FOR COMMENT

To the University Community

The Academic Computing Committee was appointed by Provost Thomas Ehrlich one year ago. The Committee was given the charge of planning for the future of academic computing at the University. The Committee and its five subcommittees, consisting of over forty persons drawn from a broad spectrum throughout the University community, have met regularly over the past year. Its report, A Strategic Plan for Academic Computing at the University of Pennsylvania, *appears as a supplement to this issue of Almanac. In addition to the material appearing here, the committee report contains a number of appendices. These are available to interested members of the academic community at the Office of the Vice Provost for Research, 106 College Hall.*

The Committee welcomes written comments about the report. These should be sent to the Committee chairman, Dr. James Emery, 1307 Steinberg-Dietrich Hall, or may be given to any member of the Committee, whose name appears on the next page. In addition, the Committee will hold two open meetings next week on December 5 and 6. The meetings will be held in Room A-1, David Rittenhouse Labs, from 3:30 to 5 p.m., and all members of the University will be most welcome.

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Appendices Available:

Academic Computing Committee

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The Committee wishes to thank Dr. Mary Jo Ambrose and Andrea Graddis for their contributions to this report.

A Strategic Plan for Academic Computing At the University of Pennsylvania

Summary

Information—its creation, transmission, and retrieval—is central to the function of a large research-oriented university such as the University of Pennsylvania. The changes in technology affecting the methods and economics of collecting, storing, retrieving, communicating, and displaying information will inevitably bring about large changes in the ways we teach, carry on research, and manage the institution. For Pennsylvania to maintain its position of excellence in instruction and research, the University must take advantage of the revolutionary changes occurring in computing.

The task of developing a plan to enhance the effectiveness of academic computing throughout the University was given to the Academic Computing Committee. This Committee was established by Provost Thomas Ehrlich in December 1982. It is composed of persons drawn from all parts of the University. The resulting report, presented in this document, is directed toward the entire University community—students, faculty, and administration—in an effort to generate a cohesive and concerted movement toward exploitation of advances in information technology.

The Committee's recommendations are in three areas: creation of organizations to provide support to the users of computing; improvement of campus computing facilities; and establishment of an administrative structure to implement this report and to be responsible for future planning for computing. The plan is characterized by 1) centralized development of those activities that transcend individual school needs, and 2) coordination of decentralized structures that meet the specialized needs of schools, departments, and centers within the University.

Successful use of computing in the instructional, research, and administrative activities of the University is heavily dependent upon the availability of support personnel and faculty release time. To provide central support services and coordinate decentralized services, the Committee recommends the creation of a Computing Resource Center. In addition, technical support should be provided at the local level for those activities that are specific to the needs of individual schools or departments. To provide faculty release time and support for the creation of instructional materials, an Educational Development Fund should be created.

The development of the personal computer brings to the individual user computational power formerly available only on large mainframes. By linking personal computers via a campus network they are transformed into powerful multifunctional workstations, serving as both stand-alone computers and as a medium of communication that allows file transfer and ready sharing of software and special-purpose hardware. The Committee recommends ready access for students, faculty, and administrators to such workstations, as well as the installation and operation of a campus communications network to link them to other computing resources. Multi-user computing facilities (mainframes, minicomputers, printers, and the like) will provide specialized services. Enhancement of such facilities must be done on the level of the University, school, department, research group, and such centers as the University libraries.

A weakness of the present organization of computing at the University is the lack of a strong centralized advocacy and coordinating function. No senior administrator has the responsibility for looking after the interests of the entire computing community and serving as an advocate for computing. The committee recommends that the Office of Vice Provost for Computing be established to assume these functions and take responsibility for implementing this plan. A Governing Council for Computing, representative of the diverse constituencies within the University, should be established to advise the President and the Provost on major policy directives for computing within the University.

The committee invites widespread discussion of the plan from all segments of the University community with the goal of reaching a broad consensus so that implementation may begin.

I. Introduction

The computer is the driving force behind the emerging "Information Age." Already more than half of U.S. workers are employed in such "knowledge" areas as computing, communications, publication, education, entertainment, and financial services. The ability to exploit information technology is increasingly recognized as a critical need for nations, organizations, and individuals.

It is hard to imagine an organization more likely to be affected by information technology than a large research-oriented university such as the University of Pennsylvania. Information—its creation, dissemination, retrieval, and transmission through teaching—is central to our function. Any technology that profoundly changes the methods and economics of collecting, storing, retrieving, communicating, and displaying information will inevitably bring about vast changes in the ways we teach, do research, and manage the institution.

Although the University has considerable competence and experience in the new technology, we are neither organized nor funded to capitalize fully on the revolutionary changes that are taking place in computing. The price that we have paid up to this point for our lack of a coordinated plan for computing has been comparatively modest because the real advances in computer information technology are only now beginning to be felt in higher education. We cannot wait much longer, however, to prepare for the profound changes that are sure to come.

II. The University's Current Computing Environment

Organization of Computing

Academic computing at the University is almost completely decentralized. Unlike virtually all major research-oriented universities, Penn does not have a computer center chartered to serve the entire institution. Neither do we have a senior official whose full-time responsibility is to manage or coordinate academic computing on a University-wide basis. Little guidance is provided centrally to the schools on how they might best use computing or manage their computing resources.

Several substantial academic computing centers have been established by various schools—the major ones being in Arts & Sciences, Engineering, Medicine, and Wharton. Each of these centers has an annual budget of several hundred thousand dollars a year and provides a variety of services to its user community. In addition, six different data communications networks have been established on campus to serve specialized constituencies.

Advantages of Decentralization

Decentralization of academic computing offers some important advantages. Although the University as a whole spends considerably less per capita than most of its peer institutions, most users are adequately served. This has been accomplished on very tight budgets, primarily by spending a disproportionate share of the funds on hardware, at the expense of the technical support staff. This approach has provided cost-effective computing for the more knowledgable or motivated users willing to learn how to use the computer without much help, but it has not met the needs of those requiring substantial technical assistance.

With decentralized management, the schools have the responsibility for providing a level of computing services consistent with their goals and priorities. Since each school has a fixed budget, spending money for computing usually means that less money is available for other worthy activities. Decentralized resource allocation provides an effective way to bring well-informed judgments to bear on these difficult decisions.

A distinct advantage of Penn's decentralized approach to computing is that we do not have a commitment to a delivery mechanism or an organizational structure made obsolete by advances in technology. The development of personal computers, minicomputers, and communication technology makes a "distributed" environment—one in which computers of various sizes are linked through a common network—more cost-effective than a purely centralized approach. Penn's current decentralized configuration of computing puts us in a good position to exploit the new technology.

Need for Closer Coordination

It is fair to say that our current organization of computing stems from a series of ad hoc decisions rather than from any articulated strategy. The movement toward decentralization began during the early 70s with the organization of Uni-Coll out of what was formerly the University's central computer center. Through a gradual shift in the duties of the Director of Computing Activities, along with an attitude of benign neglect on the part of top University officials, responsibility for computing moved heavily toward the schools. Computing fared relatively well in schools in which decision makers viewed it as an essential part of their teaching and research programs. In other schools, however, faculty or students interested in computing either had to scurry to find their own funds or they had to choose research and instructional approaches that did not require computer support.

It would be difficult to argue against the priorities that were set in the schools that preferred to put their funds into other activities, but the result nevertheless was that computing in those schools either tended to atrophy or never got started in the first place. A substantial shift toward greater funding of computing has taken place in the past few years, but the effects of the past low level of funding still linger.

Excessive decentralization has caused a number of problems. It results in duplication of effort, lost opportunities to gain economies of scale in acquiring hardware and software, and poor technical decisions made without sufficient information. Worse still, independently implemented systems and networks are often incompatible in terms of sharing of resources (such as software, data, and communication procedures) and the technical services needed to support a system (training material, documentation, and expertise). As computing permeates the University, we will pay an increasing penalty if we fail to set reasonable standards that foster close coordination throughout the campus.

It is neither possible nor desirable to set standards to evaluate the appropriateness or quality of academic computing applications; this should and will remain the prerogative of the faculty (within broad policy guidelines concerning such matters as conflict of interest and the use of human subjects). Rather, the purpose of establishing University standards is to achieve a helpful, consistent, and efficient environment within which faculty, staff, and students may pursue their own interests.

A weakness of our present organization of computing is the lack of a strong centralized advocacy and coordinating function. No senior administrator has the task of looking after the interests of the entire computing community and serving as an advocate for Penn computing within internal councils or external professional groups. Computing in each school is organized to serve the special needs of its own constituency. This sometimes leads to a situation in which a conflict exists between the perceived interests of the school and the best interests of the University as a whole. Administrative procedures have been worked out for dealing with the lack of a central facility through the exchange of information, sharing of resources, and mutual assistance, but there still remain important activities that can be handled effectively only on a more centralized basis.

An important new source of University-wide coordination is the Academic Computing Committee. It was established by Provost Thomas Ehrlich in December 1982 to deal with computing matters involving instruction, research, and other computing services that directly support academic activities. One of its principal missions is to prepare a strategic plan for computing. It is composed of members drawn from all parts of the University. It reports to the Provost through the Vice Provost for Research. Most of the committee's work has been done through five subcommittees that deal with 1) resource identification and sharing, 2) educational policies, 3) research policies, 4) networking, and 5) office automation and administrative support services.

III. The Use of the Computer for Education

Computers at the University will have their most pronounced effect as learning tools. Most classroom learning currently involves lectures and discussion, supported only by chalk, blackboard, and an occasional overhead projector. Outside of the classroom students still rely primarily on traditional means of learning: studying their textbooks, reading assigned material, doing library research, and preparing various homework assignments. The new forms of information processing—computers and the related technologies of communications, reproduction, videodisk, graphics, and the like—now offer us unparalleled opportunities to augment existing teaching methodologies. By so doing, we can use the time of the student more efficiently and provide an expanded range of educational opportunities.

Imaginative applications of computers have already been developed at the University. For example, in the introductory economics course, students can see graphically the effect of changing various assumptions in a model. In the calculus course, computer exercises illustrate and reinforce the learning of concepts, such as convergence to a limit and integration. Religious Studies teaches courses on computing and textual research, and is the first humanities graduate program in the nation to require computer "literacy" of its students. Penn has taken a national lead with its Cognitive Sciences Program that involves close cooperation in instructional programs among the departments of Computer Science, Linguistics, Philosophy, and Psychology. The Engineering and Wharton Schools use computer-based instruction in a wide variety of undergraduate and graduate courses.

Instructional computing will certainly provide more than a powerful version of a textbook; it permits learning through experimentation, discovery, and reinforcement in a way simply not possible with a textbook. For example, by means of a computer-based model of a process (a chemical reaction, say, or an electrical circuit), a student can test alternatives and examine their consequences. Many such alternatives can be considered, which would generally not be practical if the student had to deal with an actual physical system. This capability is invaluable in such disciplines as architecture, chemical engineering, electronics, business planning, and medicine.

Symbol manipulation, graphics, and other forms of non-numeric computation have become used increasingly in instruction. The benefits of word processing as a means to enhance student writing skills will surely become widely available to students. Text processing is also frequently used in language instruction, philology, and linguistics. Computer-assisted literature searches will increasely become an important educational tool.

Computer-based communications promise to be useful for students as well as for faculty members and administrators. For example, an instructor might make assignments, distribute grades, and coordinate project activities through use of the network.

Although most uses of computers by students take place at the individual level, use of the computer by groups of students in the classroom or laboratory is also likely to become an important instructional tool. Projection of computer output on a large screen can add greatly to the interest and vitality of classroom presentations. "Real time" gathering and analysis of laboratory data by a computer offer the possibility of rapid calculation and immediate feedback.

Teaching with computers, rather than about them, will be the primary motivation for making them widely available to students. It is also true, however, that a well educated person will be expected to have some understanding of the use of a computer in his or her chosen field. Computer literacy is therefore a valid goal for all Penn students, both graduate and undergraduate. We envision a variety of discipline-specific courses being integrated into the curriculum to achieve this goal.

For our graduate students—the primary source of future scholars—we must provide knowledge and skill in applying contemporary research methodologies appropriate to their disciplines. Access to suitable computational resources is essential to meeting this requirement.

IV. The Use of the Computer for Research

In many fields of research the computer has long been necessary to achieve excellence in scholarship. The likely effect of the explosion in the capabilities of information technology is that the computer will become more widely and more intensively used in connection with the research mission of the University.

It is impossible to classify all the ways in which the computer has been used as an adjunct to research. Some important areas are:

- Large-scale mathematical computations, such as those used in physics and economics
- Analysis of data bases in the social sciences, management, and medical research
- On-line control of experimental apparatus
- Computer graphics in architectural and engineering design and medical imaging
- Computational theories in modeling cognitive processes
- Creation of concordances and analysis of literary style in the humanities
- Use of "expert" systems in the reduction of large formulae, medical diagnosis, and other research-related decision making
- Verification of mathematical conjectures by analysis of a large number of cases
- Bibliographic searches in all disciplines

The use of computing for research is now expanding rapidly into fields in which it previously had little impact. This trend can be expected to continue; soon the computer will play an important role in most fields of scholarship.

While the computer is making inroads into new areas of scholarship, important changes are also taking place in the way in which computers are used in fields that historically have exploited the state of the art in computing, such as high energy physics and theoretical chemistry. Dramatic improvements in the cost-performance of computers allow investigators to attack problems that previously could not be addressed because of economic or technical constraints on resources.

The needs of the University research community for computing services are as diverse as the intellectual problems being attacked. Meeting the challenges presented by the explosive growth of the computer as a research tool will clearly require different kinds of resources for different kinds of problems. In most cases a faculty researcher will surely need access to his or her own personal computer that provides a multiplicity of functions. For many purposes, such as word processing and modest-size computing tasks, the personal computer will provide adequate stand-alone capabilities. The need for multi-user facilities—both mainframes and minicomputers—will nevertheless continue to grow. It is essential, therefore, that the campus network provide access to the multi-user facilities. These facilities will serve as a depository of shared data and software and provide a source of computing power for large computational tasks. Highly specialized jobs may even be executed on a computer external to the University (at another university, for example).

V. Academic and Related Administrative Computing

A number of administrative information systems developed and maintained at the University level have a direct impact on academic activities. Admissions, financial aid, course scheduling and registration, class lists, and grading are examples of University systems that directly bear on critical academic concerns. We will undoubtedly experience a growing need for students, faculty members, and departmental administrative staff to access administrative systems and their associated databases (with suitable attention paid to privacy and security matters).

Academic and administrative computing overlap in such areas as data sharing, networking, and common software requirements. Much of the overlap occurs at the level of the individual faculty member. Because of the wide variety of computing needed by individual faculty members, it will be necessary to combine all computing tasks—stand-alone computation, network access, word processing, and the like—into a single multifunctional personal workstation. Further, it will be essential to set standards that ensure compatibility between a faculty member's word processing system and that used in departmental offices. It should be possible to use the network to transfer text files between any two computers—either personal or shared—so that text entry and editing can be done cooperatively across systems (even though the editing commands may not be identical).

At the departmental level, standards to insure compatibility with school and University systems should be established to the extent necessary to transmit files (e.g., accounting data and documents) among the systems and provide electronic communications. Furthermore, interactive data entry at the departmental level is highly desirable for handling such matters as personnel forms and various accounting transactions. As in the case of workstations used by faculty members, it will be advantageous to combine stand-alone computation, word processing, and data entry and retrieval into each departmental workstation rather than using separate dedicated equipment for each function.

The needs of students must be taken into account in considering the closer integration between academic and administrative computing. Students should be able to handle many of their administrative chores—class registration, accessing class and exam schedules, and the like—through a personal workstation using appropriate network software.

The same technological and economic forces that are leading to the proliferation of personal computers in academic offices and laboratories are leading to a similar profusion for administrative activities. As in the case of academic computing, it is essential to link the personal workstations through a network. There are substantial advantages in implementing a campus-wide data communication network to serve both academic and administrative users.

Thus, a number of important trends push us toward greater integration of academic and administrative computing: the widespread availability of personal computers throughout the campus, the economics that favor implementing a variety of functions on a single workstation, the need to communicate among multiple terminals and computer centers over a single campus network, and the need to share data among academic and administrative applications. It is quite likely that little or no distinction will soon be made between academic and administrative computing in terms of the underlying hardware, software, or network requirements.

Administrative computing has developed organizationally quite separate from academic computing at the University of Pennsylvania. This separation is probably desirable from the standpoint of the physical computing facilities because possible economies of scale in hardware are insignificant with today's technology. However, in the near future it will become increasingly important to establish a more integrated approach to academic and administrative computing. To accomplish this objective, the University must develop mechanisms for closer coordination between academic and administrative applications.

VI. The Plan for Computing at the University of Pennsylvania

We must begin to enhance the role of computing at the University of Pennsylvania. We are in a period of rapid technological change. Almost certainly the life of today's technology is less than five years. As a result we must move forward with the anticipation that technology will change and our plan will have to be modified. Implementation of our current plan will position us to take maximum advantage of future improvements in technology.

To facilitate computing excellence, we recommend the specific actions given below. We have grouped our recommendations under three broad headings:

- Support Mechanisms
- Enhancement of Facilities
- Administrative Structures

Support Mechanisms

The key to the successful integration of computing into the educational, research, and administrative activities of the University is the creation of a supportive environment. Support is needed to enable those members of the community without technical expertise to use computer resources, and to help those with some knowledge of the computer by providing them with information and sound advice. It would be a major error to assume that the provision of equipment without support mechanisms will accomplish our desired goals.

Consistent with Penn's tradition of decentralization, support mechanisms should be provided both centrally and at the local level. We recommend:

- Establishment of a Computing Resource Center
- Creation of an Educational Development Fund
- Expansion of decentralized computer support activities

Computing Resource Center. The Computing Resource Center (CRC) will provide central computing support services and coordinate decentralized services. The Director of the Computing Resource Center will be responsible for its operations.

The CRC will function as an information clearing-house on computer-related matters. It will maintain and disseminate a Guide to Computing Services at the University of Pennsylvania. The Guide will be available as a printed document and through the campus communications network. The Guide will identify existing computing resources and support organizations throughout the University. In addition, it will provide a list of the types of personal workstations supported at the University and information concerning the acquisition of these workstations.

The CRC will maintain current technical information on hardware and software. It will support selected computer workstations and software by providing courses and consultation in their use. It will oversee specialized instructional programs and workshops to assist faculty, students, and staff in obtaining computer-related skills. It will set technical standards for courseware, coordinate educational development activities at the schools, and provide consultation on issues of the human design factors of instructional material.

The CRC will install and maintain selected computer workstations, evaluate hardware and software, negotiate purchase agreements with vendors, facilitate cooperative agreements for the acquisition and use of shared resources, and manage a reporting system for University computing.

The CRC will provide central support services to those schools which, for reasons of size or history, have not developed their own

computing resources. Mainframe computing for these users will be provided through one or more of the existing multi-user facilities.

Educational Development Fund. The creation of computer-related instructional materials and integration of these materials into existing courses is a time-consuming activity. Because this activity takes significant time from faculty research, it is of concern to all faculty members —especially junior colleagues facing tenure decisions. To ease this burden, the Educational Development Fund will provide funds for release time and summer support for faculty members to develop computer-related materials to be integrated into their courses. In addition, it will provide funds for purchase of course-related software and hardware, as well as support for students and assistants working with the faculty member on the development of materials.

Priorities for development of materials will be established within the individual schools. Designated funds will be provided to the schools by the Provost for distribution in response to faculty proposals.

Decentralized Support Activities. Most computer support services should be made available at the school or departmental level. The uses of computing will most likely differ in significant ways in the various schools of the University. Accordingly, specific activities in instruction, research, and administration are best provided at the departmental or school level. Training of faculty and staff, consultation, and development of school-specific administrative applications should be done on the school level.

For many of our faculty the development of course-related computer materials may be well beyond their programming skill (or inclination). Simulation models and graphic displays, for example, can be quite complex. Technical support staff must be provided at the school or departmental level to ease this burden and facilitate the educational use of the computer.

Enhancement of Facilities

Many different types of computational resources are necessary to facilitate and encourage the growth of computing in the instructional, research, and administrative activities of the University. We envision widespread installation of multifunctional personal workstations, capable of stand-alone computation and linked through a campus network to existing and enhanced mainframes, minicomputers, and other specialized resources. Each type of facility offers special advantages, but the real power of the system comes from connecting the heterogeneous elements together via the network.

Multifunctional Personal Workstations. The development of the personal computer brings to the individual user computational power formerly available only on large mainframes. By linking personal computers via a campus network, we transform them into powerful multifunctional personal workstations capable not only of stand-alone computing but also of accessing a wide variety of resources both on and off campus.

For many users, the majority of their computing needs will be met on their personal computer. Widely used software to support personal computing, such as word processors, spreadsheet languages, and data base managers, should be available at each workstation where appropriate. For many of our workstations, especially those heavily used for word processing, local printing capabilities should be provided. Inexpensive matrix printers usually provide adequate quality; however, for some applications, such as preparation of dissertations, "letter quality" impact or laser printers should be available via the communications network.

Convenient access to these workstations is of vital importance. For faculty and administrators, workstations must be available in individual offices throughout campus. For students, workstations must be made available in academic buildings and residential facilities.

Initially, workstations should be provided for all faculty and administrators willing to receive training in their use. The ratio of workstations to students will evolve over time; however, it seems likely that one workstation for each ten students is a good initial ratio. Because of the high cost of space and security for a cluster of workstations, it may actually prove to be less expensive to install a workstation in each student suite on campus.

Much faculty work is done at home, and many of our students live in off-campus residences. Provision must be made to ensure that these users can secure workstations, either individually or on a shared basis, for use off campus. In addition, access to the network should be available to off-campus users via telephone or some other system such as cable TV.

Communications Network. A campus network linking individual workstations, multi-user facilities, and other computational resources should be installed as soon as possible. The communications network will be managed by a director who will be responsible for its installation and operation.

Network communication software should be developed or purchased concurrent with the acquisition of the network hardware. This makes possible file transfer, the transfer of software from one machine to another, the use of shared equipment such as plotters and photocomposers, and interactive access to shared administrative and academic data bases. Standards and procedures must be set centrally to facilitate this transfer.

The network should extend to virtually all campus locations and eventually be capable of supporting thousands of workstations. It must be easy to use, reliable, and flexible enough to meet the constantly changing requirements of the University community.

The network should be established, when technically and economically feasible, in a manner that enables the user to communicate easily with existing University networks such as Gandalf, Wang and those associated with individual mainframes or clusters of microcomputers)— and others that will come into being as particular needs are satisfied. In addition, the network should provide gateway access to external networks (e.g., CSNET and ARPANET) through which individuals may communicate with their colleagues in other academic and research institutions throughout the country. Access to library networks and proprietary information services will become increasingly important, and must be accommodated.

The need for effective network connections throughout the campus is not limited to computer communications. There is also a need for enhanced network capability for video, voice, and environmental monitoring. Preference should be given to installation of a network that would accommodate the broad spectrum of uses.

Finally, we note that communications technology will continue to change; accordingly, it is likely that in five years our current choice of technology will have become obsolete. We should not use anticipated obsolescence as an excuse for delaying implementation, since changes in technology will continue for the forseeable future.

Enhancement of Other Computing Resources. Much computing will be done on the personal workstations; nevertheless, the need for multi-user facilities (minicomputers and other mainframes) will certainly increase in all parts of the University. In fact, the expansion of computer literacy among faculty and staff will naturally lead to an increased demand for computing. Individuals who begin experimenting with small data bases and trial simulations, for example, will soon discover that expanded data bases and simulations offer unanticipated research opportunities. Access to multi-user computing facilities will allow us to meet expanded needs. This access will take place from the personal workstation via the network.

Researchers will continue to demand increased computational resources. Research projects that were impossible a few years ago are now feasible due to increased computer power and lowered costs. We see no change in this trend.

Certainly most of our central administrative computing—student data bases, faculty and staff records, and budgetary records—will continue to be processed on large computers. Administrative data bases will, however, be available locally through network access for use in planning and advising. Authorized users will be able to enter and update central records from their personal workstations. Because of the sensitive nature of many administrative data bases, security procedures must be greatly tightened.

Specialized multi-user computer facilities will continue to play an important role. Enhancement of such facilities will be done on the level

of the University, school, department, and individual research group. Negotiations with computer vendors for reduced prices for the hardware and University licenses for the software should take place centrally.

While most multi-user facilities will continue on a decentralized basis, there remains the need to facilitate the acquisition of equipment that is too expensive or specialized for an individual school but is appropriate to acquire on a shared basis. Examples of such equipment include very large computers and equipment to translate from one media to another, such as reading machines and specialized printers and plotters.

Administrative Structures

To provide leadership in implementing the University's computing plan, we recommend that the office of Vice Provost for Computing be established. Recruiting an individual to fill this position should begin as soon as possible. In addition, we recommend the creation of a Governing Council for Computing to advise the President and Provost on major policy directives for computing.

Vice Provost for Computing. The Vice Provost for Computing will have central responsibility for establishing directions and planning initiatives for computing throughout the University. He or she should be qualified for a faculty appointment, be a proven leader with experience in administration and direction of university computing, and possess a vision for the future of computing in the University environment that goes well beyond our current plans.

The Director of the Computing Resource Center and the Director of the Communications Network will report to the Vice Provost for Computing. In addition, the Vice Provost will be responsible for the following functions:

- Developing and implementing strategic planning in computing
- Developing policies and procedures for dealing with such matters as the communications network, accounting for computing use, resource sharing across schools, support of multifunctional personal workstations, and provision of centralized user support services
- Coordinating computing activities among the schools of the University
- Reviewing all substantial computer acquisitions and budgets
- Coordinating the development of a comprehensive budget plan for computing resources
- Serving as the advocate and spokesperson for computing among senior administrators, faculty, and students
- Serving as the University's external representative on computing matters
- Assisting in raising funds for computing from government agencies, foundations, industry, alumni, and other individuals

Governing Council for Computing. The Governing Council for Computing will be responsible for advising the President and Provost on major policy directives for computing throughout the University. The Council will elect a chairperson each year

The Governing Council will be composed of the following representatives:

- The Vice Provost for Computing, ex officio
- The Director of the Computing Resource Center, ex officio
- The Director of the University Computing Network, ex officio
- The Vice Provost for Research, ex officio
- The Director of the Library, ex officio
- The Director of UMIS or his/her designated representative
- The Associate Dean for Computing, or a designated representative, from each school that maintains a large computer facility
- Two designated representatives chosen annually by those schools that do not maintain large computing facilities
- The Senior Vice President or his/her designated representative
- Four Faculty representatives chosen annually by the Faculty Senate
- One Student chosen annually by the Undergraduate Assembly
- One Student chosen annually by the Graduate Council

VII. Summary and Recommended Actions

The plan for computing presents a comprehensive, integrated strategy for the improvement of computing throughout the University. It is characterized by centralized development of those activities that by their very nature transcend individual school needs, as well as centralized coordination of decentralized operational structures that meet the specialized needs of schools, departments, and centers within the University.

The plan calls for accomplishment of the following goals:

Creation of support mechanisms for computing by:

- Establishment of a Computing Resource Center to provide central computing support services and coordinate decentralized services. The Center will provide technical consultation to faculty, students, and staff on all aspects of computing. It will be responsible for coordination of procurement, installation, and maintenance of hardware, software, and other related computing resources
- Creation of an Educational Development Fund to support faculty development of computer instructional materials and integration of these materials into courses

Improvement of campus computing facilities by:

- Provision of ready access throughout the campus of multifunctional computer workstations for use by students, faculty, and staff in instruction, research, and administration
- Installation and operation of a data communications network, including both hardware and software, linking workstations, terminals, multi-user computers, existing networks (both on and off campus), and other specialized computing resources
- Enhancement of multi-user computer facilities

Establishment of a central administrative structure by:

- Recruitment of a Vice Provost for Computing, who will have primary responsibility for implementing this plan and providing leadership for development of computing in the University. He or she will be a person with proven ability in administration and direction of university computing, and should qualify for a faculty appointment
- Creation of a Governing Council for Computing, with members drawn from the various constituencies within the University, to advise the President and Provost on major policy directives for computing within the University

Next Steps

In the context of the above assumptions and observations about the future directions for computing at the University, the following actions should be initiated:

- Recruit a Vice Provost for Computing, with the goal of having the position filled no later than June 1984
- Identify hardware, software, and staffing needs and develop a detailed and comprehensive financial plan for computing based on this information
- Select personal computer hardware to be used for the development of undergraduate instructional material
- Invite widespread discussion of the plan from all segments of the University community, with the goal of reaching a broad consensus as soon as feasible
- Implement those parts of the plan for which a consensus exists and funding currently is available