Vision and Strategy for Computing and Information Technology

University of Minnesota, Twin Cities
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Introduction

This report provides the Advisory Users Committee's (AUC) vision of computing and information technologies for the University of Minnesota. We consider this vision part of the development of a computing and information services strategy. Both the University and the field of computing are constantly changing, and changes in both arenas will influence the directions which a computing and information strategy might suggest. If the University of Minnesota desires to remain a premier research institution, it must have a well-defined computing strategy and clearly-articulated information policy.

The issues involved in computing for any university are long-term and diverse, and do not lend themselves to one-shot remedies. The situation is further complicated by the rapid rate of change in computing and information services fields. No sum of money today could purchase the amount and type of computing power and resources that will be needed in

the 21st century, and there is no way of knowing exactly what will be developed. Yet, with some foresight, we hope to position the University of Minnesota to capitalize on new technologies as they are developed. The preliminary strategy outlined here provides for continuous refinement in order for it to remain current and at the same time far-sighted.

This document is not the first set of recommendations regarding computing and inforation strategies and planning done at University of Minnesota. Among the more recent reports are the Adams committee, 1982; Foster report, 1984; Focus on Computing, 1987; the Pyclik/Gatewood report, 1988; the Hobbie reports of 1988 and 1989; the Gillespie, Faulkner and Associates report, 1989; Luker report, 1991. For many reasons, these recommendations were not fully addressed by the University of Minnesota. Consequently, this report presents a number of recommendations that are similar to those made in other reports. This document, however, also proposes a planning process and some implementation ideas for carrying out those recommendations. Even so, the recommendations made here will also go unheeded without

1. Administrative support, commitment, and participation that are essential to the success of a information technologies strategy and planning process,
2. Direct involvement of academic and administrative units in the planning process,
3. Acceptance of the major costs of computing (administrative and student access, as well as base support for research, education and outreach) as part of the normal University of Minnesota operating costs, and
4. University willingness to compete for qualified individuals in the job market to serve the growing need for professional service staff and encourage retention of technical expertise.

Assuming the support outlined aove, the Advisory Users Committee makes the following recommendations to the University of Minnesota community.

Vision and Strategies

Given University of Minnesota's mission as a land grant institution, information technology must be central to the university. Strong information technology is essential to fulfilling the land grant mission because it supports University units in carrying out their research, teaching, and administrative functions; and it is central to the University's outreach efforts to the metropolitan area, to greater Minnesota and to the international community. As members of a major research and teaching university, students, faculty and staff need access to information resources at the level of technology appropriate for their disciplines. This includes access to workstations and local, national, and international electronic communication networks. Additionally, as a major research institution the University of Minnesota is involved in advancing computing and information services in various technical disciplines.

Decentralized computing with full campus connectivity is a necessary base for both options stated above. The strategy described in this report is designed to establish an environment of well-connected,

decentralized information technology systems. This environment will meet our current needs by creating a common information space in which university personnel can carry out their work, and it will set the stage for the development of a shared information resource in the future.

Philosophy Statements

The five statements below represent a philosophy for University of Minnesota information technologies.

1. The Role of Computing at University of Minnesota: The University should provide a strong base of information technology support for educational, research, service, outreach and administrative needs.
2. The Availability of and Access to Information Technologies: University information technologies should be available to all students and faculty within reasonable limits, and to all staff as determined by their job functions. Convenient access to information technologies should be available for instruction, research, and administration.
3. The Relation of Information Technologies to Communication Technologies: Decisions made about computing and information services should take into account concurrent developments in all other communication and related technologies.
4. Roles of Administrative and Academic Units and the University: Decisions regarding computing and information services should be made at the lowest practical level. However, oversight and control must be exerted to prevent unnecessary duplication and costs. Therefore, the University of Minnesota should provide appropriate guidelines and technical standards to be used in the decision making.
5. Funding of Information Technologies: Computing infrastructure requires adequate and predictable funding. Investments in computing and information resources should be justified in terms of educational worth, research support, process improvement and/or administrative effectiveness. They should provide at least as great a benefit to the University of Minnesota as other options for achieving the goals of the University in order to be considered for funding.
6. Staffing for Computing and Information Technologies: Information technology staff play a critical role in the development, maintenance and delivery of services critical to this vision. Maintenance of an environment conducive to effective service and appropriate investments in human resources are essential to the realization of the vision.

The Vision of Information Technologies at the University of Minnesota

We envision an electronic environment, a common space, that invites members of the University community to make use of distributed information technology in realizing our land-grant mission. In addition we wish to involve members of the community at large in this collaboration. This environment will be tolerant of diverse computing platforms, provide access to global information resources, and will value innovation . To support this vision, the AUC offers the following objectives to be reached within the next five years.

Objectives

1. Faculty, students, and staff will have universal access to a distributed information commons.
   a. Information not limited by contract, agreement or statute will flow electronically to those who need it within the Twin Cities campus and across unit boundaries where appropriate.
   b. A campus-wide network will be expanded to provide the following:
      1) Effective and efficient connections between decentralized computing facilities at the University of Minnesota will provide access to a variety of hardware, software, and database applications for research, instruction, and administrative needs.
      2) Easy access to local and worldwide electronic networks.
      3) A single, easy electronic mail system.

2. The University will support a continuum of access options which embrace multiple platforms and operating systems within a broad framework of standards.
   a. The University community will have access to a distributed information utility from a variety of electronic work environments and from a variety of locations including home, dorm room, lab, office, classroom.
   b. Access to the distributed information utility will be via a transparent and uniform interface.
   c. Appropriate standards will be adopted and applied.

3. Information technologies will be integrated into administration, planning, research, teaching, outreach.
   a. Computing will be integrated into all appropriate curricula, both specific and general education, to ensure a level of literacy and numeracy appropriate for a research university.
   b. A full range and variety of equipment, software, and services appropriate for the institutional requirements of a major research university will be maintained and will be readily accessible to all students.
   c. Basic information technologies necessary to support research appropriate for a major research university will be available to all faculty members.
   d. Administrative computing will be cost-effective, reliable, and will strengthen University of Minnesota's competitive position among peer universities. The basic operation procedures will be modified to improve the standard and quality of computation, communication, and data transfer resulting in long-term savings to the University of Minnesota.
   e. All computing and information technologies will be coordinated with, and done in the context of, activities on campus involving other communication and related technologies.

4. There will be a single, readily identifiable source for help, support, and service with networks, computers and databases.
   a. A single source will coordinate and provide guidance to academic and administrative units concerning information, common application software, uniform guidelines, networking, and standards.
   b. A core team will coordinate delivery and assess the effectiveness of computing and telecommunication resources which, by their nature, transcend unit boundaries.

5.There will be a rational funding model that encourages individual and institutional investment and standardization.
   a.Funding for information technologies should be a high institutional priority.
   b.Computer support services will be streamlined to increase cost effectiveness and clientele appropriateness for its operation procedures.
   c.Computing resources will be allocated on the basis of needs that advance the University of Minnesota's mission and in accordance with the governance structure described below.
   d.A computing environment will be established that is open, flexible, and supportive to ideas and initiatives for acquiring and using computing and information resources.
   e.Funding assistance from outside sources should be sought and encouraged with seed funds.
   f.Various incentives will be used to obtain compliance with the standards adopted.

6.There will be a rational model for creating a productive environment for computing and information technology staff.
   a.Decisions about staffing will be based on analysis of needs.
   b.Staff development opportunities and organizational management policies should ensure the expertise needed to support required services and technologies.

Gains from Implementing Vision

Achieving the vision for information technologies will result in a number of gains for the University of Minnesota. The AUC believes that failure to follow up on these objectives will result in a net loss in resources for the entire University community. Below are the primary returns to the University of Minnesota from implementing the proposed strategy:

1.Provide the same level of access to information resources for all students, staff, and faculty.
   a.Reduce geographic and informatic caste distinctions at the University of Minnesota by making resources available to the coordinate campuses and the Minneapolis and St. Paul campuses.
   b.Provide information resources as part of the University's outreach programs including CEE and MES.

2.Faster access to available research and existing instructional technology will increase faculty productivity.
   a.Faculty will have world-wide access to collaborative research groups.
   b.Bibliographic searching will be freely available.
   c.Access to high performance simulations, imaging, and multimedia presentation will be accessible.
   d.Databases can be added to, shared, and viewed easily.

3.One hundred percent office connectivity and standardization will reduce paper flow, maximize use of and access to university resources, and reduce express mail delivery expenses.
   a.Electronic submission of grants (e.g. NSF) will be facilitated.
   b.Reducing the need for duplication of some acquisitions will improve library collections.
   c.Electronic forms (paperless buying, paying, communicating, and

electronic signature verification system) will reduce errors and document turn-around time.

4.Universal access to a distributed information utility will improve administrative decision-making by facilitating tracking of student, staff, and faculty demographics.
a.Course scheduling, grades, financial aid and billing will be accessible appropriately to students, staff, and administration.
b.Duplication of databases can be eliminated.

5.The creation of an integrated electronic environment will provide for more cost-effective decisions about resources.
a.Uniform standards will allow for a more systematic approach to the selection and development of major systems that will result in effective purchasing and maintenance of equipment and software and will facilitate college and departmental system integration.
b.Available resources and databases will be uniformly accessible via transparent interfaces.
c.An integrated environment will require minimum training for users and will be self-service
d.Decisions about telecommunications, printing and duplicating, media resources, and the library will be coordinated.

6.A productive staff environment will result in cost-effective delivery of quality service.
a.Rational staffing decisions will reduce perceived job insecurity.
b.Minimizing staff turnover can promote retention of experienced staff.
c.Well managed transitions between old and new technologies can optimize use of staff resources.

Next Steps

The AUC was charged with creating a vision of information technology and offering some preliminary strategies for achieving that vision at the University of Minnesota. We present the outline of the steps necessary to implement the vision below:

1. Secure executive approval of the vision statement and share the vision with other units.

2.Agree upon a mandate for a team commissioned to develop a plan for implementing the vision
a.Develop a technology and organizational strategy.
1).Identify targets for strategic investments in information technologies that reestablish the university as a technological leader.
a) Adopt uniform technical standards and publish them.
b) Determine migration paths to newer, more compatible systems whenever practical (or encapsulate incompatible systems when not).
c) Connect and equip every office, class and study room for network access.
d) Provide network access to connect homes where appropriate.
e) Identify sources for matching grants to encourage university, college and department investment in technology

development and maintenance.

f) Identify a funding model to encourage student investment in appropriate access modes (e.g., databases via networks) and tools (e.g., laptop computers).

b.Define the organizational structure most appropriate to deliver technology to the entire university community and foster innovation. Duties should include the following:

1) Implement and continuously update the strategic plan guiding information technology.
2) Provide support to units requiring help in developing their computing plans.
3) Plan and coordinate computing and telecommunications activities within the University.
4) Direct development of a plan for assuring that there are adequate computer teaching facilities across the university.
5) Establish faculty reward system encouraging implementation of technology in teaching.
6) Identify sources for development and maintenance funds.
7) Identify promising technology directions that could be useful to the university community.
8) Evaluate continuously new alternatives and the quality and effectiveness of existing information technology.
9) Acquire, design, develop, and implement components of technology infrastructure
10) Maintain the technology infrastructure.
11) Choose an organizational model that will achieve a high degree of coordination across the University community and that can be held accountable.

c.Define the governance structure that fosters cooperation toward university community goals and represents various stakeholder constituencies. Responsibilities should include the following:

1) Assure that the strategic plan guiding information technology is continuously updated and supports the strategic direction of the University.
2) Review and approve information technology initiatives within the University.
3) Assure that the University of Minnesota's resources committed to computing and networking are appropriately prioritized.
4) Address policy issues related to computing under the framework of the University's computing philosophy and strategy.
5) Establish a strong advisory structure allowing feedback from faculty, students and staff concerning services, needs and plans, and encouraging participation by people not familiar with computing and information technology.
6) Advocate for faculty, students and staff on computing proposals to the University.

d.Explore lasting partnerships with industry.

1) Encourage the University of Minnesota to explore viable means of generating external computing funds.
2) Pursue appropriate partnerships with outside enterprises to leverage our financial and intellectual assets.
3) Pursue technological innovation by enlisting several corporate partners to develop jointly a cost-effective universal access

model for campus information technology.
4) Attract an excellent visionary to lead this project.

e.Establish rational financing mechanisms that provide incentives for actions and behaviors supporting the mission of the university, driving implementation of our technology vision, and inviting external interest and funding:
1) Explore and encourage units of the University of Minnesota to explore innovative means of generating external funds.
2) Budget computing facilities on the same basis as other key infrastructure needs.
3) Establish funding policies that encourage decentralized acquisition decisions from a university-wide perspective.
4) Invest according to a previously articulated plan vs. who can pay.
5) Provide sufficient funding for basic access to all users.
6) Align tuition and fees with direct instructional benefits.
7) Acquire university-wide site licenses for selected software and databases.

3.Commence computer and information technology planning process for the whole university from top down.

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