using a Web browser. Faculty may create course content, track student progress, grades and course content usage, and post course documents, among other options. In summer 2000, WPI became the first university to migrate from the standalone course management system

of CourseInfo to Blackboard's enterprise-wide solution, Blackboard 5, level 3. The solution was used to create myWPI, a learning and information portal. Staff members from IMC, the library and CCC continue to be involved in the implementation and back-office integration of the portal.

The library purchased the Endeavor Voyager system in 1998 and chose Web-based access to the online catalog within and outside the library building. Since 1998, several new releases have been installed and library staff participated in a beta test of a major release in the spring of 1999. In addition to providing access to the catalog, this system enables many functional capabilities, such as ordering and physical and financial tracking of materials and resources. Library staff, in conjunction with the Web developer, created and maintain a library Web site that serves as a gateway to information on library services and resources.

The development of the library collections is done in partnership with the faculty; these collections reflect the quality, level, diversity and currency needed to support academic programs. Each academic department is allocated a portion of the library's book budget and may request books and other non-periodical materials to support faculty research, teaching and student project areas. The library book budget also supports library staff purchases to supplement important subject collections. The library director determines which periodical subscriptions—print and electronic—and electronic database licenses the library will maintain. She consults with the Periodicals Advisory Committee, which consists of faculty and library staff, to ensure that current research and teaching needs are met. The addition of a full time archivist/special collections librarian in fall 2000 enabled a more complete focus on collections in this area.

The library's collections continue to grow in support of the curriculum, research and project areas, with an ever-increasing focus on electronic Web accessible resources. As of June 2000, the print and audio-visual collections included 192,074 books, 80,270 bound journals and 2,500 videos. Gordon Library subscribed to 998 print journals and 1,248 electronic full-text Web based journals in 2000, with several hundred additional journals accessible on a pay-per-view basis and through 120 electronic databases. Access to 8,000 e-books through netLibrary became available in fall 2000. WPI Archives and Special Collections provide primary and secondary source material supporting projects in history and literature. The library is leading an effort on campus to require that all theses and dissertations be submitted and archived electronically on the Web. Currently, 83 theses and dissertations (ETDs) are accessible from a WPI Web server.

The majority of the electronic databases and full-text journals offered by the library are accessible over the Web and are available to network-authenticated faculty and students on campus, in the residence halls, and Greek housing. Off-campus access, including access from off-campus project centers, is available to WPI authorized users via a proxy server. The library catalog, electronic databases and journals, as well as electronic services, are accessible via the library Web pages 24 hours a day, seven days a week. Services are provided to students at remote campuses and project centers and ADLN students located around the world. The library is open 103 hours a week for most of the year, and now stays open until 2 a.m. four weeks a year during finals. Extended summer hours on Sundays have been implemented.

The Web Development Office, established by Gordon Library in 1995, designs and maintains the University Web site, including Web pages for administrative and academic departments. The Web site has become a central information resource for on-campus constituencies and a vital link

to external audiences, such as prospective students and alumni. The Web development staff is committed to providing high-quality Web writing and graphic design services to the WPI community. Particular attention is paid to accessibility of WPI Web pages to everyone regardless of technology or disability. Recent additions to the staff include a Web designer and a Web programmer.

The ADLN program reaches distance-learning students in many areas of the United States and internationally. Staff in ADLN and IMC support the technological requirements of delivering courses at remote locations, as well as providing a one-stop shopping focus for students to learn about registration, course requirements, and so on. ADLN and IMC staff members also support students by sending them materials, posting information on the Web, and answering technical and other questions. The Gordon Library supports ADLN students by sending them library materials in a variety of formats. ADLN and IMC staff help faculty with their technical needs and purchase new equipment, as necessary.

To assist faculty with the design, development and presentation of course materials in the electronic environment, two new positions were approved for the 2000-01 academic year. An instructional designer and Web developer were hired by IMC to help faculty with the delivery of distance learning courses and to assist those who wish to incorporate technology into the traditional classroom environment. This initiative grew out of a business plan developed for ADLN. Training and assistance in the use of the varied equipment and software is an important aspect of IMC services.

Through a cooperative effort of the Academic Affairs and Information Technology divisions, the Teaching Technology Fellows Program was created to foster teaching innovations, to effectively apply the capacities of informational and instructional technologies, and to increase communication and collaboration among users of technology. Eight faculty members from a strong pool of nominations were selected to participate in the inaugural year of the program.

The fellows will spend their fellowship year discussing learning strategies, sharing experiences, working on projects and examples, and test running course materials. They will have the opportunity to attend hands-on training workshops on various teaching technologies and to assess the effect of their technological endeavors on students' learning throughout the 2001-02 academic year.

IMC and WPI's Center for Educational Development, Technology and Assessment (CEDTA) routinely collaborate on faculty development activities. Over the past year, they have co-sponsored satellite videoconferences, faculty development programs, faculty travel stipends to teaching and learning conferences, and tuition reimbursement (beyond the University's stated benefit) for education and technology related courses.

The library, IMC and CCC provide instructional sessions of various kinds throughout the year that help ensure that students effectively integrate library and other resources into their class and project work. The CCC computer trainer provides training to students, faculty and staff in various software applications used on campus. Helpdesk staff members provide one-on-one assistance to all WPI community members, helping with a wide variety of software and hardware issues. The Gordon Library's instructional librarian provides a variety of instructional sessions

on the use of all the electronic resources available. Numbers of students attending library sessions increased from 474 in 1998-99 to 1,447 in 1999-2000 and to 1,952 in 2000-01. In addition to their individual efforts, these trainers collaborate with other members of the IT Division to train faculty and teaching assistants on the recently acquired Blackboard system.

E-mail announcements of new products and services, Web pages identifying resources and instructional sessions, and flyers and handouts are used on an ongoing basis to encourage members of the WPI community to take full advantage of all IT instruction and assistance.

All library policies, including those covering loans to various types of library users, Interlibrary Loan policies, building related policies, and policies on the acquisition of periodicals, are posted on the library's Web site. Some policies are physically posted in the library building. WPI's Acceptable Use Policy, relating to the use of computers and the network, is clearly posted on the CCC Web site and distributed to students at orientation. WPI policies on e-mail and confidentiality of information, and on the use of various types of WPI-owned data, are under discussion.

IT Division staff regularly participate in the exchange of resources and services with other institutions and networks. WPI is a member of Internet2, which facilitates the exchange of research between faculty at the other Internet2 universities. Several IT administrators are participating in the Worcester InfoTech Project. Preliminary discussions have taken place with officials at Olin College of Engineering in connection with potential IT collaboration.

WPI was the focus of a case study for its Blackboard 5 implementation and has been asked to serve as consultants to other colleges. Members of the IT Division also serve their respective professional communities by participating in the professional meetings of EDUCAUSE, CREN, NLII, NERCOMP, NLANAR, PACI and the annual Blackboard, SCT Banner and Voyager user group meetings. The library has a full interlibrary loan program that participates in the exchange of materials with libraries all over the world; it also has a direct borrowing program for students and faculty at the various local libraries. The library and CCC house the Worcester Area Union List of Serials on the library's Endeavor server and make it accessible to other local, regional and international libraries. Gordon Library belongs to various consortia, including the Worcester Area Cooperating Libraries, the New England Library Network, the Northeast Research Libraries and the Central Massachusetts Regional Library System. The University belongs to the Colleges of Worcester Consortium.

## Appraisal

Goal 5 of WPI's strategic plan applies entirely to the improvement and creation of IT services and resources. The following paragraphs discuss in more detail the status of projects in the IT Division that directly relate to the mission of each department, the mission of the IT Division, the mission of WPI, and Goal 5 of the strategic plan.

Decreased or level funding impacted all IT areas adversely in the early and mid 1990s. However, WPI has spent more than \$1 million on improvements to the campus computing infrastructure since 1999. In 1999, WPI began a three-year, \$4.5 million dollar networking upgrade for academic and administrative buildings. These capital investments in the infrastructure, coupled

with annual investments of over \$1 million on desktop computers and University servers, have made WPI one of the most technologically sophisticated universities in the country. Gordon Library's budget has been significantly increased to fund acquisitions of important electronic resources and print journals.

The five-year budgeting model adopted by WPI over the last two years has helped the IT Division focus on future needs and build in funding for future years to satisfy these needs.

A plan for a three- to five-year replacement cycle for all computers on campus is nearly complete; funding for this is being discussed at the Cabinet level.

One of the biggest challenges for CCC has been the need to develop a reasonable replacement cycle for all computing resources across campus. In 1999, it created an inventory that documented information about the age, capabilities and use of computers and software across campus. The inventory, in conjunction with requests for new equipment, enabled CCC staff to develop a prioritized list. Based on the dollar amount available, a three-year replacement cycle was developed.

The network infrastructure upgrade, mentioned above, is establishing a base line of 10/100 switched Ethernet to campus desktops. Upgrades of the campus infrastructure, involving speed to the desktop, speed of the backbone, and upgrades to the wireless links to the fraternities and sororities, are scheduled within the division's five-year budget plan. The desktop speed upgrades should be able to utilize the new wire and fiber infrastructure for years to come.

The Blackboard system has been well received. During the 1999-2000 fiscal year, there were 160 courses (25 percent of those offered at WPI), 70 faculty members and 2,400 students using CourseInfo as an online course management tool. The following year, the numbers increased to 320 courses (47 percent of those offered at WPI), 400 instructors, and 5,851 total users (faculty, students and staff).

The implementation of several SCT Banner system modules is progressing reasonably well. Major issues for staff using the various modules lie in the lack of useful reports. CCC has developed workarounds for some reports and some offices are developing skills to extract their own, but additional part time staff need to be hired to produce critical reports. The complexity of the Banner system makes the querying of data and extraction of reports a difficult issue for both users and CCC staff. To address this issue, CCC is applying resources to raise employee skill levels to that of "information workers," where appropriate, within their positions. The division is devoting more resources to formal project management techniques for critical projects. Many users among the faculty continue to be frustrated with the use of Banner for financial accounting.

Implementation of the Web for Employees interface with Banner was successful and useful for many different purposes. The Web for Employees budget accounting area is much more understandable and easier to interpret than earlier printouts. The student administrative database Web access has also been a great success, allowing WPI to move from the traditional stand-in-line registration to a virtual registration. Students now add and drop courses, check in and update their biographic information over the Web. With this success, the registrar has been able to shift

resources from processing students through lines to providing personal assistance to students and staff with special situations.

The expanded dependence on computers and the services they connect to at WPI have increased the need for excellent user support. The Helpdesk has become the center for providing direct support and coordinating specialized groups to address more technical needs. The Helpdesk was created in 1997 with a full-time staff of one, supplemented by four FTE student employees. It has grown to 4.25 FTE staff still supplemented by four FTE student employees. Training is another direct need of a community with increased computer dependency. The one CCC training position was created at the same time as the Helpdesk. In 2000-01, a position was added to the administrative Banner support group to work with the community to help individuals develop skill in extracting and organizing administrative information. This position works one-on-one with community members and with the computer trainer in developing group courses.

Library renovation is a high priority item listed in Goal 5 of the strategic plan. Preliminary planning with the architectural firm of Shepley Bulfinch Richardson and Abbot to develop the scope of the project began in fall 2000. The current facility has outgrown its ability to provide quality single and group study areas for students; some older materials have had to be placed in compact storage in the basement of Founders Hall Residence. The University's archives are in five different areas because of lack of adequate space. The addition of the Fellman Dickens Collection to the Special Collections Room resulted in most of the other Special Collections being shelved in a storage area, as the shelves are at total capacity. Security in the library building has been improved over the last few years with the installation of security cameras, panic buttons and motion detectors. Exit doors are alarmed. Maintenance in the building during the day has greatly improved with the addition of a new custodian, but evening maintenance is minimal and weekend maintenance is nonexistent. The library's preservation and stacks management program helps to ensure proper maintenance of the physical collection. The planned move of the Massachusetts Academy of Mathematics and Science from the ground floor of the library to another facility will eventually give the library more space to use in the renovation.

Keeping pace with the ever increasing costs of print and electronic resources and services and maintaining an appropriate balance between print and electronic alternatives are ongoing challenges for the library. The number of full-text periodicals available on the Web is growing quickly and online access makes these resources available from any authorized WPI account, whether on or off campus. Products such as Web of Science, JSTOR, the IEEE Electronic Library and SciFinder Scholar (Chemical Abstracts online), and full-text groups of journals from several academic publishers, permit the library to provide greater access to this information, reduce the need for additional shelving, and, in some cases, free up critical shelf space for other materials.

During the 1999-2000 academic year, an Advanced Distance Learning Committee comprised of faculty and administrators met regularly to discuss the future of distance learning at WPI and to create a business plan. The plan met with the approval of the president, provost and vice president for information technology and additional funding became available for the 2000-01 academic year to hire new staff to support faculty in the incorporation of technology into instruction.

For several years, it has been difficult to obtain funding to support the maintenance and development of increasing numbers of fully equipped electronic classrooms, as it has to be requested each year from the capital budget. Some rooms require expensive, major physical renovation at the same time. Multiyear replacement and installation plans have been created.

The retention of current staff and filling open positions has been a major issue for CCC, IMC and the library due to the demand for skilled computer expertise elsewhere and the lack of comparable compensation for these staff at WPI. An equity review and subsequent upgrade of CCC, IMC and Web development technical staff has resulted in greater satisfaction for current employees and a greater ability to attract high-quality employees to open positions. Searches for some positions continue to be difficult due to nationwide demand for specific computer, networking and advanced management of technology skills.

Adequate, quality space for all of the IT Division's staff is a major problem. Ongoing discussions have produced several suggestions, such as an addition to the Gordon Library where IT Division staff could have quality work space and work together more collaboratively. Space in Fuller Laboratories could be freed up if a combined CCC/Library Instruction and Training facility (and possibly Helpdesk) were located in Gordon Library, with offices for the staff to work together more closely.

Closer collaboration was developed with the director of the CEDTA during the 1999-2000 academic year through regular meetings that included the vice president for information technology, the director of IMC/ADLN and the library director. Through these meetings, a structure is evolving for partnering between IT Division staff and CEDTA to assist faculty in developing high-quality learning experiences for students using technology.

Closer collaborations are also being developed between the Web Development Office and various departments on campus responsible for communicating with various constituencies, including undergraduate and graduate admissions, media relations, and the Communications Group. Recent work involves collaboration with the University Relations group to create structure and hire staff to work on the new WPI marketing campaign. A challenge for the Web development staff has been keeping the main University site updated and fresh; a new design is in progress. The employment of students to assist in this area has been highly successful, freeing up the staff to do more intensive activities. Finding students with the proper skill-set, however, is a continuing challenge.

Developing better awareness among students and faculty of IT resources and services is still a challenge, as it is obvious from a number of requests and comments received by the division that the community needs to know what resources and services are available to them.

The IT Division needs to determine how to get wider input from the faculty into IT planning, capital planning and the computer replacement plan. Work has begun in this area through the creation of the position of manager of academic computing. The position serves as direct liaison to the academic departments in relation to their computing needs, and through the inventories and lists of computing requests compiled by the CCC. Currently, the information is in the form of wish lists rather than a plan, but long-range plans for each department are in development.

The division faces the challenge of ensuring that faculty, students and staff possess the technical and information literacy skills that are so necessary in a learning environment and for the emerging knowledge worker role. This issue was highlighted in a recent presentation to the Cabinet as one of the key strategic issues facing the IT Division.

Focused attention needs to be brought to bear on policies for campus-wide use of e-mail, electronic databases, confidentiality of information, and intellectual property.

Technical vision and decision-making are complex, difficult and demanding. It is extremely helpful to have input from all aspects of the campus—students, faculty, staff, alumni and trustees. In October 2000, a new WPI committee of the Board of Trustees was created to focus on technology. Nine trustees sit on the committee, with the vice president for information technology acting as staff liaison. The primary responsibility of the committee is oversight of the University's technology strategy, infrastructure, services, policies and information sources. In meetings held so far, the committee has discussed a broad number of issues, including IT capital expenditures, teaching and learning with technology, the library, and vision for the future. A reformulated committee and structure for gaining input from our faculty, students and staff is being developed. It is anticipated that this group will have interactions with the new trustee Technology Committee in the future to exchange perspective and ideas.

## Projection

WPI's focus on project-based undergraduate education in a rapidly changing technological context creates a demanding IT environment. Expanding graduate and research programs provide different demands. Future effectiveness in our service and support environments will require unprecedented technological expertise, communication ability, organizational flexibility, adaptability, speed, a capacity for rapid change, and perseverance. Our ability to execute will depend upon significant growth in funding levels for IT resources and staff. New forms of content, infrastructure, support and policy will create challenging issues for the division. Notable challenges include

- the creation, support and operation of distributed learning environments for on-campus and distance learners.
- the creation and integration of complex, new academic and administrative support services.
- the creation of new support and development activities for faculty and staff.
- envisioning and executing plans to evolve our digital library capabilities to exploit IT synergies and new forms of multimedia e-content.
- the retention and development of top-quality IT staff.
- funding, creating, delivering and supporting current and new academic computing, multimedia, e-content and networking capabilities.
- the development and application of new e-policies and evolving intellectual property rights in a rapidly changing environment.

CCC expects to implement additional functionality in the Banner system that will permit it to continue with its re-engineering efforts. These efforts are aimed at improving processes and implementing additional portions of beneficial applications, such as online purchasing and encumbrances, endowments, employee applicant tracking, the alumni Web, and the financial aid Web. CCC will continue to provide and promote the use of training for general computer competence and the use of desktop tools (such as Microsoft Access, Excel, PowerPoint, and Word) to extract, organize and present information from Banner. In addition, CCC will work with departments and individual users to identify common sets of elements that technical staff can organize into a simple view to reduce the complexity of extracting information from Banner. It is anticipated that additional training staff will be needed in the next few years to address the CCC objective of creating a computer literate information worker community. Collaboration among the library and CCC training staffs in the areas of computer, software and information literacy has produced positive results that will continue to fuel the demand for more training.

In CCC, networking will keep abreast of new technologies and continue to improve connectivity as faster technologies become affordable. Wireless networking will continue to be deployed across campus. Work will continue toward enabling Internet2 access for technology researchers. Planning has been undertaken for flexible expansion of commodity Internet bandwidth and the group will endeavor to keep up with campus demand for Internet connectivity. UNIX server systems will be upgraded to better technology as the prices for higher performance become affordable. The group will work to minimize the number of passwords needed for access to services. Telecommunications will track Internet telephony and use it as appropriate. It is working toward reducing paperwork and simplifying the budgeting for campus telecommunications service.

IMC will continue to improve and extend myWPI by implementing tested technical upgrades (such as event-driven data transfer, LDAP authentication and Web e-mail); integrating third-party media and information enhancements (i.e. course cartridges); and working with other administrative offices to bring additional University constituents online (i.e. alumni and prospective students). The department will continue to enhance various teaching and learning environments, both physical and virtual, by working with faculty on the features on the features they require in electronic classrooms, laboratories and other technology-mediated learning environments. This includes enhancements to the course management and communication and collaboration components of myWPI, the creation and expansion of faculty and student services to support more advanced media creation and conversion capabilities, and the continued evaluation of the practicality of technology in an educational setting. IMC will also work on designing more formalized metrics for the evaluation of educational technologies (cost/benefit analysis; impact on learning; and customer satisfaction with services). These will serve as a roadmap for one of the many continuous improvement processes within the IT Division.

Plans for the renovation of Gordon Library will be addressed in close cooperation with the community to ensure that the resulting facility will be the intellectual center of WPI, providing responsive, technologically advanced services and satisfying a wide variety of information needs. The renovated library plan may include many additional high-quality group and single study areas for students and an archives and special collections facility, and provide traditional as well as potential new services. A renovation committee will be formed and a plan will be developed to

communicate with multiple campus groups to obtain input on the library needs of the WPI community.

Gordon Library will continue to expand its print and electronic collections to meet WPI's curricula and research needs. It will continue to develop instruction sessions in collaboration with the faculty, provide quality services and develop new services as appropriate.

The Web development staff will continue to work closely with departments around campus to maintain and further develop the WPI Web site. A redesign of the Web site in 2001 will ensure easier access to information by all site visitors, and will include important constituencies in the design process, including students, faculty and staff, particularly in the marketing and media relations areas.

Work will continue on an overall plan to retain and attract high-quality staff in all IT departments. Space needs for IT staff will be clearly identified and quality space provided for all employees. Cooperation between the IT and Academic Affairs divisions will result in a Center for Teaching, Learning and Technology that will provide a quality technological environment and positive outcomes for student learning.

IT staff will investigate areas in need of measurement and develop further methods of gathering data in order to evaluate the adequacy and utilization of services and resources. Clearly written policies will be readily accessible from a single point on the IT Web pages. Trustee involvement will be sought to assist with much needed policies regarding e-mail, use of WPI-owned confidential data, and intellectual property on the Internet. The trustee Technology Committee will have interactions with an on-campus committee to encourage a wide range of feedback.

IT Division staff will work together to ensure that instruction and assistance to the WPI community is of the highest possible quality and that the needs of distance learners are met so that they have access to quality services and resources, wherever they may be.

The IT Division will continue to use the five-year budgeting model and keep up with emerging technologies to ensure resources and services are appropriate for the swiftly changing technological environment.