

Technology Guidelines and Standards -2006

Background:

The strategic directions for information technology provide a filter for choosing among technology alternatives those that are most consistent with Hamilton's strategic goals. The purpose of this document is to provide some concrete details about the technological guidelines and standards¹ that will help us advance our strategic directions

The document is divided into three main sections:

I. Teaching and Learning Resources

- a. Technology Enhanced Learning Environments
- b. Group Work and Collaboration Tools
- c. Asynchronous Learning Tools

II. Central Information Systems

- a. Colleague and Benefactor
- b. Web Presence and Campus Portal
- c. Electronic Commerce

III. Infrastructure

- a. Campus Network
- b. Servers
- c. Desktop Computing
- d. Wireless Connectivity

¹ Guidelines are general directions we plan to follow. Standards are specific choices that we have already made for hardware, software, or services. Changes to standards occur only when a case has been made on the basis of cost, technological capability, or sustainability.

I. Teaching and Learning Resources

Teaching and learning resources are information technologies that can be used to support and enhance the teaching and learning process. In keeping with the residential nature of Hamilton College, the process we seek to enhance is personalized and rigorous undergraduate education, but not “distance learning.” Our approaches are designed to support the objectives stated in the institutional strategic plan, including excellence in student communication, and a personalized educational environment characterized by close faculty-student working relationships. Our goal in using technology includes supporting and extending the interactions between faculty and students, between students and their classmates, and between faculty, students and external experts or peers. In addition, we use technology to enable faculty and students to address learning from a variety of perspectives, supporting multiple learning modes and styles, thereby allowing a more personalized approach to knowledge acquisition and use.

a. Technology Enhanced Learning Environments

Technology Enhanced Learning Environments have both physical and virtual components. The physical includes the public computer labs, and the classrooms that contain varying types and degrees of technology to support the teaching and learning experience. On the virtual side, we have a variety of specialized software, made available through a number of means both in the labs and classrooms and in the residence halls. The broad accessibility of these resources makes learning a more natural, fluid experience, where students may explore the answers to questions whenever and wherever those questions arise. The virtual environment also includes specialized learning tools, or objects, which are a blend of technology and content. This blend is carefully planned and constructed so that using the tool increases learning and retention. Building or finding these tools, in collaboration with faculty, is one of the important goals of information technology support services.

(Guidelines) The following are general guidelines for technology enhanced learning environments:

- Constant, consistent upgrading of technological facilities across campus:
 - Upgrade approximately one-third of the existing public lab and classroom hardware annually.
 - ITS supported lab and classroom systems will annually have upgraded images, combining the most effective operating system versions with the most recent and useful academic software.
 - The choice of academic software will be made annually based on the advice and consent of the faculty.
 - Increase the number of technology enhanced lecture rooms to bring the total to 100% of the general classroom space (currently over 70%).
- Exploration and development of new technologies and resources:
 - Increase the accessibility of academic software through a variety of means, including centralized service of statistical software and databases

- used broadly across the curriculum and the increased use of technologies that allow us to cost-effectively manage licenses across campus.
- Create new facilities to support strategic institutional goals (e.g., the Multimedia Presentation Center).
 - Encourage and facilitate the use of videoconferencing for collaboration:
 - Assist members of the Hamilton community to interact with external audiences as experts, collaborators, and colleagues.
 - Assist faculty to use these facilities to bring “experts to campus” to give students access to world class experts while saving money and time and providing access to people who would otherwise be unavailable to our community.
 - Assist both faculty and students to understand and use our existing technologies:
 - Arrange and promote various “technology for teaching and learning” seminars and workshops to showcase existing academic uses of technology, at Hamilton and at other institutions.
 - Assist faculty in the identification, selection, and effective use of instructional technologies to meet specific learning goals.
 - Create a web-based resource with “how to” guides and further examples of teaching and learning applications.
 - Assemble and train a highly effective student workforce to assist members of the Hamilton community in the use of existing technologies.
 - Collaborate with the Librarians to assist faculty in developing coherent and successful teaching projects using the full range of media, technologies, databases and references available via Hamilton’s network and facilities.

(Standards) The following are technology standards for technology-enhanced learning environments:

- Data projectors with a resolution compatible with current laptop computers, and with sufficient brightness to project while maintaining moderate light levels are used in classrooms and public computer labs.
- Control of AV/IT equipment using a single AMX control panel for all equipment wherever possible.
- Computers in podiums meet college standards (see III c.)

b. Group Work and Collaboration Tools

Provide technologies that make it easy for students and faculty share ideas and information, and to integrate their efforts and create a unified outcome.

(Guidelines) The following are general guidelines for group work and collaboration tools:

- Assure that teaching and learning goals are integrated into the development of the campus portal environment.
- Promote the broader use of existing collaboration tools, such as MS Word and the group support features of Blackboard (see “Asynchronous Learning” below).

- Collaborate with the Library and our technology trainer, to assure students and faculty are aware of the features in existing applications which can make collaborative work more manageable.
- Assist faculty in designing projects to take advantage of these tools.

(Standards) The following are technology standards for group work and collaboration tools:

- Blackboard is the standard Course Management System. Blackboard incorporates asynchronous as well as synchronous learning tools.

c. Asynchronous Learning Tools

Many of the technologies that support “asynchronous learning” are known more commonly as “distance learning technologies.” These tools make it possible for students and faculty to interact frequently, without being present at the same time. These are the technologies that most strongly contribute to a student’s ability to personalize his or her learning experience, by allowing the incorporation of learning activities, outside of class time. These activities may be communication between students, or students and faculty, or they may be exercises designed to prepare students for in class discussions, making that time more effective. These tools include specialized teaching applications that are designed around specific learning outcomes. These applications are typically interactive in nature, such as an economics game, or a formative quiz, and are intended to accommodate individual differences in learning modes or cognitive style.

(Guidelines) The following are general guidelines for asynchronous learning:

- Encourage and facilitate the use of the Blackboard web-based course management system by faculty and students to extend the learning experience beyond the classroom.
 - Create the necessary interfaces between Blackboard and other central information systems (Datatel, library OPAC, campus portal) to minimize duplication of information and maximize the usefulness of the system to faculty and students.
 - Promote a deeper understanding of the tools available, including bulletin boards, document posting spaces, calendar, course-centric emails, group tools, quizzes and surveys, gradebook, etc.
 - Assist faculty in designing applications of these tools that assist in transferring learning of some fundamental materials outside of class meeting times, freeing the faculty to use class meetings more productively.
- Assist faculty in developing learning applications that can be used outside of class time to increase a student’s understanding of and facility with the knowledge and tools of any particular discipline.
 - Collaborate with the Library to develop resources for the support of digital editing of media (sound, graphics, video, photography, etc.) that will be needed to represent information in this type of application.

- Develop and/or obtain learning objects targeted to address core concepts within a discipline.

(Standards) The following are technology standards for asynchronous learning:

- Blackboard is the standard Course Management System. Blackboard incorporates asynchronous as well as synchronous learning tools.

II. Central Information Systems

Central information systems are hardware and software that provide support for the business processing and information needs of members of the Hamilton community and external audiences, including alumni, prospective students, and parents. These systems are supplemented by a number of office-based systems. The overall goal of central information systems is to maximize the amount and quality of information provided in a secure fashion to enhance services and reduce operating cost.

(Guidelines) The following are general guidelines we will follow in the development of central information systems:

- College information will be shared broadly, securely, and appropriately across campus. Whenever possible we will provide appropriate information to individuals authorized to see it in a secure manner. Such sharing will save staff time needed to provide information, improve service to our clients, and enable the college to operate more efficiently.
- Information will be made available through an authenticated web interface to college constituents to promote efficiency and simplify access. Authentication will allow us to customize information flow to each individual based upon responsibilities and individual choice.
- Information will be maintained in only one place and shared by other systems, whenever possible. If systems are not easily integrated we will automate information flow between them to minimize human intervention.
- In general, we will investigate the purchasing/leasing rather than doing in-house development of major systems.

(Standards) The following are technology standards for central information systems:

- The core of our college-wide information system is Datatel's Colleague and Benefactor.
- Kronos is the Human Resources/ Payroll System
- Access to personal or sensitive information should be accomplished through a secure authentication scheme based upon Lightweight Directory Access Protocol (LDAP), minimizing the number of passwords needed to provide necessary security.

a. Colleague and Benefactor

Colleague and Benefactor support the transaction-based needs of the college's business processes. In addition, Datatel, through its Web Advisor product, provides institutional information to users through a web interface.

(Guidelines) The following are general guidelines we will follow in the development of the Colleague and Benefactor systems:

- Maintain our Datatel software at a release level within 12 months of the most recent release.
- Implement tools that allow authorized users to easily extract information from Datatel systems and import it into standard Hamilton software for the purposes of analysis.

b. Web Presence and Campus Portal

Hamilton's Web server is the college's presence in cyberspace. As such, it provides a first point of contact for up-to-date information for external audiences. It also serves as a repository for institutional reference materials for internal faculty, staff, and students.

A *portal* is a system in which information is presented through a Web browser and: users of the system must *authenticate* themselves to access the system (sign-on); the information presented to users is *customized* to their needs and responsibilities (e.g. students, faculty, alumni, prospective students); users of the system can *personalize* the information they see to their needs. The major use of a portal at Hamilton will be to integrate all college information systems through a common Web interface and provide each individual with a customized view of the information most important to his/her decision-making. Hamilton's portal is called My Hamilton and is available at <http://my.hamilton.edu>.

(Guidelines) The following are general guidelines we will follow in the development of the Hamilton's Web and portal systems:

- Seek input from a broad-based campus group to determine the information needs for a portal environment and to assure consistency with campus Web standards.
- Whenever possible, decisions about central information systems will be consistent with the guidelines developed by the President's Internet Initiative for presentation of data on the official college Web site:
 - Graphic Identity — All official College information presented on the official Web site must adhere to the current site design and format. Deviations are permitted for non-official information such as personal home pages and student organizations. Academic departments may also choose to create and maintain their own pages, but the College will prepare a specific "cover" page for each academic department. This

guideline is consistent with the College's move to a standard graphic identity.

- Information Architecture and Usability — Information on the Hamilton Web site is organized according to a standard format (i.e., three columns with consistent placement of navigation). Information should be accessed with as few clicks as possible.
- Data Accessibility — To facilitate integration of all information, new systems and software should allow access to underlying data using the core systems employed by our current Web site (e.g., all systems should use ODBC/JDBC/SQL compliant applications for data storage).

(Standards): The following are technology standards for the development of the college's Web and portal systems:

- The Web development environment is Macromedia's ColdFusion.
- Utilize SQL and XML –database driven information and a content management approach to keeping information up-to-date.
- The Web hardware environment is Windows IIS running on HP/Compaq servers.

c. Electronic Commerce (e-commerce)

By e-commerce we mean the completion of business functions through electronic means (Web, Internet). Our students, parents and alumni will increasingly transact business online. Hamilton must provide the option of doing business the same way. The focus of our e-commerce efforts will be to reduce cost and improve service (timeliness, accuracy, accessibility) without compromising personal attention to individual needs.

(Guidelines) The following are general guidelines we will follow for electronic commerce:

- Outsource business functions (e.g. credit card authentication) to reduce cost and focus on our core mission.
- Redesign internal processes to allow those with authority to access information to do so directly (avoiding intermediaries).
- Develop partnerships with corporations to permit the purchasing of, and payment for, materials online while minimizing the need for forms processing (e.g. purchase orders, invoices).
- Adhere to established national standards for electronic transfer between on-campus and off-campus audiences.

III. Infrastructure

Hamilton is committed to maintaining a state-of-the-art infrastructure that is pervasive, fast, secure, and reliable.

(Guidelines) The following are general guidelines we will follow in the development of the Hamilton's infrastructure:

- Budgets and replacement plans will be created to upgrade all infrastructure components (desktop, network, classroom) on a defined time schedule.
- Partner with Physical Plant to assure that we maximize opportunities to enhance the pervasiveness and reliability of our infrastructure.
- Track latest industry trends, policies, and tools.
- Outsourcing arrangements will be utilized to assure high availability and cost-effectiveness.

a. Campus Network

(Guidelines) The following are general guidelines we will follow in the development of the Hamilton's campus network:

- The data network topology is gigabit Ethernet over fiber between most buildings with switched 10/100Mbps connections to every network jack.
- The "information outlet" provides a termination point for the network in all offices, classrooms, residence hall rooms, and public spaces. The information outlet terminates a Category 5e/6 cable for the data network, a Category 3 cable for telephone access, and an RG-6 cable for cable television.
- Reliability will be achieved by actively monitoring devices on the network backbone, having spare devices on-site in case of equipment failures, and maintaining service contracts for 24-hour hardware and phone support.
- UPS battery backup will protect the core network devices against power failures.
- Software upgrades for all network backbone devices are completed annually.
- Monitoring unusual network traffic and disabling network ports that may cause a security breach on the network will enhance security. Actively monitor bulletins from CERT, SANS, and other security organizations to alert us to the latest network security threats.
- Secure all network equipment in locked closets or cabinets.
- Ensure network backbone cabling and electronics are sized appropriately to allow for future growth and adjustments.
- Upgrade network electronics every five years to adequately support applications, which require increased network bandwidth.
- Utilize on-campus and off-campus bandwidth measuring tools to determine the traffic capacity of our network.
- Research trends in network usage to predict and identify future needs.

(Standards) The following are technology standards for the development of Hamilton's campus network:

- Cisco is the supplier of our data network electronics.
- Cisco PIX firewalls are used to protect the Datatel system and the entire campus network from the Internet.
- Contracts for 24 hour hardware support for Cisco core network equipment and firewalls are maintained with Cisco. Spare network equipment is maintained on-site for other network equipment failures in buildings.
- The telephone switch is a Nortel Meridian maintained through an arrangement with the Telecommunications Analysis Group (TAG). Local and Long Distance phone service and billing is provided through contracts with Paetec and STC.
- The cable television network is coaxial cable maintained through an arrangement with Falls Earth Station.
- The campus connection to the Internet is a 45 Mbps T3 provided through a contract with Bandwidth.com/MCI.
- The Allot Net Enforcer is used to shape bandwidth patterns to provide higher priority to certain types of network traffic that flows over our Internet connection.

b. Servers

Access to electronic information depends on the existence of secure, high-performance, and reliable information servers. Standardization on these hardware and software environments is done to assure that there will always be excellent support.

(Guidelines) The following are general guidelines for servers:

- Server environments other than Macintosh OS X, Windows 200X and Solaris UNIX must be justified by the need to support applications that are essential and not supported in these environments. Such justification will also indicate how the server will be supported. Non-standard server environments will be reviewed annually to assure that one of the standard environments cannot be used.
- System security will be assured by actively monitoring releases of critical Microsoft security patches and/or service packs, and ensuring prompt installation of any pertinent/critical security related updates.
- Security policies and practices will be refined and defined regularly.
- Server scanning is done periodically using various security analysis tools to identify any security holes or vulnerabilities.
- Anti-virus definition files are updated daily on all servers.
- Administrator server passwords are changed on a periodic basis.
- Secure Socket Layer (SSL) and other encryption methods are used in some applications to protect data, which is transmitted over the network.
- All server equipment is physically secured in locked rooms.
- System reliability is assured by using fault tolerant configurations for all servers. This includes purchasing and configuring redundant hardware components (dual power supplies, dual network interfaces, etc.), and implementing system fail over configurations using various levels of RAID storage configurations.

- Weekly, full and daily differential backup tapes of all critical system data are done and maintained.
- Software tools are used to ensure data storage is maintained efficiently and reliably.
- Disk space usage, processor utilization, and other statistics are actively monitored.
- Proper environmental conditions air conditioning and power conditioning are provided.
- System logs are regularly monitored to ensure processes are running normally.
- A test server environment is maintained for experimenting and validating configurations before implementing changes on production servers.

(Standards) The following are technology standards for Hamilton's servers:

- Our server environment is Macintosh OS X, Microsoft Windows 200X and Solaris UNIX.
- HP servers are the standard Windows server hardware platform.
- Sun servers are the standard UNIX hardware platform.
- Contracts for 24-hour hardware support provided through HP and Sun on all critical servers.

c. Desktop Computing

Hamilton supports both Windows and Macintosh computing environments.

(Guidelines) The following are general guidelines for our desktop computing environment.

- All desktop hardware will be replaced on a 3-5 year cycle, during the months of June – August.
- Standard hardware and software configurations are implemented whenever possible.
- The Vice-President for Information Technology must approve computer purchases outside of the replacement plan.
- Standard software and hardware are acquired and installed by ITS.

(Standards) The following are technology standards for Hamilton's desktop computing environment:

- The hardware platform for Windows is the Dell Optiplex/ Latitude family of desktop/laptop computers.
- The Apple Macintosh computer is the alternative hardware platform.
- Standard software is: Microsoft Office, Filemaker, Dreamweaver, Internet Explorer, Adobe Acrobat, and Eudora.
- Sophos is the standard anti-virus software used on all institutional computers and provided free to students. All computers must maintain up-to-date virus protection and computers running the Windows operating system must maintain up-to-date critical operating system patches.

d. Wireless connectivity

The price/performance ratio of wired versus wireless communications will always be lower for wired communications. Nevertheless the application of wireless networking will be important at Hamilton. For a variety of reasons wireless computing is convenient. Increasingly students bring laptop computers to campus as these devices become less expensive and more capable. There are places on campus where having wireless access makes sense.

(Guidelines) The following are general guidelines for wireless connectivity:

- Implement wireless in academic buildings and large public areas where groups of individuals gather and where the need for access to network resources is likely, or other places, such as science laboratories and auditoriums where wired connections are inconvenient, a risk to safety, or costly to implement.
- Implement security features to assure that the wireless connections are available only to authorized members of the Hamilton College community.

(Standards) The following are technology standards for wireless connectivity:

- Hamilton wireless connectivity conforms to 802.11b/g standards.