EXECUTIVE SUMMARY

During the drafting of this report a study team member noted with more amusement than surprise that she had "just received a message from tomorrow." While the electronic message she had received from Australia was literally from tomorrow, the irony and impact of this statement in the larger context of the changing academic environment did not go unnoticed among members of the Academic Computing Study (ACS) team. The team recognized that Kent State University has implemented several important computing and related technological applications during the past decade, resulting in many positive changes in academic and administrative programs and services. However there was also a realization that the work is far from complete. The University continues to build a strong record of technological achievement, while looking for improved methods to meet the many and varied technological challenges of the 1990s and beyond. These challenges must be met if the University hopes to improve its competitiveness and meet the expectations placed on higher education for the year 2000.

Solutions to the challenges will lie in the ability of the University community to better articulate the options and resource requirements for academic computing and technology. The logical assignment of responsibilities for meeting needs and the establishment of a well-defined balance of effort between central and distributed information systems and services must be determined and implemented. Much work will be required before the next century to meet the particular computing needs of each discipline. This will necessitate a major realignment of allocations across all sectors of the University to achieve noticeable progress and positive change in the instructional processes.

Rapid technological innovation has produced a dynamic and volatile environment for instruction and research. The contributions of this ACS include careful data collection, recommendations, and an implementation plan. The study team found a need for continuous improvement of the academic computing and technology environment at Kent, and it anticipates the concomitant positive impact on the instructional enterprise for both students and faculty. The team also recognizes that this technological innovation will be driven by faculty commitment and leadership.

The team echoes the needs expressed by students and faculty for distributed discipline-specific databases and other electronic information resources to enhance the instruction and research environment. Such resources may reside in a variety of national and worldwide locations. Network access to these resources will enable collaboration among faculty and students using diverse computer workstations housed in a variety of locations. This emerging environment at Kent will include:

growth of discipline-specific hardware and software adequate to support student and faculty educational endeavors;

standardization of general computer applications such as word processing, spreadsheets, and database management;

consistent access to well-equipped and staffed student computer labs;

support of electronic or multimedia classrooms that house a selected set of technologies that enhance instructional capabilities through a variety of methodologies and resources;

requirements and opportunities for students, staff, and faculty to achieve technological competency;

student and faculty access to library and other information resources, including text and graphics, whether they are located on a specific campus, across the nation, or around the world;

real time conferencing involving multiple users such as faculty and students, interacting at an informal conversational level;

collaborative research projects and routine group work by teams through the use of common tools such as spreadsheets, graphic representations, tables, and mathematical equations;

the integration of administrative data into the instructional process, thus contributing to faculty and staff effectiveness through improved timely access to needed information for purposes such as student advising;

the study of information flow and re-engineering of work processes to reduce manual procedures and paper flow where needed.

The study team recommends that by the year 2000 technologies be in place at Kent to support this emerging environment and other elements in this academic computing plan. Specifically, the team emphasizes the following recommendations, arranged around nine key themes. More information and additional recommendations can be found in the Recommendations and Benefits section of this report.

1. Advocacy for Academic Computing.

University policies regarding acquisition and distribution of computer resources should place an added emphasis on academic computing. An advocate for academic computing should be appointed to coordinate academic computing priorities and resource needs, including fund raising and budget development. The advocate should also promote collaboration between those responsible for computing within academic units and Academic Computing Services. In addition, an Advisory Committee on Technology (ACT) should be established to advise both the Provost and the Vice President for Business and Finance. The ACT should be an expanded version of the NISS-recommended Technology Policy Advisory Committee, and should include constituency-based representation across academic and administrative units of the University, including faculty and student representation. Charges to this committee should include serving as an advocate for constituency information systems, academic and administrative computing, and instructional technology needs; serving as a resource and review group for implementing information systems, instructional technology, and network facilities; and advocating and promoting advances in technology.

2. Annual Planning.

The annual planning process should include consideration of the role and use of technology in support of the mission of the academic units. As part of the formal planning process, faculty should be provided opportunities to identify specialized hardware and software requirements for their academic units. Operating budgets that include funding lines for academic computing should be earmarked and safeguarded. Capital budget planning should make provision for the installation of network connections in every office and residence hall room. Academic units should ensure that technical expertise is available to support computer hardware, networks, and discipline-specific software. Such arrangements may be made through employment of full time systems support staff, shared support staff with other units, formal agreements with their college or Computer Services, or, when appropriate, on-load assignment to designated faculty.

Planning should include movement toward a distributed academic computing environment in which all classrooms, labs, residence hall rooms, and faculty and administrative offices are connected to the campus fiber optic backbone. Ultimately, the role of Academic Computing Services should continue to evolve from that of a hardware and software provider to a centralized consulting and support service for computing systems distributed in academic units.

3. Provide and Reallocate E&G Budget for Student and Faculty Access.

Funding plans need to be developed to ensure continuous improvement in the academic computing environment. Ongoing funding needs to be provided for the purchase of new equipment, equipment replacement, and maintenance for discipline-specific academic unit needs. The Office of the Provost, colleges, and independent schools should work in partnership to allocate funding to meet the growing technical support staff needs of academic units. Funding plans should take into account the total cost of using computers, including purchase, training, installation of hardware and software, maintenance, repair, replacement, and upgrading. University policy should encourage budget carry-forward plans to ensure better acquisition decisions in support of purchases and upgrades to new technology. The director of Information Systems and Technology, with advice from ACT, should investigate alternative ways to contract for maintenance and repair, and should review the pricing structure for service contracts offered by Computer Equipment Services. In order to maximize efficiency, bureaucracy inherent to the selection and purchasing processes should be reviewed and streamlined as much as possible. This would allow academic units to procure the brand of equipment needed within the required time frame.

4. Universal Network Connectivity.

Assuming the completion of the campus backbone, it is imperative that connection of offices, classrooms, labs, and rooms in residence halls to the Kent Campus network should occur in order to provide access to campus and global educational resources. Electronic mail should be migrated from the mainframe to user friendly LAN based systems connected to the Internet. A UNIX platform should be used for campus wide mail and Internet access and as a central node for a distributed campus wide information system.

University dial-in modem lines on the Kent and Regional campuses should be connected to networked terminal servers to enable transparent access from all locations to all University computers and local area networks. These dial-in connections should be enhanced to support direct Internet connection. Increasing demand from students and faculty for remote access will necessitate constant expansion of the number of dial-in lines.

5. Faculty Development and Support.

The administration and the faculty share the obligation for faculty learning about ways in which technology can be applied to their disciplines. Faculty professional development plans should incorporate provision for time to develop skills in basic and advanced computer use. A plan and strategy should be developed and implemented to acquire discipline-specific technology and to provide every faculty member with a computer that is appropriate to his or her instructional and research activities, including support for both UNIX and Macintosh platforms and evaluation of alternative PC platforms, such as Windows, Windows NT, and OS/2.

The Office of the Provost should establish local unit or college-based support positions and a faculty and staff support center that contains multiplatform state-of-the-art instructional hardware and software, including a software lending library. This support center should showcase the use of technology in teaching and provide hands-on training for faculty and staff.

In recognition of the substantial time required to develop and provide technology-based instruction, academic units should provide incentives and workload reductions for faculty to engage in innovative computer-based instruction (e.g., summer instructional grants, merit pay, and credit toward promotion and tenure). In view of the strategic importance of computing to the future of the University, departmental handbooks should provide information regarding workload equivalents for faculty who engage in management or support of computing resources.

6. Student Access to Computing Resources.

Students need access in their departments to discipline-specific hardware and software that are as current as that normally used in the professions for which they are being educated. Academic units should recognize this need and budget for the necessary equipment and software. Academic units need to revise current staffing policies of computer labs to provide staffing on evenings and weekends. Student lab monitors should receive adequate and formal training appropriate to their assigned responsibilities.

The Office of the Vice President for Business and Finance, in cooperation with academic units, should coordinate computer purchase programs for students so as to provide recommendations and reduce costs to those who choose to purchase their own equipment. Students should be provided with information regarding local and remote network connections so that they can ensure that their computer is able to connect to the University network.

Every student should be given, upon request, a computer account that provides Internet access.

7. Training and User Assistance for Students and Faculty.

A Technological Education Requirement should be instituted for freshmen that would ensure student computer literacy by developing competency in areas such as word processing, spreadsheets, databases, e-mail, and accessing Internet resources. It is recommended that these skills be applied where relevant in existing courses. An example is the emerging integration of word processing into English composition.

Academic units should schedule training for faculty. Staff should be given formal release time to take advantage of available training. In addition, Computer Services should provide self-paced learning aids such as online tutorials, computer assisted instruction, or videos. A central help desk with a single phone number should be available sixteen hours a day to answer a wide variety of questions from users on any computer related topic.

8. Upgrade Classrooms for Technology Use.

All new and renovated classroom facilities need to be equipped with appropriate instructional technologies. Designing effective instructional facilities requires a holistic approach to the classroom environment. The needs of students (e.g., seating, computer workstations) and instructors (e.g., user friendly teaching stations), as well as room and infrastructure elements of networks, electricity, equipment, security, screens, lighting, air handling, noise, and their related controls, all need to be considered. Advances in classroom technology and necessary technical and maintenance support should be incorporated into the annual planning process. To that end, Media Services, in consultation with academic units, the ACT, the Space Committee, Facilities Planning, Physical Plant, the Registrar, and other pertinent parties, should all contribute to proposed classroom design work.

In addition, Computer Services and Media Services should investigate the distribution of multimedia to enhance support for teaching efforts and to facilitate use of technological applications. One option is to use the mainframe as a multimedia megaserver; another option is a distributed network of powerful workstations.

9. Distance Learning for Kent State University.

Distance education has enormous potential to transform higher education. Research in the use of alternative instructional delivery systems should be reviewed and augmented as a means of achieving the mission of the University. In addition to methods of delivery and areas of focus within and beyond the Kent system, many points need to be considered to ensure overall quality. These issues include planning, administration, methods of instruction, technical support, curriculum, faculty workload and incentives. Environmental assessment and a needs study should be undertaken to identify Kent's niche and to determine the level and extent of the resources the University should commit to the development and support of alternative instructional delivery systems.

Responsibility for examining these and other issues should be assigned to a person who would coordinate and foster the activity of those faculty and staff interested in distance education and who would act as an advocate for it. In addition, a joint subcommittee of the Teaching Council and ACT should be established to advise and participate in planning and implementation.

CURRENT ENVIRONMENT

NATIONAL

Information is one of the nation's most critical economic resources. By one estimate, two-thirds of U.S. workers are in information-related jobs, and the rest are in industries that rely heavily on information. In an era of global markets and competition, the technologies to create, manipulate, manage, and use information are of strategic importance for the United States. Those technologies will help U.S. businesses remain competitive and create challenging, high-paying jobs. They also will fuel economic growth, which in turn will generate a steadily increasing standard of living for Americans.

In response to the development of technology, the Clinton Administration has launched the National Information Infrastructure (NII) initiative. NII encompasses an ever-expanding range of equipment including cameras, scanners, keyboards, telephones, fax machines, computers, switches, compact disks, video and audio tape, cable, wire, satellites, optical fiber transmission lines, microwave nets, televisions, monitors, printers, and much more. The goal is to use this technology to provide all Americans with the ability to access information and to communicate with each other using voice, data, images, or video anytime, anywhere.

Meeting this goal depends on the development of the high-speed and high-capacity National Research and Education Network (NREN). The purpose of NREN is to establish a communications infrastructure that will significantly enhance researchers' access to distributed computing capabilities at research and educational institutions nationwide. The NREN program will advance the state-of-the-art of networking technology and access to current high-performance computing facilities. The NREN will serve as a catalyst for the development of a truly general purpose high-speed communications infrastructure for the entire nation.

OHIO

Ohio is often called an information state because it is home to a sizable number of international providers of electronic information (e.g., Chemical Abstracts, Compuserve, Mead Data General, and Online Computer Library Center). Ohio is leading the nation by creating innovative library and information networks to link academic and school libraries. OhioLINK will connect seventeen major university libraries, the State Library, and seventeen two-year colleges by 1995. It is currently

operational at ten universities. INFOhio is designed to automate and electronically link all school building libraries in Ohio. There is also a plan, still at the discussion stage, to link all public libraries through a network to be called OPLIN.

Internet access in public schools is supported in part through the Ohio Education Computer Network (OECN). This project of the Ohio Department of Education provides Internet access to designated "A" sites throughout the state. Each "A" site will be providing Internet access to its regional school districts.

Access to information and network based communications tools such as electronic mail will be the applications which initially attract a large segment of the user community to networks. Few users, however, will stop at e-mail for they will discover other resources instantly available to them through the networks. As use of these networks increases, it should become clear that accessing information resources will be one of the central applications of networks in Ohio and across the nation.

KENT STATE UNIVERSITY

Persistent technological change along with budgetary constraints create major challenges for the University to meet the technological needs of the academic sector. The Self-Study Report for North-Central Accreditation notes that Kent continues to allocate an ever-greater proportion of its resources to computing in an effort to improve its networking, mainframes, instructional delivery, and information systems. The University is in the process of constructing a Kent Campus fiber-optic network. The use of computing and instructional technology in some academic programs, such as architecture, art, business administration, library and information science, and philosophy, is in the mainstream, if not at the forefront, of technological innovation. Further, Kent's Strategic Plan suggests that this trend will continue. One of the seventeen major initiatives identified in the Strategic Plan for the next three to five years states that the University should "enhance access, teaching, and learning by utilizing state-of-the-art instructional and communication technologies."

COMPUTING RESOURCES

The Network and Information Systems Study, completed in March of 1993, made a number of recommendations for administrative computing. Because implementation of these recommendations is likely to interact in significant ways with the development of academic computing at the University, a brief summary of the more important recommendations from that study is provided.

The most critical of these recommendations for both administrative and academic computing at the University is the completion of the Kent Campus backbone of the university network. Two million dollars for

Kent's FY95 and FY96 biennial capital appropriation have been requested from the Ohio Board of Regents to extend the backbone to all major buildings on campus.

As a result of a recommendation to evaluate, select, and implement an integrated student information system and a data base management system, the University has purchased IBM's DB2 and the SCT IA-Plus integrated student information system. The University also purchased an IBM ES9000 9121-732 computer system with enterprise server capability as a replacement for existing 3090-200s and 4381 mainframe computers. In addition to administrative support, the new mainframe has the capability to serve as the cornerstone for advanced multimedia applications and their distribution.

The Network and Information Systems Study also recommended that the University conduct a study of academic computing, complete the initial stage of distance education infrastructure, establish site licenses, develop an e-mail directory, update and disseminate the University's network plan, and enhance and expand dial-up access to network resources. In recognition of the importance of computing to students, faculty, and programs, the University is moving forward on these initiatives. A more detailed status report of progress on these recommendations can be found in Appendix G.

Although there is a significant central computing facility on the Kent Campus, the academic computing environment is very dispersed throughout the campus and is quite extensive at all of the Regional Campuses as well. In addition, the Library merits special discussion due to its importance in support of instruction and research and its broad use of technological applications. The current computing environment is examined in four parts--the central facility, the dispersed facilities on the Kent Campus, the Library facilities, and the Regional Campus facilities.

1. The Kent Central Facility

Office of Computer Services.

The Office of Computer Services supports two major computing systems--an IBM ES9000 9121-732 and two DEC VAX 11/780s--plus a large lab of personal computers. The IBM is partitioned to run two operating systems, MVS for most administrative applications and VM/CMS for academic and research applications. The DEC VAX 11/780s can be accessed from twenty-one dedicated terminals in the central Library lab as well as via network connections from many other sites on and off campus and dial-in phone lines. There are eighteen dedicated IBM terminals in the Library lab to access the IBM mainframe, which can also be accessed from dozens of other sites on campus as well as via network connections and dial-up phone lines. In addition to the VAX and IBM terminals, the Library computer lab contains forty-six MS-DOS personal computers.

The VAX computers are intended mostly for undergraduate interactive computing but are also available for individual research and electronic mail. The MVS side of the IBM is only accessible by classes using systems that are unique to that system and also includes the NOTIS library system. The VM/CMS side is used mostly by graduate students

and faculty, but is also used by some undergraduate classes and is available for all types of individual research. In addition, it is currently the major electronic mail source for both academic and administrative users. All of these systems require an authorized userid which is issued for specific classes for a semester or for individual research on a continuing basis.

Software on the VAX systems is mostly geared to instruction. There are several compilers for various languages, the standard system software, the EDT and Emacs editors, and other applications. VM/CMS not only supports several compilers, but is also the central source of many statistical packages, including SPSS, SAS, BMDP, EQS, and LISREL. In a typical semester, there are between 1,500 and 2,000 individual userids active on the combined VAXes, and there are currently over 2,500 userids active on CMS.

General purpose computer labs.

The personal computer lab in the Library is available to the entire University and does not require a userid for use. The microcomputers located there are connected via a Novell network and run dozens of application programs, including word processing, spreadsheet analysis, and graphics. Specific examples are WordPerfect, Lotus, Harvard Graphics, and Quattro Pro, but there are dozens of other packages, such as specialized CBE programs, available there. On a typical day in the lab toward the end of the semester, there may be over 1,000 individual sessions of an average length of about half an hour. This lab is the largest general purpose computing lab on campus and is undoubtedly the most popular due to the ease of access, the available hours, and constant staffing. Most of the time it is at or near 100 percent utilization.

There are other general purpose labs available to students. Audio Visual Services maintains a Macintosh lab in the Library and the Undergraduate Student Senate runs a lab in the Student Center. There are three labs in residence halls, all of which have both DOS and Macintosh computers available.

2. Kent Campus Academic Unit Computing

The most important factor about Kent's dispersed computing environment is that in most instances academic units are very autonomous in their acquisition and maintenance of computers. The two major exceptions are the College of Business and the College of Education, where computing is managed mostly at the college level rather than by individual units. There are a few other instances of units sharing facilities, such as the Macintosh lab shared by the School of Architecture and Environmental Design and the School of Journalism and Mass Communication, and the DOS lab shared by the Department of English and the Department of Modern and Classical Languages. Also, Technology's CAD-CAM lab can be used by other units within the College of Fine and Professional Arts. However, shared arrangements such as these are rare.

Most software is also acquired and managed at the academic unit level, although there are now campus site licenses for WordPerfect and

Lotus products. Much of the other software used is specialized (e.g., AutoCAD is used in just a few academic units) and some software is unique to single units.

One problem faced by academic units is the age of the equipment. There are still some Apple IIe machines and hundreds of 8088 DOS computers in local units. These are barely functional because they cannot run current software, yet they are often counted as though they were viable computers.

Within academic units, computers may be used for basic functions, such as word processing, or for discipline-specific subjects, such as CAD-CAM or programming. In general, if discipline-specific computing is required, then it is available to all students, but when it is not, access to computing facilities is usually restricted to graduate students and faculty.

One aspect of technology that should not be overlooked is the use of computers that are dedicated to certain processes, such as those that are a part of specialized research equipment, and computers that are used to complement other equipment. These computers may be directly attached to the equipment to gather data, monitor results, or control experiments, or they may be physically separate but used only to manipulate data for specialized experiments. This type of use is common in many units, usually in the physical sciences.

House Bill money from the Ohio Legislature has become a crucial (and sometimes the only) source of equipment funding for many units. For those academic units that can use this source of funds for computers, there may be a reasonable supply of labs and personal computers. However, some units must use such funds for other types of instructional equipment. Thus, those units with no other technical needs and those that can attract funds through grants tend to have the best computer facilities.

In some units, such as mathematics and computer science, physics/LCI, and administrative sciences, one would expect to find significant computer use because in those disciplines the hardware and/or software is often the object of study; however, even in those areas some equipment may not be current, in good working condition, or ideal for the intended curricular use. Staffing availability and expertise are important elements in maintaining unit progress. In other units, where computing could be a valuable tool, there is simply a dearth of equipment. Notable examples are biological sciences, criminal justice studies, and music.

At the same time, there are some instances where academic units are either keeping pace with hardware and software development or are setting the tempo for the integration of computing applications into academic programs. The University can take pride in the progress these units have made in the use of computers in the last decade. Computers are generally available for faculty, graduate students, and undergraduate students. The following units are cited because they have used computers as a tool to further subject matter instruction or because they provided the necessary organizational change, including staffing, required to support computerization for instruction at the unit level.

Architecture and Environmental Design. By working with a large

Chicago architectural firm and having a staff member in charge of computer applications, the School of Architecture and Environmental Design has developed a leadership position in the use of computers for architectural design. Drawing tables and technical pens are now seen as inflexible media compared to computer tools that are now a major component of instruction. The School of Architecture and Environmental Design has three main labs that contain fifteen RTs, eleven RS/6000s, and four Macs (two Quadras). The school also makes limited use of a Mac lab shared with the School of Journalism and Mass Communication. Discipline-specific software is available and is used in course work for all majors. About half of the Architecture faculty have computers on their desks which they use mostly for word processing.

Art. The Visual Communication Design program in the School of Art has integrated computing into the curriculum. Over 400 undergraduate majors are learning on equipment acquired after this outstanding program was recognized with an Academic Challenge award from the Ohio Board of Regents. Students in this program are using contemporary computer tools to do work that will equip them to be immediately productive upon employment. The School of Art maintains three labs, one of which is a very sophisticated Mac lab with large, high resolution monitors. Course fees help defray some of the consumable costs of operating this facility.

College of Business Administration. With the advent of Visicalc and Lotus ten years ago, spreadsheets became a required tool for all areas of business. Data base management and word processing, too, are indispensable tools for managers, auditors, and information systems analysts. Computing for accounting, administrative sciences, economics, finance, and marketing is managed primarily at the college level. The building has been wired for a local area network and each faculty office is connected. This Novell network has five file servers serving 225 stations throughout the college. Thus, software license efficiencies are achieved. The LAN is connected via an SNA gateway to the IBM mainframe and to the campus backbone (and hence the Internet) via a TCP/IP router. Each unit has a central printing lab for faculty and staff who desire high-quality output. Introductory courses are offered in spreadsheets and data base management, while advanced general courses assume students have competency in these areas. Courses in Information Systems include data communications, artificial intelligence, data management, multimedia, and systems analysis and design. To support this instructional need, the college maintains several student labs. Word processing is discouraged in the labs unless there is no demand on lab equipment by students who are completing class assignments. One professional support staff member has overseen the development of the college network and upgrading of computers for the past ten years. This individual is assisted by several undergraduate and graduate students. The College of Business Administration has two classrooms with ceiling mounted video projectors and network connections.

Library and Information Science.

The field of library and information science was one of the first to recognize the potential for computerization. Card catalogs have been replaced with online catalogs, electronic data bases are growing in number and level of sophistication, circulation and acquisition procedures have

been automated, access to distant information resources is being provided, and the trend continues. Instruction in this field requires students to have access to sophisticated computing tools. The school maintains its own local area network and most faculty have computers on their desks. There is good potential for this school to develop distance learning as a way to facilitate instruction of its program on The Ohio State University campus. The school maintains two labs, one in Kent and one in Columbus. These are used to teach students and faculty how to use the many information resources available locally and on the Internet. The Kent lab contains seven Macs and sixteen PCs (nine of them 386s), whereas the Columbus lab has two Macs and eight PCs (four of them 486s), for a total of ten. The software used is SilverPlatter, Wilsondisc, and Passport as well as the usual productivity tools such as WordPerfect, Quattro Pro, and dBase. Computer support for the school comes primarily from faculty members who assume a heavy service load to maintain and install equipment, provide technical advice, and consult with students and other faculty about software use. One professional staff person oversees lab resources and instructs students on use of equipment and software.

Philosophy.

While all faculty have access to a small lab where personal computers can be shared, only a few have a personal computer at their disposal, and none have network access. The two unit computers that have mainframe access are provided by the University for use by faculty who have administrative assignments. A new classroom with thirty-three workstations equipped with 386 PCs and an instructor podium with PC and overhead projection was recently added. This classroom's primary use is for instruction in general education courses and instructors may hold class meetings there by reserving it. The Department of Philosophy has assumed it has a responsibility to expose undergraduate students to basic computer use, primarily word processing. Students are expected to show evidence of their thinking skills through written communication on class topics and some specialized software is used to prompt thinking on philosophical issues. Most of the PCs in the unit, including those in the classroom, run Windows, and the most used software package is WordPerfect. Support for the lab comes from faculty volunteering time to supervise it during open hours. Some graduate assistant support is also available. The Department of Philosophy does not employ a technical support person to assist with hardware and software problems, training, or equipment upgrades.

3. Kent Campus Classroom Facilities

Classrooms. The Kent Campus maintains 172 general purpose, standard classrooms which will accommodate between twenty and 100 students. The average size of these rooms is approximately 900 square feet with no special features. Seats and desks are normally movable chairs with attached tablet arms. Lighting is usually fluorescent with a minimal amount of control (two or three switches, front to rear section control). Window coverings may be either shades or venetian blinds and a duplex electrical outlet is located on each wall.

Instructional equipment normally consists of a chalkboard, an overhead projector, and a projection screen. All other equipment must be delivered to these rooms upon special request of the instructor. During the

past few years a limited number of classrooms were equipped with selected, permanently installed audiovisual equipment items (e.g., television monitors or video/graphics projection systems). Currently there are very few classrooms that are connected to the campus network and of these, none are available for general campus use.

Other classrooms specially equipped are:

Business Administration 115 and 208 -- video/graphics projection systems and controls mounted in a permanent teaching station. These rooms have access to the campus network through the Business Administration LAN.

Van Deusen 219, CAD-CAM lab -- video/graphics projection system.
Mathematics and Computer Science classrooms -- connected to the campus network but lack any computing or video/graphics projection systems.

Lecture Halls.

There are seventeen large instructional rooms or lecture halls that can accommodate more than 100 students. Many have tiered or sloping floors with permanently mounted seating and an attached arm tablet or table desk. Most lecture halls have two lighting systems--fluorescent and incandescent with dimmers. Windows, if existent, have shades or venetian blinds.

Standard instructional equipment consists of a chalkboard, sound system, projection screen, overhead projector, and usually a slide projector and 16 mm motion picture projector. Some lecture halls have projection booths, while others house projection equipment in cabinets. Eleven lecture halls have installed video and computer projection systems. These rooms contain a wall-mounted cabinet located in the front of the room which provides an interface and video cassette player. Some cabinets also house sound system controls and two have video disc players available. Currently, no lecture halls have network connections.

Lecture Halls Equipped with Video or Video and Computer Graphics Projection Systems

Video only projection systems:

- Bowman 137
- Satterfield 121
- Business Administration 100

Video and computer graphics projection systems:

- Art 202

- McGilvrey 302
- Bowman 303
- Rockwell 231
- Henderson 201
- University Auditorium
- Kent 119
- Williams 110

Special Rooms Equipped with Video or Video and Computer Graphics Projection Systems (not scheduled for regular instruction)

- Library 019
- Audio Visual Services (330 Library) classroom

Seminar Rooms and Other Instructional Areas.

There are 32 seminar rooms, each with twenty or fewer seats, usually arranged or designed in a conference style, with chairs and tables. In addition, there are 99 regularly scheduled teaching labs, 111 unscheduled labs, 88 self-instruction areas with computer or video capability, and 167 reading and study areas for students and faculty.

4. Libraries

During 1986, Kent State University demonstrated significant support for library automation through its selection and acquisition of the Northwestern Online Total Integrated System (NOTIS). The NOTIS system was installed on the University's mainframe system, sharing available computing resources with selected administrative computing systems. As the Library implemented various components over a period of two years, operating efficiencies were made possible. The cataloging process was streamlined by eliminating the card catalog, several manual procedures, and related paper files. Ordering and management of the materials budget was transformed from an entirely manual process to an automated one. An antiquated and inefficient circulation system was replaced. NOTIS also provided better capabilities for serials control than the previous system. Further, automation had a major positive impact on library users. The online catalog provided more complete information than the card catalog by tracking materials from the pre-order process through cataloging to current circulation status, and it significantly increased search options available to the user for finding needed material. The catalog is now available in its entirety via 150 terminals located in the main, branch, and Regional Campus libraries. Network and dial access extends its availability to labs, offices, and homes of students and faculty. During a typical day over 45,000 transactions are recorded on the system.

Developing computer technology has also increased users'

capabilities for searching journal indexes and full-text documents through a variety of electronic resources, including CD-ROMs, online sources such as Lexis/Nexis, and floppy-disk based products. The main library at Kent introduced CD-ROM resources in 1987 and has witnessed a steady growth in their popularity and in the reliance placed on them. Presently there are fifteen CD-ROM titles available on multiple workstations through a local area network and others available on request. Networked CD-ROM capacity will soon be more than doubled to two file servers with fifty drives. Access will be extended across the campus network to other departments, with support for Macintosh and UNIX workstations. CD-ROM titles are also available in branch and Regional Campus libraries.

Through grant funding, the main library provides Internet access through dedicated terminals. Users are able to access library catalogs, electronic journals, and a host of other external resources. The online catalog, other electronic resources, and the Internet are introduced to thousands of students each year through the freshman library orientation program, course-integrated library instruction, and specialized workshops. These sessions use both lectures, with online demonstrations projected to the classes, and hands-on instruction.

The information available to Kent users is dramatically increasing with the development of OhioLINK, a statewide information system designed for higher education and supported by the Ohio Board of Regents. The libraries of the fifteen state-supported universities, two private universities, and the State Library are working collaboratively to create a central online catalog available through the Internet that will provide access to over eighteen million volumes. Another key objective of OhioLINK is to provide more immediate use of materials owned by other libraries than is possible with traditional interlibrary loan. This is being accomplished through an online requesting module available directly to users of the system coupled with a statewide ground delivery system. In addition to books, OhioLINK offers users access to reference databases, full-text documents, and the rapidly expanding world of Internet resources.

OhioLINK, including the central and local sites, is using software developed by Innovative Interfaces, Inc. of Berkeley, California. By the end of 1993, ten libraries had implemented the new system and contributed their holdings to the central catalog. Kent installed its OhioLINK computer, a DEC 4000 Model 710, in late November 1993. It runs the OSF/1 operating system and features a 190 MHz Alpha microprocessor, 320 megabytes of memory and 8 gigabytes of disk storage. Kent began moving data from the existing IBM based NOTIS system onto the new DEC computer during the spring semester of 1994, and will finish the local installation during the summer of 1994. Shortly thereafter the DEC computer will be connected to the central computer and Kent State University holdings will be added to the statewide catalog. At that point Kent and Regional campus students, faculty, and staff will have full access to a state-of-the-art library and information system.

These public resources are complemented by extensive computing support provided to the faculty and staff through the Systems Office of Libraries and Media Services. All library faculty and many staff have PC workstations on their desks. Most hardware is 386 level or better and is

connected to the Libraries and Media Services LAN. A LAN file server dedicated to administrative use provides a full array of applications including (1) word processing, databases, and other office software; (2) local and Internet mail service; (3) terminal emulation for online access to NOTIS and other local and remote computer systems; (4) specialized information retrieval tools; and (5) standard utilities for accessing Internet resources.

5. Regional Campuses

The Regional Campuses have made a significant move during the past few years from a minicomputer-based to a largely networked PC-based academic computing environment. While every campus has had a VAX/7XX minicomputer for instruction and/or connectivity with the Kent Campus, most campuses today are removing them or discussing a target date for removal. Networking of microcomputers at all Regional Campuses has been accomplished exclusively with Novell Netware 3X software on 386 or 486 servers, using Ethernet protocol run on coaxial cable or 10-baseT on twisted-pair. Where multiple buildings are involved, fiber optic cable is installed. The microcomputer of choice has overwhelmingly been the IBM compatible. Macintosh or Apple computers are limited to some science and art areas. Access by dedicated telephone line to the Kent Campus IBM mainframe has received minimal use for instructional purposes. However, it is increasingly being used by students and faculty for electronic mail and Internet communication.

The general plan at many Regional Campuses is to purchase new microcomputers for student labs and provide faculty with the older computers for office use. Student labs are typically available from 8:00 a.m. or 9:00 a.m. to 8:00 p.m. or 10:00 p.m., Monday through Thursday, with Friday hours until 5:00 p.m. Five out of the seven Regional Campuses have Saturday hours but no campus has Sunday lab hours. More and more dependence is being placed on microcomputer software. The software of choice at the Regional Campuses includes WordPerfect, Lotus 1-2-3, dBase III+ and IV, Borland programming products, AutoCAD, PageMaker, and Harvard Graphics. Six out of the seven Regional Campuses participate in a Borland site license that includes all Borland products.

Most Regional Campuses look to the Kent Campus for many services including connectivity to library catalogs, data bases, and Internet resources. It is important that Regional Campuses provide the advantages of both a small campus environment and the resources of a major university.

Ashtabula. Almost all of the faculty at Ashtabula have computers in their offices. They still use a VAX 11/750, but it plays an increasingly smaller role. They have four computer labs with day and evening access and Saturday access until 4:00 p.m. Not all of the labs are networked.

East Liverpool. Only a few of the faculty have computers in their offices, but there is a faculty computer lab. Faculty still use the VAX 11/750. East Liverpool has four student labs in addition to the faculty lab, and all labs are networked. Students can gain access daily and some Saturday hours are provided.

Geauga. The ten faculty on this campus all have computers in their offices. They no longer use the VAX 11/750. All faculty computers and all computers in the student lab are networked. Access is daily with some Saturday hours.

Salem. Very few faculty have computers in their offices at this campus and there is presently no networking of student computers. Up to three computer laboratories are planned or under development and will become operational by August 1994. They still make some use of their VAX 11/750. Access to labs is daily but there are no Saturday hours.

Stark. Over half of the fifty-five faculty at the Stark Campus have computers in their offices. The VAX 11/780 is still used for teaching programming languages and communications. There are five student labs and all are networked. Many faculty office computers will soon be networked. This campus has daily lab access but no Saturday hours.

Trumbull. Essentially all faculty at Trumbull have networked office computers. The six computer labs are all networked. There are daily lab hours with some Saturday hours provided. There are over 200 microcomputers at this campus. Trumbull has maintained the largest VAX 11/780 minicomputer system but it too is scheduled to be removed from service.

Tuscarawas. Approximately half of the faculty at the Tuscarawas Campus have computers in their offices. The VAX 11/730 has been permanently removed from service. There is one general computer lab on campus accessible daily and some Saturday hours are provided.

INTRODUCTION

In its prime the agrarian society of the 19th century contributed much to the stability and wealth of the nation. However, this culture experienced profound change that affected its very roots as large segments of the society were displaced by advances in machine technology and farming methods. Continuous improvement in farming methods and technology brought multiple increases in productivity. In effect, each farm could produce more with fewer hands in less time, and as farm size and productivity continued to increase, the cost of food commodities decreased accordingly.

The manufacturing industry brought much wealth to the nation as well. Recently, it too experienced similar sweeping technological changes and vast improvements in methods of operation. Again large segments of the nation's society were disenfranchised or displaced by the enormity of these changes.

Today the wealth of the nation rests with the brain power individuals bring to the work environment. Just as agriculture, heavy manufacturing, and the service industry have changed, so too must our system of education. Higher education is now a $146 billion national

industry. Federal- and state-level political forces have sought improvements in productivity by suggesting alternate methods of management and accountability coupled with opportunities afforded by advances in technology.

Kent State University has responded to these pressures and opportunities in many ways. In January of 1994 the Strategic Plan for Academic and Student Affairs captured the salient actions that have been taken or will be taken in the near future to achieve significant improvements in methods of operation, delivery of instruction, and support of research. Information services and technology are important components of this plan which potentially can bring positive change and improvement to the University's academic environment.

In this climate of change the Academic Computing Study (ACS) was initiated by President Carol A. Cartwright and Provost Myron S. Henry as the second of two studies authorized to assess administrative and academic computing within Kent State University. The ACS team received its formal charge during September 1993 and met frequently through March 1994.

Provost Henry's charge for this second study focused on priorities and resource support requirements from the perspective of academic needs. Specifically, the team was asked to (1) assess academic computing and information services provided to Kent's students, faculty, and staff at the Kent and Regional campuses; (2) examine the role and responsibility of both Computer Services and the academic departments, schools, and colleges in providing current and future computing and information services; (3) identify policy and other issues pertinent to the goals of meeting the needs of the academic community and improving the quality of services provided; and (4) make recommendations regarding objectives and priorities, and provide an implementation plan which discusses distribution of resources to support academic computing services and systems.

The work of the ACS team has overlapped to some extent with the Network and Information Systems Study (NISS) completed in March 1993. The NISS team focused on administrative information technology and network infrastructure, whereas the ACS team has examined information systems and technology necessary to the work of academic departments, schools, and colleges (hereafter referred to as academic units). Importantly, while developing priorities for the future, the ACS team endorses the critical NISS recommendation which stressed the network infrastructure needs of the Kent Campus and the importance of enhancing electronic linkages across Northeast Ohio that connect all eight campuses of the University. The team supports computer resource integration, including the need for developing appropriate linkages to administrative data to better support advising and other strategic academic functions. The team endorses the need for ongoing strategic planning for both centrally managed, university-wide computing services, and distributed systems more appropriately housed in academic and administrative units.

One important central theme of this report is the need to provide significant academic input into the planning, priority setting, and distribution of resources that support both central and distributed

information systems and technology. The team also recognized the crucial importance of increasing both the accessibility and quantity of hardware and software available to students and faculty in academic departments. Finally, the team recommends that each academic unit articulate its strategic vision for technology and incorporate this vision into the formal academic planning process. As part of this process each academic unit must identify how it can contribute to the resource base required to meet future information system and technology needs.

Other previous plans and studies contribute to the conclusions drawn here. Complementing the work of the NISS and the ACS are the Network Plan for Kent State University submitted in October 1992 and the May 1992 Academic Support Systems Task Force (ASSTF) report. The Network Plan report focused on inter-building telecommunication concerns while the ASSTF report identified issues such as the importance of connectivity to enhance communication and training.

INTRODUCTION TO STRENGTHS, ISSUES AND IMPLICATIONS, AND RECOMMENDATIONS AND BENEFITS

The ACS team used site visits, questionnaires, and focus group sessions to gather information and opinions from the academic sector of the University. These observations and impressions from faculty, staff, and students identified many strengths within the academic computing environment. Many groups and individuals acknowledged that major progress had been made in advancing academic computing across the University during the past decade. Further, it was clear that the University had taken steps to implement several important overarching recommendations outlined in the March 1993 NISS report. This positive and immediate response was viewed as a major strength by team members and many participants in the ACS effort.

The major focus of any study and the methodologies used to conduct and support that study should emphasize the identification of issues in need of further work on attention. Thus, as a natural outcome of this process, an ambitious list of concerns and issues that need to be addressed can be expected. This result held true for the ACS study as well. The major effort of the team was to identify and articulate an extensive, but legitimate, list of academic computing issues and concerns which require attention at a variety of levels within the University community.

The team then deliberately examined all identified issues and prepared recommendations to address those concerns. The benefits of implementing the recommendations were identified and included in the recommendations section of the report.

Finally, it should be noted that the strengths, issues and implications, and recommendations and benefits sections were organized within the following five categories:

- Instruction and Research
- Communication and Networking
- Equipment, Resources, and Maintenance
- Support Staff and Training
- Policies, Planning, and Organization

STRENGTHS

In this study process, more time and energy were devoted to the identification of issues and the development of recommendations that to strength identification. However, the opportunities that were provided to participants did permit the team to identify several significant strengths found in the current Kent academic environment.

INSTRUCTION AND RESEARCH

1. Some academic units are involved in innovative uses of computing in support of the academic mission of the University. As a result:

   A. Some units are incorporating emerging computing and networking technologies into their research and instructional activities.

   B. Many units have been successful in receiving some outside funding or in-kind contributions for hardware and software.

2. Funding has been received to support the installation of a new statewide library and information system in 1994. As a result:

   A. Kent students, faculty, and staff soon will have greatly improved access to major academic and research collections throughout the state and to other important electronic resources via OhioLINK.

   B. The large holdings and extensive reference sources owned by the Kent libraries will be more widely accessible.

3. Audio Visual Services and Teleproductions employ a quality, service-oriented staff in support of classroom instruction. As a result:

   A. Many faculty use film and other traditional media in the classroom.
   B. An increasing number of faculty are beginning to incorporate video conferences, interactive video, and computer applications in instruction.

COMMUNICATIONS AND NETWORKING

1. The IBM ES9000 9121-732 provides a unified point of access to electronic mail and Internet resources. As a result:

   A. Faculty, staff, and student use of electronic mail is growing.

B. Faculty, staff, and students have increased awareness of the availability and value of Internet resources.
C. University internal and external electronic communication is supported.
D. The Internet is used to support classes and electronic office hours.

2. Local area networks (LANs) have been installed in several academic units. As a result:
A. The local LANs will serve as the foundation for connection to the campus network.
B. A platform is provided for the growing use of local electronic mail and Internet access.
C. LANs are encouraging the sharing of hardware and software resources.
D. Network-based computer applications are becoming available to more faculty, students, and staff.

3. The University has committed to the completion of the network infrastructure, recommended in the Network and Information Systems Study, as part of its strategic and capital plans. As a result:

A. The network infrastructure will permit LANs to be interconnected.
B. Communication and access to information from many sources will be simplified and enhanced.
C. CD-ROM data bases and other library resources will be accessible from remote locations.
D. It will be possible to quickly disseminate information and news to the academic community.

ISSUES AND IMPLICATIONS

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In this section the committee summarizes the concerns, needs, and problems that have been identified through the focus group sessions, survey responses, and site visits to each academic unit. Also highlighted are some of the major implications that should be considered if the University community is unable to respond to these issues.

INSTRUCTION AND RESEARCH

1. Existing facilities and equipment cannot adequately support the teaching of classes that make use of computer, network, information, and instructional technologies. In particular, there is need for redesigned and fully equipped teaching laboratories and classrooms that support hands-on technological instruction. Where these facilities are lacking, the opportunity to enhance the

curriculum through the integration of appropriate technology and hands-on experience is lost.

2. Faculty need more opportunities to acquire skills in computer, information, and instructional technologies. When these opportunities are not available, faculty are unlikely to employ innovative instructional technologies in their classes unless they do so on their own time and at their own expense. It is clear that many faculty need opportunities to learn about existing instructional software or time and resources to develop software to better support their instruction. Otherwise, little use will be made of instructional software and other technology to facilitate the learning process.

3. The potential benefits of computer-based instruction and multimedia technologies to the instructional environment have not been realized. Without budgetary support and faculty incentives, major progress in integrating these technologies into the instructional environment cannot be achieved.

4. Curricular programs in computer related fields need to provide hands-on experiences for students in current computer systems administration, network management, and client-server computing. Without the equipment and faculty expertise to support these curricular improvements, students will graduate lacking adequate preparation for careers in contemporary computing environments.

5. Kent needs facilities to provide more on-campus continuing education courses in computer technology and related applications. Without such facilities opportunities are missed to increase revenue, enhance the image of the University, obtain sponsorship from local businesses, and foster outreach to the community. In addition, competitiveness with local post-secondary institutions is greatly impaired.

6. The needs of faculty who require high-performance scientific computing equipment to accomplish their research are not always recognized by the University. Without access to such equipment, faculty will have difficulty in achieving research goals and acquiring external funding, thereby decreasing University competitiveness in attracting and retaining quality faculty.

7. Undergraduate students need more opportunities to gain hands-on experience with current discipline specific hardware and software. Without such opportunities, students are not well prepared for their chosen careers, thereby decreasing University competitiveness in attracting and retaining quality students.

8. All students need to acquire basic computer and information technology skills early in their University careers. Without assurance of such skills, instructors cannot assume students have minimal competence in computer applications to support course assignments. Thus, valuable course time is lost due to the necessity to teach basic computer-related skills.

RECOMMENDATIONS AND BENEFITS

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The ACS team carefully reviewed the statements of issues and implication found in the prior section of the report. Recommendations appropriate to the issue themes were developed using all information gathered through the ACS process. Current trends in academic computing were assessed through educational sessions sponsored by IBM and selected readings from a variety of publications focusing on instructional and research computing in higher education. These, coupled with the work of the previous Kent computing and networking committees, and the findings from the current ACS process enabled the committee to prepare priority recommendations for inclusion in this report.

BENEFITS

The study team, with assistance from the focus group participants, identified dozens of benefits that will result if recommendations are implemented. In this section, specific benefits are listed after each recommendation. There are also several overarching benefits to the University that would result from the systematic implementation of the recommendations. They include:

- improved motivation, retention, and satisfaction of students
- students better prepared for their careers
- graduates more competitive in the marketplace
- students better prepared to live and work in the computer and information
- age
- an improved placement record for the University
- improved instructional techniques
- enhanced recruitment of excellent students and faculty
- enhanced student, faculty, and staff productivity
- improved faculty research competitiveness
- decreased frustration and improved morale among students, faculty, and
- staff
- an improved image of the University

INSTRUCTION AND RESEARCH

1. Classrooms. Consistent with the goals of the Strategic Plan, all new and renovated classroom facilities need to be equipped with appropriate instructional technologies. The University should create instructional facilities that not only meet today's requirements, but are adaptable to future needs. Designing instructional facilities requires a holistic approach to the classroom environment.

The needs of students (e.g., seating, computer workstations) and instructors (e.g., user friendly teaching stations), as well as the room elements of networks, equipment, screens, lighting, air handling, noise, and their related controls, all

need to be considered. Identification of the appropriate classroom technology to support instruction should be incorporated into the annual planning process along with necessary technical and maintenance support. To that end, the Office of Facilities Planning and Operations should consult with academic units, Media Services, the proposed Advisory Committee for Technology (ACT; see Recommendation #27), the Space Committee, Physical Plant Services, the Office of the Registrar, and other pertinent parties to ensure that future classrooms are properly designed to support technological applications.

Standard Classrooms. These are defined as general purpose basic or traditional rooms that accommodate between twenty and 100 students. Permanently installed instructional technologies are minimal. However, the condition of all 172 general purpose classrooms on the Kent Campus should be assessed to ensure that each room has the following equipment and facilities installed and in good working order:

- chalkboard;
- projection screen (usually 70" x 70");
- overhead projector in portable cart;
- window treatment (opaque shades);
- light control, switches to control lights in sections, from front to back; electrical
- outlets, minimum of one duplex outlet, centered on front and back walls;
- network connection for voice, video, and data (centered on front wall).

In addition, the Kent Campus maintains seventeen lecture halls with a capacity of 100 or more seats and thirty-two seminar rooms, each with twenty or fewer seats usually arranged or designed in a conference setting with chairs and one or more tables. The condition, furnishings, and technological needs of these rooms should be assessed as well.

Master Classrooms. These are defined as rooms or lecture halls that may be linked via a campus network to a centrally located electronic media distribution system. Located in the room are a minimum number of instructional technologies and a control center located in a teaching station. These rooms, sometimes called multimedia classrooms, may accommodate from twenty to 100 students, or more if they are classed as lecture halls. The University should assess the current condition of each of these classrooms on the Kent Campus and should implement a plan to upgrade 2 percent of the total standard classrooms and lecture halls to master classroom status during each of the next five years. Thus, eventually 10 percent of the classrooms would be upgraded to accommodate the following media and technological applications:

- projection screen (electric);
- video/graphics projection system;
- overhead projector (option: visual presenter, desk-top);
- control panel (mounted in teaching station);
- sound reinforcement system with wireless microphone;
- microcomputer with CD-ROM;

- teaching station/equipment cabinet;
- laser pointer;
- electrical outlets and wiring to accommodate multiple pieces of equipment,
- including ceiling video/graphics projector;
- network connection for voice, video, and data;
- light control (incandescent and fluorescent with dimmers, or fluorescent with
- dimmers) with switches at teaching station;
- window treatment (opaque shades).

In addition, selected lecture halls should be equipped with computerized student response systems.

Computer Classrooms. These are defined as rooms that have a wide range of instructional technologies permanently installed, and a computer workstation for the instructor and for each student or grouping of two students, with a control center located in a teaching station, linked via a campus network to a centrally located electronic media distribution system. The Kent Campus should implement a plan to upgrade 1 percent of the total standard classrooms to computer classrooms during each of the next five years. Thus, 5 percent of the classrooms eventually would be upgraded to serve as computer based or electronic classrooms with each containing the following technological applications:

- projection screen (electric);
- video/graphics projection system;
- overhead projector (option: visual presenter, desk-top);
- video cassette player;
- video disc player;
- control panel (mounted in teaching station);
- sound reinforcement system with wireless microphone;
- microcomputer with CD-ROM;
- teaching station/equipment cabinet;
- laser pointer;
- computer tables and chairs;
- microcomputers (PC/DOS or Macintosh);
- electrical outlets and wiring to accommodate multiple pieces of equipment,
- including ceiling video/graphics projector;
- network connection for voice, video, and data;
- light control (incandescent and fluorescent with dimmers, or fluorescent with
- dimmers) with switches at teaching station;
- window treatment (opaque shades).

In addition, for classrooms where use does not justify permanent installations, portable teaching stations with computer, projection system, video cassette and video disc players, and CD-ROM player should be made available.

Distance Learning Classrooms. The renovation of Moulton Hall will

allow for the establishment of a first-class center for instructional technology and distance learning. It will be designed expressly to showcase the use of state-of-the-art educational technology. It will be supported by an integrated, comprehensive cabling system that will be able to handle all communications--voice, video, and data--within the building as well as between it and distant locations.

In addition to supporting the Moulton Hall initiative, the team recommends that Libraries and Media Services proceed with plans and use existing resources to convert the Audio Visual Services classroom into a two-way interactive audio-video distance learning facility. Further appropriate space, in proximity to Audio Visual Services, should be identified and converted into a hands-on computer based electronic classroom to support distance learning initiatives and education and training programs offered by both Libraries and Media Services and Computer Services.

BENEFITS:

The quality and efficiency of instruction will increase.

Students will receive more hands-on instruction, resulting in an improved learning experience.

When students see computers and related technology used effectively, they have better models for their own computer use. Computers will be more widely used in the classroom.

Faculty will be better positioned to use multimedia technologies to enhance the learning process.

Faculty will have added incentives to invest their time in computer-based innovation.

Faculty will face fewer environmental difficulties in attempting to use new technologies.

Faculty will have consistent and reliable access to appropriately equipped classrooms.

Less faculty time will be spent in equipment set-up in classrooms.

2. Continuing Education. Technology-equipped classrooms should be available for teaching continuing education courses and workshops in the areas of computer technology and applications. In addition to meeting community needs, such facilities also could be made available for faculty and staff training.

BENEFITS:

The University will have more opportunities to increase revenue and enhance its image.

There will be more opportunities to build relationships with and obtain funding from local businesses and other organizations.

Kent will be more competitive with nearby institutions.
Outreach to the local community will increase.

3. Instructional Development. In recognition of the substantial time required to develop and provide technology-based instruction, academic units and the Office of the Provost should provide incentives and workload reductions for faculty to engage in innovative instruction (e.g., summer instructional grants, merit pay, and credit toward promotion and tenure).

BENEFITS:

Faculty will be more likely to invest their time in the development of technology based instruction.

More faculty will incorporate computer, information, and instructional technologies in their teaching.

More faculty will implement new teaching methods based on technology.

Teaching will improve.

4. Multimedia Distribution. Computer Services and Media Services should investigate possibilities for distribution of multimedia. One option is to use the IBM mainframe as a central server. A possible problem with that solution is the potential loss of network performance. Another option for consideration is a distributed network of powerful workstations. Both methods should be investigated to determine costs and benefits. In an increasingly distributed computing environment, it is important for faculty to have reliable and convenient access to instructional tools such as multimedia applications.

BENEFITS:

The instructional use of multimedia will be promoted and increased. Faculty will be better positioned to utilize multimedia instructional tools.

5. Faculty and Staff Support Center. The University should establish a faculty and staff support center that contains multiplatform, state-of-the-art, instructional hardware and software, including a software lending library. The budget for this facility should be adequate to ensure timely installation of new technology as it emerges and to provide technical support for the facility. This facility should showcase the use of technology in teaching and provide hands-on training for faculty and staff.

BENEFITS:

More faculty will make use of available instructional software and other technologies to improve the learning process.

Faculty will be more likely to utilize new technologies in instructional efforts.

6. Student Education and Training. A Technological Education Requirement should be instituted for freshmen that would ensure student computer literacy by developing competency in areas such as word processing, spreadsheets, databases, e-mail, and accessing Internet resources. It is recommended that these skills be applied where relevant into existing courses. An example is the emerging integration of word processing into English composition.

BENEFITS:

Students will gain skills in computer use and information access.

Students' computer anxiety will be reduced.

Students will acquire basic computer skills early in their academic careers.

Faculty will know that all students have a minimum level of computer skills enabling the incorporation of computer based assignments into course work.

Faculty can give assignments that are too time consuming if done manually.

There will be less competition between acquiring computer skills and the academic content of courses.

Students will be better positioned to pursue advanced courses involving computer technology.

More students will be able to use technology to increase their chances of success and to advance their academic and professional careers.

7. Discipline-Specific Needs. Students need access to hardware and software that are as current as that normally used in the professions for which they are being educated. For instance, some students need access to state-of-the-art CAD/CAM systems while others need access to experimental networks that can be used to learn systems and network operations. Academic units should recognize this need and budget for the necessary equipment and software.

BENEFITS:

Students will have the opportunity to learn the most up-to-date applications in their chosen fields.

Students seeking employment where current technology is used will be more marketable.

The quality of courses in computer and network technology will be enhanced through hands-on experience for students.

Employers will be assured that students have a basic level of computer literacy.

COMMUNICATIONS AND NETWORKING

8. Campus Network. This committee concurs with the Network and Information Systems Study recommendation that,

The University should recognize that a University wide network is becoming a required utility (like water and heat) for the survival of a modern campus. The network should be ubiquitous, reliable, and provide adequate capacity to support voice, data, and interactive video communications.

Assuming the completion of the campus backbone it is imperative that connection

of offices, classrooms, labs, and rooms in residence halls to the Kent Campus network should be a top priority in order to provide access to campus and global educational resources. Such connection is required for the network to be used for online course discussions, delivery of class assignments, course based research, student-faculty communication, and access to library resources. Connection of LANs to the network also will allow the sharing of resources such as specialized hardware and common software.

BENEFITS:

Overall support for the emerging technological needs of the University will be improved.

It will be possible to achieve the plan for classroom network access.

Students and faculty will have easy access to OhioLINK and other national, state, and local computer-based resources.

Students and faculty will have remote access to the library CD- ROM data bases.

Students will have enhanced access to televised education and entertainment programming.

9. Future Network Enhancements. First, University support of the widespread use of multimedia will require more bandwidth for LANs and more power for workstations. Second, the University should plan for the growing use of personal laptop computers by providing points of power and network access across the campuses, recognizing security requirements for both the laptops and the network.

BENEFITS:

The growth of multimedia use will not be slowed by lack of power and bandwidth.

Classrooms and student workstations will be able to use multimedia, providing both an in-class experience and an opportunity for further study for the student.

Students will be more likely to purchase laptop computers, knowing that they can connect to the campus network from a number of locations. Expansion of computer use will be supported.

As new applications and hardware become available, students and faculty will be positioned to access, retrieve, and manage data from local and remote sites.

10. Electronic Mail and Network Access. Since the current IBM mainframe is not suitable for thousands of e-mail users and cannot adequately support the VT100 emulation required for more sophisticated Internet access applications such as remote login (telnet), electronic mail should be migrated from the mainframe to user friendly LAN based systems connected to the Internet. An interface is needed to provide both menu driven access to enhance friendliness for beginners and direct command options for experienced users to enhance speed and response time. An electronic mail directory service should be developed on a

UNIX platform to enhance the mail system, allowing users to address mail by name (e.g., susan.b.anthony@kent.edu). In the ultimate distributed LAN based environment the server could be used to forward mail to the appropriate LAN thus enabling transparent correspondence between incompatible mail systems on different LANs. It would also reduce the need for individual LANs to maintain full e-mail directory information on all University users. The UNIX system would also be used as a main platform for campus-wide mail and Internet access and as a central node for a distributed campus wide information system.

BENEFITS:

It will be possible for all students and faculty to have e-mail accounts, promoting e-mail as a communication tool.

Students and faculty will be able to incorporate the resources of the information super highway (e.g., electronic journal articles) into their work.

Communication between students and faculty both at Kent and other institutions will, in some cases, be further facilitated and in other cases, made possible.

Students and faculty will gain a better appreciation of the concept of a global village.

E-mail will be easier and faster to use.

Response times during peak periods will be improved.

11. Dial-In Access. University dial-in modem lines on the Kent and Regional campuses should be connected to networked terminal servers instead of individual computers in order to enable transparent access from all locations to all University computers and local area networks. These dial-in connections should be enhanced to support direct Internet connection using protocols such as SLIP or PPP. In view of the greater role of computing, increasing demand from students and faculty for remote access will necessitate constant expansion of the number of dial-in lines.

BENEFITS:

Students and faculty will have greater success in dialing in to the campus network.

Students and faculty will have better access to the resources that they need.

Remote access to University resources will be greatly facilitated.

EQUIPMENT, RESOURCES, AND MAINTENANCE

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12. External Funding. The University should engage in development efforts

to secure additional external funding to upgrade teaching and laboratory environments.

BENEFITS:

It will be possible to enhance some teaching and learning environments in ways not otherwise achievable.

13. Funding for New Equipment and Maintenance. Ongoing funding needs to be provided for the purchase of new equipment, equipment replacement, and maintenance for discipline-specific applications. Equipment acquisitions should take into account the rapidly increasing requirements for capacity and functionality occasioned by recent software and multimedia advances. Academic units must recognize that maintenance should be given a higher priority in the budget, so that there is adequate funding of departmental lines to manage equipment maintenance. Academic units, in consultation with the proposed advocate for academic technology (see Recommendation #26), should periodically review the need to upgrade or replace aging equipment. The advocate, with the assistance of Computer Services, should investigate alternative ways to contract for maintenance and repair, for example the use of off-campus vendors with centralized coordination and quality control. The advocate should review the pricing structure for service contracts offered by Computer Equipment Services to ensure they remain competitive with outside vendors.

BENEFITS:

There will be significant improvements in equipment repair practices.

Equipment repair will be more timely.

Unit expectations for maintenance and support will be more closely met.

Equipment will be more cost effectively utilized.

Computing equipment will receive better service.

Equipment will be more reliable and down time will be reduced.

14. Central Pool of Equipment. In cases where low departmental usage does not justify acquisition, the department should work with Audio Visual Services (AVS) to borrow equipment from a central pool when needed. Funds should be made available to academic units and/or AVS to acquire and support commonly needed hardware and software.

BENEFITS:

More specialized instructional technology will be used in the classroom.
Support for grant proposal presentations and field research will be increased.

15. Peripherals. At least one network/LAN connected laser printer should be provided in each academic building.

BENEFITS:

Access to quality printing will be improved.

Travel time to laser quality printing facilities will be reduced.

SUPPORT STAFF AND TRAINING

16. Central Help Desk. A central help desk with a single phone number should be available sixteen hours a day to answer a wide variety of questions on any computer related topic. The caller should not be referred to another person unless they are specifically seeking the contact person in their department. Ordinarily, the help desk staff should either be able to answer the question or pass it on to someone who will contact the caller. A data base of frequently asked questions should be maintained so that a student could staff this desk most of the time. This data base would also contain the names of contact people in all units. A bulletin-board should be available for both the help desk staff and the general user, so that answers not available in the data base and not known to the help desk staff could be sought. Online help should be available to reduce the level of expertise needed locally to use available systems.

BENEFITS:

Users will get effective support for computer applications when needed.

The use of computing resources will be facilitated.

The effect of variations in levels of expertise in labs will be minimized.

The University will be perceived as having a well-run, comprehensive, efficient, customer oriented support service for computing.

User frustration will decrease, and productivity will increase.

17. Faculty Development. The administration and the faculty share the obligation for faculty learning about ways in which technology can be applied to their disciplines. The administration should ensure that the faculty have the opportunity to attain a basic level of computer and technological literacy appropriate for their disciplines. Faculty professional development plans should incorporate provision for time to develop skills in basic and advanced computer usage. Basic support services needed to integrate technology into the curriculum should be identified and provided at the University level. Academic units should identify and provide for the specialized instructional support needs of their faculty.

BENEFITS: SEE #18 (BELOW).

18. Faculty and Staff Training. Academic units should schedule training for faculty. Staff should be given formal release time to take advantage of available training. Academic units should be encouraged and supported in their efforts to offer technological training related to their discipline.

BENEFITS:

Faculty will be more familiar with the technological tools used in their

disciplines and will be better able to remain technologically current.

Faculty will be better able to provide relevant technological education to students.

Staff will have better opportunities to acquire the skills they need for accomplishing their jobs.

Staff talent will be developed to its fullest potential.

More training will be available for faculty and staff who want it.

More faculty and staff will take advantage of existing training programs.

19. Instructional Workshops. University classes for basic skills such as computer fundamentals, word processing, spreadsheets, data bases, and e-mail should provide in-class, hands-on experience. These classes could be a part of expanded Continuing Education offerings or given as shorter workshops.

BENEFITS:

Training will be available when needed.

Students, faculty, and staff will receive the support necessary to become technologically literate.

20. Learning Tools. Computer Services should provide self-paced learning aids such as online tutorials, computer assisted instruction, or videos. These aids need to be available for the multiple platforms, operating systems, and applications that exist in the University.

BENEFITS:

Support will be available at the most critical moment--when there is an immediate need to know.

Users will be able to pace their learning to best fit their own styles.

21. Academic Unit Initiatives. As academic units make necessary moves toward more sophisticated computing environments, they need to anticipate the greater level of technical expertise needed to support LANs, multimedia software, etc. Academic units should ensure that technical expertise is available to support computer hardware and discipline-specific software. They may arrange for support by employment of full time systems support staff, shared support staff with other units, formal arrangements with their college or Computer Services, or, when appropriate, on-load assignment to designated faculty. The names of staff assigned support roles should be made available to the entire University community through a centralized help desk. Academic units should have formal backup arrangements for mutual support across a cluster of similar units.

BENEFITS:

Technical support for local computing will be more even and consistent. Faculty will spend less time handling support tasks.

Networks and core systems will be better managed and maintained. Fewer

ad hoc demands will be placed on Computer Services. Academic units will be more likely to acquire and maintain current technology.

Potential LAN problems will be anticipated prior to a complete failure of a LAN application.

22. Local Staffing. The Office of the Provost, colleges, and independent schools need to work in partnership to allocate funding to meet the growing academic unit technical support staff needs.

BENEFITS:

The quality of support for faculty and students, especially for discipline-specific applications, will improve.

Response time for problems and training will improve.

More one-on-one help will be available when needed.

23. Computer Lab Staffing. Academic units need to revise current staffing policies to provide staffing on evenings and weekends. The lack of lab availability in the evening and on weekends inhibits the use of technology by students who are time or place bound. Student lab monitors should receive adequate and formal training appropriate to their assigned responsibilities. This training should begin early in each academic year. Centralized training should be provided for software that is used across units of the University while local training should be provided for discipline-specific software.

BENEFITS:

Labs will be available more hours for students.

Commuter students will have greatly increased access to computing resources.

Students will spend less time queuing for high-demand resources.

Computer resources will be used in a more cost effective manner.

Lab hours will be more consistent across each campus.

Lab monitors will be better able to assist users.

Assistance available at all labs will be consistent and reliable. Students will have more convenient access to computing resources needed to complete assignments.

24. User Groups. Computer Services should encourage the creation of groups of users to provide mutual education and support. A user group of academic lab managers should be formally established as a subcommittee of the Advisory Committee for Technology.

BENEFITS:

Quality of lab support will be more consistent.

New and experienced lab managers will have formal channels for exchanging information and support.

Decisions concerning the management of labs will be in concert with the overall computing and technology goals of the University.

POLICIES, PLANNING, AND ORGANIZATION

25. Importance of Academic Computing. The University should recognize that, as a student centered organization, priority should be given to acquiring computing equipment for the departments, colleges, and centralized facilities that serve students and for the faculty who educate them. Future reallocation of funding should reflect the positive role that academic computing must play in the instruction and education of students. University policies regarding acquisition of computer resources should appropriately recognize academic computing within the context of other pedagogical resource needs.

BENEFITS: SEE #27 (BELOW).

26. Structure. Given the current organizational structure of the University and the increasing role of decentralized academic computing, significant research and instructional computing responsibilities lie within academic departments, schools, and colleges as well as Libraries and Media Services and Computer Services. As a result, there is a need for advocacy and overall coordination of academic technology activities. Therefore, a director for academic technology advocacy should be appointed, reporting to the Office of the Provost with coordinating ties to the vice president for Business and Finance. This advocate should promote collaboration among those responsible for academic technology within all areas of the University.

The recommended duties and responsibilities of the advocate should include:

1. Provide advocacy for advances in computing and instructional technology;
2. Develop and recommend policies, procedures, and standards for academic computing and instructional technology;
3. Develop plans for meeting the needs of academic users in coordination with academic and administrative units, including Computer Services;
4. Promote the migration to a distributed academic computing environment with local and centralized consulting support;
5. Coordinate management and operation of the Moulton Hall distance learning and instructional technology facility;
6. Monitor and update the University's computing plans on a biennial basis;
7. Identify and recommend core academic software that is to be supported by Computer Services. This should be done on an annual basis in coordination with the director of Information Systems and Technology;
8. Identify, recommend, and negotiate contracts for academic software in cases where the University would benefit from university-wide site licenses;
9. Establish standing or ad hoc subcommittees as needed;
10. Advise the provost, the vice president for Business and Finance, and the Educational Policies Council on academic and instructional technology;
11. Serve as co-chair of the Advisory Committee for Technology (see # 27).

BENEFITS: SEE #27 (BELOW).

27. Advisory Committee for Technology (ACT). In recognition of the central role of technology in the achievement of both the University's academic and administrative missions and because both the provost and vice president exercise budgetary control over computer purchases, it is recommended that the charge of the NISS-recommended Technology Policy Advisory Committee (TPAC) be expanded to include advising the provost and the vice president for Business and Finance. The committee should be called the Advisory Committee for Technology (ACT). The committee's primary charge should include advising on policies, standards, and resource allocation priorities relating to information technology, instructional technology, network communications, and related technological areas. ACT should also call for, rank order, and recommend instructional technology incentive proposals from faculty for training, equipment, or software (see Recommendation #3).

It is recommended that other ACT charges include the following:

1. Serve as advocate for constituency information systems, academic computing and instructional technology needs, incorporating them as appropriate in recommendations;
2. Serve as a resource and review group for implementing information systems, instructional technology, and network communications facilities.
3. Advocate and promote advances in technology and network communications.

The membership of ACT should have seven ex officio members, who serve by virtue of their position. These are the:

- Director for Academic Technology Advocacy (Co-chair of ACT)
- Associate Vice President for Business and Finance (Co-chair of ACT)
- Vice Provost and Dean for Research and Graduate Studies
- Dean of Libraries and Media Services
- Director of Information Systems and Technology
- Director of Network Services for Regional Campuses
- Undergraduate Student Senate Representative
- Graduate Student Senate Representative

The vice president for Business and Finance, with the approval of the provost and the advice of the Faculty Senate, should appoint individuals representing the following constituencies for two-year overlapping terms:

- one college dean
- one chair or director from an academic department or school
- five faculty, to represent the four colleges and one independent school
- four administrative directors, to represent Business and Finance, Human
- Resources, Student Affairs, and University Relations
- one computer support staff member from a local academic unit

In appointing members, the vice president for Business and Finance should be mindful of the diversity of technological requirements and platforms used by the academic and administrative constituencies of the University, as well as discipline specific needs and the unique environments of the eight campuses.

The ACT can establish subcommittees to address specific needs it defines. Because the lines between academic and administrative computing are blurring, it is not advisable to have permanent standing committees related to either academic or administrative computing; rather, all committees must realize the mission-critical importance of academic computing and plan, organize, and implement computing and technology to further the instruction and professional development of undergraduate and graduate students. It is quite possible that subcommittees might be formed around technical/applied issues as well as academic/administrative ones.

ACT members should be proactive and seek input from their University community constituents. ACT should establish an electronic LISTSERV for committee communication and a Kent State University Newsgroup that allows users to communicate quickly and easily with the ACT and each other. The Newsgroup should be used to report back to individuals and constituencies about recommendations made and actions taken. The ACT membership should be publicized so that students, faculty, and staff know whom to inform about issues that need attention. Policies, standards, priorities, and guidelines endorsed or established by the ACT should be made available online and published in CONNECT.

The proposed reporting structure for ACT works through the director for Academic Technology Advocacy to the provost and through the associate vice president for Business and Finance to the vice president for Business and Finance. The solid lines indicate reporting relationships while the dotted lines indicate advisory relationships.

BENEFITS

The use of computing and instructional technology in the classroom will be enhanced with the support of an academic advocate

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Morale of faculty members will increase as they perceive their concerns are being recognized.

Interdisciplinary cooperation will be facilitated.

Information about computing problems will be available to all.

A Newsgroup will provide a way for currently unrecognized experts (students, faculty, or staff) to share their knowledge to the benefit of the University.

Information about computing purchases will be readily available.

Expanding the role of ACT will help ensure broad-based University participation in plans, priorities, and standards for information technology, instructional technology, network communications, and administrative computing.

28. Campus Wide Information System. An online system that can be used to communicate campus information to the entire University should be implemented by Computer Services and Libraries and Media Services. Examples of information available would be: catalog course descriptions, Schedule of Classes, syllabi for each course/instructor, key contact faculty or staff in various offices, current campus news, the campus bus schedule, a directory of students, faculty, and staff, including e-mail addresses, etc. Such a system would also provide access to external information sources, such as OhioLINK and other library systems, other campuses, gophers, and freenets.

BENEFITS:

Important information about the University will be much more widely and conveniently available to current and prospective students and faculty.

29. Planning. The annual planning process should include consideration of the role and use of technology in support of the mission of the academic units. As part of the formal planning process, faculty should be provided opportunities to identify specialized hardware and software requirements for their academic units. Chairs and directors should consider those needs and include them in the annual planning reports. Operating budgets that include funding lines for academic computing should be earmarked and safeguarded. Capital budget planning should make provision for the installation of network connections in every office and residence hall room, regardless of the age of the building.

BENEFITS:

University computing equipment, software, and facilities will be more current.

30. Acquisition of Discipline-Specific Technology. A plan and strategy should be developed and implemented to provide every faculty member with a computer that is appropriate to his or her instructional and research activities. Also, plans and implementation strategies need to provide for the acquisition and support of UNIX and Macintosh platforms and evaluation of alternative PC platforms (e.g., Windows, Windows NT, OS/2). The needs of faculty for high-performance computer resources should be identified and the most cost effective means of meeting these needs should be articulated.

BENEFITS:

Faculty will have the computing resources they need on campus.

Fewer faculty will be forced to rely on home computing equipment.

More faculty will be present on campus a greater number of hours each week.

High-end users will have better access to high-performance scientific computing.

More faculty and staff will use new high-end technology.

More faculty will be positioned to achieve complex research goals.

Faculty competitiveness in acquiring research grants will be improved.

There will be more support for the inclusion of equipment acquisitions in grant proposals.

Students and faculty who prefer non-DOS systems will have other options available to them.

UNIX systems will receive more central support.

There will be more self-sufficient users of high-end workstations.

31. Budget Considerations. University policy should encourage budget carry-forward plans to ensure better acquisition decisions in support of purchases and upgrades to new technology. In order to maximize efficiency, bureaucracy inherent to the selection and purchasing process should be reviewed and streamlined as much as possible. Coordination of computing hardware and software specifications, quality standards, and service needs should be instituted to ensure that the purchasing process adequately considers the issue of value which is comprised of numerous elements, including cost, functionality, and service quality. Because of the rapid rate of technological obsolescence, the University should amortize equipment over an appropriate time frame. A funding plan needs to be developed to ensure continuous improvement in the rapidly changing computer related technology field. Also, this plan should take into account the total cost of using computers, including the cost to purchase and install hardware and software, train users, maintain, and replace or upgrade equipment, etc.

BENEFITS:

Academic units will be positioned to make better purchasing decisions with an added emphasis on overall suitability of the equipment to meet its intended use.

Academic units will be able to make better use of bulk discount opportunities and to take advantage of offers requiring a speedy response.

There will be less reliance on obsolete or otherwise inadequate equipment.

Access to computing resources will be improved.

Overall equipment costs will be lower.

Maintenance costs will be lower.

Purchases of equipment will be more timely.

RECOMMENDATIONS AND BENEFITS ... CONTINUED

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32. Alternative Instruction. Research in the use of alternative instructional delivery systems should be reviewed and augmented as a means of achieving the

mission of the University. Although few focus group and survey participants raised the issue, distance education has enormous potential to transform higher education. Both methods of delivery and areas of focus (within and beyond the Kent system) need to be considered.

Many questions and issues pertaining to faculty and distance education need to be addressed. These issues include socialization, sense of community, social mentoring, credentialing, liberal arts education, consumerism, and academic mentoring. There are many planning issues, including the role of administration, faculty, students, and technical support staff; the potential impact of both importing and exporting alternative education; and the need to ensure that funding does not detract from existing programs of strength. Environmental assessment and a needs study should be undertaken to identify Kent's niche and to determine the level and extent of the resources the University should commit to the development and support of alternative instructional delivery systems.

Quality issues include curricular oversight, personal interaction, evaluation, availability of resource materials, teaching methods, and faculty credentials. There are technical quality issues, including adequate technical support staff and equipment, adequate staff at distant locations, and interactiveness. Faculty incentives must also be considered, possibly in terms of double workload credit, compensation, and development release time/workload credit. Student needs include advising (course, career-related), technical support, and administrative support. Curriculum issues need to be considered, including types of courses to be offered (lab, lecture, seminar), type of technology that can be used, size of class/participation, office hours, distancing of faculty from students, and grading.

Responsibility for examining these and other issues should be assigned to a person who would coordinate and foster the activity of those faculty and staff interested in distance education and act as an advocate for it. In addition, a joint subcommittee of the Teaching Council and ACT should be established to advise and participate in planning and implementation. The majority of subcommittee members should be faculty.

BENEFITS:

The University will build the expertise base needed to design, support, and implement alternative instruction.

The University will be positioned to be a player in the distance education environment.

33. Classrooms. In consultation with the ACT, academic units should define minimum technological requirements for classroom computer equipment. These minimum configurations should include consideration of: networked computers with a control console and separate instructor's monitor, computer projection monitor systems and access to multimedia devices and products. These standards need to reflect the diversity of platforms used in the curriculum and numerous ergonomic considerations. To better support existing and emerging technological applications, the Space Committee should be apprised of classroom and labs with substandard configured space. Selected space should be configured to serve as both open computer labs for general student use and as classrooms for computer-related instructional purposes. The first installation of a fully mediated classroom should be promoted to enhance the reputation of the University and to seek funding for additional classroom upgrades. In turn, these improved facilities

should be used as part of the University's out-reach and continuing education program.

BENEFITS:

Current and emerging instructional techniques involving technology will be better supported and encouraged.

There will be improved opportunities for occasional scheduling of class meetings in a computer lab.

Use of technology will increase student learning and improve retention.

34. University Hardware and Software Standards. The academic technology advocate should develop University-wide standards to ensure that all lab equipment is able to run commonly used programs. Minimum standards for computer lab services should be established and met. The University should subsidize a portion of the cost to achieve and maintain minimum software standards and the basic hardware needed to support this software.

BENEFITS:

There will be fewer brands of computers and related software to support.

Lab users will be able to rely on having consistent basic equipment, software, and services in labs.

Occasions of disk and file format incompatibility will be reduced, resulting in less re-entry of data.

Students will have greater incentives to use computers in course-related activities.

Fewer software applications will result in less training time needed to accommodate all versions.

The number of unnecessary exposures to license infringements will be reduced.

Purchase decisions for new software versions will be better and more timely.

35. Student Ownership. Business and Finance, in cooperation with academic units, should support and enable students who want to purchase their own computers for general computing applications. Students should be provided with information regarding local and remote network connections so that they can ensure that their computer is able to connect to the University network. Such computers should be suitable for running general purpose software, (e.g., word processors, spreadsheets, and data bases), but may also require capabilities related to particular disciplines. Academic units should seek consensus regarding hardware and software appropriate to the discipline so that prospective and current students who seek to purchase their own equipment can be properly advised. Part of this effort would include the publication of systems that would be maintained by the University in terms of training, support, and purchase programs, and would also include the wiring of residence hall rooms for network access. Business and Finance, in cooperation with academic units, should coordinate student purchase

programs so as to reduce costs to students who choose to purchase their own equipment and should investigate the feasibility of creating an on-campus computer store.

BENEFITS:

Students will receive strong encouragement to purchase computers, enhancing their own experiences and lessening demand for computer labs.

Students who own computers will be better able to take advantage of training, learning tools, and increasingly available network resources.

36. Workplace Environment. Plans for computer acquisition should take into account the need for proper ergonomics in order to avoid the possibility of computer related health problems. The University should retrofit furniture and work areas where computers are located, including classrooms and labs, so as to enhance usability. The University should identify the technological and access needs of students with disabilities and address the needs as identified.

BENEFITS:

Work spaces will be more conducive to productivity and efficiency.

The possibility of physical injury to students, faculty, and staff will be reduced.

Equipment is less likely to be damaged.

Federally funded projects will be housed in more appropriate environments.

The University will enhance its compliance with the Americans with Disabilities Act of 1990.

Students with disabilities will have better opportunities to use computing resources.

Recruitment and retention of students with disabilities will be improved.

37. Infrastructure. Plans for computer acquisition should take into account the infrastructure necessary for the installation and use of equipment. This includes issues of power, network connections, and security. University infrastructure planning efforts should recognize that substantial deferred costs occur when inadequate provisions are made for current and future instructional technology needs (e.g., power, lighting controls, window covers, conduit, cooling, and telecommunications). In order to ascertain current and future technological needs of the academic community, the Office of Facilities Planning and Operations should consult with the Director of Information Systems and Technology and the academic computing advocate as well as the units affected as academic buildings are being built or renovated.

BENEFITS:

Costly and time consuming post-construction modifications can be avoided.

38. Position Descriptions. In view of the strategic importance of computing to the future of the University, departmental handbooks should provide information regarding workload equivalents for faculty who engage in management or support of computing resources. The University should establish guidelines to ensure that jobs in academic units are properly graded to reflect the technical roles that staff are performing. Position descriptions, grading, and reward structures should reflect and encourage the role of experts in mentoring other users.

BENEFITS:

Faculty with computing expertise will receive appropriate recognition for time spent to support and maintain hardware and software within their academic units.

Knowledgeable individuals from one unit who provide installation and user support for other units would be more likely to receive formal recognition or compensation.

39. Computer Services. Given the growing diversity of specialized hardware and software, it will be necessary to identify a limited number of standard configurations that will be supported by Computer Services. General purpose University labs and the software available in those labs should be supported by Computer Services. Software that has been designated as meeting University-wide standards should be supported by Computer Services. Computer Services needs to provide UNIX and Macintosh support to the University community in addition to the present PC and mainframe support. Given the current environment, there is a need to better manage/oversee increasingly distributed computing resources and to increase the consulting role of Computer Services. The developing role and function of Computer Services within the academic environment should be articulated and communicated to the University.

BENEFITS:

Faculty and staff will develop a common understanding of the mission of Computer Services and a more realistic view of the level of support available.

40. Copyright Concerns. The University should provide a copyright clearance service to ensure that software users and producers are in compliance with the appropriate laws. A review of University policies regarding copyright laws and ownership of software and multimedia developed by faculty, staff, and students needs to occur to ensure that they reflect technological advances. Faculty who use the emerging technologies need to be kept informed of changing laws regarding copyright.

BENEFITS:

The potential for copyright infringement and related legal actions will be reduced.

There will be a clearer understanding by both faculty and the University of the rights of software authors.

41. Fees. It is very difficult for the committee to endorse additional fees for computing. Kent already has the second-highest fee structure in the state. The current general fee structure includes a number of general fees (student organizations-$12.00, publications-$0.56, student leader compensation-$0.27,

athletics-$97.00, intramurals-$15.00, student center-$68.75, health center-$40.00, athletic facilities-$80.00, medical services-$2.00, bands-$1.50, bus-$41.50, theatre-$0.50, and registration services-$7.50). In addition there are numerous course fees and miscellaneous fees for which students are responsible. Endorsement among survey respondents for a new fee to support computing was limited. The survey item was, "How much need is there for the University to institute a new instructional fee to support computer and hardware?" Among students, the responses were "None" - 37 percent; "Little" - 30 percent; "Moderate" - 23 percent; and "Extensive" - 10 percent. Faculty and staff responses were more evenly divided--49 percent responded "Moderate" or "Extensive." If a fee is instituted, it should be earmarked for support and improvement of academic computing.

42. Facility Access. Present University building security policies that inhibit access to scarce resources should be reviewed and revised as appropriate to provide more cost effective utilization of computing resources. As new labs are planned, consideration should be given to evening and weekend access and to using the Kent Card recommended by the Network and Information Systems Study to control building access.

BENEFITS:

Students and others who need or want to use labs will have increased access.

43. Universal Student Accounts. A computer account should be established for every student upon request, and this account should persist until the student is no longer active. This account should enable all students to use e-mail and Internet information resources through a UNIX-based system.

BENEFITS:

Students will learn to use resources they likely will use after graduation.

The University will gain an image as a place that provides state-of-the-art Internet access.

44. Distributed Computing. The University should move toward a distributed academic computing environment in which all classrooms, labs, residence hall rooms, and faculty and administrative offices are connected to the campus backbone. Academic Computer Services should migrate applications to an open computing environment, such as UNIX in order to facilitate their ultimate transfer to distributed platforms. Ultimately, the role of Academic Computer Services would evolve from that of a hardware and software provider to that of a centralized consulting and support service for computing systems distributed in academic units. Academic units will be responsible for management and support of local distributed systems.

BENEFITS:

Connectivity will increase and enhance access to remote information.

Distributed systems will provide a better access path from academic units to centralized systems.

Intra-unit communication will be enhanced.

IMPLEMENTATION PLAN

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Solutions to the technological challenges facing the University lie in the ability of the University community to better articulate the options and resource requirements for academic computing and technology. The logical assignment of responsibilities for meeting needs and the establishment of a well-defined balance of effort between central and distributed information systems and services must be determined and implemented. Much work will be required before the next century to meet the particular computing needs of each discipline. This will necessitate a major realignment of allocations across all sectors of the University to achieve noticeable progress and positive change in the instructional processes.

The following table states the estimated costs of implementing the more important recommendations proposed by the team over a five-year period. There are many recommendations which do not have a cost that can be estimated, as they involve either shifting priorities, changing job duties, or simply investigating areas in more depth. In addition, many of the recommendations will require very different expenditures in each of the next five years, with some items costing more in the beginning, while others will require more resources in later years. Further, it should be recognized that many of the costs in this plan may be part of current academic operating budgets or may be met through external funding, such as grants and house bill monies.

The single most complicated area involves classrooms. Currently, the Kent Campus comprises seventeen lecture halls, 172 general purpose classrooms, thirty-two general seminar rooms and numerous teaching labs. (See Current Environment - Kent Campus Classroom Facilities section, page 11). The Regional Campuses have a combined count of 124 general purpose classrooms. Problems arise when trying to decide on a standard classroom design while recognizing disciplinary differences. In the final analysis the team believes each general purpose standard classroom, lecture hall, and seminar room should be assessed to ensure that they meet minimum standards. Further, 10 percent of the classrooms should be upgraded to accommodate selected technological applications and 5 percent should be upgraded to serve as computer-based classrooms. Thus, all classrooms should be designed and maintained to enhance current and evolving teaching methods. While some of these teaching facilities would become equipment intensive in the near term, once the campus network is in place, multimedia applications may be implemented more efficiently from a central distribution system, a potential function of the mainframe. The projected expenditures for classrooms reflect many of these concerns.

Although it is fairly straightforward to calculate approximate costs for items to be placed in classrooms, it is more difficult to estimate the cost of connecting all rooms to the campus backbone, or the cost of obtaining and maintaining adequate computing facilities. Therefore, some cost figures are predictable while others, of necessity, are simply estimates.

Finally, it should be noted that the figures in the table represent the best estimates available at this time. There are many factors that could cause the figures to be altered at some future date, including changing academic programs, needs, costs, and products.

Faculty and Student Survey Results

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For the purposes of this study the team designed two survey instruments, one for faculty/staff and one for students (see Appendix C). These instruments were designed to assess opinions about computer hardware and software availability and need. There were 2,174 faculty and 5,674 student survey instruments distributed. Faculty and staff returned 655 surveys and students returned 2,398 surveys, yielding response rates of 30% and 42% respectively. In most cases faculty and student survey questions were parallel in construction. However, where the content was not applicable for both groups, individual items were designed to elicit responses unique to each group.

Faculty. Survey forms were distributed to all faculty at each of the eight campuses. Among the respondents there was good representation across all academic ranks.

Students. Student survey forms were distributed to academic units at all eight campuses. A sampling procedure was used to obtain responses from lower division (including Liberal Education Requirement courses), upper division, and graduate level courses. Student responses were received from all academic units. Upper division students were more heavily sampled than lower division students because it was assumed they would have a more complete perspective on computing issues within their academic disciplines. Graduate students account for approximately 20% of Kent's student population and were proportionately sampled.

The total student population of the Kent Campus is divided approximately in thirds by those who live on campus, those in off-campus housing near the University, and those who commute. Figure 3 illustrates student response rates by residence category. The number of commuting students is significant to the study because of the importance of computer lab locations and hours of availability to these students.

The response profile of faculty and students from the Kent and Regional campuses was very similar. Approximately 74 percent of the responses were obtained from the Kent Campus and approximately 26 percent of the responses were obtained from the Regional Campuses.

The survey response format presented questions which required faculty, staff, and students to indicate the intensity of their use of a perceived need for items listed after each question, selecting from a range of four terms: extensive, moderate, little, or none. Graphs in Appendix F illustrate only the percent of valid responses for each item that was answered "extensive" or "moderate." Faculty/staff responses are shown by the solid bar and student responses are shown by the shaded bar. (Please note that the questions in items 12 through 16 were different for faculty and students, and that questions 59 through 61 were not appropriate for students.)

Interpretive Observations

The following observations were selected for comment because two-thirds of the faculty or student responses were grouped into the two upper (Extensive or Moderate) or the two lower (Little or None) categories. Such groupings were interpreted as total sample agreement or consensus. In contrast, divergence of opinion that was expressed with a relatively even spread across all four categories engendered none of the following comments.

These observations grow out of the team's subjective interpretation of the frequency counts produced in the faculty and student surveys of academic computing needs and capabilities at Kent State University. The rotated bar graphs (Appendix F) provide a visual interpretation of these results.

Faculty in the sample make substantially more use of all types of computers than do the sampled students. Macintosh computers are the only exception to this trend--their use was about equal for students and faculty/staff. MS-DOS personal computers are the predominant hardware of choice.

Faculty have more access to computers at home, whereas most student access is gained through University public computer labs. Faculty largely use computers to conduct research and to support their professional writing efforts.

Students indicated less use of computers for in-class assignments and examinations. They expressed need for training in word processing, spreadsheets, data base applications, graphics, library access systems, use of external networks, and discipline-specific software and hardware to carry out their course work.

Faculty had no preferential concerns for the topic of training needed. Perceived need for training in programming languages garnered the lowest response from both students and faculty. Faculty and students both expressed a career need for training in word processing. Faculty also expressed a need for training in library access systems and discipline-specific software. They noted a need for workshops on word processing, modem use, and terminal use. The faculty typically have more experience than students in computer usage and believe they need adequate computing tools to convey this knowledge to students.

Faculty overwhelmingly state they are giving little or no computer-oriented instruction and students indicated that they are receiving virtually no computer-oriented instruction. These responses specifically covered word processing, spreadsheets, data base applications, electronic mail, library access systems, use of external networks, and discipline-specific software and hardware.

Strong support was indicated by both faculty and students for the University to provide more academic unit computer labs, specialized software for majors, library access, exposure to computing for all majors in English composition, staff support and training for computer lab users, up-to-date computer technology, access to other libraries and data bases, and required and elective courses in computer literacy.

Both faculty and students strongly supported University investments for the Kent Campus network, training, and more computer labs in academic areas. Faculty also supported expending funds for classrooms capable of projecting video images. Neither faculty nor students thought students should be required to own their own computer and students were opposed to a new instructional fee to support

computer hardware.

Summary of Written Comments

Many respondents took the opportunity to add written comments to their Academic Computing Survey questionnaires. From these, several themes of concern and interest were identified. Faculty comments are reviewed first.

Faculty Responses. Many faculty are concerned that students do not learn the computer skills they will need to be competitive in the job market. The current environment is seen as inadequate in terms of equipment, software, networking, staff support, and training. That is, there is an expressed need for more computers in faculty offices, more labs, wired classrooms, better performance from the IBM mainframe, increased knowledgeable staffing in labs, more technical support, more support for Macintosh, an emphasis on computer literacy, and better and increased training for faculty and staff. The have a strong desire to see the Kent Campus network infrastructure completed which will permit the connection of department networks to the campus network and the Internet. Faculty expressed a general sense of frustration:

I am at home a lot more than I'd like to be because I can work on my own computer there.

I am concerned about the ability of Kent to attract and keep knowledgeable faculty and staff members due to our backward condition. This campus does not train or reward its people for technical achievement, it buys new 'experts.'

. . . Right now I am having problems getting a new software package up and .Right now I am having problems getting a new software package up and running. I feel isolated and exhausted.

There is also a sense of optimism and a strong recognition about the potential of computing technology to help improve research and instructional endeavors. Many faculty indicated that they would incorporate discipline-specific computing into their teaching if there was adequate support:

I would like to take advantage of the software, CD-ROM disks, and laser disks available to enhance lectures and allow students opportunities for independent work outside of class.

Notwithstanding the benefits, some respondents noted the need to retain the human element when creating a computer culture:

How will we guarantee people can talk to one another in a computer world?

Student Responses. Students expressed frustration about inadequate facilities and support. Although a few students were satisfied with what is currently available, many more indicated that there are too few labs, not enough lab hours (particularly for commuting students), too few knowledgeable staff to provide lab support, and frequent problems with malfunctioning equipment. Available equipment and software is out-of-date and incompatible within and between labs. Students want Macintosh and Windows to be more widely available and supported. They want more use of computers in the classroom.

In addition to local software and hardware needs, students expressed a

desire for network access to external resources. They want to be able to get and keep mainframe accounts for using e-mail and the Internet and they want increased access to research data bases such as Lexis/Nexis and PsycLit.

Another area of concern is training and computer literacy. Many students appear to support the notion of a required computer literacy class featuring hands-on instruction and an emphasis on applications, as typified by this comment:

Students who lack computer skills need a variety of application courses... . These classes should focus on applications, not fundamental principles of how a computer works.

Students expressed considerable worry that, because the appropriate software and hardware is not used or is not readily available, they are not learning the skills they need in their majors and for their careers.

The school expects us to compete in the real world without much training in the latest technologies--client server, data base, plus open systems and 461s. [M.I.S. program]

Television Production majors should be trained on computer video editing equipment and video FX equipment like "Toaster." I got screwed because you didn't prepare me for this type of equipment. I will be sorry. Tape editing is soon to be dead; non-computer edit controllers are dead.

Students expressed strong opposition to increased costs, whether in the form of additional fees or required purchases, although there is some support for the idea of making computers available for students to purchase at a discount. Many students challenged the University to revise spending priorities to reflect the importance of creating and maintaining a computing environment that will serve their current educational needs and future career expectations. Sprinkled throughout the comments were indications of students having erroneous information that appeared to add to their dissatisfaction. For example, inaccurate statements were made about computer lab locations, requirements for obtaining mainframe accounts, and remote access to the library catalog.

CONCLUSION

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This Academic Computing Study (ACS) was initiated to complement the work of the Network and Information Systems Study (NISS) completed in March of 1993. The ACS team has attempted to develop an institutional plan for academic computing that includes support for instruction, research, and classroom upgrades and that integrates instructional technology with the emerging University network.

The team recognized the importance of being objective and thorough in completing the work of the study, even though the time available was relatively short and team members continued to perform their normal responsibilities and assignments. Assessment of the current environment, recognition of strengths, articulation of issues and their implications, creative recommendations, and a realistic implementation plan were the goals of the study team.

A formal advocacy for academic computing within the administrative

structure of the University is one of the important needs related to academic computing at Kent State University. Annual planning, budgeting, faculty development and support, student and faculty connectivity and access to computing resources, training and user assistance, improved classrooms, and distance learning all are critical issues for Kent to consider in terms of improved support for academic endeavors.

It is hoped that this report will serve in some measure as a blueprint for future developments, investments, and reallocations of scarce University resources. Academic computing, in its many aspects, is a critical component of instruction and research and will serve as a cornerstone for higher education transformation in years to come. Academic computing is crucial to University goals cited in the statement of the role and mission of Kent State University: broadening intellectual perspectives, preparing students for productive and responsible citizenship, and maintaining the University's position as an essential and dynamic resource for the state of Ohio and beyond.