



INFORMATION TECHNOLOGY ARCHITECTURE 2001

I. Introduction

In preparing for battle, I have always found that plans are useless, but planning is indispensable.

Dwight D. Eisenhower

This document is *not* a detailed plan. Instead, it is a high-level blueprint intended to guide the continuing work of information technology planning at Colorado College. It provides a framework for planning. It is analogous to an architectural rendering of a new building – it suggests the “shape” and “look” of what is to be created and outlines major “structural” elements integral to the future information technology environment at the College.

We have organized this document in four sections. First, we describe the process of strategic planning, emphasizing the unique characteristics of planning in the information technology environment. Second, in a section entitled “How Information Technology Helps the College,” we address why we make investments in information technology. Third, we focus on strategic thinking, i.e., the goals, outcomes, and assessment strategies associated with information technology use. Finally, we discuss tactics and provide brief summaries of near-term projects within Information Technology Services (ITS).

II. Strategic Planning for Information Technology

Strategic planning is a *process* for taking us from where we are to where we want to be. When done well, it creates a shared vision of the future among members of an organization. It helps people imagine a desired future and then create it. Planning should be guided by a clear understanding of organizational purpose (the

mission). The information technology environment in any organization is one that might be characterized as “permanent whitewater” – it is turbulent, sometimes unpredictable, and risky. Therefore, in planning for information technology, it is most important to prepare to be adaptive with both human and technical resources.

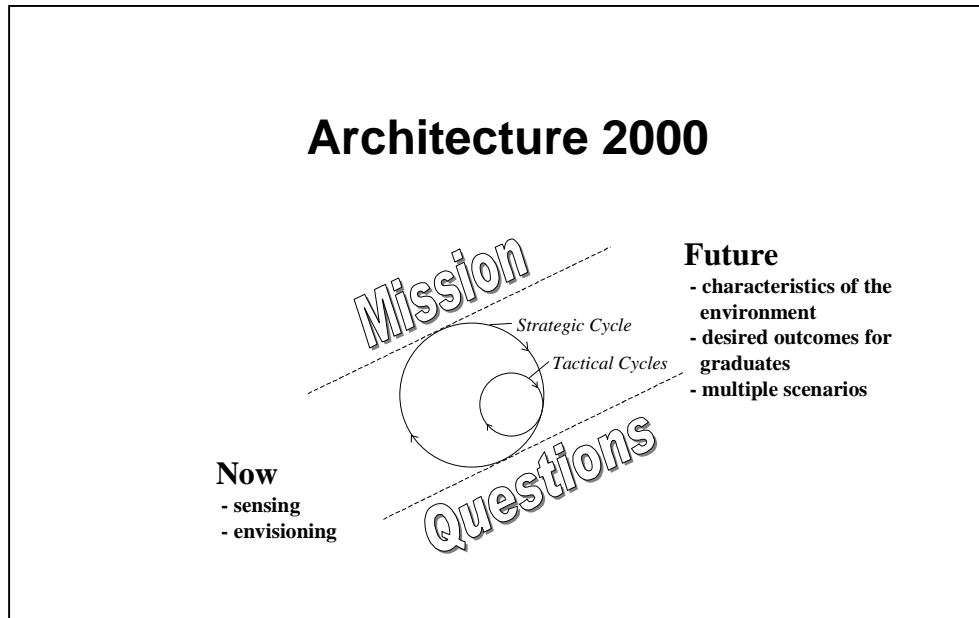
Planning proceeds as *cycles within cycles* (see graphic on next page). Longer-term cycles are strategic in nature and require broad involvement from campus constituencies. At the strategic level, there should be an ongoing dialogue guided by enduring questions about the role of information technology within the organization. At the tactical level, Information Technology Services, with guidance and feedback from the Information Technology Policy Board, is responsible for planning and implementing both the human and technical activities that will enable progress toward the desired future.

Planning must be informed by a blend of sensing the environment and envisioning the future. Sensing should be done both within the organization (e.g., robust communication with users) and outside the organization (e.g., benchmarking, visiting leading institutions). In envisioning the future (and setting goals), we should pay attention both to characteristics of the environment and desired outcomes for graduates of the College. Also, we should incorporate assessment strategies into plans for change to provide indicators of progress and to ensure accountability. When thinking of the future, it is often advantageous to envision several alternative future scenarios and to weigh their respective advantages and disadvantages.

In the world of information technology, the pace of change provides frequent and plentiful opportunities; it is a continuing challenge to identify those opportunities with real promise for

the College. Also, the College's acceptance rate of technological innovations is an important strategic issue. Does the College community intend to be a leader in this area ("early adopter"), or are people here more comfortable following the

lead of others ("early majority")? This decision has very important financial implications. The rate of change is also obviously constrained by available resources (financial, human, and time).



III. How Information Technology Helps the College

In itself, technology is neither helpful nor harmful; it is simply a tool. The most advanced and speediest computers in the world will be of little help in our mission if the software is mindless and fails to engage understanding. Conversely, armed only with their minds, a few books, chalk, and a pencil, well-informed and motivated teachers can lead their students triumphantly down the road to understanding. Indeed, Socrates had not so much as a blackboard; he stimulated understanding simply by the shrewd questions that he asked, the order in which he posed them, and his often pointed reactions to the responses of those for whom he served as gadfly.

Still, we would be ill advised to ignore the opportunities afforded us by the sophisticated technologies of today. Videodiscs can draw students vividly into mathematical problem solving or the art treasures of the past. Databases allow them to collect and manipulate all kinds of information about their world, their community, and their own lives. Electronic linkages allow them to share their interests with others from around the world. Networked personal computers and scanners enable them to write, make diagrams, draw, and compose music, revise works as they wish, share them with peers, and make them available to experts anywhere – or indeed, to the students' own subsequent review and critique.

*Howard Gardner
Harvard University*

The College Mission and Information Technology

Colorado College seeks to offer the best possible liberal arts education in a diverse community that supports intellectual creativity. The College is committed to personal, social, and intellectual growth, and to personal integrity coupled with concern for others. It seeks to create a climate, both in and out of the classroom, in which all members of the community can freely think, write, research, analyze, and criticize. It hopes to help students become effective citizens of the world who lead responsible, reflective, and creative lives.

Within the context of our mission, we seek to prepare students for leadership in a technologically sophisticated world. We strive not only to foster critical thinking and effective management assisted by information technology, but also to evaluate the impact of technology on our work, our society, and our lives. We also recognize that information technology plays a critical role in the business processes of the College and intend to use technology, where appropriate, to enhance those processes.

Information Technology Defined

As used in this document, “information technology” includes such products and services as telephones, multimedia, books, chalk, computers and computer software, fax machines, the Internet, e-books, palmtops, networking in general, and the full spectrum of communications media. It is viewed as both an application and a science. Further, computer programming and educational technology are considered subsets of information technology.

Some Philosophical and Practical Questions

There is a long history of the use of technological innovations in teaching and learning. As early as the fifth century BC, teachers used written records in addition to the spoken word. These written records led to the creation of libraries. In the 1400s, the printing

press was invented. And in just the past century, mass schooling and formalized testing have become commonplace. Each of these innovations (and many others not mentioned) raised questions about its impact on educational practice.

Questions can be very good teachers. As we plan and implement our way to the future, our planning conversations should be guided by both broad philosophical and practical questions concerning information technology, both in the campus environment and the larger society. As a learning community, it will be helpful for us to address these questions together. For example:

- What is the evidence that information technology provides leverage in teaching and learning?
- How do we balance the benefits of information technology with the personal, intensive, face-to-face style of education and administration that is the hallmark of Colorado College?
- What is the appropriate role of information technology in a liberal arts setting?
- How does technology enhance the business processes of the College?

Answering these and related questions will be an ongoing process of discovery and dialogue. Following are some quotes and brief statements corresponding to these questions to provide a basis for discussion.

Technology as a Lever in Teaching and Learning

Basic changes in technology have created a vast new design space, including both new ideas made conceivable by the technology and old ideas made practicable by the technology's widespread adoption.

*Phillip Agre
UCLA*

The use of information technology does not cause learning, but it can enhance the learning process. Information technology is a tool with the potential to enhance (or enable) the human

learning process. It promises to bring increased access, speed, power, efficiency, flexibility, variety, ease, feedback, realism, relevance, and independence to education. At its best, information technology should be “invisible” and operate in the background (unless it is the subject of study). Use of technology tools should become second nature, so that primary human mental energy can be focused on the construction of knowledge, critical thinking, and creativity.

Although learning is primarily an internal human process, it is highly dependent on external input. Information technology changes the learning environment. When used effectively, technology enhances the inputs (data and information) available to the learner. However, use of technology does not guarantee learning.

Technology as a Complement to Human Interaction

Although the information age is marked by profound changes in the quantity, quality and availability of information, much of what goes on between human ears is likely to remain unchanged. Better understanding of human learning is an absolute prerequisite to managing the effects of and capitalizing on the opportunities provided by information technology.

*John Darley
Princeton University*

Human interaction is essential in a high-quality educational program. We should make every effort to preserve the rich student-teacher and student-student interaction that characterizes education at Colorado College. Technology will not replace the intensity of interaction that comes when groups of students and faculty work together on difficult intellectual problems.

When used well, however, technology allows more class time for those intellectual discussions and less for mere presentation of information. We expect information technology to grow as a tool that teachers can use to enhance the learning

environment they design and create. Perhaps the most significant impact of technology will occur outside the “classroom,” where student-teacher and student-student interaction may have been limited in the past.

The Role of Information Technology in the Liberal Arts

Liberal arts colleges have special opportunities and resources to use computers in ways that may change the educational process. One of the principal commitments and strengths of our college program is interdisciplinary learning and instruction, involving collaboration among faculty members across departmental and divisional boundaries. Moreover, liberal arts faculties are involved in the management of college affairs. As a result, cooperative enterprises among faculty in different fields (in science and humanities, for example), and between faculty and administrators fit easily within our established practices. We believe that this kind of interdisciplinary cooperation, where mathematicians work with artists, and scientists with humanists, can assist us to exploit the potential of computers in new ways to enhance creative teaching and inspired learning within the context of liberal education.

*William Hochman
Colorado College*

Information technology is a powerful enabler of communication. There are three broad categories of computer use in higher education: 1) modeling and simulation; 2) improving productivity; 3) communication (including electronic research). While the first two categories are important, it is the use of computers and the Internet to enhance communication that is perhaps the most powerful in higher education, especially in a liberal arts setting. Two of the requisites of a first-class education are clear information and informative feedback for students. In fact, it is the ongoing conversation between faculty and students that lies at the heart of effective teaching and learning. Today, computers and networks have become extraordinarily powerful enablers of academic conversation. They allow

a faculty member or student more access to more information, in more forms, and in less time than ever before. They also allow faculty and students to be connected to other people and learning communities around the world throughout their lifetimes. Every CC student must be given ample opportunity to develop his or her skills using these new “engines and highways” of knowledge creation.

We place high priority on the ability to analyze material, to differentiate between the significant and the trivial, and to make informed judgements. Through new technologies, students have access to tremendous amounts of information; they must hone their critical and analytical skills to sift through all the material and focus on key elements.

Information Technology and College Business

Information technology also enhances the many administrative services of the College, e.g., admissions and financial aid, the business office, development, registration, the bookstore, etc. In general, administrative uses of technology tend to be much more structured, narrowly focused, and repetitive than academic uses. Business processes are often constrained by rules or laws. Teaching and learning, at their best, are context dependent and tailored to the respective styles of faculty and students. Business processes need to be designed for efficiency; it is expected that few should serve many. Speed is usually critical. Security is also much more likely to be an important issue in administrative uses, thus the interest in careful Intranet design and development. These fundamental differences in the nature of business and educational processes imply very different technology requirements.

Other Questions

Following are additional important questions (without answers) that we should consider as we create the future IT environment at CC.

- What guidelines can we use to determine which emerging technologies are consistent with our mission of preparing students for

professional leadership and civic responsibility in an interdependent world?

- To what extent must the college respond to technological developments in the larger society, and to what extent can we control our own progress?
- How best can we exercise our responsibility as an academic community to evaluate critically the impact of technology on our work, our society, and our lives?

IV. Thinking Strategically

To think strategically about information technology means we should adopt a system-wide and relatively long-term perspective as we chart the course for this dimension of the College. It means keeping many things in mind at once, i.e., a well-informed sense of the current state, a solid understanding of the College mission, and a vision of a desired future. In this section, we discuss institutional and ITS goals for technology, desired outcomes for students, and assessment strategies.

College Goals for Information Technology

We must be explicit about our goals as we expend time and resources on technology enhancements. The list below corresponds to an institutional perspective and is intended to guide the College in its decision-making vis-à-vis information technology.

Mission compatibility - obtain and integrate new technologies in ways that are compatible with the mission of the College. Computing and other technologies can reinforce such liberal arts attributes as evaluation of information and critical thinking, or they can encourage mindless acceptance of anything found on the Internet. Obviously we want to reinforce those qualities most directly linked to higher levels of teaching, learning, and discovery.

Adaptive planning - information technology changes rapidly, and, as a result, long-range planning is difficult. However, to the extent possible, new technologies should be phased in

strategically according to pre-established plans, rather than on an ad hoc basis. Also, planning must be done in such a way that information technology systems can adapt rapidly to change.

Technology tailored to needs - enhance academic and work environments through technology appropriate to the needs and tasks of particular courses, disciplines, and administrative offices. Not everyone has the same intensity or sophistication of use; we need to carefully match equipment and services to individual and group needs. Colorado College is simply not a “one size fits all” kind of place. However, we recognize the significant benefits (especially for staff who provide support services) of some degree of standardization in hardware and software.

Wise investments in IT resources - strive for cost effectiveness and efficiency in maintaining current information technology systems and in upgrading and expanding them. At the same time, we should ensure that innovators and early adopters at CC are given adequate opportunities to take prudent risks.

Increased reliability – continue to strengthen reliability of campus systems. As we become more dependent on technology, we need to have it work well for both academic and administrative uses. At the same time we must recognize that no system is failsafe – our systems must be designed with redundancy. The intensity of the Block Plan makes “down time” much more critical at CC than at a school on the semester system. To the extent possible, scheduled down time should be planned to minimize disruption.

Privacy and security of our systems - we need to have necessary records available for efficient operation of the college, yet must ensure that these materials are safe from unauthorized users. We must balance the need for openness in our information systems with the need for reasonable security, and we must protect necessary individual privacy.

Excellent training - prepare, train, and support members of all constituencies to make effective

and wise use of technology. Hardware and software is only as good as the uses to which it is put. Like most other colleges and universities, we have discovered that effective use of technology requires extensive and robust support systems.

Improved connectivity and communication - recent innovations in this area have dramatically expanded our access to information, broadened our internal communications, and provided greater visibility with alumni and the world beyond campus.

Routine assessment - evaluate the impact of technology on liberal arts education, on campus programs, on work environments, and on the larger society. One of our responsibilities as an institution of higher education is that of social critic. We should consider analytically how technology affects our work, our society, and our lives.

ITS Goals for Information Technology

ITS is the organizational element responsible for providing IT services and for building and maintaining the infrastructure (networks, servers, user machines, and audiovisual resources). Following are statements of goals for the members of ITS:

Quality service - those responsible for providing IT support services must maintain a strong customer service orientation that is responsive to reasonable requests for assistance. Demands need to be weighed within the context of established service priorities (see Appendix C).

Mission focus - support and enhance pedagogy through collaborations with faculty, students, librarians, and others who are most directly involved in the academic mission. We also recognize that the academic mission depends on the work of the many support offices and agencies of the College. So, while we strive to support the whole community, service priorities must reflect the primacy of teaching and learning.

Keep CC informed – today’s information technology systems are integral to the work of most people on campus. It is critically important that we keep the users informed about the state of, and proposed changes to, our IT systems.

Positive work climate – the people who provide IT services should have ample opportunities for achievement, they should work in an atmosphere of trust and mutual respect, they should have a reasonable degree of freedom in accomplishing their tasks, and they should find enjoyment in their work.

Up-to-date infrastructure – information technology resources have a relatively short life cycle. Sufficient funds should be provided to ensure reasonable life-cycle replacement.

Outcomes

What should students, faculty, and staff know to participate effectively in an information-rich society? We need to be clear about the intended outcomes from our information technology investments, especially those related to student learning. There is a growing understanding of the concept of *information literacy* that is relevant here. Information literacy is not the same as library literacy, media literacy, computer literacy, network or Internet literacy, or technology literacy.

Information literacy encompasses all of these types of literacy, but is more than the sum of all of them. Even more importantly, the focus of information literacy is different from all of these literacies in one very important aspect.

Whereas the specific literacies focus on learning about things, information literacy focuses on people’s empowerment for success in today’s information-rich society. Information literacy starts with people who have a problem or need to make a decision (whether in their personal or professional lives) and incorporates all the abilities they need to effectively access and use information to address their needs. ...

Information literacy is knowing when information is needed, identifying the information needed to address a given problem

or issue, finding needed information, organizing the needed information, and using the information effectively to address the problem or issue at hand.

Aspen Institute

- Colorado College hopes to help students become effective, *information literate* citizens of the world who lead responsible, reflective, and creative lives.

There are also certain fundamental skills and competencies related to information technology that *every graduate* of the College should possess as a result of his or her CC education. These include:

- a general knowledge of computers and troubleshooting strategies;
- the ability to use word processing, spreadsheets, web page design tools, and presentation software;
- the ability to locate and evaluate information available on the Internet;
- an awareness of the legal and ethical issues associated with information technology resources.

Faculty members as well as College administrators and support staff should be given every opportunity to develop these skills.

Assessment

Everyone wishes they had good data about teaching, learning, and technology but few institutions are doing the work to get it. That’s dangerous. Technology changes quickly and unpredictably, technology budgets are large and getting larger, money is tight, and the higher education world is turbulent and unpredictable. Faculty and administrators are making large investments of time and money with their eyes closed. In such a world it is important to get the information so institutions can see what they are doing, fix problems, and document achievements.

*Stephen Ehrmann
The TLT Group*

There is a need to expand CC's *formal mechanisms* for awarding faculty time or funding to integrate technology into teaching. The Dean does award development blocks, and CC does have an annual equipment request process. Also, ITS has a modest budget line to support faculty development initiatives related to technology integration. In addition, the College needs to develop its system of proposal writing (for both internal and grant funding) to include systematic *project assessment* vis-à-vis the use of educational technology. Studies of technology use, perhaps like those sponsored by the TLT Group's Flashlight Project, should be initiated at CC. Another good source of ideas for assessment work is the International Center for Computer Enhanced Learning (ICCEL) at Wake Forest University.

Where We Stand on the Big Issues

Hardware and software standardization

At present, there is great freedom of choice, especially with respect to software, at Colorado College. For students we do recommend a minimum set of hardware specifications for both PC and Macintosh platforms (see Appendix A) and also a preferred network card manufactured by 3Com. We recommend the Microsoft Office Suite for both PCs and Macs, Internet Explorer or Netscape Navigator as the Web browser, and Outlook or Eudora as the e-mail client.

For institutionally-owned PCs, we support the following software packages: Windows 95, NT, or 2000 operating systems; Microsoft Office 97 or 2000 (Word, Excel, PowerPoint, Outlook, Access); Corel WordPerfect 8 Suite (WordPerfect, Quattro Pro, Presentations); Netscape Communicator; Internet Explorer; Cisco Telnet & FTP suite; other specialized packages (e.g., for mathematics, statistics, or foreign languages). We expect to migrate campus computers to Microsoft Office 2000 throughout the summer and next academic year.

For campus Macs, we support the following software packages: Mac OS 8.x or 9.0 operating systems (occasionally System 7.5.x on older

Macs); Microsoft Office 98 (Word, Excel, PowerPoint, Outlook); Netscape Communicator; Internet Explorer; Fetch; NSCA Telnet; other specialized packages.

Mandatory vs. optional computers for students

Colorado College does not require students to own a personal computer. However, for the 1999-2000 academic year, more than eighty percent of our freshmen brought computers with them, and nearly half of those brought laptops. Some might argue that it would be a small step to require all students to own machines. If we were to require a standard machine and software suite for all students, faculty, and staff, this would allow us to shift more of our support resources to training (as opposed to troubleshooting). Also, if students were required to bring mobile computing devices, it would be possible to create a "computer classroom" in nearly any space on campus. If we were to take this step, we would have to plan for the impact on our financial aid program and increase the level of support for faculty use of computers in instruction. Rather than a campus-wide mandate for computers as a first step, we would strongly encourage one or more *departments* to institute such a requirement and to assess the impact on the curriculum.

For those students who do not bring their own computers to campus, or for those who need access to specialized software for a course, we provide public computing facilities. We support small dorm labs in Slocum, Loomis, and Mathias. We also support many larger, teaching-oriented computer labs across campus – Barnes PC Lab, Barnes Mac Lab, Tutt Library Lab, Palmer 14 (Math) Lab, Palmer 20 (Social Sciences) Lab, Keck Humanities Lab (3rd floor Armstrong), and Worner Lab. Many of the labs have been recently renovated and provide good options for studying and working on computer-related projects. Student lab assistants staff the labs in the afternoons and evenings (hours vary for each lab, but two labs are open until midnight).

The Information Technology Budget and Procurement Priorities

In recent years, Colorado College has invested between 4.0 percent and 4.5 percent of Educational & General (E&G) expenses in information technology human resources and infrastructure. This is near the average investment of other Consortium of Liberal Arts Colleges (CLAC) institutions. Nationwide, the range of IT investment is between 3.0 and 11.0 percent of E&G. Compared to similar institutions, our staff ratio (e.g., number of IT staff/students) is at or above the average. Our most pressing infrastructure need is for sufficient funds in the annual budget for life-cycle replacement; we need to become less reliant on end-of-year money for this purpose.

Colorado College has made a substantial investment in information technology infrastructure during the past 20 years. That infrastructure can be grouped into four broad categories: 1) the local area network (LAN) including all its electronic components; 2) more than 850 institutionally-owned computing devices (desktops, laptops, and workstations) and peripherals in offices, classrooms, and public access locations; 3) administrative computing devices associated with the College database; 4) the inventory of audiovisual devices, including the equipment used in “high-tech” classrooms. At present, the replacement value of this infrastructure exceeds \$6M, and annual life-cycle replacement needs are nearly \$700K. Each year, the Equipment Review Committee receives and reviews requests for additions to and/or life-cycle replacement of the information technology infrastructure. The criteria used to evaluate such requests are shown in Appendix B.

Priorities for Service

Just as there are limits to College financial resources for information technology, so also are there human resource limits. Therefore, the Colorado College Information Technology Policy Board has established guidelines for setting service priorities. These guidelines are shown in Appendix C.

V. Thinking Tactically: Major Projects for Year 2001

Academic Computing and User Services

Implementation of HEAT Help Desk Software

The Help Desk has procured a commercial ticketing and tracking package called HEAT. During the spring of 2001, we will receive training in the installation and use of this package, and will install it and begin using it. HEAT will afford us an improved system by which we receive problem calls on the Help Desk. Not only will it allow us to more easily track calls and escalate them for a technician’s response, but it will integrate a useful “knowledge base” for storing answers to frequently asked questions.

Expanded Help Desk Role in IT Training

We are reorganizing the Help Desk staff to include a certified trainer on the team. This MCT-qualified trainer will provide expertise in content such as that required in the MCSE and A+ certification tracks. This “advanced technology training” emphasis, as we are calling it, covers hardware, software, and networking aspects of computing topics. It will provide an excellent incentive to student workers in ITS, and it will further advantage fellow ITS staff, proving an economical model of professional development. In the longer term, we also hope to explore ways in which technical workshops could help staff outside of ITS.

More Student Support in the Help Desk

During Half Block of 2001, we hired additional student workers on the Help Desk, bringing the total to eight. They received intensive training in both hardware skills and customer service skills, and during the spring semester, we hope to expand their role on the Help Desk. They will provide phone support during the extended Help Desk hours, and they will also run calls and assist with hardware troubleshooting and repair. The success of this program is very important for the busy Help Desk, where it will provide valuable skills to student employees, better

service to campus users, and an expanded support system for a talented but small group of full-time Help Desk staff.

Plan Procurement of Approximately 101 New Systems; Cascade Approximately 44 Old Systems

The Computer Selection Committee, formed during 1999-2000, will once again survey the market for excellent computer systems for the campus. After examining several good vendors, and weighing specifications and pricing, we'll select the best vendor from whom the bulk of the computers will be purchased during the 2001-02 year. We'll strive to complete this process even sooner in the spring semester than ever before, enabling the procurement to be done as efficiently as possible. We'll cascade functional computers (largely from the public labs, but some from staff or faculty offices) into locations where "newer" systems are required, thus getting the most value out of each computer system.

Prepare to Establish Thin-Client Labs in the Student Dorms (with N&S Group)

A "thin-client" lab is one in which the only "smart" computer is the server, and the individual workstations connected to it are nothing more than conduits to the server. A thin-client architecture promises reduced life-cycle cost, easier management, and improved security. We have successfully piloted a thin-client lab experiment in the Worner Center during the fall of 2000. During the spring of 2001, we will procure thin-client boxes and servers for the computer labs in Slocum, Loomis, and Mathias.

Develop Joint Plan with TLC and Library vis-à-vis Teaching, Learning, and Technology Seminars

We have begun discussions with the ATS team, the librarians, and the director of the TLC regarding how we might fruitfully collaborate together, and with faculty, on topics of teaching, learning, and technology. One idea involves joint sponsorship of seminars by invited

speakers on topics of teaching, learning, and technology. Another idea involves hosting more CC faculty panels on such topics. And we would like to further explore the sorts of grants and special funding that could be provided to support endeavors in instructional technology and information literacy (internal grants, as well as possible sources of funding from the ACM or the like).

Prepare Plan for ADA

As Colorado College formulates a campus-wide committee to examine the impact of ADA compliance, ITS realizes the importance of its voice on this committee for exploring valuable contributions in the area of adaptive technologies. We will provide a member for this committee and research information for students and staff with special needs. We will consider the needs of our public computer labs to be more inclusive, and we will explore alliances with regional schools that have already pioneered the way.

Administrative Computing

Develop Web Access to Administrative Information for New Campus Constituencies

Our user community has identified transactional applications that will substantially improve service to students, faculty and administration by presenting and capturing administrative information via the Internet. Our first project will target direct student access to transcripts, class schedules, pre-registration, drop/add, waiting list status, degree progress analysis, GPA information, account balances and advanced course catalog searches. Our second project will build upon the first by offering student and course information to faculty to assist with advising and teaching.

Participate in the Campus-Wide Information Systems Study

The specific job of the Information Systems Task Force (ISTF) is to guide the processes associated with a review of administrative information systems, web course management

systems, digital imaging software and portal technologies. The review includes consideration of what we are doing now at CC, as well as commercial products available from a selected sample of vendors. Many established groups, committees, and constituencies will participate in this review, providing inputs to the task force recommendations.

Move the *Benefactor* Software System to a new HP Server

Datatel, the software vendor that provides *Benefactor* to the Advancement Division, no longer supports this software running on our Data General hardware platform for administrative applications. As a result, we will move the software to our new HP server, develop links back to critical data files on the Data General machines, and integrate this new system into our existing centralized printing, backup, transaction logging and batch processing scheme.

Audio Visual Services

Portable Data Presentation Capabilities

AVS recently acquired two “ultra-portable” data projectors. Weighing less than six pounds, these units are smaller than some laptop computers, yet they present bright, high-resolution images of data or video. They are an extremely popular check out item, and we plan to purchase more of these as a solution to increased demand for data display in classes and meetings. We are also increasing our stock of check out laptop computers.

Continued High-Tech Classroom Development

Several projects are in various stages of completion. Three History Department classrooms- Palmer 216, 217, 223- will undergo significant equipment upgrades this spring. Improvements include brighter, higher resolution data projectors, multi-standard DVD players, and space-saving equipment racks. High tech classrooms (or cart systems) for

Romance Languages and Environmental Sciences are in the design phase.

Packard Auditorium Improvements

This spring we expect to complete improvements to the sound and lighting systems in Packard Auditorium. Small-yet-powerful speakers will be installed along with a new, digital mixing board. Two additional lighting instruments will be installed near the sound booth. Aimed at the stage, these lights will provide greater front lighting for speakers and performers.

Network and Systems

Implement a Firewall

ITS recently procured a firewall. Our next steps in implementation are to enlist outside technical support and to ensure that our uses of the firewall are not only consistent with College policies, but also understood by our user community.

Annual Server Upgrade and Life-Cycle Replacement

A great deal of institutional information and applications reside on our servers. Due to the exponential growth in demand on these systems, it is especially important that we upgrade or replace them as appropriate on a regular basis. With the early release of funds from next year’s budget, the life cycle needs of several servers (PFaids, Faculty 1, and the campus Web server) will be addressed during the next low usage period in late May, 2001.

Upgrade Mail Server Farm

With the importance of e-mail and listservs growing daily within the campus community; so does the need for a better e-mail infrastructure. The three current servers running Microsoft Exchange 5.5 will be migrated to Microsoft Exchange 2000. This work will lay the groundwork for better messaging and collaboration among the college community.

File and Web Server Restructure

This is the first phase in a multi-phase approach towards reducing the number of file servers in the computer room and creating personal web space for users in the college community. In addition this will make the file servers more secure by having web services on separate servers.

Campus Web Site Redesign

A web site working group (WWG) has been formed to oversee a redesign of the College's external and internal web appearance. A goal of creating a cohesive look and feel to departmental web pages is a high priority. In addition the WWG would like to promote the development of web pages that contain more dynamic features.

Addition of Internet Bandwidth with Traffic Management

We will increase our bandwidth to the Internet by another 50 percent during the spring semester to help reduce congestion during the busiest times of the day. Traffic studies accomplished during this fall have shown that our Internet connection operates at full capacity for approximately two-thirds of the day. In addition, it appears that approximately half of our traffic is recreational. Therefore, bandwidth management (traffic shaping) will be put into effect.

Provide Network Connectivity for Buildings A,B,C,D,E,F and J in the Western Ridge Project

Network infrastructure will be installed for the seven new residential facilities currently being built along the Western Ridge area of the Colorado College campus. This infrastructure will provide 10/100Mb bandwidth throughout.

Implement Proactive Network Monitoring

This project requires installation and configuration of software packages that monitor the network and give electronic notification of impending trouble to ITS staff, thus facilitating round the clock, rapid response to problems.

VI. Conclusion

Information technology no longer is a luxury for elite colleges and universities; it is a basic requirement for any institution striving to provide a high-quality educational environment. Any institution that fails to make substantial investments in information technology runs the risk of falling into fiscal and intellectual jeopardy... . To forego such investments will mean educating people to live in a world that no longer exists.

*Carol Twigg
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Colorado College is committed to providing a first-rate liberal arts education for its students. It is also committed to the full integration of information technology with teaching, learning, and the College business processes. In this document, we have provided our rationale for the use of information technology, several key policy statements, and the framework for the *continuous planning cycles* that must be done in the "permanent whitewater" environment of information technology. It is our intent to review and update this document regularly. We also invite feedback from faculty, students, staff, graduates, parents, and others with an interest in the future of the College. Please contact Randy Stiles, Director of Information Technology Services, with any comments or suggestions.

Information Technology Services

and the

Information Technology Policy Board

Appendix A

Computing Guidelines for New Students

In preparation for your arrival at CC, here are some highlights with regard to computing:

- We recommend that you bring a computer that meets or exceeds the following minimum specifications:

PC (Desktop or Laptop)

Components:	Minimum:	Recommended:
CPU	Pentium II	Pentium III, Celeron or Athlon
Speed of the CPU	300 MHz	500 MHz
Memory	64 MB	128 MB
Monitor	15"	17" (desktop)
Network Card	Ethernet 10BaseT	Ethernet 10/100BaseT (3Com 905b XL)
Modem	56K V.90	56K V.90
Hard Drive	4 GB	10 GB
CD-ROM Drive	4x	32x
Zip Drive	None	100 MB

Mac (Desktop or Laptop)

Components:	Minimum:	Recommended:
CPU	PowerPC (604)	G3 or iMac
Speed of the CPU	200 MHz	350 MHz
Memory	64 MB	128 MB
Monitor	15"	17"
Network Card	Ethernet 10BaseT	Ethernet 10/100BaseT
Modem	56K V.90	56K V.90
Hard Drive	4 GB	8 GB
CD-ROM Drive	4x	32x
Zip Drive	None	100 MB

- There are many excellent computer vendors to choose from. Pay attention to the networking components of any brand you choose, as well as your warranty and service options should something go wrong.
- Buy your computer with a modem and a network card already installed, if possible.
- 3Com is the preferred brand of network card if you buy an add-on component.
- ITS cannot repair or upgrade your hardware or software, due to warranty and liability issues.
- The Colorado College Bookstore offers an excellent discount on Microsoft Office and Microsoft FrontPage. This software is yours to use for academic work, both during your tenure at Colorado College and after you graduate.

Appendix B

Colorado College Equipment Committee

Evaluation criteria for information technology procurement

- Each faculty and staff member should have an interoperable, network-compatible system capable of accomplishing requisite work demands.
- Technology should be integrated into the classroom to advance the teaching and learning mission.
- Network resources should be reliable, secure, expansive, and standards-compliant.
- Capacity should be added to serve the expanding user demands.
- Student labs should be equipped with current technology.

Further description of criteria with emphasis on priorities

1. Highest priority is given to hardware or software with institution-wide impact. For example, a life-cycle replacement request for the campus email server would receive a high priority because it provides benefit for everyone on campus. Since the network is, in a sense, the foundation for all campus data communication and connectivity with the external world, we must ensure that it is reliable, secure, and standards-compliant.
2. We want to ensure that every faculty member, administrator, and support staff member *with a need* for a computer has a system with the hardware and software necessary for accomplishing his or her work. Those systems should be compatible with, and connected to, the network.
3. For computing devices located in public places (e.g., student labs and library workstations), priority should be given to high-quality, durable equipment, and we should plan relatively short life-cycle (with cascading) to minimize maintenance costs.
4. Information technology resources, including audiovisual equipment, should be integrated into classrooms where it can be demonstrated that they will enhance the teaching and learning mission. Information technology resources should also be used in administrative offices wherever it can be demonstrated that they will enhance the conduct of College business.
5. Specialized labs, which support the work of a single department or a relatively small number of students, will receive institutional support only if resources are available after consideration of higher priorities. Departments making such a request should also seek alternative funding sources.

Appendix C

Guidelines to Setting Priorities for Users of ITS

November, 1998*

The Colorado College Information Technology Policy Board has endorsed the following guidelines for users of Information Technology Services (ITS). The ITS staff is committed to providing high-quality service to all users of Colorado College information technology resources. However, we operate within both human resource and financial constraints, and so we must prioritize work requests. Also, there are sometimes unanticipated or emergency circumstances that will impact our ability to provide timely response to a request for service. Our goal is to develop realistic agreements with users that result in timely delivery of Help Desk support and completion of longer-term, special projects.

We intend to provide open and frequent communication with users of our services including the status of Help Desk requests, special projects, equipment orders, and system outages. We also encourage users to contact the appropriate ITS staff person if there are questions. The Help Desk is the “nerve center” of our organization; when in doubt, call X-6449.

In *descending order of priority*, the following situations may affect the amount of attention ITS can bring to a request for support:

1. An unscheduled network or campus server, software, or another electronic or cabling failure that affects most or all of the campus.
2. A security breach or possibility of a security breach that renders network services, servers, or other workstations inoperable, or a security event which damages the digital contents of network equipment, servers, or other storage media (e.g., virus attacks or vandalism).
3. An outage affecting a group of systems (e.g., a software halt, or a lab, classroom, or office outage).
4. An outage of a part of the network, server, peripheral, or audiovisual system affecting the teaching of a class or other educational activity in process or soon to begin.
5. The failure of an individual’s College-owned system (e.g. desktop, printer, projector, or College-supported software).
6. Preparation of a high-tech classroom or computer lab prior to its use for teaching.
7. “Trouble calls,” questions, and other requests that can be answered over the phone by Help Desk staff.
8. Conducting workshops or working on special projects that are accepted by and assigned to ITS staff after discussion with users, or requests for purchasing activities requested of ITS staff by other offices or departments (e.g., pricing, soliciting competitive bids, and ordering of equipment).
9. Ongoing operation of equipment, provision of support services (e.g., such as that provided by audiovisual, NT server administration, or teaching lab support), and maintenance of facilities, systems, infrastructure and other equipment.
10. Repair of College-owned systems which run College-licensed software and are temporarily installed in the employee’s home. However, home support on these systems is limited only to services that can be provided by telephone. If the problem can’t be resolved over the phone, then the system should be brought to a CC repair facility.
11. Limited assistance for personally-owned computers and software. In general, this will include tip sheets and phone support *during regular business hours*. Given the constraints of other, higher priorities for service and the large number of on-campus systems, ITS recommends using private support providers or entrepreneurial students whenever possible. We can give referrals for installation of software used to connect to the campus network and for software licensed by the College. Also, ITS will provide guidance, advice, and service recommendations to deal with disasters and emergencies on personal machines that affect teaching, scholarly work, or the business of the College.

* updated May, 2000



**Information Technology
Architecture 2000**

Contents

- I. Introduction**
- II. Strategic Planning for Information Technology**
- III. How Information Technology Helps the College**
The College Mission and Information Technology
Information Technology Defined
Some Philosophical and Practical Questions
- IV. Thinking Strategically**
College Goals for Information Technology
ITS Goals for Information Technology
Outcomes
Assessment
Where We Stand on the Big Issues
- V. Thinking Tactically: Major Projects for Spring 2001**
Academic Computing and User Services
Administrative Computing
Audiovisual Services
Network and Systems

- Appendix A. Computing Guidelines for New Students (summary)**
- Appendix B. Evaluation Criteria for Information Technology Infrastructure**
- Appendix C. Guidelines to Setting Priorities for Users of ITS Services**