



Standard 5

Library and Information Resources

Computing Services

Organization, Mission and Goals

Computing Services is a centralized information technology service organization that furthers the Mission of the College by providing access to modern computer hardware, software applications, and network services including internal and external databases, on-line library catalog, e-mail, and the Internet. In addition, the department provides a variety of technical support services that enhance the learning experience and promote student success.

The department supports 25 instructional and general-purpose computer labs for use by students. In addition, the department delivers information technology support services to 475 FTE employees. In all, Computing Services supports in excess of 1200 computers, 15 local area networks, and 5 wide area networks. Support services include:

- Design, installation, maintenance, and staffing of instructional computer labs.
- Installation and maintenance of computer hardware and software for faculty and staff.
- Local and wide area network planning, design, implementation, and maintenance.
- Systems administration including the administrative applications server, file and print servers, Internet applications server, e-mail server, and remote access server.
- Technical consultation and guidance to faculty and staff on computer resources planning and hardware and software selection.
- Telecommunications services including PBX administration, station equipment adds/moves/changes, voice mail, and technical support for the Touch Tone registration system.

- Assistance to Plant Services with facilities planning.
- Training of end-users in core services.

In the ten years since the last accreditation visit, the College has made significant investments in information technology, particularly in instructional areas. The institution has evolved from one with a primitive data network and pockets of stand-alone computers to a fully inter-networked campus with computing activities in virtually every discipline. Every building on the main campus is connected with a modern voice, data, and video infrastructure.

The College has more than tripled the number of computers available to students, and has provided every full-time faculty member with an office computer. Similarly, all support staff whose jobs require one have been equipped with a computer. Lastly, the College has invested in a modern telephone PBX and voice mail system.

Computing Resources and Services

● Resources for Students

The College has had an ongoing commitment to adequately fund computing resources and services to support the educational programs reflected in Attachment 5CS.1, Computing Services provides support for 25 computer labs. Of these, 16 labs are dedicated exclusively to scheduled classroom activities, three are instructional facilities with some open hours scheduled throughout the quarter, three are unscheduled general-purpose open labs, and four are multiple-use scheduled facilities.

Computing resources are, in general, sufficient to support the curriculum. Laboratory facilities are available to support a variety of vocational, aca-

demarc transfer, and developmental education courses. Some laboratories are shared by their sponsoring divisions on a time-available basis. The College has three non-scheduled, general-purpose computer labs available to students, although some departments maintain open lab hours for students enrolled in a particular program.

In addition to the College's three general-purpose open computer labs, several instructional programs provide open hours in dedicated labs as a service to students. Lab assistants are provided in open labs to help students with application questions, printing, accessing network resources, and troubleshooting. In addition, a student-run help desk is available to assist students and staff with computing questions.

Access to instructional labs is available to any currently enrolled Clark College student who has a lab pass. Lab assistants who work in unscheduled open labs are selected, trained, and supervised by Computing Services. Dedicated labs with open hours are staffed with student lab assistants who are selected, trained, and supervised by the instructional department/division for whom they work. Lab assistants are paid with revenue generated by course fees and over-the-counter purchases of lab passes. These dedicated fees are also used to purchase application software, and consumable supplies such as paper and toner cartridges.

Technical support for labs is provided by Computing Services staff and consists of hardware and software installation, updates, maintenance, and troubleshooting. In addition, a small group of capable lab assistants and student interns from several technical occupational programs are used to provide technical support. Application support is also available to students from a help desk that is operated by students fulfilling graduation requirements in the Microcomputer Support Specialist (MCSS) program.

Most labs are equipped with Pentium-class machines or PowerMacs, and most have the Microsoft Office suite of general-purpose software installed. Specialized software used by instructional program, including graphics applications, CAD/CAM applications, software development tools, statistical packages, and discipline-specific tutorials is installed in specific labs. To support the after-hours needs of students in specialized programs, Comput-

ing Services will equip a number of stations in the open lab facilities with specialized application programs. All laboratory facilities are connected to the campus network and provide access to the Internet. Refer to Attachment 5CS.1 for details on computing laboratory facilities.

● Resources for Faculty and Staff

Clark College has approximately 161 full-time faculty and 360 adjunct faculty. The College has been successful in providing a computer for all full-time faculty, although there are considerable variations in the currency of the hardware and software (there are no institutional minimum standards for computing hardware). (CS5.1 Computing Resources by Department and Employee Classification.)

Adjunct faculty are not generally provided with a computer, although many departments maintain one or more computers in a pool for adjunct faculty use. E-mail and voice mail services are available to full-time and part-time faculty alike.

The College employs approximately 214 classified staff and administrators. All administrative and support staff are provided computers where required to perform their jobs. Again, there are variations in the currency of computing hardware and software, but the variations are less pronounced amongst the staff.

Computing Services staff assist College employees with hardware and software selection, and with the preparation of purchasing documents. Department technicians install and configure hardware and software, provide basic training, perform routine upgrades, troubleshoot problems, and repair defective equipment. In addition, Computing Services staff serve as consultants to faculty and staff for technical planning and design.

● Systems Administration

Computing Services staff provide system administration functions for the College's administrative applications server, Internet applications server, file and print servers, CD-ROM servers, e-mail server, and remote access server. Supported operating systems include MPE, HP-UX, Novell Netware, and Microsoft NT. In support of administrative data processing, the department provides a part-time machine operator, performs software implementa-

tion and backup functions, and oversees production printing, document preparation, and delivery.

The department administers fifteen Novell file and print servers, two UNIX hosts, and three Microsoft NT servers. Computing Services also administers a remote access server with 16 modems that provide student access to UNIX shell accounts for e-mail and instructional purposes. Additional eight modems provide faculty and staff remote access to the campus network and the Internet.

● Network Services

Computing Services provides support for the campus network infrastructure and associated equipment. For smaller scale infrastructure upgrade projects, the staff will pull and terminate network cabling. Department personnel perform network planning and design, equipment specification, installation and maintenance. Network devices are monitored with an HP OpenView network management system. (Exhibit CS5.2 Diagram of Campus Network.)

● Campus Intranet

The College will begin development of an Intranet consisting of networked applications and resources that are accessible to employees using a web browser. An Intranet can provide access to static information such as forms and policies, or may be used to submit and track work orders, purchase requests, etc. Intranet applications include the student information kiosk, and web-based grade submittal among others.

● Telecommunications Services

A Computing Services technician administers the campus PBX and voice mail system. Computing services also provides technical support for the College's Touch Tone registration system.

● External Networks

Clark College offers a variety of access to information resources through local, regional, national, and international networks. Network services include: (1) Internal CD-ROM databases; (2) External subscription databases including *Encyclopedia Britannica*, *Periodicals On-line*, etc.; (3) Internet: WWW, e-mail, news groups, discussion groups, search engines, databases; (4) K-20 Network: Data and video linkages to institutions of higher educa-

tion in Washington, K-12 institutions, and other governmental agencies; (5) Community library consortium: FVRL, Cannell Library, Camas Library, Southwest Washington Medical Center Library, and PORTALS; (6) Integrated Services Delivery Network: One-stop job placement, counseling and educational services for unemployed workers in Clark County; and (7) TV-ETC.

Clark College and other participating agencies are justifiably proud of the work done to develop and implement the region's Integrated Services Delivery Network. This project is a collaborative effort between Clark College, the Washington State Employment Security Department, the Southwest Washington Private Industry Council, and Lower Columbia Community College to provide one-stop educational, counseling, and job placement services for unemployed workers in Clark and Cowlitz counties. This network has been used as a model for similar projects throughout the state.

The Fort Vancouver Regional Library, the Lewis D. Cannell Library at Clark College, the Southwest Washington Medical Center Library, and the Camas Community Library participate in a consortium that provides truly comprehensive library services for residents of Clark County. The library network allows patrons to view the collections at any of the member libraries, reserve materials, and have the materials mailed to their home. The Portland Area Library System (PORTALS) is a broader consortium of community and higher education libraries in the greater Portland metropolitan area. Library patrons use the Internet to view the collections and other services offered by the participating libraries.

As Clark's distance education activities expand, the use of external networks will become increasingly important. In 1998/99 and beyond, Clark will expand its interactive video classroom activities to deliver a number of distance education courses over the newly installed K-20 network. In addition, this network will create new opportunities to create linkages with the K-12 schools in our service area. The use of the Internet and Internet technologies will continue to expand as students and instructors incorporate this amazing resource into their learning activities.

● Training

Computing Services staff provide basic orientation and training for employees on the systems the department installs and maintains. When an employee receives new equipment or an equipment upgrade, the staff will conduct a brief orientation. Computing Services conducts one to two hour short courses, and publishes short tutorials and procedures for common network services such as telephone usage, voice mail, and e-mail.

The department generally does not provide application program training and has no staff dedicated to this function. End-user training is available through regular college course offerings, self-paced computer-based training, Community Education workshops, the Center for Information Services (CIS), or third-party training organizations. Exhibit CS5.3 summarizes Computer Training Opportunities for Faculty and Staff.

Training for faculty and staff is a key issue. Incoming students are rapidly outpacing the computing abilities of a substantial number of the faculty. Currently the College does not provide adequate training opportunities with sufficient flexibility to meet the diverse needs of its user community. This conclusion was reinforced by the findings from a one-year training pilot project that was dubbed the Cyber Curriculum Center (CCC). In 1996 the CCC was funded to provide individual and small group instruction for faculty and staff. A part-time trainer who provided instruction primarily in the use of the Microsoft Office suite of application software (Word, Excel, PowerPoint, and Access) and the Internet staffed the CCC.

While there are several avenues for college employees to pursue training, the institution has no formal training policy related to employee training. The lack of a formal policy that defines minimum skill levels, or that links equipment acquisition to specific training thresholds has resulted in faculty and staff inefficiencies, wasted resources, and an increased burden on Computing Services staff. Moreover, staff development resources for this purpose are ill defined, unevenly distributed, and poorly communicated to the campus community.

Recommendations and Actions Taken

- **Training must be offered to employees that addresses varying degrees of depth, class duration, diverse schedules, and a variety of applications. Classroom, small group, individual, and self-study approaches should be explored.**
- **Computing Services will endeavor to provide more training for lab assistants and increase open lab hours to further assist students with their computing needs. The College will focus considerable effort on training issues as it develops an Information Technology Strategic Plan. (Exhibit CS5.4 Draft of Strategic Plan for Information Technology).**

The Cyber Curriculum Center showed promise but the scope would have to be expanded if this approach is to be effective. If training is to be handled internally, additional staff resources dedicated to training will be required. As an alternative, this activity could be outsourced to a private contractor. Incentives should be considered to induce faculty to upgrade their skills.

● Curriculum Support

The delivery of information resources and services is consistent with the nature of the educational programs at the College. Professional/technical programs have traditionally received a high level of information technology support reflecting very specific program objectives and outcomes. Academic transfer programs in the past have embraced computers as important tools but their use was not integral to the delivery of instruction. In recent years this has changed, and computers are increasingly an essential element in the curricula of the Humanities and Social Sciences, Mathematics, and Sciences.

The Vancouver/Portland metropolitan area is home to a rapidly increasing number of high-tech companies and related industries. The College offers a number of two-year occupational programs that directly satisfy the human resources needs of this industry. Programs include:

- Microcomputer Support Specialist
- Data Networks & Telecommunications
- Manufacturing Technologies
- Machining Technology
- Business Technologies
- Computer Networking

- Electronics
- Industrial Technology/Electricity
- Graphic Communications/Printing
- Computer Science

Approximately two-thirds of the College's computer laboratory facilities operate to support these programs. Other labs support academic transfer programs in the sciences, mathematics, computer science, humanities, social sciences, health and physical education.

Not only has the College done a good job funding equipment and classroom facilities, but related information technology projects have been supported as well. The College has made a significant investment in portable computers and data projectors to equip electronic classrooms.

Several innovative technology projects have been funded as well, including the two year Genesis Project, a program jointly funded by the College and US West where students and faculty explored the use of cutting-edge technology in learning and curriculum development.

While Clark College has been involved in distance education activities for over ten years, the installation of state-funded video conferencing equipment in 1997 allowed the College to begin offering distance education classes via a two-way interactive classroom. This capability will be extended to the College's satellite facility at Town Plaza Center in 1999 during Phase II of the state-funded K-20 project.

The English Department opened a new computer-equipped Writing Center in the spring of 1998 to assist students from all areas of the campus with writing projects. In 1999 the College will collaborate with WSU-Vancouver to create an on-line writing lab where students can submit their writing projects via web browser for comments and constructive criticism by fellow students and the faculty of both institutions. This project will be patterned after the OWL (On-line Writing Lab) project at WSU-Pullman.

As more and more instructional programs attempt to integrate information technologies into the curriculum, the College must undertake comprehensive and ongoing information technology planning ac-

tivities to successfully balance the needs of instructional programs with the reality of finite resources. As the use of information technology in instructional programs has expanded, the College has often failed to adequately gauge the necessary support costs, or identify dependable sources of equipment replacement dollars.

The instructional division chairs negotiate annually to receive a portion of the institution's instructional equipment allocation. Once the instructional equipment dollars are allocated to the divisions, the funds are further divided among the individual departments within the division. While computer purchases from this equipment allocation reflect divisional priorities, they may not necessarily mirror the institution's priorities (i.e., a computer that represents a minimum standard on every faculty desk). Thus, there may be disparities in the 'wealth' of the computing environment from one division to the next. The same discrepancies may arise between administrative units depending on the budget priorities of individual administrators.

With this system, clearly not every computer purchase results in the best and highest use. Even so, the divisions/departments do a credible job of allocating new equipment to those who will use it most effectively, and 'rolling down' used equipment to those with fewer skills.

Recommendations and Actions Taken

The College must decide whether to continue the current budget model for computer equipment purchases or move to a more centralized approach. This issue will be addressed in the College's Information Technology Strategic Plan.

Providing adequate support for instructional labs is a constant challenge for Computing Services due to the complexity of the software installations, a propensity on the part of students to corrupt (accidentally or willfully) operating systems and software configurations, and frequent hardware and software upgrades.

Recommendations and Actions Taken

The use of rapid recovery utilities and procedures has helped ameliorate the problem. Lab assistants and student interns help ease the workload of permanent staff by performing preventative maintenance tasks in the labs.

In Fall 1998, a help desk staffed in part by students in the MCSS Program will be established by Computing Services. This change will provide Computing Services with additional staff resources.

● Curriculum Development

The College has neither the space nor the support services to build new computing facilities at the same rate it has in the past ten years. As the College's ability to build dedicated instructional computer labs diminishes, it will have to look to existing and new open lab facilities to serve the needs of departments that are integrating computing technologies in the curriculum.

Computing Services will need to work closely with instructional departments in the course of curriculum design to match the need to available resources, and to provide enhanced support services in open lab facilities to support the unique curriculum requirements of different departments/divisions.

The College does not currently fund or allocate computing resources at the institutional level. Routine computer purchases are made using funds from division/department budgets. Larger projects (labs, network upgrades, etc.) are funded with special one-time legislative appropriations, special funds (Worker Retraining, excess enrollment, etc.), or the President's contingency fund.

While the College has been successful in providing a computer for virtually every full-time faculty and staff member, there are considerable variations in the currency of the hardware and software. This situation makes it difficult to set institutional standards for software revisions, increases maintenance requirements, and complicates file sharing.

Clark College has no formal policies governing the selection and support of computer hardware and software. To date this has not resulted in any appreciable problems for the College. The institution has arrived at a *de facto* standard for hardware purchases based on statewide convenience contracts and historical precedent. Employees may choose from among three brands of Windows-compatible machines or Apple Macintosh for desktop use. One brand of Windows-compatible notebook computer and Macintosh notebooks have emerged as *de facto*

standards. The College has migrated to the Microsoft Office suite of general office software primarily due to the steep volume discounts offered by Microsoft to higher education.

Recommendations and Actions

Employees would benefit from a written policy that details the hardware and software choices and the differentiating factors. The issue of institutional minimum standards for computing hardware and software must be examined in the Information Technology Strategic Plan. It is anticipated that formal policies and procedures will be developed in 1998-99.

Facilities and Access

● Infrastructure

In 1992, the College invested \$225,000 to update the campus infrastructure. Fiber optic cable was used to interconnect a majority of the buildings on campus. New 200-pair copper voice cabling was also installed between buildings. Offices and classrooms were wired for voice and data, and network hubs, bridges and routers were installed. (Exhibit CS5.5 Strategic Network Plan for Clark College).

In addition to the data and voice infrastructure described above, Clark College maintains a broadband video network consisting of two parallel coaxial cable systems that ring the campus. One loop carries subscriber television programming from the local cable company (TCI), and the other carries institutional closed circuit television signals. This system has the capability to deliver video signals "upstream" to the TCI central head-end facility.

All major buildings on campus have a tap into this cable system. There are 22 building taps with drops into individual classrooms as needed. Additionally, a mini head-end located in GHL 035 provides RF modulators, an RF multiplexer, post amplifier, a routing switcher, and monitors to support the closed circuit loop.

In 1995, when the Legislature appropriated funds for the "Educational Technology Initiative II (ETI), to upgrade infrastructure and information technologies, Clark spent \$70,000 of this funding to extend network infrastructure to buildings that had no service or were inadequately served. Today, every

building on the main campus is connected with fiber optic cable. All offices and virtually all classrooms have been wired for voice and data communications.

Although upgrades undertaken with ETI funds and locally funded projects utilized the newer category 5 wiring standard, buildings using category 3 wire will pose a problem when the campus migrates to 100 Mbps LAN technologies in the future. While the current 10 Mbps LAN speeds will adequately serve many areas on campus for years to come, several instructional areas are already demonstrating a need for higher performance networking technologies.

The increasing use of multimedia data transmissions including real time audio and video will rapidly create bottlenecks on the existing 10 Mbps networks. Options include using network equipment that promises to operate at 100Mbps over category 3 wire, such as Hewlett-Packard's 100VG technology, or replacing the existing wire with a medium grade (category 5 or fiber) that will provide greater bandwidth.

In addition to aging station wiring in many of Clark's buildings, virtually all networking hardware (hubs, bridges, routers) used on the campus today was designed to operate at LAN speeds of 10 Mbps. A phased migration to ethernet switching and 100 Mbps or gigabit backbone technologies must be addressed in future planning efforts.

● **Instructional Computing**

In 1991, Clark College became the second community college in the nation to be connected to the Internet. The College has now achieved its goal of providing a computer for every full-time faculty member. Funds were provided by a Title III grant (1990-93), Educational Technology Initiative funds (1995), and annual expenditures from the general operating fund.

Since equipment purchases have spanned a seven-year period, the College faces a major challenge in keeping faculty computers up-to-date in a rapidly changing technological environment. The College has not identified a stable and predictable funding source for systematically upgrading and replacing instructional computing resources.

The College does not have a sinking fund or other mechanism that provides for routine equipment upgrades/replacements. Replacements/upgrades have been funded over the past five years with a combination of divisional funds, funds from student fees, special legislative appropriations, and other special funds (Worker Retraining, President's contingency, etc.). This approach is clearly vulnerable during leaner periods marked by legislative budget cuts.

Recommendations and Actions Taken

- **The College must address the issue of equipment replacement if it is to have a stable computing environment with current equipment.**
- **In 1998-99 the College will evaluate the merits of a technology fee paid by each enrolled student to help defray the costs of operating, maintaining and staffing instructional computing facilities.**

● **Computer labs**

Since the major infrastructure upgrade was undertaken in 1991, computing at Clark has expanded to include all instructional areas. The number of instructional computer labs has increased from six stand-alone labs in 1991 to 22 labs today, averaging 22 workstations each. Of these, three are unscheduled general access labs while the remainder are dedicated to specific instructional units.

Two of the unscheduled labs feature 25 PCs and 5 Macintosh computers each, and are available to students an average of 70 hours per week. The open lab located in the Library is available to students on the weekend coinciding with the Library hours of operation. Several of the dedicated lab facilities also offer open hours in addition to scheduled activities, but access is generally restricted to students in a particular instructional program. Today, almost all instructional labs have access to the Internet. Several labs are equipped to assist students with disabilities, and the remainder can be equipped on a need basis.

Table 1 reveals that a considerable number of rooms on the Clark College campus are devoted to computer laboratories. With approximately 15 percent of the non-dedicated instructional space used by computer labs, general-purpose classroom space has become scarce. As more and more departments

integrate computing into the curriculum, the demand for access to computers will certainly increase.

Recommendations and Actions Taken

The College must decide whether to allocate what little space that remains to open lab facilities, or to build more dedicated labs. These and other issues will be addressed in the strategic planning process.

● **Related Instructional Technology**

In addition to faculty and lab computers, ETI funds were used to purchase data projection equipment for classrooms, and distance education technologies including interactive video classroom equipment and a remote access server for use by students and staff. Several instructional areas (Library and Automotive Technologies) employ CD-ROM servers to provide student access to libraries of printed materials and other databases.

In 1996, the Legislature funded a massive project to create a statewide data and video network to link institutions of higher education and schools in the K-12 system. The so-called "K-20 Project" has provided Clark with high-speed (T1) data and video circuits to link the College to other community and technical colleges as well as the four year baccalaureate institutions in the state. The second phase of the project will add K-12 school districts to the statewide network. This project will open many opportunities for collaborative efforts among educational institutions and enhance distance education activities. Clark began pilot interactive video classroom activities in Winter quarter, 1998.

● **Internet and Web-based Technologies**

UNIX activities that are universal to the campus are administered by Computing Services. In 1998 a UNIX administrator/Web Master was hired to maintain a new institutional Internet host machine and to coordinate efforts related to the College's official web page. In addition, the UNIX administrator will assist with the development of a campus Intranet and monitor site security. A web technician was hired in the summer of 1998 to develop web content for the College.

● **Macintosh Support**

The person hired in January 1998, as Computer Maintenance Technician Supervisor is also highly trained in Macintosh support. This happy state of affairs will result in better service to a large contingent of Macintosh users in the sciences, mathematics, and graphics who were previously under served.

● **Administrative Computing**

Computing resources for administrative units has generally kept pace with advances in personal computer hardware and software. Several third party applications (purchasing system, facilities management system, room scheduling software, and Touch-Tone registration) have been purchased to extend the capabilities of legacy applications. The CIS has written interfaces for these third party applications to provide database connectivity with existing software. This amalgamation of in-house and third party software does not function without problems, but addresses our needs in the short term.

Clark's administrative application software (student management system, financial management system, etc.) is administered by a computing cooperative (Center for Information Services or CIS) representing the 32 community and technical colleges in the state. The CIS (formerly known as the CTC) has routinely updated the administrative software over the past ten years, but the original host/terminal architecture remains.

Until a suitable software replacement strategy is developed, the CIS has focused its efforts on reworking the existing applications to provide web-based tools (student information kiosk, grade submittal via the web, and registration by the web), and better accessibility to data for reporting purposes. Clark will implement the available web tools in 1998.

● **Administrative Computing Enhancements**

A long-standing criticism of the College's administrative applications is the lack of accessibility to the critical data needed to do effective planning, forecasting, and reporting. Currently, *ad hoc* reports are generated using a tool that is difficult for the typical user to learn and use. Since the community college

system is not likely to replace current administrative applications in the next two years or longer, the College must consider alternatives to increase efficiency and to make data more accessible. Data warehousing and document imaging technologies will be examined to afford some relief until a new suite of administrative applications can be purchased and implemented.

● **Construction of Instructional Computing Facilities**

In the past five years, members of the faculty have done a good job of consulting with Computing Services in the areas of computer lab design and software purchases. This cooperative effort has resulted in instructional computing facilities with superior floor plans, more functional furniture selections, and better values on equipment and software purchases. Today, Computing Services is actively involved in the planning and construction of all instructional computing facilities.

Scarpelli Hall, completed in 1994, is home to the Computer Science department and the Business Division. These two instructional units represent the heaviest concentration of computing technology on the campus. Computing Services worked closely with the faculty, architect, contractor, and Plant Services to design and build a facility that would support the objectives and curricula of these instructional units for years to come. The result is a showcase of computing excellence on the Clark College campus.

The College is rapidly running out of physical space to build instructional computer labs, and it is an ongoing challenge to maintain the existing labs. Assuming that the demand for computing resources in the classroom will continue to increase, the College will have to solve the problem of providing continuity to those programs and classes that came first, while providing an opportunity to access computing resources for those who are new to the game. The institution will have to decide whether the remaining space that is available for computer labs should be committed to open labs or to dedicated instructional facilities. The choice will have a major impact both on curriculum development and the potential use of a technology fee.

● **Distance Education**

The service area of the College is concentrated in the Portland/Vancouver metropolitan area. Truly remote regions in the College's service area are limited to several small communities to the east in the Columbia Gorge. Given the population profile and the potentially high cost of distance education technologies, the College will need to evaluate how and to what extent it will be involved in distance education activities.

Personnel and Management

● **Organizational Structure**

A reorganization of the Computing Services organization in 1992 created a structure that combined and delivered support services for instructional and administrative units in a centralized fashion. Reorganization involved integrating personnel from existing instructional, administrative, and telecommunications support groups. This reorganization has resulted in more efficient use of available staff resources, and more uniform and equitable delivery of services.

Each computer maintenance technician is assigned one or more instructional and administrative units that are their primary areas of responsibility. A second technician is trained in the unique requirements of a department to serve as a backup in the event the primary technician is unavailable. Some departments with heavy support requirements, such as the Library and Computer Science, are assigned a support technician for a scheduled period of time each week.

From its inception, Computing Services has had a flat organizational structure. A department objective was to expand the number of support staff and to cross-train the staff to obtain the most effective and flexible use of limited support personnel. Consistent with this jack-of-all-trades approach was relative parity among employee classifications and pay scales for technical support staff. Until January 1998, the Director of Computing Services had supervisory responsibility for all department employees. As the number of computers, networks, and applications has increased, the department has grown from 7.5 non-student staff FTEs in 1992 to

13.5 staff FTEs in 1998. The limitations of this flat organizational structure in the current computing environment have become apparent.

Recommendations and Actions Taken

In January 1998, the department added a new administrative exempt position to manage and supervise the computer maintenance activities of the department. The addition of a Computer Maintenance Technician Supervisor has allowed the director to concentrate more attention on planning and institutional issues, and has provided the maintenance staff with an improved operational structure.

● **Technical Staff**

Computing Services staff is adequate to provide installation, maintenance, and repair of computer and network hardware and software, and to provide basic services such as e-mail, voice mail, and Internet access. Despite the grueling workload that has faced Computing Services over the last five years, the staff has done a fine job overall in providing a high degree of availability and reliability in the institution's computing environment. However, the assistance the staff can provide to users in the areas of project research and development, application assistance, and training is limited.

As the number of high-tech firms that locate in the Portland/Vancouver metropolitan area continues to grow, it is becoming increasingly difficult to compete with these companies in the area of salaries for technical employees. Consequently, the department has experienced relatively high technical staff turnover in recent years as high-tech companies lure employees away to higher paying jobs. While staffing levels remain inadequate to provide all the services desired on campus, the institution has made a determined effort to expand the technical staff, and select job classifications that pay a more competitive wage. (Exhibit CS5.6 Growth in Computing Services Staff)

It is doubtful that the College will ever be able to compete with the private sector on the basis of salaries alone. The College must work harder to create a positive work environment for skilled technical employees by hiring additional employees and reducing job stress. Additional incentives in the form of advancement opportunities, training and job va-

riety must be provided in order to avoid the disruptions in service that accompany high staff turnover.

The organizational chart for Computing Services appears in Attachment 5CS.2.

● **Staff Qualifications and Responsibilities**

Job responsibilities and required competencies are clearly spelled out in detailed job descriptions and performance expectations. Candidates for technical support positions are carefully screened during the application and interview process.

Examples of job descriptions, performance expectations, and evaluation instruments are included in Exhibit CS5.7.

The Computing Services staff does an excellent job of providing a high degree of availability and reliability for computer and network users at Clark. The staff works in a highly complex and demanding computing environment consisting of multiple hardware platforms, operating systems, and networking protocols. Moreover, the staff must cope with a constantly changing computing environment, and the technical problems that inevitably arise with change, in order to satisfy the instructional and administrative goals of the College. Amidst all of this activity, the staff must find time to perform planning tasks and update their technical skills. This challenge requires a high degree of skill, dedication, and perseverance.

Recommendations and Actions Taken

- **The department must work to make sufficient time available to technical staff members to adequately document activities and projects, and to research best practices in computer maintenance.**
- **With the addition of an entry level computer maintenance technician, a computer maintenance tech supervisor, a UNIX administrator/Web Master, and a web technician in 1997/98, staff resources in the Computing Services department are now adequate to provide basic services, maintenance, and security. There are still insufficient staff resources to provide adequate levels for application development and support, and training for faculty and staff.**
- **In 1998/99, employee roles will be redefined to promote greater efficiency and permit technical specialization. Training opportuni-**

ties and career advancement pathways will also be identified and communicated to the employees in the department.

● **Staff Development**

The College has done an adequate job of promoting professional growth by providing technical training opportunities for department employees and rotating work assignments where appropriate. Until recently, there have been insufficient opportunities for salary advancement among technical staff in Computing Services. Once hired, employees move on the salary schedule with annual increments until they reach the top of the range. Once this point is reached, advancement (other than cost-of-living adjustments) can only occur if the employee is reclassified. The administration has always approached this option with caution due to the obvious budget implications. This fact, coupled with below-market wage levels for skilled technicians, has contributed to a relatively high staff turnover rate.

Computing Services has done a good job of providing the technical staff with a broad exposure to the full range of campus computing activities. The department endeavors to cross train employees and to rotate assignments where appropriate. Due to the scope and complexity of its computing environment, the College is an ideal training ground for new hires and student interns. The department also underwrites professional training and certification courses offered by third party vendors.

Recommendations and Actions Taken

The College needs to broaden promotional opportunities for technical employees in order to reduce turnover. It must also increase staff development activities, not just for technical staff, but for mid-managers as well.

● **Oversight Committees**

The organizational structure governing computer or computer-related activities at Clark College consists of three planning and oversight committees and the Director of Computing Services. The committee structure consists of two advisory committees, the Instructional Computer Users Committee (ICUC) and the Administrative Computer Users Committee (ACUC). Recommendations from these two committees are submitted to the Computing

Policy Committee (CPC) for consideration and approval. The Computing Policy Committee is composed of members of the College's Executive Team and one representative each from the ICUC and ACUC. There are no student representatives on these committees at this time. (Exhibit CS5.8 Campus Computer Committees, Roles and Responsibilities.)

The existing committee structure is redundant and inefficient. The ICUC, which is composed primarily of faculty representatives from the instructional divisions, is too large to effectively schedule meetings. The resulting high absenteeism hampers the work of this important committee.

Recommendations and Actions Taken

- **The structure and composition of the three campus computing committees will be examined during the College's IT strategic planning process to determine if a smaller, more effective IT planning and governance body can be formed.**
- **Student representatives on the computing committee(s) should be considered, especially if a technology fee is pursued.**

● **Maintenance and Security**

The College has been successful in funding the rapid growth in computing equipment during the last five years, and has done an adequate job of replacing obsolete equipment. However, the College has accomplished this largely with special legislative appropriations and transient funding sources such as the Worker Retraining fund, excess enrollment fund, the Education Technology Initiative, the K-20 project, and the President's contingency fund. The College lacks a formal equipment replacement policy that defines what equipment will be replaced with institutional versus department/division resources, replacement schedules, and funding sources.

Recommendations and Actions Taken

- **As new Internet and Intranet applications are implemented, the College must be vigilant to ensure that there are adequate resources provided to maintain the integrity and security of our networks and host processors.**
- **The institution does not have an adequate disaster recovery plan for critical data proc-**

essing functions. There are discussions currently under way between the CIS and member colleges on this issue and possible collaborative solutions.

● **Institutional Policies and Procedures**

Clark College lacks formal policies and procedures in several areas related to the development and management of information resources, including resource allocation, equipment replacement criteria and schedules, employee training, hardware and software standards, and service delivery agreements. The College's Computing Resources Policy is adequate but needs to be updated and expanded in several areas. (Exhibit CS5.9)

As the department has grown, the need for internal policies has become apparent. Areas that need to be addressed are the integrity and uniformity of file systems, hardware and software configuration, software licensing, asset control, and system administrator ethics and conduct.

Recommendations and Actions Taken

The need for institutional policies and procedures related to IT will be addressed in Clark's Information Technology Strategic Plan and in subsequent planning efforts. Specific departmental policies will be developed during 1998/99 to address internal issues. In 1998/99, the department will compile employee handbooks detailing standards and procedures for conducting service calls, hardware and software configurations, and other department-related activities.

With the growth in Computing Services staff, it has become increasingly difficult to maintain consistency in the computing environment and service levels using informal or verbally communicated procedures.

Recommendations and Actions Taken

Computing Services is currently converting from a paper-based work order system to an automated order entry and call tracking system. The new system is scheduled to be fully implemented in 1998/99.

The existing Computing Resources Policy needs to be updated to reflect changes in the computing environment at Clark as well as governing state law. Areas requiring expansion and clarification include

World Wide Web development and use, e-mail, and remote network access.

Recommendations and Actions Taken

- **New policies will be written or the existing policy expanded to provide more specific detail in the areas of the World Wide Web, e-mail, and remote network access. All computing policies and related materials will be posted on Clark's web site. The goal is to complete these tasks in 1998/99.**
- **Other institutional policy issues in the areas of resource allocation, equipment replacement, and employee training will be identified in the College's IT strategic planning process and recommendations will be developed to address these vexing issues in the years ahead.**
- **Written procedures detailing the process used by employees when moving equipment or requesting the disposal of surplus equipment need to be improved and disseminated to employees to improve asset control.**
- **Computing Services will publish these procedures for asset control on the College's web site and provide access to the department's inventory database via web browsers to assist departments with inventory control.**

Planning and Evaluation

● **Evaluation**

There are few formal mechanisms in place to regularly and systematically evaluate the quality and adequacy of computing resources and services. Quality and adequacy are measured informally by input from the computing committees, meetings with instructional departments/divisions, and individual users on campus. Regularly scheduled meetings with the Computer Science Department, Library and Media Services, and the AT Division have proven to be very helpful and will be extended to other areas on campus.

Mechanisms are in place or are available to monitor utilization of network resources, but are not employed on a regular schedule primarily due to limited staff resources. No detailed statistics are currently generated to monitor the utilization of either dedicated instructional labs or open labs. An automated software solution is being investigated

that will track usage statistics such as time of day, duration of use, application used, etc. This type of software is generally licensed on a per server basis which may dictate a limited or rotating deployment.

Recommendations and Actions Taken

Computing Services needs to improve its ongoing planning and assessment efforts. The IT Strategic Plan will examine ways to evaluate the performance of the service organization and the College's technology projects.

● **Planning**

The College has periodically undertaken information technology planning activities since the last accreditation visit in 1989. With expenditures for equipment and support services now consuming a significant portion of the institutional budget, it has become increasingly apparent that IT planning efforts must be comprehensive and ongoing if the institution is to make prudent and sustainable technology decisions.

Technology Surveys

The College conducted a technology survey in 1992 and again in 1994 to poll the faculty on a variety of issues related to computing technologies. In 1994, the faculty at Clark participated in Dr. Kenneth Green's Technology, Teaching, and Scholarship Project. The results of this survey compared Clark's computing environment to that of other colleges and universities in the nation. This allowed an examination of specific strengths and weaknesses and illuminated trends and challenges that were common to all educational institutions. (Exhibit CS5.10 Computing Surveys.)

1996 Educational Technology Strategic Plan

In 1996, the College defined strategic directions for the use of technology to further the Mission of the institution. (Exhibit CS5.11. 1996 Educational Technology Strategic Plan.) Elements of the plan are annotated in Italics and describe the outcomes of the planning initiative.

In the past ten years, the College has concentrated on building infrastructure and providing sufficient computing equipment to satisfy the needs of instructional and administrative units. The institution's investment in support personnel and training has not kept pace with the equipment investment.

The biggest challenge for the College is to develop and implement a comprehensive Information Technology Strategic Plan that will align future technology investments with the Mission of the College.

Recommendations and Actions Taken

In the Spring of 1998, Clark College contracted with the Shared Client Services unit of the CIS to assist the College with the development of a comprehensive IT strategic plan. At the time of this writing, an IT planning task force had been selected from faculty, staff, administrators, and students.

This group of eleven individuals will work with the consultant to design the planning methodology, identify and prioritize planning issues, and to design surveys and other data gathering instruments.

Critical issues addressed in the plan include:

1. providing necessary and sufficient IT access for all students and employees
2. providing funding for IT acquisitions, training, and technical support
3. instituting governance and decision-making structures
4. enabling planning and research for future IT growth and development
5. establishing standards for IT equipment, software, access, security, and technical support.
6. providing adequate technical support for IT users and for infrastructure maintenance and development
7. providing for ongoing employee training

A key task for the IT strategic planning task force is to identify short-term and long-term technology needs for the campus. Out of this effort will come the ability to set institutional priorities and identify required resources.

Computing Services staff will then perform a technical review of the campus network, and develop a plan to systematically upgrade the network infrastructure and equipment to meet the needs of the institution's instruction and business units.

Attachments

- Attachment CS5.1 Instructional Computer Laboratories
- Attachment CS5.2 Department and Division Legend
- Attachment CS5.3 Organizational Chart for Computing Services Department

Materials in Team Room

- Exhibit CS5.1 Computing Resources Distribution by Department and Employee Classification
- Exhibit CS5.2 Diagram of Campus Network
- Exhibit CS5.3 Campus Computer Opportunities for Faculty and Staff
- Exhibit CS5.4 Strategic Plan for Information Technology (Draft)
- Exhibit CS5.5 Strategic Network Plan for Clark College (1991)
- Exhibit CS5.6 Growth in Computing Services Staff 1991-1998
- Exhibit CS5.7 Job Descriptions, Performance Expectations, and Evaluation Instruments
- Exhibit CS5.8 Campus Computer Committees, Roles and Responsibilities
- Exhibit CS5.9 Clark College Computing Resources Policy
- Exhibit CS5.10 Computing Surveys
- Exhibit CS5.11 Educational Technology Strategic Plan (1996)
- Exhibit CS5.12 Information Provided to Students on Computing Resources, Access, and Policies
- Exhibit CS5.13 Computing Services Departmental Budgets

| Attachment 5CS.1 - Instructional Computer Laboratories (see attached legend) | | | | | | |
|--|----------|---------------------------|---------------------------|----------------------------|-------------|---------------------------------|
| LAB | BLDG RM | DIV | USED BY | TYPE | NO. | USE |
| DNET Lab | AA4 109 | AT | DNET, ITEL | Pentium II | 19 | Dedicated |
| ELEC Lab | AA4 201 | AT | ELEC | 486 Pentium | 7 16 | Dedicated |
| Printing Lab | AA5 100D | AT | GRCP | Macintosh PowerMac | 11 6 | Dedicated |
| TECHLAB | AA4 105 | AT | ENGR, GRCP, MACH, MT | Pentium II | 21 | Dedicated |
| | SHL 017 | BUS | NON-SCHED | Pentium II | 25 | Open |
| | SHL 018 | BUS | BTEC, BUS | Pentium | 25 | Dedicated |
| | SHL 019 | BUS | BTEC, BUS | Pentium II | 25 | Dedicated |
| | SHL 022 | BUS | BTEC, BUS | Pentium | 28 | Dedicated |
| | SHL 023 | BUS | BTEC, BUS | 486 | 25 | Dedicated |
| COMMED | TPC 107 | Community Education | AE, B&I, FML | Pentium Pro | 20 | Multiple Use/ Scheduled |
| | BHL 107 | CS | NON-SCHED | Pentium PowerMac | 25 5 | Open |
| LIBLAB | LIB 203 | CS | NON-SCHED | Pentium II PowerMac | 28 5 | Open |
| DVED Lab | JSH 102 | ED | DVED | Pentium Pentium II | 17 8 | Dedicated |
| | TPC 116 | ED | ABE/ESL | Mac LC | 18 | Dedicated |
| Art Lab | ART 100B | HUM/SS | ART | 486 Pentium PowerMac | 4 4 5 | Dedicated |
| Hawkins Lab | HKH 104 | HUM/SS | CSCI, ENGL, MUS | Pentium | 24 | Multiple Use/ Scheduled/Open |
| Writing Lab | HKH 102 | HUM/SS | ENGL | Pentium II | 6 | Open |
| ENL Lab | BHL 101 | International Programs | ENL | Pentium | 20 | Dedicated |
| Library Re- search Lab | LIB 103 | LIB | LIB, other scheduled uses | Pentium | 15 | Multiple Use/ Scheduled |
| CNET Lab | BHL 102 | MACS | CNET, MCSS, ELEC | Pentium | 22 | Dedicated |
| | SHL 124 | MACS | CNET, CSA, CSCI, MCSS | Pentium | 22 | Dedicated |
| | SHL 125 | MACS | CNET, CSA, CSCI, MCSS | Pentium | 21 | Dedicated |
| | SHL 135 | MACS | CNET, CSA, CSCI, MCSS | Pentium | 30 | Dedicated Open |
| APH Lab | APH 102 | SCI HEOC | SCI, CSCI, GRCP | PowerMac 486 | 22 12 | Multiple Use/ Scheduled/Open |
| Testing Lab | GHL 207 | SSS | Student Support Services | Pentium Pentium II | 1 6 | Dedicated |

Attachment CS5.2 — Legend

AT - Applied Technology Division

DNET Data Networks & Telecommunications Tech
ELEC Electronics Technology
GRCP Graphic Communications/Printing
ITEL Industrial Technology – Electricity
MACH Machining Technology
MT Manufacturing Technology

BUS - Business Division

BTEC Business Technologies
BUS Business Administration

Community Education

AE Adult Education
B&I Business & Industry Training
FML Mature Learning

CS - Computing Services

ED - Education Division

ABE/ESL Adult Basic Ed/English as a Second Language
DVED Developmental Education

HEOC - Health Occupations

NURS Nursing

HUM/SS - Humanities & Social Sciences

ART Art
ENGL English
MUS Music

International Programs

ENL English as a Non-native Language

LIB - Library & Media Services

MACS - Math & Computer Science

CNET Computer Network Administrator
CSA Computer Software & Applications
CSCI Computer Science
MCSS Microcomputer Support Specialist

SCI - Science Division

ENGR Engineering

SSS - Student Support Services

Attachment CS5-3 – Organization Chart