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When Bad Things Happen to Good Campuses

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CURRENT ISSUES

4 The Telecommunications Act of 1996: What’s in this Bill for Higher Ed?
by Michael M. Roberts, Educom

6 Principles of Good Practice for Distance Learning Programs
by Barbara Krauth, Western Interstate Commission for Higher Education

FEATURES

9 Management Is About Relationships
by Carole A. Barone, University of California Davis

12 IT Leadership is Key to Transformation
by Donald M. Norris, Strategic Initiatives, Inc., and Michael G. Dolence, Michael G. Dolence & Associates

21 The Financial Mythology of Information Technology: The New Economics
by John L. Oberlin, University of North Carolina-Chapel Hill

34 The Use of Electronic Data Interchange under the Family Educational Rights and Privacy Act
by Paul T. Rhinehart, University of Southern Mississippi

VIEWPOINTS

40 Electronic Data Interchange: We Are Stampeding
by Virginia Rezmierski, University of Michigan

43 Killing the Electronic Messenger
by Robert Morley, University of Southern California

44 When Bad Things Happen to Good Campuses
by Sally Webster, SUNY, and Frank W. Connolly, American University

GOOD IDEAS

49 The Standing Meeting
by David L. Smallen, Hamilton College

51 Partnering with a Vendor to Prototype a Data Warehouse in Ninety Days
by Robert G. May and Teresa Stankiewicz, University of Texas
In his CNI report this quarter, Richard West points out that the recent passage by Congress of the Telecommunications Act has “focused the leadership of our professional higher education associations—and indeed the leadership of our institutions—on the opportunities, costs, and benefits of information technology, particularly network-related technology.” Richard couldn’t have written a better preamble for this issue of CAUSE/EFFECT. From Mike Roberts’ overview of what the Telecom Act will mean to higher education to Sally Webster and Frank Connolly’s insightful and entertaining look at what to do “when bad things happen to good campuses,” the articles in this issue should stimulate thinking about the challenges networking presents to higher education.

Roberts’ article, written within hours of the Act’s passage, provides a quick estimation of what we “won” and “lost” with this bill. The winners, he says, include benefits from competition, acceleration of the development and delivery of advanced broadband services, and continued Internet growth. The losers are what he calls the “indecency follies”—the failure of rational arguments to prevent inclusion in the bill of the provisions of the Communications Decency Act. While the ACLU has already challenged these provisions, Roberts says, “The Justice Department is going to have to develop guidance for owners and operators of servers as to what ‘reasonableness, effective, and appropriate’ measures to avoid transmission or display of indecent content to minors actually means.”

An area of network-related policy of growing importance is the governance of programs electronically delivered across state lines. The Western Cooperative for Educational Telecommunications (WCET) of the Western Interstate Commission for Higher Education (WICHE) has published a booklet summarizing existing regulations in this area for the Western states, including a set of principles of good practice for electronically offered academic degree and certificate programs. That set of principles is included in its entirety in Barbara Krauth’s article about the project that spawned the WCET publication.

Donald Norris and Michael Dolence’s article on the role of the IT leader in transformation extends the premise of their recent book, Transforming Higher Education: A Vision for Learning in the 21st Century. In this article, they articulate an emerging model for IT leadership founded on educating, collaborating, and cooperating across diverse campus constituencies to achieve an institutional vision for learning in the next century (a model for leadership exemplified by last year’s CAUSE ELITE Award winner, Carole Barone). Norris and Dolence end by examining the need to develop new economic and financial paradigms, a theme that is the focus of John O’berlin’s article, which challenges information technologists and business officers to relinquish “legacy-based fiscal thinking.” O’berlin believes that understanding the attendant economics of IT—through understanding its value, demand, and cost—is fundamental to developing financial strategies to accommodate technological advances and to manage IT investments effectively.

Network technologies also enable new ways of doing business, among them the electronic data interchange (EDI) of student records. While this technology offers many clear advantages, one important question author Paul Rhinehart says must be addressed is how students’ privacy will be protected under this means of transmission. His article examines protections afforded by the Family Educational Rights and Privacy Act of 1974 (FERPA) in light of new interpretations of FERPA, principles established in past case law, and the world of electronic banking, where procedures, legislation, and case law are well established.

Two follow-on viewpoints also look at the growth of EDI and privacy of student information. Virginia Rezmierski shares three areas she believes are of concern as higher education moves rapidly in this technological direction: determining purpose and direction, focusing and staying the course, and remembering our responsibilities along the way. Robert Morley believes that as long as the stewards of protected information continue to act in a responsible manner, “new and emerging technologies should be considered an opportunity, not a threat.”

Beyond FERPA and EDI, there are other issues arising related to privacy of student information in an increasingly networked environment. To explore these issues, CAUSE has established a task force (in cooperation with the American Association of Collegiate Registrars and Admissions Officers) to develop a white paper that will include guidelines for developing institutional policy in this area. This task force is the first of several activities CAUSE is planning related to institutional information policies in a networked environment. A new page on the CAUSE Web server will function as a gateway to campus network-related policies, as well as to other relevant resources (see http://cause-www.colorado.edu/issues/policy.html). We invite you to contribute appropriate policies or their URLs to this collection, and send your ideas for related activities to CAUSE President Jane Ryland (jryland@cause.colorado.edu).

Julia A. Rudy, Editor
Future Perfect

by Richard P. West

We’ve all talked about it for some time, “it” being the future we imagine that will allow us to have widespread access to digitized information. Even more exciting is the ability to fetch the information from afar via electronic networks while we reside at home or wherever our office is that day. CNI was created to explore the possibilities of storing and communicating information across electronic networks—“To Advance Scholarship and Intellectual Productivity”—as CNI’s letterhead succinctly states. Throughout CNI’s Task Force meetings and projects the possibility of using networked information has been enthusiastically encouraged, examined, and envisioned.

In CNI forums, the nature of the changes required to implement the future world of networked information has never been restricted to the technical aspects of networked information. To be sure, the navigation and interoperability issues, which are primarily technical, constituted one of the five original CNI project themes identified at the first few organizational meetings of the CNI Task Force. However, institutional and user readiness, public policy, and the changing economics of networked information have also always been part of CNI’s thematic tracks.

As I complete this article, Congress has passed the Telecommunications Act of 1996. As originators and now veteran users of the Internet, the higher education community has a lot riding on how the policy decisions made by the Congress are implemented. The actions of Congress have focused the leadership of our professional higher education associations—and, indeed, the leadership of our institutions—on the opportunities, costs, and benefits of information technology, particularly network-related technology.

A common theme among today’s higher education technology and information managers is how to communicate, advise, and inform our higher education leadership about the potential of technology for the mission of our institutions. Most presidents and provosts, I think, are persuaded that networked technology is beginning to have a positive force on higher education’s activities. Some recognize that the impact on our services of teaching, research, and learning can be significant and even revolutionary. However, when the professional managers begin talking about the technology, presidents and provosts often become impatient and confused, don’t grasp the points of our presentations, and miss the wisdom of our recommendations.

It is our responsibility as information resources managers (I include both librarians and information technologists here) to frame our ideas, discussions, and implementation of technology with as much consideration to the business of managing technology as to the technology itself. Although I enjoy the word games and intellectual challenges of, for instance, determining the real meaning of client/server technology and cleverly implemented Z39.50-based services, my president should be spared these nuances. Our challenge is to persuade our presidents that our institutions’ funds that acquire information technology and support technology-based information resources and services are being deployed to incorporate change, both technically and organizationally, as it continuously happens.

We should not be selling grand slams, moon shots, miraculous revolutions, or, perhaps the worst sin of all, all the great things technology will do for us tomorrow. Rather, we should be selling networked information as a powerful force now operating on each and every one of our campuses to lower the barriers of time and place to access facts, records, ideas, information, and people. We need to design processes appropriate to each of our campuses to implement the many changes that will be enabled by the new marketplace dynamics unleashed by the new Telecommunications Act. The simple selling of technology may be over, but the ongoing incorporation of its benefits into our organizational daily lives has just begun.

Today’s management of technology and the change created by it is as much about economics, marketplaces, and regulation as it is about hardware and software. We need to work with our presidents and other executives not on the next exciting piece of “future perfect” technology, but rather on how to manage a wonderfully rich and vibrant—and, yes, constantly evolving—campus information infrastructure that advances scholarship and intellectual productivity.

(continued on page 8)
The Telecommunications Act of 1996: What’s in this Bill for Higher Ed?

by Michael M. Roberts

Shortly after the Telecommunications Act of 1996 was signed into law on February 8, Reed Hundt, Chair of the FCC, described the Act as “opening the doors to invention and creativity,” noting that the bill establishes incentives for the FCC and the States “to bring the Internet to every classroom in America.” What actually is in this bill for higher education, and how will it play out?

Our general goals for this legislation might be summarized as follows:

• Bring some relief to the excessive rates universities pay for telephone service and the generally low level of innovation and new technology provided by the local telephone company monopolies. Since our aggregate telephone bills are on the order of $2 billion a year, the predicted 10 percent to 30 percent savings over the next several years due to competition can be put to good use.

• Provide an operating environment for telecommunications in which there are normal business incentives for capital investment, in order to create new services and new technology that will enable colleges and universities to meet needs for interactive distance learning, outreach to communities and other levels of education, and partnerships with research organizations and the business community in general.

• Facilitate, or at least not inhibit, the continuing growth of the Internet and its culture of openness, competition, and inclusion.

• Do no mischief to other things we hold dear.

Along with dozens of telecommunications special interest groups and constituencies, we won some and lost some with this bill. There is hardly a page in a total of more than 200 pages that does not reflect a compromise or tradeoff of competing interests.

Winners

Benefits from competition

The pace of entry in new markets will be quite rapid. Chairman Hundt has said that the FCC will establish the ground rules for mandatory interconnection of competing networks, including wireline, wireless, and cable, within six months. He predicted that a major marketing effort will be made to attract consumers, both business and residential, to “full service” offerings. Most of the big players have decided that they do not need to build, own, or operate full service networks in order to attract customers. Many of the new bundled “end to end” service offerings will be based, partially or completely, on reselling or brokering of services purchased wholesale from carriers with investments in facilities. This is, in effect, a form of systems integration that college and university networkers are familiar with from their computing experience.

At a workshop on advanced educational networking held by the New York State University Regents in early February, Cathy Brown, head of the office of policy analysis for telecommunications in the Commerce Department, said there will be a special premium in the next several years to be a “smart consumer” of telecommunications services. This is a polite way of saying that the time-honored American snake oil salesmen will be out in force in the new competitive world of telecommunications. It is no simple proposition to evolve from a single monopoly industry, with common engineering practices, serving 250 million people, to a heterogeneous, disaggregated, multiple technology industry with many providers large and small.

Most colleges and universities, which have had years of reinforcement of their low opinion of regulated telephone monopolies, are eagerly awaiting the rush of wheeler-dealers. Their shopping list starts out with a requirement for big reductions in voice rates, further reductions in bandwidth adjusted Internet rates, and a vendor commitment to early introduction of integrated broadband services. Let the fur fly. At the Regents workshop mentioned above, it was announced that a bill will be introduced in the New York State legislature within the next several weeks which will facilitate a common bargaining and
procurement strategy for interactive broadband services for up to 10,000 educational and cultural Internet access points in that state.

One of the other developing competitive strategies is to avoid investing in new copper or coax facilities to serve the “last mile” to customers, especially residential subscribers. This is a relatively expensive proposition because of population density factors, and also runs into a hornet’s nest of residual “universal service” issues where vestiges of regulation will remain indefinitely. Consequently, we are likely to see end-to-end offerings based on new wireless services for the last mile. Similarly, the cable industry is basing great hopes for profits by providing Internet access over their existing analog coax networks with the addition of inexpensive two-way modems. A number of these tactics to build business without investing in the underlying facilities will run out of gas after a while, especially as pressure builds from content providers who want full interactive digital service delivery capability. The television set industry is very anxious to get started building digital televisions, which will command premium prices for a number of years. The impending FCC order adopting the Grand Alliance ATS standard will contribute significantly to competitive pressures on satellite, off-the-air, and cable system operators to provide full digital transmission facilities.

It’s hard to predict the success of any one of these strategies, and they will have little effect on existing campus connections to the Internet, which are hard wired and either already are fiber based or will be shortly. However, they will have an effect on the availability of outreach to off-campus sites and may facilitate campus plans depending on individual circumstances.

Broadband services
For the first time, the bill establishes a federal goal of accelerating the development of broadband network services and making them widely available, especially to education. Two years ago, the Administration drafted an entirely new section of the Telecommunications Act to deal with advanced services. This aggressive posture was attacked by both industry and Republicans as being too expensive and too centrist. But the watered down language in the new bill does oblige the FCC and the states to give weight to the development and delivery of advanced services, which will be very useful to colleges and universities.

Internet growth
The Cox-Wyden amendment barring the FCC from regulating the Internet was dropped in conference because of its interaction with the Hyde indecency amendment (about which see note below). There is now some talk of reviving such a rule as part of an independent bill, perhaps the FCC reform measure which Representative Fields and Speaker Gingrich are plotting to bring forward before the end of this session of Congress. In any event, there has been little sentiment at the Commission to regulate the Internet, where competition has produced such positive results, and the FCC can take credit for having been so prescient in deciding that “enhanced” data services should not be regulated. We are fortunate that almost everyone involved with the telecomm bill wants to move their piece of the business to where the Internet already is.

The Internet is currently growing at the rate of more than 10,000 hosts per working day, and probably more than twice that in subscribers to the thousands of access service providers. The internals of the network are being sorely tested for several reasons. Many of the new providers are overcommitting their configurations, the arrangements among providers to exchange packets at high rates are not as reliable as they need to be, and the transition from IPv4 to IPv6, which solves many scaling problems, is still in front of us. As was the case with several major failures of the circuit-switched telephone network a few years ago, there is a possibility that a cascading major routing failure of the Internet would result in calls for the FCC to impose a version of the reliability reporting and correction regime on Internet providers, as it did on the telephone companies. This would be no mean feat; considering the distributed nature of the network. Let us hope that circumstances do not put us in that position.

Losers
Indecency follies
In October, higher education took the position with the conference committee members that since pornographic content on the Internet was already subject to the provisions of Title 18 of the U.S. Criminal Code, the Congress should refrain from inserting redundant language to the same effect in the telecomm bill. While we were advancing rational arguments, the Christian Coalition and its allies were reminding senators and representatives of their obligations to the nation’s children. Following the passage of the bill, the Family Research Council spokesman said, “[this is] an absolute home run for families,” and added, “What this is really about is closing an online loophole in federal pornography law.”

On February 15, a federal court issued a

(continued on page 48)

“"We are fortunate that almost everyone involved with the telecomm bill wants to move their piece of the business to where the Internet already is."
Principles of Good Practice for Distance Learning Programs

by Barbara Krauth

The Western Cooperative for Educational Telecommunications (WCET), a program of the Western Interstate Commission for Higher Education (WICHE), is at the forefront of a growing movement to develop guidelines for evaluating distance learning programs. The Western Cooperative's project, Balancing Quality and Access: Reducing State Policy Barriers to Electronically Delivered Higher Education, is only one of several efforts under way to develop “standards” or “principles” for higher education programs delivered via telecommunications. The project’s overall goal is to encourage the interstate delivery of high quality education programs via electronic means to students in the Western states. At its heart are two questions: what does “quality” mean, and how can it be addressed?

The quality question is being asked by a variety of interested parties, for up to now there has been nothing to guide the review of electronically offered programs from any relevant perspective. That is, neither state agencies responsible for approving higher education programs, the regional accrediting associations, institutions involved in developing programs for delivery at a distance, nor students curious about whether they might pursue their educational goals via telecommunications have had any way to judge the quality of programs delivered by technology.

A number of regional and national organizations are now involved in efforts to develop standards for distance learning programs. These groups include the regional higher education accrediting associations’ Task Force on Distance Learning and The Alliance, a group formed by the American Council on Education. The efficacy of learning by means of technology is not itself being questioned in these current efforts. Research and evaluation studies put that issue to rest long ago. Instead, the quality concern focuses on issues related to student support and to program integrity: Will students in “virtual” learning situations be isolated, with no semblance of human contact with their instructors or other students? How can effective advising and academic support services be made available to distance learning students? How can students in such programs be sure that their learning experiences will equal those on campuses and that their degrees will be seen as equivalent to a traditionally delivered degree program?

Regional accrediting associations, too, are at last beginning to acknowledge that traditional means of evaluating an institution’s services must be revised when looking at programs delivered off campus. The number of books in the library is no longer the relevant issue, for example. Rather, what is important is whether and which technological means are available to assist students at a distance or in rural areas in accessing information resources.

The WCET’s Principles of Good Practice for Electronically Offered Degree and Certificate Programs are based on: (1) research on states’ policies for reviewing and approving higher education programs proposed for offering by out-of-state institutions, and (2) extensive reviews, discussions, and comments by higher education leaders in the West.

We recognize that these Principles—or any principles or standards, for that matter—are not the final answer on the issue of quality. They provide only an initial framework for developing the real policies that must emerge from and reflect specific environments. We also know that the Principles cannot help state agencies to regulate many of the programs delivered across state lines via telecommunications. There is no real way to predict, for example, the location of a student studying over the Internet. However much state regulatory agencies would like to control the operation of education that “takes place” within their boundaries, in reality they have no way to stop unscrupulous providers from offering such programs within their state.

Nevertheless, we believe that the Principles of Good Practice can be of genuine assistance in addressing the quality issue. Through widespread dissemination, discussion, and broad endorsement by the higher education community, the Principles of Good Practice can benefit a variety of constituents:

1 This project is supported by the Fund for the Improvement of Postsecondary Education (FIPSE).
Principles of Good Practice for Electronically Offered
Academic Degree and Certificate Programs

Preamble

These Principles are the product of a Western Cooperative for Educational Telecommunications project, Balancing Quality and Access: Reducing State Policy Barriers to Electronically Delivered Higher Education Programs. The three-year project, supported by the U.S. Department of Education’s Fund for the Improvement of Postsecondary Education, is designed to foster an interstate environment that encourages the electronic provision of quality higher education programs across state lines. The Principles have been developed by a group representing the Western states’ higher education regulating agencies, higher education institutions, and the regional accrediting community.

Recognizing that the context for learning in our society is undergoing profound changes, those charged with developing the Principles have tried not to tie them to or compare them to traditional campus structures. The Principles are also designed to be sufficiently flexible that institutions offering a range of programs—from graduate degrees to certificates—will find them useful.

Several assumptions form the basis for these Principles:

- The electronically offered program is provided by or through an institution that is accredited by a nationally recognized accrediting body.
- The institution’s programs holding specialized accreditation meet the same requirements when offered electronically.
- The “institution” may be a traditional higher education institution, a consortium of such institutions, or another type of organization or entity.
- These Principles address programs rather than individual courses.
- It is the institution’s responsibility to review educational programs it provides via technology in terms of its own internally applied definitions of these Principles.

Curriculum and Instruction

- Each program of study results in learning outcomes appropriate to the rigor and breadth of the degree or certificate awarded.
- An electronically offered degree or certificate program is coherent and complete.
- The program provides for appropriate real-time or delayed interaction between faculty and students and among students.
- Qualified faculty provide appropriate oversight of the program electronically offered.

Institutional Context and Commitment

Role and Mission
- The program is consistent with the institution’s role and mission.
- Review and approval processes ensure the appropriateness of the technology being used to meet the program’s objectives.

Faculty Support
- The program provides faculty support services specifically related to teaching via an electronic system.
- The program provides training for faculty who teach via the use of technology.

Resources for Learning
- The program ensures that appropriate learning resources are available to students.

Students and Student Services
- The program provides students with clear, complete, and timely information on the curriculum, course and degree requirements, nature of faculty/student interaction, assumptions about technological competence and skills, technical equipment requirements, availability of academic support services and financial aid resources, and costs and payment policies.
- Enrolled students have reasonable and adequate access to the range of student services appropriate to support their learning.
- Accepted students have the background, knowledge, and technical skills needed to undertake the program.
- Advertising, recruiting, and admissions materials clearly and accurately represent the program and the services available.

Commitment to Support
- Policies for faculty evaluation include appropriate consideration of teaching and scholarly activities related to electronically offered programs.
- The institution demonstrates a commitment to ongoing support, both financial and technical, and to continuation of the program for a period sufficient to enable students to complete a degree/certificate.

Evaluation and Assessment
- The institution evaluates the program’s educational effectiveness, including assessments of student learning outcomes, student retention, and student and faculty satisfaction. Students have access to such program evaluation data.
- The institution provides for assessment and documentation of student achievement in each course and at completion of the program.
Higher education institutions. The Principles can support the efforts of colleges and universities interested in developing and providing quality distance learning programs. By communicating some guidelines to enable such institutions to gauge their own degree of success, the Principles of Good Practice can provide a useful tool for institutions' self-assessment. While they do not in themselves constitute policy, the Principles identify the areas that are crucial to address in policy development. The Principles might also eventually serve as a kind of “Seal of Approval,” enabling private, for-profit program providers to advertise their efforts to meet quality standards.

The regional accrediting associations. The accrediting associations' Task Force on Distance Education has agreed to use the language of the Principles as the basis for standards being developed to address distance learning. As of this writing, the boards of the North Central Association of Colleges and Schools Commission on Institutions and the junior college division of the Western Association of Schools and Colleges have adopted the Principles exactly as written for inclusion in their handbooks for accreditation.

State higher education regulatory agencies and boards. Higher education offices in several Western states have committed themselves to using the Principles in their review of electronically delivered programs proposed by in-state colleges and universities. (States that have so far agreed to this policy include Alaska, Colorado, Montana, New Mexico, and South Dakota.) In addition, the Western Legislators' Conference passed a resolution encouraging all Western states to consider adopting the Principles as the basis for in-state assessments. The next step in WICHE's project is to encourage the development of reciprocal agreements whereby any “receiving” state could rely on a home state's review to ensure that the proposed program meets the Principles of Good Practice. Such agreements would in turn benefit program providers by ensuring that they would no longer have to meet the disparate requirements of fifty states' regulations.

Prospective students. Empowering the learner is, finally, the only real way to ensure that higher education programs delivered via technology are of high quality. In this regard, the Principles can help prospective students identify the questions to ask of provider institutions. It will be up to students to ask these questions and to make sure they get satisfactory answers. Staff of the Balancing Quality and Access project are developing brochures on distance learning and the Principles of Good Practice to help students understand how to ensure that educational programming delivered to their homes and work places conveys the quality they are entitled to expect.

It now seems possible that the Principles of Good Practice may become the basis for national agreement on the standards for education programs delivered via technology. If so, they will eventually provide—in most cases, for the first time—a basis for assessing the quality of electronically offered programs.

Future Perfect...
(continued from page 3)

We need to demonstrate to our presidents that we know how to consolidate our economic gains and change the ways of doing business to benefit from the constantly improving technology available to us. The lesson to learn is that while technological change is constant, our implementation of technology is discrete, although ongoing. We must not let the constancy of technological change blind our ability to consolidate our productivity gains by modifying our personal and institutional behavior.

One of the best pieces of advice I have ever received was to understand that “life is what is happening while you’re busy making other plans.” We have incorporated much of our networked information technology into our daily lives already. There are presentations that I prepare in hours and days with information that would have taken weeks to obtain without today’s networked information—and the information is more current and up to date. Electronic journals abound. And the Web gives me more digitized graphics and photos than I thought, as recently as two years ago, would be commonly available by now.

However, we still have scholarly journals increasing in price in some science and medical fields at 15–18 percent per year at a time of 2–3 percent inflation. The price of scholarly information in general has increased more than inflation. The technology is exciting and being incorporated into our daily activities, but our organizational and economic policy issues persist. To help our executive leadership we need to be vigilant and aggressive in identifying the barriers to changing our personal and institutional behavior to “advance productivity.” If we do that successfully, the investment and support we are seeking for our future perfect world of networked information will come quite automatically.
Management Is About Relationships

by Carole A. Barone

At the 1995 CAUSE annual conference in New Orleans, CAUSE presented its ELITE Award for Exemplary Leadership and Information Technology Excellence to Carole Barone. The award recognizes outstanding professionals in the field of information technology management in higher education. Dr. Barone addressed nearly 2,000 information resources professionals at a special luncheon at which she was honored. Her remarks, from which this article was adapted, compared the challenges of managing an IT organization to those faced in rafting and mountaineering, two sports in which she is an avid participant.

A few years ago I rafted down the Box Canyon of the Rio Grande River. It was early spring, just the second day of the rafting season. The river was high and wild. Early in the run we came upon a kayaker trapped in a whirlpool. The kayaker calmly steadied his boat as he waited for the river to shoot him out. I thought that he should be fighting to get free. However, our guide pointed out that the only choice the kayaker had was to wait in anticipation. At that point, the kayaker could do nothing to help himself, nor could anyone else help him.

You could say that the kayaker had not established a good working relationship with the river.

When you run a river or climb a mountain, you do not call the shots. Instead you have to read the river or the mountain and figure out how—or even if—it will allow you to make your journey. The river, with its challenging rapids, waterfalls, and whirlpools, often comes to my mind these days as I find myself pondering the role that we in information technology organizations must play in the transformation of our institutions.

Lesson #1: Build a relationship with your institution and with the people who make it work. Get to know it and them well enough to be able to discern what is possible, and when.

Relationships succeed because of compromise. I have been fortunate in having colleagues who have been kind enough to point that out to me from time to time.

The Faculty Senate is a powerful governing body on our campus. Last year, during a brief but unfortunate lapse into ego gratification, I became engaged in a battle of wills with the faculty member who was the chair of the most powerful Faculty Senate Committee. When the chair of the Faculty Senate heard about it, he called me and suggested that I phone this person and offer to sit down and talk about our differences. It didn’t really matter that I was right (and I was right, and I dearly wanted to prove it). What mattered was that I not win the battle over that issue and produce a permanent rift with the Faculty Senate.
Carole Barone, in little more than ten years as an information technology leader, has become an influential force in harnessing information resources to the service of higher education. She has orchestrated transformations in two universities she has been associated with, as well as significant initiatives in several national organizations, with humor, creativity, hard work, and a deep commitment to the importance of dedicated staff.

Dr. Barone began a 22-year tenure with Syracuse University in 1969 as assistant to the comptroller. She served Syracuse as University registrar, director of student data systems, and, ultimately, as vice president for information systems and computing. During her six years as the University’s CIO she and her staff created a campus network and established a University-wide computer literacy program for all freshmen; by the time she left Syracuse all administrative information systems were online and interactive.

Upon assuming the position of Associate Vice Chancellor for Information Technology at the University of California Davis in 1991, Dr. Barone led the design and implementation of a distributed computing architecture and is now working toward creating a campuswide ATM network. She worked with the UCD librarian to develop a Center of Advanced Information Technology where faculty, staff, and students can explore leading-edge technologies.

Apart from her roles at individual universities, Dr. Barone’s vision and energy have contributed to structures that advance goals important to all of higher education:
- During her tenure as chair of the CAUSE Board of Directors, the Board conducted a major strategic planning initiative, out of which came a renewed focus on professional development. Dr. Barone now chairs the Professional Development Committee.
- While serving on the Educom Board of Trustees, she chaired the Teaching and Learning Committee and was on the Educom Strategic Planning Committee.
- She has served on the steering committee for the Coalition for Networked Information from its early stages, helping formulate priorities and policy which are crucial to the effective use of the technologies.
- She has been a member of the National Learning Infrastructure Initiative’s Planning Committee from its inception.
- She was a founding board member of NYSERNET, the New York State Education and Research Network.

Dr. Barone has been acknowledged for her unselfish contributions to our profession. She has shared her experiences and knowledge with others through extensive writing, speaking, and teaching. Her work and vision bring direction to our efforts as well as encouragement to step across old boundaries and test new ideas. She challenges us to be solid professionals, solid citizens, and creative implementers of technology in support of the delivery and the administration of higher education.

Lesson #2: We need to have, and to be, colleagues who help each other to succeed.

Let me tell you the story of an administrator’s life. We’re born and our mothers think that we’re wonderful and they always will. We get married, and our spouses identify for us all those little ways in which we are not so wonderful. Then we reach a point in our careers in which we have an administrative assistant, who knows all of those ways in which we are not so wonderful and compensates for them.

River runners, climbers, and others who love adventure have their trusted partners; they know each others’ skills, strengths, and weaknesses so well that they almost work as one. You know that your partner will be there, especially when the going gets tough.

Lesson #3: There exist in our professional lives some very special relationships; acknowledge them and value them.

Sometimes a rafter or a climber will form an association with an adventure travel company to enable him or her to experience an especially remote or difficult adventure. Likewise, functional units are seeking partnerships with IT organizations to experience the adventure of developing new application systems.

Adventurers choose their partners very carefully; they team up with people they trust. Good communication is vital to survival on a difficult river run or technical climb. Trust is built on communication.

Consider how we must truly terrify some of our campus partners. Our vocabulary is strange. They don’t understand our skill sets. Consequently, they don’t value them. Our methods of working frighten them (and vice versa, I might add).

In speculating about why we and our partners often find it so difficult to communicate, it occurs to me that there is an awful lot about power and control in relationships, and it usually isn’t good. If you don’t work out a healthy balance of power, you are into a troubled relationship in which both partners (and the institution) suffer.

On our campus, we recently embarked on a financial information system development adventure. It is instructive to note that our assistant vice chancellor for accounting and finance and a member of his project team are attending this
conference. Although I might wish to believe otherwise, I assure you that they did not come to New Orleans to see me receive the ELITE Award. They came here to learn more about the hocus pocus that we wave over their functional systems, and frankly I’m glad they did. I am confident that the CAUSE95 program sessions will establish our credibility with them.

Seriously, building a relationship that allows the IT organization effectively to execute its enabling role in institutional transformation is the greatest challenge we and our partners face. The problem is that neither we nor our partners have recognized or dealt with it as a mutual challenge.

**Lesson #4:** Communication, mutual respect, and trust are fundamental to any good relationship; they are more important than technical or functional competence in our partnerships with our clients.

If ever there were relationships that I have valued, they have been with the people with whom I work every day and whose competence I respect. I am honored to have staff colleagues from Syracuse University and UC Davis here today.

The most difficult part of leaving Syracuse University was knowing that I would no longer be working with this group of professionals, whom I had grown to know, respect, and to care very much about, over a period of more than twenty years. The most wonderful aspect of my tenure at UC Davis has been the relationship that I have with my IT staff colleagues.

Navigating through a period of institutional transformation is like running rapids in a river. Knowing that they must deal with difficult and capricious conditions motivates many a lone kayaker or solo climber to team up for enhanced safety and increased odds at reaching the desired destination. These are strong, capable, independent people who are wise enough to realize that what one accomplishes is the result of interdependencies and relationships.

I could have accomplished nothing without the loyalty, support, and competence of the staff colleagues with whom I work at UC Davis. When I think of the courage, steadfastness, and good humor that they have displayed as we have worked through the agonizing process of change in our organization, I am overwhelmed. I am under no illusions about how difficult it has been for them to carry us to where we are today, because I know how difficult it has been for me. We have learned and grown together. I am a different, and I believe a better, person because of my association with them.

**Lesson #5:** Our staff are our colleagues. We need to be able to rely on each other. Since we’re making this exciting journey together, we might as well enjoy each other and have some fun along the way. Harmonious companions enhance the satisfaction of a journey successfully completed.

Climbers, white water rafters, and others who relish risk often have families who do not share their passions. One hopes that in responding to their own needs to face and surmount danger they have taken the time to work through the consequences their actions could have for those who are closest to them.

This is also true for us as we develop as professionals. The accomplishments for which I am being recognized through the ELITE Award are those that I should be engaged in at this stage of my career. In the beginning we focus inward on our personal development and that of the work unit. As we gain experience and take risks, like changing jobs or speaking out, our scope of involvement and influence broadens, and our obligation to serve beyond our own campus grows. We move from paddling a stream to running the Colorado River.

Those who are closest to us share in both the good and bad of the choices we make along the way. As I have progressed along my career path, my husband has always been with me. My career choices have affected his life. Of course, he would tell you that some of my mountaineering choices have threatened his life. I could not have made my way through my career, much less my life, without him. My husband has taught me to stay true to your values and to place integrity above all else.

**Lesson #6:** Staying true to your values makes you strong at the core. When you are strong at the core, you make choices. When you are strong at the core, there are no insurmountable obstacles.

You can tell that the ELITE Award prompted me to reflect upon (actually obsess is more accurate) the relationships in my life. This is a very humbling experience because you become acutely aware of how many others are responsible for enabling the achievements that are being attributed to you.

I want to thank the [SCT Corporation](http://example.com) for the generous scholarship donation to the Students First Fund at UC Davis; it is being matched dollar for dollar by our student association. And a special and heartfelt thanks to the [CAUSE Recognition Committee](http://example.com) for selecting me for this honor, which is very much about professional, collegial relationships.

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*CAUSE/EFFECT Spring 1996*
IT Leadership Is Key to Transformation

by Donald M. Norris and Michael G. Dolence

If colleges and universities are to capitalize on the opportunities presented by the growth of the learning industry into a truly global market, they must transform themselves from Industrial Age educational institutions to Information Age learning enterprises. What are the significant transitions that will need to be made? What are the leadership challenges, planning strategies, vendor roles, and new economic and financial paradigms that will be necessary to make these transitions? And what are the emerging models of information technology leadership in these changing times?

In our book, Transforming Higher Education: A Vision for Learning in the 21st Century, we presented a vision for the opportunities awaiting higher learning in the Information Age. We proposed that learning will be a growth industry in the Information Age. While society's investment in traditional higher education has stabilized or is even declining, the percentage of our nation's gross domestic product (GDP) invested in higher learning will increase. Moreover, a truly global market will develop for Information Age learning products and services. This will provide significant opportunities for colleges, universities, and other learning providers.

The Information Age will be the Age of Learning—or more aptly, the Age of Learners. But the dividends from the growth in higher learning will be reaped by those providers and intermediaries who focus on the needs of learners—especially perpetual learners—who will fuse work and learning throughout productive careers that will span fifty or sixty years or more. If they are to capitalize on these opportunities, colleges and universities must transform themselves from Industrial Age educational institutions to Information Age learning enterprises.

Transitions of Profound Significance

The transformation to an Information Age model will involve several transitions of profound significance, as illustrated in Table 1.

Studying these families of transitions yields several insights for planners.

First, the essential nature of higher learning will change dramatically, but with substantial variations between different learning settings.

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Donald M. Norris (stratinit@aol.com) and Michael G. Dolence (miked@cucmail.claremont.edu) have helped many organizations develop strategies to meet the enhanced performance challenges of the Information Age and have assisted scores of institutions in strategic planning and organizational transformation. They have also written and spoken extensively on transforming higher education. Before establishing their consulting firms, both Norris and Dolence gained experience in a variety of research, administration, and planning capacities in higher education.

Norris has served at the University of Houston, University of Texas at Austin, and Virginia Polytechnic Institute and State University. Currently, he is a fellow at the Institute for Educational Transformation at George Mason University and President of Strategic Initiatives, Inc., Herndon, Virginia.

Dolence has served at the California State University–Los Angeles and the Commission on Independent Colleges and Universities for the state of New York. Currently, he is President of Michael G. Dolence & Associates, Claremont, California.
Transformation is for everyone, but not every campus will transform equally. Moreover, other, more transformative learning intermediaries and providers will emerge to capitalize on perpetual learning opportunities.

Second, IT infrastructure is a fundamental enabler of this change. Without advanced IT infrastructure, Information Age learning is impossible.

Third, the complexity of the IT options will expand considerably. At the same time, the rate of change will accelerate, and even greater uncertainty will prevail concerning the future of particular technology pathways.

These emerging conditions will change both the nature of Information Age planning and the roles of the IT leader in campus planning for the transition to the Information Age.

In the Information Age, planning never ends. No more “plan, implement, celebrate success, and rest,” but continuous whitewater. It’s like climbing a mountain whose crest is shrouded in mist. As the planning team zigzags its way upward, the mist moves higher. The longer-term future remains hidden, unknown and unknowable. Occasionally, through a break in the clouds, they catch a glimpse of their future: the mountain has no crest, no final destination. Information Age planning is perpetual for the rest of our professional lives.

Information technology infrastructure is the fundamental ingredient enabling transformation to Information Age models of learning. However, more than the push of new technology is needed to create Information Age learning. A genuine comprehension of the power of the learner-centered transitions must be present to generate “learning vision pull.” This is one of the important transitions to the Information Age.

### Technology push → Learning vision pull

Coupled with “technology push,” learning vision pull elevates technology planning from a six-month-to-two-year time horizon to a five-to-ten-year horizon, or more. Learning vision replaces a technology project mentality with a perspective shaped by the enabling learning infrastructure. Learning vision pull focuses on learning innovation and synergies, not just technology innovation and function. Learning effectiveness is the driver, not narrow project decisions. Learning vision pull can only be generated if academic leadership embraces the concept of a learning vision for the institution, based on the application of technology—and if academic leadership participates fully and knowledgeably in the planning process and assumes ownership of an IT-based learning vision.

Put simply, the potential of IT infrastructure and the tools of transformation can only be realized by mobilizing academic leadership and IT leadership in an aggressive partnership to establish the Information Age learning enterprise.

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**Table 1: Transitions from the Industrial Age to the Information Age**

<table>
<thead>
<tr>
<th>INDUSTRIAL AGE</th>
<th>INFORMATION AGE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The Nature of Higher Learning</strong></td>
<td><strong>The Nature of Higher Learning</strong></td>
</tr>
<tr>
<td>Teaching franchise</td>
<td>Learning franchise</td>
</tr>
<tr>
<td>Provider-driven, set time for learning</td>
<td>Individualized learning</td>
</tr>
<tr>
<td>Time out for education</td>
<td>Just-in-time learning</td>
</tr>
<tr>
<td>Continuing education</td>
<td>Perpetual learning</td>
</tr>
<tr>
<td>Separate learning system</td>
<td>Fused learning systems</td>
</tr>
<tr>
<td>Traditional courses, degrees, and academic calendars</td>
<td>Unbundled learning experiences based on learner needs</td>
</tr>
<tr>
<td>Teaching and certification of mastery are combined</td>
<td>Learning and certification of mastery are related, yet separable, issues</td>
</tr>
<tr>
<td>Front-end, lump-sum payment based on length of academic process</td>
<td>Point-of-access payment for exchange of intellectual property, based on value</td>
</tr>
</tbody>
</table>

| **The Role of Information Infrastructure** | **The Role of Information Infrastructure** |
| Information technology as support tool | Information infrastructure as the fundamental instrument of transformation |

| **The Nature of IT Systems and Infrastructure** | **The Nature of IT Systems and Infrastructure** |
| Separate academic and administrative systems | Fused academic and administrative systems |
| Individual technologies, technology islands | Technology synergies, coherence, and harmony |
| Networking connects hardware and software islands | Networking fuses islands and replaces hardware and software |
| Collections of fragmented, narrow, proprietary systems | Seamless, integrated, comprehensive, and open systems |
| Bureaucratic systems | Self-informing, self-correcting systems |
| Rigid and predesigned processes, one size fits all | Transaction-based interactions used to create customized processes |
The Leadership Challenge in Transitioning to the Information Age

Transitioning to the Information Age demands a different type of leadership. Higher education is not looking for messianic leaders to appear bearing stone tablets containing the ten commandments of transformation. Rather, we need leaders who can engage broadly participatory groups of academic and administrative leaders in developing shared visions for learning in the Information Age. The shared vision on each campus will be different, even distinctive. These shared visions will provide the unifying themes around which highly diverse constituencies can unite.

The term “visionary” often earns a pejorative connotation. It conjures up a picture of a lone seer with special insight which only he or she can generate. While Information Age leaders may begin with clearer and more perceptive vision than other academics, their success depends on their capacity to work with diverse planning groups and fashion an even more perceptive shared vision. This process calls for raising the consciousness of disparate groups on campus. Quite often it requires the leader to reach out to many whom other planning processes have ignored, in order to:

- calm the anxious;
- energize the inert;
- enable the supine to raise themselves;
- help the sightless to discover their vision;
- collaborate with the isolated;
- repatriate the self-exiled;
- take prisoners along the way; and
- give all the credit to them.

These are the personal challenges of the Information Age leader.

Planning for the Information Age

Information Age planning will be perpetual, fast-paced, and inclusive. Planning processes must be crafted to enable leaders to work with planning groups to fashion shared vision. Successful planning will display the following characteristics.

✓ Adopt a learning vision

Planning that is driven by a shared vision for learning in the Information Age will have a longer vision horizon. It will place meeting the needs of learners at the center of the planning process. Such processes will provide a basis for raising the consciousness and developing the vision and commitment of faculty, instructional support staff, and others involved in supporting learning.

For most institutions, developing a shared learning vision for the Information Age is its most important act of strategic thinking. We encourage the campuses which we assist in planning for their transition to the Information Age to craft such a shared learning vision, as an act of strategic thinking, before they proceed with strategic planning. The learning vision can and should be reshaped throughout the planning process, but it must be created at the beginning to guide planning. This elevates the vision and the sights of subsequent planning.

✓ Plan for beyond the horizon

Successful Information Age planning requires the capacity to see beyond the horizon, around the curvature of the earth, then to apply that vision to today’s decisions, adjusting the course of existing programs and initiatives. Planning beyond the horizon enables a planning group to better gauge the “futurity” of current decisions and to be guided by desired futures which they wish to create or enable.

Combining a vision of the future with the practicality of today’s decisions requires the planning group to operate “where the blue sky meets the road.” An inclusive planning group, properly facilitated, can utilize the different perspectives of its participants to bring the insights from beyond the horizon to bear on current decisions and initiatives.

✓ Ensure migration paths

As we climb the mountain, moving upward through the mist, it is difficult to know which of many paths to follow. This is especially true when dealing with information technology, where the pace of change is frenetic, the stakes are high, and marketplace competition is powerful. Who can tell, with any real precision, what combination of technologies and applications will emerge by the twenty-first century as the IT infrastructure supporting higher learning? More to the point, it is the task of planners to ensure that their institution can prosper under any reasonable scenario that may emerge. Put in a positive way, the task of leadership is to position the institution to ensure a variety of migration paths. Expressed in the negative, the task of leadership is to avoid painting the institution into figurative and literal corners.

Ensuring migration paths requires the planning group to favor open systems, non-proprietary solutions, and to continually ask itself, “What flexibility does this option or decision provide?” Maintaining flexibility may require delaying a decision or opting for a temporary solution until a more strategic and transformative option becomes available. For example, take an institution establishing a new branch campus and
using that opportunity to introduce a new, distributed information systems base to the new and existing campus. This institution may choose to install a temporary solution on the new campus until a new, more transformative suite of software products becomes available, a year after the new campus opens.

Redirect existing processes to transformative ends

The most attractive opportunities for positioning your campus to achieve its Information Age learning vision often can be found by redirecting current processes, not by creating new initiatives. Existing processes of strategic planning, budget planning, facilities planning, promotion and tenure, fund raising and institutional advancement, campus advisory boards, and program review can be reshaped and recharted to direct the campus into transformative waters. The cumulative effect over five to ten years of a ten or fifteen degree alteration in course can be exceptional.

True synergy can be achieved when several existing processes are combined and redirected. The University of Delaware leveraged its opportunities by combining the design and renovation of an historic schoolhouse into a student services building, the introduction of a new suite of academic/administrative software, and organizational realignment. Their creation was a distinctive, one-stop shopping student service facility and a new culture for customer-focused student service.

Examples abound of other distinctive campus approaches to transformation. We are working with a campus that has redirected its planning and budgeting exercise, which was dealing with substantial declines in government appropriations. By focusing on strategic enrollment management, new revenue opportunities, and productivity improvement, this campus is countering the spiral of decline. Over time, these new directions will yield cost savings, productivity enhancements, and new revenues sufficient to substantially mitigate the declines in appropriations. Other campuses are redirecting their fund raising and institutional advancement activities to focus on developing Learning Age capabilities, targeting their alumni and other stakeholders who are working in the information technology industry. An Information Age learning vision, enabled by technology, will attract donors who would be uninterested in merely supporting the laying of fiber on campus.

In some cases, the most ill-advised tactic for campus leadership is to announce, “We’re transforming this campus,” or to proclaim that a project or initiative “is a transformative endeavor.” Often it is best to be stealthy, or to focus on the learning vision rather than the intention to transform. Tailored strategies and tactics are required for each setting.

Select leverage points for action

In choosing which processes to redirect or which new initiatives to launch, the planning group should assess the leverage afforded by different processes. High profile, high visibility processes provide great symbolic value.

For example, new facilities are important symbols. A traditional or insufficiently innovative design can limit new approaches to learning for decades, or require expensive retrofit. Building planning committees can introduce new concepts and generally raise the consciousness of the campus to new approaches to learning.

Broaden participation

Information Age planning requires the involvement of a broad range of academic and administrative participants. Research has demonstrated conclusively that complex decision-making, dealing with uncertainty and requiring many perspectives, is best accomplished by a diverse planning group. This is especially true of Information Age planning, the purpose of which is to raise consciousness and vision, prepare for perpetual change, and position the institution for assured migration paths. Participants in the core planning group should be selected, in part, for their capacity to “think out of the box.” Statements of vision, preliminary plans, and scenarios for the future should be discussed broadly with other groups, as a means of refining plans, raising vision, and “taking prisoners along the way.”

The Information Age is forging new relationships among stakeholders in the learning process. Figure 1 suggests a new era of interactions involving learners, providers/intermediaries, and IT vendors.

**Figure 1: New relationships among stakeholders in the Information Age**
Optimizing the use of existing systems through improved training and changed practices is an untapped opportunity for improvement in most organizations.

Emerging Models of IT Leadership

In this context of leadership and Information Age planning, new models are emerging for the successful IT leader.

✓ Raise the institutional knowledge base
The IT leader is in a unique position to raise the knowledge base of all stakeholders on campus about the potentials of information resources and of Information Age learning. This consciousness raising and knowledge building is best done in collaboration with other academic and administrative leaders, but IT leaders bring special expertise to the process. Several focal points deserve prominence:

• Develop and share a knowledge base on future technologies and on the impact of IT resources on learning. This knowledge base should consist of books, monographs, articles, and clippings on emerging technology trends and forecasts, research on the impact of technology on learning, and examples of best practices as they apply to transformation using information technology. A synthesis of these materials should be made available to interested parties across campus—faculty, administrators, and learners. At some level, the scope should encompass not just traditional higher education, but also K-12 learning and perpetual learning in the workplace.

• Collaborate with academic and administrative leaders in establishing IT training. Training is essential to optimizing the use of IT. Optimizing the use of existing systems through improved training and changed practices is an untapped opportunity for improvement in most organizations.

• Provide distribution and dissemination mechanisms for institutions to learn about themselves. Given the pace of change in technology trends, campus applications of technology, and campus IT plans, special provisions must be made to provide up-to-date, online access to information about IT plans and developments. IT leaders should establish bulletin boards, WWW sites, or groupware to display syntheses of information, IT plans, and the campus learning vision in some form that is available to the entire campus community. Changes and additions, the status of implementation, and other information can be regularly updated.

✓ Fuse academic and administrative systems
The separation between academic and administrative systems and organizations must be eliminated. Period. It is one of the greatest impediments to the achievement of an Information Age vision for learning. This separation leads to unnecessarily redundant systems, divergent investment strategies, competing personal agendas, and other fragmenting influences.

✓ Serve as navigator, guide, interpreter, mentor, and learner
The IT leader must play many roles to meet the challenges of leadership in the Information Age, including:

• Navigator. IT leaders must work with other leaders to craft a shared vision and chart ensured migration paths for the institution. While this collaboration will lead to shared ownership, IT leaders will be counted on to be the chief navigators on many technology-related and many application issues.

• Guide. Using the ensured migration paths as templates, many IT leaders can serve as guides, helping many campus stakeholders find their way into the future.

• Interpreter. IT leaders must interpret and explain many aspects of technology and applications to others who range from the relatively uninitiated to the expert. Often there are conflicting interpretations, and the IT leader must face the challenge of expressing or accommodating alternative views.

• Mentor. In the recent past, we would have expressed this role as teacher or instructor. But the IT leader must provide for training and development opportunities that empower users. Users must be able to acquire basic skills mastery in IT subjects at the time and place of their choosing, often in collaboration with other groups of learners at the same relative level of skill. Then IT leaders can mentor technology learners in the utilization of those skills in higher-order applications.

• Learner. IT leaders must never lose sight of the fact that all knowledge workers are always learning. The greatest expert and mentor is at the same time a learner. On some subjects, his
or her mentor may be the most junior member of the staff. This collection of roles requires a highly collaborative, approachable IT leader. It also requires that IT leaders develop a high tolerance for competing expertise. In the Information Age learning organization, expertise in IT and IT-based applications will be spread throughout the organization. IT leaders and staff who were used to being regarded as the experts must cultivate a healthy regard for and appreciation of the expertise of faculty, other administrative staff, and even learners who have developed first-class expertise. This is a great challenge to many IT staff who were acculturated in traditional IT organizations.

✓ Work collaboratively to set expectations, chronicle progress, and establish the benefits of IT
One of the most pervasive problems in today’s colleges and universities is a culture of diminishing expectations. The recurring cycles of retrenching, restructuring, reorganizing, and reallocating resources have created a spiral of decline. IT leaders must work collaboratively with institutional leadership to use a vision for learning in the Information Age to break the back of this deleterious cycle. They must make a reasonable case for how to raise performance expectations and then deliver on the promise. One key expectation: learning can be a growth industry again.

One of the consistent shortcomings of IT leadership is to fail to chronicle the organization’s progress and mark the improvements in performance that have been achieved. Otherwise, the organization’s IT position is expressed in terms of what is missing rather than what has been accomplished and improved. IT leaders should document decisions and progress. This documentation should be posted and shared with the campus community along with plans for the future.

IT is no panacea. But an enhanced IT infrastructure is fundamental to Information Age learning. IT leadership must engage other academic and administrative leaders in understanding and agreeing on the benefits of IT and communicating those benefits to the campus community.

✓ Serve as architect for the new IT infrastructure
This is perhaps the most significant role for IT leaders. Figure 2 portrays a cross-section of the information technology infrastructure for the Information Age.

- **Network Layer** includes voice, data, and video telecommunications networks, anchored by cable, fiber, and/or microwave infrastructure.
- **Enabling Layer** consists of multiple layers of machines, systems, and facilitating applications. These layers enable the networks to serve as powerful applications platforms. Many of these enabling capabilities may in future reside on the network. The enabling capabilities include integrated administrative/academic systems, client/server-based applications, groupware, powerful smart card systems, development tools, and enhanced input/output capabilities—such as information kiosks, workstations, personal digital assistants, notebook computers, and knowledge navigators.
- **Applications Layer** requires the first two layers to be successful. This layer includes digital portfolios, personalized systems of instruction, learning management systems, interactive, multimedia learning tools, knowledge navigation tools, text-on-demand, and collaborative research tools. The applications layer will contain user-developed and -owned applications, which will be pervasive in the Information Age.
- **Human Layer** consists of the human resources necessary for the information technology infrastructure to be utilized effectively. The successful development of human resources depends on training and continuing skills development. Perpetual learning, where work and learning are fused for the knowledge worker, will be key to the development of human resources utilizing the IT infrastructure.

Figure 2: A cross-section of the new IT infrastructure
In the Information Age, we will come to regard this IT infrastructure as a continuous structure, spanning the entire learner universe, including preschool, K-12, higher learning, and perpetual learning.

While IT leaders serve as architects of this infrastructure, their design and development work must be highly collaborative. In the Information Age, the outer two layers—applications and human resources—will be largely “owned” by users, with IT leaders playing an advisory and consultative role.

In the past, IT professionals working in institutions and with vendors in the IT industry accepted a variation on the concept of “fiduciary responsibility” for planning and developing the IT infrastructure in higher education. This “stewardship” role carries on in the Information Age in the role of architect. The primary difference, however, is that the stewardship is shared and collaborative.

From IT Infrastructure to Knowledge Infrastructure

In the Information Age, the success and value of organizations are based on their effective use of knowledge. The Information Revolution is really a Knowledge Revolution. To tap the potential of this revolution requires more than IT infrastructure. It requires other information resources, human skills development, and knowledge tools that facilitate the use of the IT infrastructure.

The combination of all of these factors creates a knowledge infrastructure, made up of the following:
- **Skills and training.** The weak link in the knowledge infrastructure in most institutions is the skills and training in Information Age tools and processes for learners, faculty, staff, and other participants. Campuses must invest more extensively in the training and development of their knowledge workers.
- **Knowledge bases.** Knowledge bases are the accumulated bases of data, information, and synthesis available for learning, research, and the management and operation of the institution. Given the proliferation of data and information on campuses today, the tools to synthesize, cull, and sort information are critical to the capacity of the organization to create and use information.
- **Navigation tools and measures.** Knowledge navigation tools are essential elements of the knowledge infrastructure. Measurement tools are also essential to the information synthesis and knowledge generation process.
- **Networks.** Networks are the circulation systems of the knowledge infrastructure. They link everything. The network is a metaphor for the knowledge infrastructure: pervasive, ubiquitous, powerful, and adaptive.

The Vendor’s Role in the Knowledge Infrastructure

Vendors are not merely commercial entities serving higher education for profit-seeking purposes. The relationships between technology companies and higher education is multi-faceted, involving marketing and sales, research and development, training and professional development, philanthropy, and leadership. IT vendors have been instrumental in developing the IT infrastructure in higher education. The nature of the partnerships between IT vendors and higher education has evolved over time and will continue to change. In the Information Age, IT vendors will play significant roles in the development of the knowledge infrastructure, albeit in different ways than in the past.
- **Learning vision pull = vendor vision pull.** It should not take IT companies long to understand that incorporating learning vision pull into their vision and their products will serve as a powerful source of competitive advantage. But the vision must be genuine. And it must be grounded in a ready appreciation of the range of needs of different learners. Perceptive vendors will work aggressively to understand the needs of emerging learners, new providers and intermediaries, and traditional colleges and universities.
- **Institution stakeholders = vendor stakeholders.** This is another way of a vendor saying, “Companies will succeed by meeting the needs of their clients’ clients.” IT products that are tailored to meet learner needs and be customizable to the needs of the full range of stakeholders should dominate the marketplace. Vendors need to approach and understand stakeholder needs both by direct means and through working with institutional intermediaries.
- **Fused academic and administrative capacities.** Just as IT leadership must obliterate the distinction between academic and administrative systems, IT vendors must reconceptualize their products and services to fuse academic and administrative capacities. This
will require new generations of powerful systems. Table 2 illustrates a possible configuration of families of integrated systems to achieve this end and to position higher education for twenty-first century challenges.

- **Maintaining migration paths.** IT vendors must play a leadership role in defining and maintaining migration paths for their clients. This, too, is a collaborative process. As more institutions embrace the new models of Information Age planning, they will raise their standards for vendor performance. Institutions will demand that winning vendors be able to present a compelling vision for serving Information Age learners and for maintaining ensured migration paths into the future.

- **Training, training, training.** Training is thrice important to the IT vendor: (1) the initial training of implementation to install products and services and prepare a central core of users; (2) the training of the remainder of the base of institutional users and stakeholders; and (3) training in the use and application of the capabilities of the products, to optimize their application in meeting learner needs. Training design, development, and implementation will become an even greater core competency of the successful IT vendor.

### Developing New Economic and Financial Paradigms

IT leadership has a special opportunity and obligation in the development of new financial paradigms for IT in higher education. This is a critical component of the transition of higher education into higher learning. Without new economic and financial models, we cannot afford to develop the knowledge infrastructure necessary to achieve transformation. Nor can we reach the legions of perpetual learners without new means of accessing and paying for learning.

- **Establish a broader vision of the economics of learning**
  
  Our existing economic paradigms for learning and intellectual property must be expanded on several key dimensions.

  First, the existing model of lump-sum, frontend payment based on the length of the academic process will remain appropriate for some learning experiences. But perpetual learning will require an economic model based on point-of-access payment for the exchange of intellectual property based on some accounting of the value added of the content.

  Second, learning and certification of mastery will need to be unbundled and treated as related, yet separable, issues for many learning experiences.

  Third, the existing publishing paradigms will need to be augmented by a number of transitional modes of print-on-demand textual materials, access-controlled and print-protected electronic books, and electronic cash payment for online materials. These transitional stages will begin the process of reconceptualizing Information Age publishing. They will also enable the emergence of new models for the valuation of intellectual property.

  Fourth, electronic commerce must be introduced to the world of learning.

- **Integrate the knowledge economy into higher education**
  
  Many leaders of academe and the publishing world view the knowledge economy as a formi-
dable threat. Often, their instinctive reaction is to delay and to seek to protect their existing franchise for the delivery of intellectual property and the valuation of intellectual product. But if the current providers do not actively participate in the integration of the knowledge economy into higher education, new models will be developed directly by vendors and new providers who can access the intellectual property in our colleges and universities. Rather than remaining aloof and having their intellectual property cherry picked like some Third World commodity-based economy, higher education must aggressively participate in the integration of the knowledge economy into higher education and the application of the resulting new tools to serving new learners. Electronic commerce must be integrated into higher learning.

This does not suggest that colleges and universities can ignore the financial implications of the new knowledge economy, and just let the chips fall where they may. Higher education must protect its capacity to serve existing and new learners. Therefore, it must determine which parts of the value chain for knowledge will command the greatest value in the marketplace and position its offerings to address those high value needs for learners. We cannot maintain our franchise by building higher, thicker walls. We must understand what it will take to succeed in a world of digital learning and commerce and become competitive.

Create new working relationships between academic leadership and other stakeholders

The introduction of new economic and financial paradigms to Information Age learning will provide IT leaders with the need to work with academic leaders and stakeholders in new ways. For example:

- **Introducing electronic commerce to the campus** will require IT leaders to work with book store managers, library professionals, other academic leaders, and business officers. Many IT leaders are not aware of the excellent work of the National Association of College Stores (NACS) in considering the potential for electronic commerce. Partnerships between these individuals on campus, and by the professional associations interested in these issues (CAUSE, Educom, ARL, NACS, and NACUBO, for example) could yield some fruitful insights.

- **Developing investment pools for knowledge infrastructure** could partner IT leaders with development and institutional advancement professionals to craft fund-raising initiatives using as a centerpiece the creation of a knowledge infrastructure investment pool. This pitch could be especially attractive to alumni and other stakeholders working in the IT industry, and to other donors captivated by the vision of Information Age learning.

- **Crafting new models for the valuation of intellectual property** could become a central theme for academic leaders, with the expert consultation of IT leaders.

In many of these initiatives, IT leaders will not play the primary role, but they should be active participants. The time has come to elevate the issue of building and utilizing the knowledge infrastructure to the stature it deserves in higher education.
The Financial Mythology of Information Technology: The New Economics

by John L. Oberlin

One of the most misunderstood aspects of managing information technology is the attendant economics. The rate of technical advancement is accelerating, demand is intensifying, standards and architectures are changing daily, prices are falling, but total costs are growing. Yet the legacy-based fiscal thinking of both technologists and financial officers has changed little in the face of these new realities. Understanding the attendant economics of information technology is a necessary first step toward developing sound financial strategies to accommodate technological advancement.

The financial truths surrounding information technology at educational institutions have never been particularly clear. The economics of these investments are often steeped in an intellectual haze that can be described as the financial mythology of information technology (IT). This mythology is nourished by an unusual set of economic and technical factors that often place the financial analysis of IT outside the comfort zone of not only technologists, but financial officers and senior administrators as well.

This article argues that the principal forces driving the new economics of information technology are: (1) it is steadily increasing in value, (2) academic demand for information technology and computing power is virtually unlimited; (3) the per unit price of information technology is declining rapidly; and (4) the total cost of owning and maintaining these systems is steadily rising.

In other words, the potential benefits are truly revolutionary and the demand is insatiable—but the falling prices mislead many to expect cost savings that will never materialize.

These forces, combined with the breathtaking rate of change inherent in IT, produce a unique economic environment that seems to breed financial paradoxes. The new economics are formidable. Shortening life cycles will force fundamental changes in how institutions manage these assets; the increasing value of IT and the pressure to spend more on it will make the financial crisis facing many institutions worse; and the ability of new technologies to transcend time and distance will intensify competition among institutions. Information technology will represent the single biggest opportunity to either enhance or damage an institution’s competitive standing. Academic, technology, and financial leaders will have to come together as never before to address these issues.

The Institutional Context

The potential for information technology to do good is unarguable and contributes to a pervasive mythos that captures the imagination of individuals from every walk of life. In this infor-
The value of IT is increasing

Information technology has tremendous potential. Computers can already talk; they process visual images; and they will even have the capability to sense smells in a few short years. It would not be unreasonable within the decade to have our personal computers wake us up in the morning, read us the newspaper, report on the weather, and download the traffic report to our car before we leave for work. Scholarly scenarios have computers assessing prospective students’ knowledge base for course placement; managing curricula, interactions, data, and visualizations; and building lifelong connections to scholarship through distance learning technologies. The potential value of information technology is limited only by our imagination and our willingness to invest in change.

What was optional only a decade ago is now so valuable it is a necessity. Neither campus libraries, nor laboratories, nor research facilities would be viable today without computers. Over the last decade we’ve witnessed revolutionary changes in the level of computing and networking power that resides on the faculty desktop. The technology does so much more than it did a few years ago — the computer is already indispensable. The problem is that many people don’t realize its increasing value because they have incorporated the expectation for constant improvements into the very nature of information technology. For example, the Commerce Department estimates that 70 percent of America’s top 500 companies use artificial intelligence (AI) in their computing. The quandary is that this innovation doesn’t get the credit it’s due. Whenever artificial intelligence works, it ceases to be called AI; instead, it becomes an integral part of the system and is then taken for granted. This phenomenon appears to be common whenever an explicit valuation of information technology is called for. Nevertheless, the implicit evaluation is changing. Just as we would be very reluctant to give up our heating, air-conditioning, or phone, we are quickly becoming equally loath to give up our computers.

The Value of Information Technology

The issue of valuing IT investments carries a mystique. The question of how to value technology is being asked at campuses everywhere and is often viewed as a question that is impossible to answer correctly. I propose a new question: Can we value information technology without knowing its value? I believe we can. While we may not be able to assess the value of information technology in some absolute sense, we can clearly observe that its value to our institutions is increasing over time. This is the most critical aspect of value and the one most worth understanding.

The numbers are going to be too big not to get serious about financial analysis. In the end, the answer to “if” or “when” these sweeping technical advances will ever take place won’t be found on the drawing board of some network engineer, computer scientist, futurist, or even a chief information officer. Instead, these answers will come from the strategic plans and business analyses of pan-university planners, senior business officers, college presidents, trustees, and legislators. This flows from the realization that there is no technical or pedagogical problem involved here as daunting as the bottom line. The technology revolution won’t come cheap. Until the business case is quantified and verified, the promise of using information technologies to realize the anticipated benefits will remain just that — a promise.

This article briefly examines several of the legacy-based assumptions that contribute to the financial mythology of information technology and identifies the new economic realities that IT is bringing to bear on academic institutions.

for articles relating to information technology—and it cost less to buy than my first computer purchased ten years ago. More to the point, that original computer wasn’t able to do any of these things. This computer is not just more valuable to me than my previous ones, it has become critical to what I do.

Each successive generation of information technology brings new levels of performance and functionality that weren’t there previously. There is very little information technology on campuses today that couldn’t be replaced with something that is both less expensive and superior in performance and function. It seems clear that the value of information technology is increasing from year to year, as well as its respective value to our institutions. IT supports teaching, learning, communications, and collaboration in ways that simply weren’t available only a few years ago.

The aggregate value of IT

The total value of information technology is greater than the sum of its parts. To the extent that enterprise-wide systems function in aggregate-like ecosystems, much of IT’s value grows exponentially as its supporting infrastructure and interconnections grow richer. For example, the value of a departmental e-mail system is enhanced if the entire campus community is also on the network, and is greater still if the campus is connected to the Internet. Similarly, connecting faculty to a campus network would be valuable, but the value of connecting the entire campus community of faculty, staff, and students would be much greater still.

In these cases there is a multiplying effect on the value accrued to the institution that goes beyond the sheer number of users. There is a synergistic aspect to this aggregation of users and resources. It appears that the cost/benefit curve for technology investments is a step function, where particular levels of investment can produce superior value. The challenge for financial planners is to target the specific level of functionality desired and identify the minimum investments needed to move from one plateau to the next.

The Demand for Information Technology

Years ago Pablo Picasso quipped that “computers are worthless, they only give answers.” While this assertion may have had great validity at the time and may still have in philosophical circles, it appears today that his conclusion is completely wrong even though the original reason he gave is still true. The problem for educational institutions is that there’s no end in sight to the questions. Thus, there is no end in sight for the demand for the computers and information technology that help provide the answers.

The demand for information technology is driven by more than just the need to answer questions. Successful implementation almost always creates new demand and expectations that grow exponentially. Computationally intense researchers can bring any quantity of CPU power to its knees simply by relaxing a few restrictions in their models. The challenge is to accept this exponential growth in demand and work to develop financial and management strategies to accommodate it. The academic value of IT systems is growing—it is only natural to expect individuals, departments, schools, and institutions to desire more of it. The fact that they do is an affirmation that our scholarly values are strong and that our campuses are vigorous.

The demand for large systems

Researchers across a range of disciplines will continue to propose questions that can only be answered using the largest systems available, and once these questions are answered, new and more demanding questions will follow. The need for large machines to help solve large problems will persist and grow. Furthermore, the demand for enterprise-wide solutions for data warehousing, e-mail, and administrative functions will drive demand for ever larger central administrative systems. Electronic libraries with digital archives and advanced search and retrieval engines will require large systems currently unavailable on campuses.

Twenty years ago the entire campus computing capacity was centralized in the academic computing center. Today, personal computers, local area networks, and distributed computing environments have changed that. While it is true that the trend is for central computing to represent a smaller percentage of the total computing resources available on campus, it is equally true that this key central resource has been growing in absolute size, and will need to continue growing.

Computing power will continue to be deployed throughout campuses at a level that is appropriate to meet aggregate demand. Desktop systems will deliver some minimum level of power suitable for personal use, departmental servers will be larger to meet the demands of multiple users and larger databases, schools will require even more powerful computers and storage systems to meet their demand, and institutions will deploy central academic resources to meet the remaining level of aggregate need. The NSF Blue Ribbon Panel on High Performance Computing and Communications Initiative to Support the Nation’s Information Infrastructure (Washington, D.C.: National Academy Press, 1995).
The demand for distributed systems

Today’s conventional wisdom is heavily in favor of distributed computing systems and client/server architectures. Individuals on campus want the greater personal power and freedom of choice that is inherent in these systems. PCs and departmental LANs are increasingly expected to support multimedia, visualization, virtual reality simulations, and disintermediated teaching and learning opportunities. Larger networks are facing similar demands; consider ARPANET, the first large-scale computer network used by faculty. It was originally designed to link computer scientists at universities to distant computers, thereby permitting efficient access to computational resources unavailable at their respective institutions. A minor feature called electronic mail was included only as a sidebar to the host computing function. Yet electronic mail rapidly became one of the system’s most popular features. Today, traffic on the Internet is growing at 10 percent per month, a million and a half new servers were connected in 1994, and the advent of the World Wide Web is driving even more growth.

Increases in demand

The demand for information technology is not simply a “change in quantity demanded” as prices fall. In this case there is an actual “increase in demand.” The subtle difference in this economic jargon is an important distinction with significant ramifications. A change in quantity demanded describes how individuals tend to desire more of almost anything when the price is lower or when their income increases; for example, entertainment, travel, or vacations. Conversely, an actual change in demand describes a shift in the demand curve for that product—a situation where more is demanded at all price points. This is the case with information technology. This demand characteristic is a major driver of the economics of the entire technology industry. It is what allows technology providers to lower prices continuously. It means that technology manufacturers can expect their revenue, and profits, to grow even as they drop their prices radically. Without this shifting demand function, the economic viability of information technology would be much different than it is today.

The Cost of Information Technology

It is commonly reported today that buying computing systems has never been cheaper. By some accounts, the price of buying computers has been halved at least every three years. However, this encouraging news comes with at least two caveats. First, lower per-unit prices for individual components of a computer system do not always translate into a lower acquisition price for today’s average system. For example, no one would argue that the per-unit price of memory, processors, and most peripherals for personal computers hasn’t fallen dramatically. On the other hand, as mentioned earlier, today’s average user demands more memory, more powerful processors and more peripherals than the average user did three years ago. The end result is that we get a lot more for what we paid three years ago, but in many cases the actual acquisition price may not be falling significantly. Worse yet, demand for even more powerful systems that are now financially viable could actually drive the average acquisition price up.

The second caveat is that the total cost of owning technology is rising. More sophisticated and distributed systems require more technical support, more training, more peripherals, and more time. The price of technology is what you pay to purchase it. The cost includes the price as well as all the other expenses associated with owning, operating, and maintaining it. Every new generation of technology introduces its own unique set of incompatibilities and obsolescence of peripherals. The net effect is a host of new costs that include training, user support, and time to reconfigure networks. As long as total costs are increasing as demand increases, it appears that the best result that institutions can hope for are
solutions that support future cost avoidance rather than actual cost reduction.

The cost of distributed systems
The growth of distributed computing environments, with their inherent complexity, significantly contributes to the increase in total costs that campuses face. According to the Gartner Group, the total cost of distributed systems may be ten times or more the purchase price. These costs, including the opportunity cost of having research faculty administer local computing centers, may very well exceed that of central systems. Moreover, studies have shown that the cost of owning and maintaining a PC in a distributed environment has grown steadily over the last five years.9

The cost of success
One of the paradoxes of managing information technology is the high cost of success. Successful technology implementations almost always lead to greater expense. A marginally effective e-mail system or networking environment on campus will result in only a limited utilization of the services. However, history shows that once a system becomes functionally viable there is typically an explosion in the number of users as well as in the level of usage. The result is an increase in demand and an increase in total cost as more equipment is needed and better support and training become an imperative.

Emerging technologies will almost certainly repeat this pattern, whether they be distance learning, multimedia, or some other innovation. The shift from traditional paper-based libraries to electronic libraries is a case in point. As libraries move to put more and more electronic information online, few if any of their historical services are being displaced.10 Even though the expectation is that full text retrieval will alleviate the need for books, it may instead create new requirements for printing on demand. The effect is that these electronic services are adding new costs in terms of equipment, training, and operations, with little in the way of cost savings from discontinued activities. There is no evidence that information technology has lowered the total cost of operating academic libraries.

The sociological cost
The largest costs of IT will come from the social changes it produces. Fundamental changes in the positions of individual stakeholders are taking place. Technology is changing the role of libraries and supporting the privatization of information. The advent of distance learning will affect the nature of faculty-student relation-ships. Changes of this nature will certainly spawn new costs. Strategies that support continuous or incremental change of social norms, not revolution, should dominate in this environment. As Kotter makes clear, planning for transformations is the wrong goal.11 Planning for constant incremental change not only produces better results, but can help avoid the most expensive disruptions in organizational effectiveness.

The Economics of Information Technology
As described above, the value of information technology is increasing over time, the demand is intensifying, and the price is falling, while total cost is growing. How do these observations affect the fundamental economic equations that determine the wisdom of investing in and managing these systems?

Life cycles
The first step toward understanding the new economics of information technology is to realize that each new generation has an economic life cycle that is independent of its functional life cycle. Computers rarely wear out. Instead, they become economically obsolete and are replaced. The record of academic institutions is littered with examples of technology at every level—desktop PCs, departmental servers, campus networks, and shared regional supercomputers—that have become functionally obsolete long before their hardware stopped working.

End of life

Recognizing the end of life for information technology equipment is not always obvious, nor is it easy. The problem with determining end of life on most campuses is the decision rule they use. The test on most campuses is, "if it's still running, it must be good for something." The paradox is that a five-year-old computer still looks and runs as well as it did when it was new, even though it may be obsolete. It does everything it did then and more, and whatever was prone to break has already been fixed. Nevertheless, it may be well past its economic life.

An economic life cycle is defined as the useful financial life of an item. In other words, the life cycle is the number of years one should plan to keep a piece of hardware or software. For example, a life cycle of three years for a computer implies that at the end of three years, the computer is either: (1) no longer suited for its intended purpose (e.g., Intel 80286-based servers won't run Netware 3.11), or (2) maintenance and support have grown to the extent that it is cheaper to replace the computer than keep it, or (3) new requirements or performance standards (such as portability, ease of use, user interface, visualization, networking, processing power) have necessitated its replacement to meet user needs.

Replacing old technology

When compared to other capital assets, the replacement of information technology systems is unique. The difference with technology is you don't just replace what you had, you upgrade it significantly. Replacing traditional assets, like cars and office furniture, results in something basically the same as what you started with, only newer. On the other hand, a five-year-old desktop computer (e.g., a 16 MHz Intel 80386-based machine) could be replaced with a 100 MHz Pentium-based, multimedia, portable computer for less money. These two computers are fundamentally different. The new one not only does the old things better, it does important new things that the original didn't. The economic equation has changed.

Determining life cycles

There are several ways of determining technology life cycles that draw on quantitative assessment methods. One is to take into account technology generations. In the simplest example of this method, consider a single faculty member who uses a personal computer to support his or her computationally intense research. If the area of research is competitive, which is almost always the case, the researcher will need to maintain a competitive level of computing. It could be argued, all other things being equal, that this researcher could afford to be no more than one generation of processing power behind his or her peers—otherwise the research would suffer from time delays or poor analytical depth. If new CPUs are introduced every three years, the maximum competitive life cycle for this researcher would be six years—three years for the current generation, and three more for the next. After that, he or she would have to upgrade to stay no more than one generation behind.

Changing life cycles

In the 1980s Intel produced a major new generation of microprocessors approximately every three and a half years. Currently, the time between generations is shorter, perhaps two years or less. The implications for life cycles are obvious—they're getting shorter. As a result, it's more expensive for institutions to stay on the leading edge and be competitive in the 1990s because of shorter technology life cycles, and it's likely to be even more difficult in the next decade. All indications point to an accelerating rate of technological change which will continue to shorten life cycles.

Even if institutions were to ignore the competitive aspects upon which this generation approach draws, they would still be in for trouble when managing the changes their students will bring to campus. Today, $1,800 buys a 75 MHz Pentium computer with 8 MB of RAM and 500 MB of disk. In five years or less, $1,800 will buy...
a 600 MHz fifth-generation Pentium computer with 64 MB of RAM, over 6 GB of disk, and an ultra fast network connection (see Figure 3). Students will be bringing these machines to campus in large numbers whether they are required or not, and this alone will drive increased expectations, expensive additions to campus networks, and a need for additional support services.

It won’t be easy having faculty and seniors using old systems while incoming freshmen enjoy new technological advantages. Expectations are going to rise. Life cycles can’t be ignored, nor can they be avoided. Understanding them, accepting them, managing them, and planning for them goes to the heart of the new economics of information technology.

Asset management

The principles of asset management that apply to buying a computer are fundamentally unlike those of buying a truck. If the physical plant purchased a half-ton pickup truck for $25,000, with an expected life of five years, it would have a capital cost of $5,000 per year. At the end of five years, the truck could be replaced with another truck that would cost more but still be more or less functionally identical. (A half-ton pickup truck will still only carry half a ton five years from now.) One way to help make this investment pay better would be to invest more in maintenance and amortize the cost over more years. The rule of thumb to optimize this type of investment is to amortize it for as many years as possible.

Computers, on the other hand, are quite different. If the physics department purchased a $25,000 computer and amortized the expense over five years it would also cost $5,000 per year. The difference comes when considering what happens when the machine is replaced. In this case, the physics department will be able to spend significantly less on the replacement and still receive a new computer that is superior to the one it is replacing. This fundamentally changes the asset management paradigm for this equipment.

Given the superior performance of the replacement machine, the lower price, and the growing demand, the whole premise of evaluating information technology investments by the same methods used to evaluate the truck seems silly. Yet most campuses do just that. A strong argument can be made to turn the model on its ear. Increasing the amortization period for technology investments may actually be a less desirable investment decision. Instead of buying the biggest computer necessary to do the job for five years, it seems compelling to consider the case of buying the smallest computer that would do the job, say, for three years. The question is, would the physics department be better off buying a $25,000 computer for five years, or a $15,000 computer for three years, and then replacing it sooner? It seems obvious that the second case is superior. It has the same annual cost and the department gets the benefit of replacing it with a superior machine for less money after only three years instead of five. In cases where this is true, the rule of thumb for making computer purchases is to adopt a life-cycle model where you buy as little as possible and keep it for as short a time as possible. The challenge for planners is to balance the constant academic demand for more power today against a financial strategy that will provide for superior power over time.

Saving versus gaining

In the above example, the physics department actually has a strategic choice of how to manage the replacement of technology. At the end of three years the department can choose to either: (1) keep its computing power at a constant level and lower its annual expenditure by buying something with the same power for less money; (2) grow its computing power by holding IT spending constant and taking advantage of new economies; or (3) expand its real investment in IT by growing its level of spending. Case one can be rejected as a strategy of stagnation—regardless of the life cycle length, it assumes no growth in power or capabilities. The strategic choice is actually between holding the capital budget constant or growing it.

Current evidence shows that private industry has adopted the strategy of growing its capital budget for IT hardware.14 Trends showing increased spending on IT among educational institutions suggests that a similar, albeit tacit, conclusion within the higher education community may be brewing.15 If higher education doesn’t keep pace, the benefits of information technology may accrue disproportionately to the private sector.

Financial pressures

As long as institutions can expect a continual improvement in their return on investments in information technology, they will be compelled to spend an increased percentage of their budget on it. It is a simple economic reality. Any organization in a competitive environment will be forced over time to invest more of its money where the return is greatest. In the case of information technology, where it pays to invest today, it will pay even greater dividends to invest even more tomorrow. Regrettably, these forces may

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not always be well understood or recognized explicitly. Nevertheless, they are quite real, and are already affecting most institutions. Many institutions feel the pressure growing to invest more in technology, yet struggle to accept IT’s relentless nature. They scrutinize investments on a case-by-case and school-by-school basis but often fail to see the big economic picture inherent to IT investments.

Colleges and universities will have to spend more money on information technology simply because it benefits them to do so—it’s a better alternative than whatever is second best. There is no other asset among their resources that improves its cost/benefit ratio every year. The only other possibility is their human resources. If the return on personnel is increasing, it is almost certainly linked to increased productivity derived from new technology.

The business case

Who is responsible for developing a business case for information technology? Developing a business case for information technology in higher education is difficult. Colleges and universities have their own unique brand of conventional wisdom and peer review that makes most critical decisions well. Information technology seems to be an exception. It doesn’t fit well with the existing political system and decision-making structure. For example, deans are often out of the loop when it comes to technology issues. They typically don’t know much about IT, and faculty tend to bypass them when dealing with computing issues. This is because there’s usually an administrative or academic computing organization operating outside of the deans’ normal sphere of influence that fields these calls. Exacerbating the problem is the fact that institutional financial officers are also out of the IT decision-making loop. That leaves technologists holding the bag for developing the business case.

This shift in authority for decision-making contributes to the mythology surrounding the economics of information technology. All three parties—deans, financial officers, technologists—see a different set of facts. As a result the business case is frequently poorly understood, underdeveloped, crudely articulated and disseminated, and often misses the key elements of what the analysis should be all about.

The business question

Traditional wisdom governing technology investment decisions views the investment decision primarily as an expense issue. In reality it’s a cost/benefit issue, where it’s an investment in both the goals of the institution as well as the individuals charged with advancing them. No dean or department head would fill a faculty vacancy based solely on the fact that one applicant might be less expensive than another. It should be equally ridiculous to make investment decisions for technology based solely on cost. Moreover, many faculty might actually argue that the “best” possible candidate should always be hired, regardless of cost—a position few would advocate for technology. The financial decision to purchase and manage information technology cannot be based on minimizing cost, but instead needs to be based on maximizing the net return of the investment.

Teaching and learning

As mentioned earlier, part of the promise of information technology is its tremendous potential to improve teaching and learning. What will be the business case for technologies that support teaching and learning? Are distance learning, multimedia applications, and online information services going to be a financial cash cow for colleges and universities? Not likely. Justifying investments in technology for teaching and learning will have to come from either greater benefits (e.g., better student learning), or lower costs (e.g., fewer faculty), or higher revenues (e.g., more students).

It seems unlikely that technology investments will truly be able to disintermediate students from teachers enough to allow for either significant reductions in faculty or increases in students. If information technology should significantly disintermediate student learning from teachers, it would imply that technological solutions to providing education are equally viable to traditional campus experiences. This would create new and alluring opportunities for private concerns that could threaten the traditional notion of campus experience being central to the educational process. If the promised disintermediation doesn’t prove effective, and teachers are needed in similar numbers and ratios to what is needed today, then the business case for investing in information technology for teaching and learning will rest primarily on a scenario that relies on valuing greater learning. If this is the case, which appears most likely, then institutions will have to grow their technology budgets without significantly reducing their faculty. They will be faced with the hard decision of either raising the price of an education or reallocating current budgets to eliminate inefficient and redundant programs.16 This prospect is further complicated by the fact that higher education has few mechanisms available for measuring and demonstrating higher value for its primary product.

Fee versus free services

Central computing facilities and libraries face the question of whether to charge for some or all of their services or to provide some or all of them for free. This is often referred to as the “fee versus free” problem. The dilemma faced by these organizations is how to provide the best possible level of service to all possible users while also being efficient and equitable. The history of the debate is best documented in the library literature, where equity arguments generally have prevailed over any scheme to pervasively charge for service.

From a fiscal perspective it is an error to structure the argument in this manner. The issue has never really been a question of fee versus free; instead it is a question of fee versus subsidy—a much different issue with different implications. In this context, the issue becomes one of assessing the costs and benefits of the entire user community under each of the two possible cases. What is important is that under either of the two schemes there will be a different allocation of costs and benefits to the user community—although there is no clear answer yet as to who might benefit the most or by how much. However, where services are to be subsidized, the planning task is to determine the appropriate size of the subsidy as well as the primary audience the subsidy is intended to serve. Given the growing demand, subsidizing all services to all groups will never be economically viable.

Competitive economics

The biggest institutional downside of new information technologies is their potential impact on inter-institution competition. For example, if distance learning, enabled by IT, becomes viable, it could drastically change the competitive landscape. One result would be to break down the regional barriers to competition. If it were financially viable for State College to deliver education at a distance, what is to stop Out-of-State University from delivering competing offerings? A second consideration is that the cost of teaching “personalities” could go through the roof. Like the market for TV personalities, the market for teaching personalities in a distance learning environment could lead to some unpleasant dilemmas for colleges that desire star performers. Assuming that distance learning becomes viable, it implies by definition that new competition will be inevitable. Similarly, if there is new competition, the one thing we can predict with certainty is that there will be winners and losers.

As another example, should the notion of electronic libraries become viable, the potential impacts could be equally dramatic. Consider the case where major Research-I university libraries have, for the bulk of their holdings, online searching and full-text retrieval available over the Internet. Library holdings have been, and still are, an important factor in accreditation and institutional ranking decisions. In this electronic library scenario, smaller colleges with more limited financial resources would have an incentive to leverage these online libraries and downsize their own facilities, effectively free-riding on the investments of other institutions. If the accreditation process ever recognizes the significant value of “access” to information that the new information highway paradigm emphasizes, wealthier schools with large electronic holdings would have an incentive to either withhold services from the Internet to preserve their status or attach fees to prevent freeloading. In other words, if online access to searching and retrieval becomes truly valuable as technology visionaries suggest, large holders will have financial and competitive reasons to withhold access or charge for it.

In either event, the vision of ubiquitous access to free information would be in jeopardy. Moreover, as online services in general become more financially viable, the trend of increased privatization of information and education will accelerate—again threatening the vision as well as changing the economic equations that colleges face.

Conclusion

In summation, the legacy-based thinking of both technologists and financial officers has changed little in the face of new realities: the accelerating rate of technical advancement, continually changing standards and architectures, and falling per-unit prices. Rationalizing financial strategies to accommodate technological change is an imperative for effective IT investing. Financial officers will need to accept a new set of economic realities that will in turn change how institutions manage their investments in technology; CIOs will need to abandon as their dominant financial strategy positioning IT as a tool for cost reduction; and institutions will need to accept the verdict that they will be spending a greater percentage of their budgets on information technology.

Campus Profile

CALIFORNIA LUTHERAN UNIVERSITY

California Lutheran University (CLU)—one of twenty-eight colleges and universities of the Evangelical Lutheran Church in America—is a young liberal arts university (founded in 1959) with an enrollment of 2,600 students, 1,600 of whom are undergraduates. Located primarily on a 290-acre campus in Thousand Oaks, California (14 miles inland from Malibu), CLU also has graduate centers in Woodland Hills, Oxnard, and North Hollywood. The University offers undergraduate and graduate programs through its College of Arts and Sciences, School of Business, and School of Education and Continuing Education.

Recent, rapid technological change

When CLU President Luther Luedtke took office in the fall of 1992, two grants had recently enabled the University to provide 486-level desktop computers for the majority of faculty. However, there was very little network connectivity for these computers (one or two small local area networks were in place), the University was operating with an antique phone switch, administrative software was homegrown and running on a couple of IBM 36 machines, and most administrative users were using dumb terminals.

Today, the CLU main campus is fully networked, an integrated suite of administrative systems has been purchased, a new digital phone system has been installed, and a major restructuring of the library and technology organizations has led to the creation of a single department responsible for managing the University's information resources. All of these changes were the result of the implementation of the CLUnet Project. What is impressive is not just the scope of the project, but also the short timeframe—less than three years—in which it was accomplished.

What caused such rapid and major technological change at CLU, and what made it possible? According to Vice President for Academic Affairs Pamela Jolicoeur, “While these changes were not prompted by a written strategic plan—which didn’t exist at the time we initiated them—it was certainly strategic thinking that led us to implement both the network and the reorganization. The concept of viewing information and technology together as a set of strategic resources was both cause and effect in our experience; it prompted us to create the new organization, but in creating such a dramatically restructured organization we also made the campus community aware that we are really talking about one thing—information and the processing of information—and this understanding now underlies our current strategic planning efforts.”

As for what made it possible, in Jolicoeur’s estimation, “As a small and relatively new university, we have the luxury of being flexible. We simply capitalized on some circumstances that provided an opportunity to change—a new administration led by a president who ‘got it,’ a community of administrators and faculty with a positive attitude toward change, a visionary library director, and a receptive board.” When the CLUnet Project proposal was presented for funding to the board, one regent’s simple but powerful statement effectively summed up the situation: “If we say no to this proposal, we’re saying no to the future of the institution.”

The “visionary library director” to whom both Jolicoeur and Luedtke attribute much of the success of the project was Kenneth Pflueger, now head of the new Information Systems and Services (ISS) organization. A brief white paper circulated by Pflueger raising questions about the future of the library also raised consciousness about the need for a campus network and eventually prompted the appointment of a working group by the president to define a set of mission statements for the project.

Among the goals identified for the CLUnet Project in the fall of 1993 were:

- supporting CLU’s quest for a highly competitive teaching and learning environment, by establishing a campuswide network to enable the distribution and submission of course assignments and to provide universal access to e-mail, shared applications, course material, and the library catalog and other information databases;
- equipping students for meaningful lives and successful careers in the twenty-first century within a context of technological change, by training them on network use and information management;
- providing a foundation for the Library's modernization project; and
- providing the framework and infrastructure for the emergence of a campuswide environment and the Twenty-First Century campus user.
streamlining administrative procedures to increase efficiency, reduce costs, and better serve faculty and students, by selecting and implementing a new hardware platform and a commercial administrative application that will allow network access to administrative information in an “open systems” environment.

When the network was completed nine months later, the Thousand Oaks campus had implemented a 10-Base-T Ethernet network, running TCP/IP, IPX, and AppleTalk protocols over 58 miles of fiber optic cable and linking all campus buildings—including residence halls. Computing resources on the network include six dedicated file servers and two DEC Alphas.

CLU in cyberspace

Even more rapid than CLUnet’s implementation was its acceptance by the campus community as a new way of doing business. Students, faculty, and staff alike quickly and enthusiastically embraced the new campuswide information system and the easy access it provides to a wealth of information and applications (see graphic below).

According to Luedtke, when students found they could get online from their residence halls they were euphoric. As president, he regularly receives e-mail from students and is disappointed, he says, “if there are no e-mail messages from students when I log on in the morning.”

It didn’t take the campus community long to realize that a university-wide committee would be needed to address the many questions that arise in a networked information environment. The Internet and World Wide Web Committee was established with a membership of about fifteen people including faculty members, administrators, traditional library professionals, and publications and public information staff. This committee worked initially to plan an ideal “prototype” of CLU’s Web site and to establish policies with respect to use of networked computing resources.

While the technical services unit of ISS is responsible for the technology that supports the Web development, design and organization of the content have been primarily the responsibility of CLU’s publications director, working closely with the public information office. Departments are responsible for their own home pages, and the committee continues to function in an advisory capacity as needed.

A dramatic information services reorganization

In the midst of planning and implementing the CLUnet project, a major restructuring took place that brought together the staffs and responsibilities of five distinct departments—Library Services, Academic Computing, Data Processing, Telecommunications, and Instruction Media—into the new Office of Information Systems and Services. The plan to restructure these departments grew out of discussions of the University Information Services Committee, prompted by Pflueger’s white paper mentioned above. This committee had essentially been functioning as a focal point for planning and budgeting for information resources, since there were so many diverse units with related re-

California Lutheran University in Cyberspace

WWW FEATURES:

CLU Home Page
http://robles.callutheran.edu/
• Gateway to CLU
• Undergraduate Catalog
• Campus Tour

Pearson Library
• Online card catalog
• Reference materials
• Gateway to electronic texts
• CLU Gopher

Departmental Home Pages
CLU News
Cultural Events Calendar
KCLU Radio
CLU Magazine Online
Two other critical success factors in the reorganization were being open and upfront about the changes that were going to occur, and employing human resources experts from a local corporation to conduct a structured interview process similar to one that had been used successfully in their company. All personnel in the various units involved were invited to apply for new positions, with new job descriptions. Pflueger believed that going through that interview process caused staff to rethink their skills and to buy into the new organization. Clearly, staff were not expected to already possess the needed skills for the newly defined positions, but CLU was willing to provide the training to make it possible for them to qualify for those positions, and staff were expected to demonstrate their willingness to change and to learn the new skills. In all, four staff members did not continue with the new organization.

The division of services into technical and user components represented a traditional structure for libraries that Pflueger believed would work in a broader organization as well. Has that proven to be the case?

Evolving structure and culture

After nearly two years in operation, Pflueger believes the new structure is working very well on the user services side, but some changes may need to be made in technical services. One of these will be taking some of the technical services that relate to the library and moving them to the resource development area of the user services unit. Eventually, Pflueger also would like to see a merger of the reference and help desks in user services, as the reference desk function becomes more technical in nature, but he admits that this will be a challenge since traditionally reference desk skills have not been technical.

Like other reorganizations of this kind, a tremendous cultural change had to occur for the merger to work. Each “camp” of professionals had to give a little to promote synergy and discussion.

One of the most difficult aspects of the new organization is the submersion of old cultures into a single new one. This is still taking place. As recently as a few months ago, Pflueger says, staff were asking, “When are we going to have a library meeting?” Of course, the library continues to be a physical location within the University, but in terms of personnel, there are no longer “library” staff and “computing” staff.

Impact of CLUnet on teaching and learning

According to Luettel, the implementation of CLUnet has provided “an opportunity fundamentally to re-envision the way we teach and learn.” An increasing number of faculty at CLU agree, thanks to a prevailing commitment to teaching and learning and an effective approach to training and mentoring in the new technologies.

Through a task force on teaching and technology (now called the Teaching and Technology Committee), the University set a goal to establish a skill level among full-time faculty relative to a basic set of computer competencies, including e-mail, operating systems, and the Internet. The goal is being met through a mentoring program in which an early-adopter faculty member commits to mentoring two faculty colleagues to provide each of them with individualized instruction in these competencies in their own offices on their own computers.

In addition, a series of workshops was held for faculty to provide additional training in core competencies. These workshops were held in conjunction with other faculty development activities under the auspices of the University’s Teaching and Learning Center, a mechanism established two years ago to encourage general faculty development.

The training workshops didn’t just address technology as a learning tool, but emphasized ways in which technology competencies can be applied in the faculty member’s discipline. This is a key concept of the program, according to Education Professor Silva Karayan: “Nullless faculty can perceive value in using the technology, they won’t use it. And the training by ISS has been very effective in that respect; that is, the mentoring has tied the technology to its effective use.”

As a result of the training and mentoring program, there is an expectation that nearly all faculty will have attained the desired skill levels by the fall of 1996.

Many CLU faculty have already
Impact on administration

Just as challenging as the change occurring on the academic side is the impact the new administrative systems are having on the way business is conducted at the University. The CLUnet Project planning committee determined that the most appropriate strategy for CLU was to purchase a set of completely integrated, off-the-shelf commercial modules (from Datatel) which CLU would not customize. This meant administrative processes would have to be adapted to the new system.

Chief financial officer Robert Allison believes that having to modify some of their business processes to accommodate the new system provided a good opportunity to make needed changes. The best thing about moving into a distributed environment, Allison says, is that the network has allowed a different way of doing business by not being spatially bound; now other, more appropriate departments can perform the functions they couldn’t previously.

The networked environment is enabling Registrar Lucy Rodriguez to think in terms of a graphical user interface to the student system (currently in the conversion phase), rather than a phone-based approach. Plans include eventually implementing such an interface so that students can take advantage of the network for services such as registration, advising, using online forms, and accessing grades and course information. As with the financial modules, converting to the new system has enabled some positive process change.

Director of Technical Services Zareh Marselian says one significant lesson CLU learned in its move to commercial software is that the costs were higher than anticipated: “When a school hasn’t spent much on systems in the past, it is a cultural shift to accept that there will now be ongoing costs.” Also, going from homegrown systems to a new system with a different platform and different software meant a magnitude of change that was very difficult for some users. He believes assigning an ISS member to each user department would have alleviated some of the pain, but with such a small staff, this was simply not possible.

Budgeting for information resources

According to Pfueger, a major benefit of the new ISS organization is that “for the first time, this entire area presents a united front in the planning and budgeting process. As we move through the strategic planning process of the University, the new organization is a strong advantage. It enables one voice for information resources, including representation on the President’s Cabinet, bringing a focus to CLU’s information resources investments and how they support the mission of the University.”

Pfueger adds that while CLU has invested a lot in technology, the harder pill to swallow is the need to continue that investment: “We recognize that we can’t put our information systems, network, and hardware on the same kind of depreciation schedule we have used in the past, but we’re not sure what sort of schedule to put it on yet, or how we will establish or predict the lifespan of the fiber-optic backbone and what kinds of appropriations we need to make in the operating budget for replacements and enhancements. We’re going to have to threshold these generational steps. Technology is no more of a black hole than anything else that needs to be done at the institution; it will continue to be justified on the basis of how it serves our needs.”

A big step forward ... but questions remain

We are not a heavily endowed institution, yet there was a willingness at the board level to take some risks and try to leverage available resources into a big step forward in technology infrastructure. What other choices did we have? ... If anything was courageous it was the decision to do it all at once, rather than continually try to play catch up, to recognize that we had an opportunity to jump ahead. The effect this has had on the self confidence and image of the University is extraordinary.

The three most ardently argued topics at meetings of college leaders in my recent experience are tuition discounting, productivity, and technology. I’m not sure whether anyone knows whether improved productivity—whatever that is—through technology is a chimera or whether we really are going to break through into a new realm of pedagogy enabled by technology. It's a critical question for our kind of institution.

We are close to the end of a year and a half of strategic planning, and it’s clear that our intention is to remain a largely liberal arts and residential institution. But if one reads the literature, the winds are in the opposite direction. We are not trying to put ourselves in the position of delivering educational services to masses of people with new media, substituting for the human factor, but we haven’t yet discovered all the ways we can enrich, diversify, or improve the relationship between the mentor/teacher and the student using new technologies.

Meanwhile, technology is becoming a larger and larger part of our operating budget. We haven’t established the kind of protocols and thresholds that I think we need for the University to finally decide what we are not going to do, or cannot afford to do, as well as what we are aspiring to do.

Excerpts from a conversation with Luther Luedtke, CLU President January 1996
The Use of Electronic Data Interchange under the Family Educational Rights and Privacy Act

by Paul T. Rhinehart

Among the many technologies that continue to transform our colleges and universities, one of the latest is electronic data interchange, or EDI. When used in the student records area, EDI allows electronic student records to be fed directly into a receiving institution’s database, instead of being sent by mail. While this process offers many clear advantages, one important question that needs to be addressed is how will students’ privacy be protected under this new means of transmission?

The application of electronic data interchange (EDI) in the area of student records in higher education has been recent and rapid. EDI was first developed for use in banking (the familiar ATM, for example) and the trucking industry, with application in higher education student records transmission emerging in the late 1980s. One pioneer was the Georgia Institute of Technology, which in 1989 started to accept student “flat file” applications for admission electronically. Georgia Tech viewed the process as a method of speeding the application process, reducing time spent in data entry, and also recruiting technically advanced applicants.1

To date there are approximately 459 institutions involved at some stage of EDI implementation. The widest application has been in the task of transmitting transcripts between institutions during the admissions process. For example, in Florida over 250,000 student records are exchanged within the state per year by EDI. The University of Texas at Austin has received over 40,000 transcripts via EDI.2

And the process could very well soon go national. The American Association of Collegiate Registrars and Admissions Officers (AACRAO) has developed a system of EDI known as SPEEDE/ExPRESS and has gained government acceptance for its X.12 standard protocol. This is an important step, in that it provides uniformity in transmission. The Department of Education is also supporting the use of EDI. Further, major organizations such as The College Board and Peterson’s are developing national electronic clearinghouses of student data, for the purpose of transmitting batches of student applications and records, and helping schools and students “find each other.”3

As the use of EDI of student data continues to increase, one concern is the legal protection of privacy afforded students under this new technology. Currently, student record privacy is protected under the Family Educational Rights and Privacy Act of 1974, known as the Buckley Amendment or FERPA.4 However, FERPA, having been written over twenty years ago, does not explicitly address EDI. Thus, college and university officers are left with the following sources for guidance:

• new interpretations of the existing FERPA legislation,


3 Note: Alphabetical reference annotations refer to code and legal citations, found as endnotes to this article.

4 Paul Rhinehart (rhinehart@ocean.st.usm.edu) is currently completing his Ph.D. in higher education administration at the University of Southern Mississippi, where he served for five years as an assistant in the office of the Graduate Dean and the Office of Graduate Admissions. He has also served as a research intern with the Educational Testing Service in Princeton, New Jersey.
• extension of principles established in past case law concerning FERPA, and
• the world of electronic banking, where, because of EDI’s early application, there are already established procedures, legislation, and case law.

At least one of these sources, past case law concerning FERPA, is especially slim, because there have been very few court cases addressing FERPA. One reason for this is FERPA stipulations which require that the Department of Education’s FERPA Office resolve most complaints administratively. Another reason is the absence of any allowance in FERPA for private action and recovery of damages as a result of violation of FERPA protection. Also, given the novel nature of EDI, there is especially a dearth of case law here; traditionally, legislation/jurisdiction experience a time lag behind technological change. The topic is, however, currently being researched by the FERPA office.4

EDI of Directory Information

To begin the analysis, there are two categories of student information, according to FERPA (a)(5)(A): “directory” information and “nondirectory” information. Directory information consists of students’ names, addresses, telephone listings, dates of birth, major fields of study, and so forth, which are already officially available to the public. FERPA (a)(5)(B) does state that the student must have a chance to request non-release of directory information. However, barring such a request, directory information in fact must be made available to the public under the Freedom of Information Act (FOIA). Thus, as long as student data clearly fall into the category of directory information and the student has not requested non-release, there will be no primary privacy concerns with EDI.

There has been some judicial controversy, however, concerning when certain student data are or are not properly directory information. In judicial rulings concerning this question, the courts attempt to balance FOIA vs. FERPA—“the privacy interest of the student is weighted against the genuine need of the party requesting the information for its disclosure.”5

From the case law, one can discern the following guidelines for circumstances when directory information is not disclosable:

(1) When student information is matched with achievement test scores. The test scores themselves must be disclosed; however, names and social security numbers must be presented in a masked and scrambled format.d

(2) When it accompanies other student statistical data, in this case number of transfer students, exams taken for transfer purposes, and sponsoring schools. Again, the school must release the statistics, but without names and addresses or other personally identifiable information.e

(3) When the school has no published policy of release of directory information, as required under FERPA. Said the Supreme Court of New Hampshire, student name and address data are protected as an extension of the privacy of the home as protected under the fourth and fifth U.S. Constitution Amendments, and release of this data would place the children “at the mercy of pedophiles and other criminals who could do them harm.”f

Further cases have provided the following:

• Social Security numbers do not constitute directory information. However, FERPA (b)(1)(D) allows the school to release identifiable individual data, even including course grades, without consent to an employer who sponsored the student in the course.5,h

• Information concerning the funding of individual athletic students is not “educational records” protected by FERPA. An athletic conference is not an “educational agency,” and so is not subject to the authority of FERPA.1 Presumably, such distinctions as are made in the above cases are independent of the mode of transmission, and so would be applied exactly the same under EDI. The only difference may be that with EDI the question of privacy protection will perhaps become more intense because of: (1) the sheer increase in volume of data transmitted, and (2) its concentrated possession by central clearinghouses, with the data’s obvious value to marketers.6

EDI of Nondirectory Information

There is more reason to be concerned about the use of EDI with respect to the release of nondirectory information. Nondirectory information is not public knowledge under FERPA, and so its privacy is guarded much more closely. There are several provisions of FERPA which would be of particular interest under EDI.

Will written consent be required?

First, one of FERPA’s major concepts is that no nondirectory information should be disclosed without written permission of the subject (or parents) [(b)(1)]. However, since most use of EDI takes place within the admissions process, technical permission is not required. This is because, according to FERPA (b)(1)(B), there are several exceptions to the consent requirement, among them: release of data to “officials of
schools or school systems in which the student seeks or intends to enroll ..." Other exceptions listed include release of data to educational officials within the institution, and to certain government bodies, for example. FERPA here follows similar provisions in the Privacy Act of 1974 which addresses information held by government agencies, and which similarly allows exceptions for “routine uses.”

Thus, transcripts could be sent without any prior written consent. The institution to which the student had applied could merely request the information on its own from the source institution. If this were to occur, the source school would still have to observe the following FERPA stipulations protecting the student’s privacy: the school must publish its policy of what it will release and to whom; the student must have a chance to request non-release; and the student must receive notice each time information is sent.

Nevertheless, even though it is not technically required, most institutions will most likely seek some form of written consent from the student. In fact, under the current process, most institutions require students’ written consent each time a transcript is requested. This process seems to result from (1) the fact that the school collects a fee for each transcript, and (2) there is no established popular procedure by which one institution directly requests a transcript from another.

Prospectively, however, when EDI is brought into the picture, there is yet another reason that schools may wish to require written consent—namely, there is the problem of the as-yet unproven and possibly risky method of transmission. Thus, the school may wish to have the student sign a waiver referring to the electronic mode of transmission, with language to the effect that, “I give the institution permission to release my transcript electronically to requesting educational institutions.” Indeed, the original AACRAO Legal Guide of 1984 includes a whole addendum of such canned clauses, and similarly the Electronic Fund Transfer Act (EFT) of 1978 provides for the Federal Reserve Board to issue such canned clauses for banks to include in signed documents.

When will consent be required?

Thus, given that the institution using EDI does continue to seek the student’s written consent for transcript release, the issue next arises as to when or how often that written consent will be required. In other words, given that the institution had obtained the student’s permission to use EDI by a blanket waiver as above, there would be no reason that the institution could not then conduct all future transmissions to schools to which the student had applied on a simply automatic basis. Any fee collection could be done by automatic billing. There would be no need to obtain the student’s permission for each individual transaction, but rather the scenario would work very conveniently as follows: (1) the student submits his application for admission; (2) the prospective school merely notifies the source school by EDI of the application; (3) according to prestated authorization, the source school simply sends the transcript by EDI; (4) the sending institution gives the student subsequent notification as required by FERPA.10

Could electronic consent be used?

Now, extending the application of EDI yet further, assuming that the school does obtain consent, must such consent really be “written”? The question arises because in order to deploy EDI to its fullest advantage, one would envision a situation of electronic consent. However, this threatens the very aspect of FERPA which requires that the consent must be written, i.e., by signature.11

It would be very convenient, indeed, for the institution to be able to accept authorization via electronic communication with the student, and so the question arises of what exactly could suffice as official authorization. The use of paper by mail in today’s modern age is beginning to seem more inconvenient to today’s consumers, including students, who are used to faster means such as ATM bank machines.

According to FERPA officials, the law as it now stands requires a paper signature. However, the trend may be toward the acceptance of electronic verification procedures, such as passwords, as modeled on the emerging use of such passwords in electronic fund transfers (EFT) and ATM use in banking.12

Obviously, this creates definite security questions, as it somehow seems less secure to rely on the secrecy of a password or PIN number (as employed in many colleges and universities in telephone registration systems) than a written signature. (But one wonders, with the pace of technology, will signatures be able to be collected by means of people writing with electronic pens on the screen itself, as used in the Apple Newton, for example?)

Indeed, if FERPA were to be construed along the lines of the EFT Act, it would allow the legality of passwords for discrete transactions. Under the provisions of the EFT Act, written means do still play a part, but more as a kind of meta-authorization signed by the customer very early in the
relationship and stating procedures by which all subsequent recurring transactions will proceed. For example, when you obtain an ATM card, you sign a document covering the relationship, and then each transaction is carried out with a password.

Considering privacy protection, it is also significant that such an electronic authorization system would not be without backup, because FERPA demands student notification of each transaction, so that the student would notice if something went wrong. Similarly, the EFT Act includes multiple extra security provisions, such as requiring a written record to be generated for the customer during each transaction (the printout generated by the ATM); a regular (usually monthly) list of all transactions; and procedures for corrections of mistakes. Similar provisions could be added to FERPA.

By the way, in any discussion of EDI, the question arises of access and fairness for students in rural or poor areas, and in fact in this regard the EFT Act does provide that at no time can it be mandatory that the customer employ electronic means for the transaction.

Given acceptance of electronic authorization, then, the scenario could work as follows: at the inception of her relationship with the institution, the student could be issued an electronic password or card, similar to an ATM number or a personal ID number for telephone registration, and all subsequent actions could be carried out by computer, including transcript requests.

**What about system security and liability?**

Finally, and perhaps most tangibly important for the institution itself, assuming that electronics are used both for authorization by means of password and for the transmission itself, the question remains, is the system itself, the data in transit, secure? And at what level will the institution have to prove its security or face liability?

Oddly enough for a piece of legislation concerned with protecting privacy, FERPA nowhere explicitly stipulates the duties of the institution to ensure the minimum inherent security of the data storage and transmission system itself (presently the filing cabinet and federal mail system). Rather, the legislators seem to have left this merely to be implied.

This void in the legislation is beginning to seem a bigger problem. First, there is very scant enforcement even under the current paper system. For example, currently registrars never take the time, and indeed could not take the time, to verify every signature they receive on mailed transcript requests. Also, with the increasing use of facsimile (fax) machine requests, there is document distortion and signature distortion by such means. If we accept payment by VISA card number, how do we know who is sending us this number? What if someone's password is stolen?

These kinds of questions are gaining increasing attention. According to a FERPA official, these issues are of currently heated debate in the use of EDI for student loans and financial aid.

As we move toward EDI, indeed, the means seem less secure. Several writers address the vulnerability of EDI. For example, Willis Ware is concerned about “hackers” obtaining data:

Between the outreach of remotely provided computing services and the interconnectedness of modern day networking, the educational community finds itself in an ever increasing posture of exposure and subject to an increasing scope of threats: fraud, hacking, pirating of information, stealing of computer resources, destruction of records, invasions of privacy, physical damage to facilities ... And Curran says,

Many computer systems presently in use do not sufficiently protect the privacy concerns required in Buckley and other privacy laws. Courts have made it clear that efforts to blame the computer will fall on deaf ears. [The threat is] risk of deliberate tampering. Further, Goode and Johnson note the possibility of accidental diversion of data across lines, simply because of glitches in the system.

Perhaps most significantly, the courts too have recognized this danger. For example, in the court’s ruling in *Wachter v. Denver National Bank*, the U.S. District Court, applying the EFT Act, stated that because electronic transmission was new, expanded legislation had become necessary to “alleviate concern” and to “enumerate rights and responsibilities.” The court further said that the EFT Act was meant to protect customers, in light of the idea that automated systems are “more vulnerable to fraud and unauthorized use” than traditional methods. These same concerns would seem to be relevant now in the situation of EDI of student records.

Indeed, under FERPA and under future EDI rulings it will be an important issue as to what constitutes “enough” or “reasonable” measures for the institution to protect EDI transmissions against hacking and privacy invasions. The EFT Act of 1978 requires that banks take “reasonable care” to prevent breach of security, and makes them liable for not guarding against forgery.

Such liability was upheld in the case of *Bradford Trust Co. v. Texas American Bank*, where the court ruled under an application of the Consumer Credit and Protection Act that a bank was liable for failure to follow its own “internal...
Several court decisions have ruled that there is no right for individual private action and recovery of damages as a result of violation of FERPA protection.

Could EDI FERPA violations be litigated?

The only remedy that FERPA itself provides for violations is the withdrawal of federal funding. According to the courts' interpretation, in order to be punishable such violations must be on a systematic, not an individual, basis, and must be handled via administrative procedures by the FERPA Office in the Department of Education. Said the U.S. District Court in Smith v. Duquesne University: “[I]t is clear that FERPA was adopted to address systematic, not individual, violations of students’ privacy ... to stem the growing policy of many institutions to carelessly release student records.”

Curran, however, points out that no institution has ever been penalized with loss of federal funding; rather, under finding of a violation the Department of Education merely brings the offending institution into future compliance. He does, however, suggest the possibility of individual suit under tort law. Further, some courts have found that there may be cause for private relief under application of Section 1983.

Several court decisions have ruled that there is no right for individual private action and recovery of damages as a result of violation of FERPA protection. The courts’ reasoning here is based on the absence of any allowance for private action in FERPA itself, and on similar court precedents related to other similar federal legislation.

Further, as Curran points out, there is no private right to action because the right to privacy is not a right recognized by the federal Constitution. The U.S. Constitution never mentions the word “privacy.” However, Curran notes that the individual’s right to privacy is hinted elsewhere in the Constitution, which “speaks of other privacy-related rights—the right to be free from unreasonable searches and seizures, and the basic right of liberty protected by the due process clauses of the fifth and fourteenth amendments.”

On the other hand, one of the more important cases to date on this point, Porten v. University of San Francisco, does seem to leave the door open for private suit under at least two possible scenarios:

(1) The court seemed to imply that there would be a possibility for private suit based on tortious invasion of privacy, if the unauthorized disclosure were “to the public in general or to a large number of persons,” rather than on a more limited scope.

(2) The court in Porten acknowledged that where the state constitution provides the explicit right to privacy, such a right becomes “inalienable,” “self-executing,” and “confers a judicial right of action on all [citizens].”

Again, should there be future FERPA legislation modeled on banking regulations, the institution may be required to ensure “reasonable care” in establishing security of records, and be liable for failures, as banks are under the Bank Secrecy Act, and for example, Bradford v. Texas American Bank.

And lastly, as regards any “hackers” who may perpetrate the illegal interception of transmissions, there may be penalties for them. For example, the Electronic Communication Privacy Act of 1986 covers the illegal interception of transmissions, by phone, TV, or computer, with civil and criminal penalties up to a $10,000 fine.

The Future of FERPA and EDI

The possibility is that we will need amendments to FERPA to address the new technology. According to Curran, “Unfortunately, the new regulations ... of 1988 do not address the issues of computer records ... Buckley needs an electronic overhaul to bring it into compliance with modern electronic systems.” In addition, certainly case law interpretations will emerge construing FERPA in the context of EDI.
Interestingly, at least one constitutional law expert has actually suggested a federal Constitutional amendment to extend all current individual protections into the new world of technology. Laurence Tribe proposes a “high-tech” amendment to provide “constitutional protections construed without regard to medium.”

As for future scenarios, there has been some speculation about the possible national societal implications of EDI. Among its ramifications might be the de facto formation of a quasi-national “universal university.” As institutions increasingly communicate using a standardizing network, it is logical to suspect that their respective internal operations may also tend to become standardized. Such a “universal university” system could be heavily dominated by the large public universities, and may “swallow” smaller private institutions, who would be unable to compete with resources, and whose market identity differentiation could become less feasible.

In fact, these possibilities and other scenarios like them were the concern of the EFT legislators. Part of the EFT Act created a body to further investigate and report back to the legislature concerning possible impacts of EFT on the smaller banks, on competition within banking, and on access by those of low income. All of these concerns have their equivalents in the area of EDI in student records, and may well be a focus of concern in the future.

### Code and Legal References:

- **Arkansas Gazette Co. v. Southern State College**, 620 S.W.2d. 258 (Ark. 1981)
- **751 F.Supp. 906** (D.Colo. 1990)
- **790 F.2d. 407** (5th Cir. 1986)
- **U.S. Code, vol. 15, secs. 1601 et seq.** (1988)
- **U.S. Code, vol. 12, secs. 1951 et seq.** (1988)
- **612 F.Supp. 72** (D.C.Pa. 1985)
- **U.S. Code, vol. 18, secs. 1367,2232,2510 et seq., 2701 et seq.,3117,3121 et seq.** (1988)

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**Privacy of Student Information in a Networked Information Environment:**
Beyond FERPA and EDI

With the proliferation of campus connectivity to the Internet and networking of information, many questions are arising related to the privacy of student information:

- Can rosters of students enrolled in classes be posted on the World Wide Web?
- Is our institution liable for a violation of privacy that occurs because of information posted on a student’s Web page when we have no policy regarding what students may post?
- Which administrators should have access to which data?
- Can student photos be posted to an electronic directory?
- What does “secure” mean in an Internet environment?
- Can we use e-mail to deliver student course and billing information?
- Given that some listserv software can be queried to determine who the subscribers are, is this a violation of FERPA protections for “academic records”?

CAUSE, in cooperation with the American Association of Collegiate Registrars and Admissions Officers, has created a task force to develop a white paper that will provide guidelines to help colleges and universities create or refine policies and processes related to the collection, use, maintenance, and disclosure of personal information of students in an increasingly networked environment. These guidelines will evolve through a thorough review of applicable state and federal laws, emerging legal questions, current campus incidents, relevant literature, and existing campus policies, and through an understanding of the concerns of stakeholders such as bursars, admissions officers, financial aid officers, and registrars. The paper will articulate the continuum of values that influence the creation of policy, and take into account the advances and implications of the technology that raises these issues.

### Task Force Membership

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Colleges and universities are moving rapidly towards electronic data interchange. Nay, we are stampeding towards EDI. Do we know why we have selected this trail? What is our purpose, our direction? Are we on course, or are we following distractions, side paths, and short cuts? And are we willing, able, or even eager to find ways to shed our responsibilities in some areas in order to stay on this trail?

I have used the term stampeding because it denotes rapid movement in a direction determined not by individuals, but by a group, at a pace set by a few, with togetherness perhaps achieved under duress. With these characteristics in mind, it behooves us to examine three areas of concern as we move rapidly toward EDI: how we have determined this purpose and direction, whether we will be able to focus and stay the course, and how to remember our responsibilities along the way.

Determining purpose and direction

Why have we chosen this trail? Often, when we discuss EDI in the context of student data, we talk about how it will speed the handling of student records for admission to institutions, for transfer of students from one institution to another, for the processing of student aid applications, and provide remote access to student transcripts. Implicit in our emphasis on speed and electronic processes is the belief that with them will come a reduction in costs, a reduction in human effort, and better satisfaction for students.

This begs the question, though, of who identified these needs. Did we as administrators say, “we need to handle student records more quickly, we need to make admissions faster,” “we need to transfer students from one institution to another with more speed,” or “we need to get student aid applications handled more rapidly”? Did the students tell us that they are tired of waiting for their applications to be processed, and for their student aid approvals to reach them?

If this demand came directly from our customers (the students of our institutions) or from their representatives (the administrators who provide services to these customers), our rush to EDI may be justified.

There are, however, plenty of occasions when a new technology has appeared on the scene and—instead of the actual needs of our communities determining our course—we have allowed the possibilities of the technology, or promises of future benefits, to divert us. Many a trail has been taken simply because the technology made it possible, not because we had any evidence of need or evidence of the actual benefits we would realize.

Too, it is more exciting to focus on the bright promises of the destination than on the potential pitfalls along the way. Electronic data interchange increases the potential for tying databases together—database matching—with resulting potential for misuse of information. If everything is electronically available, and sorting for any number of variables can be done with ease, then information tends to become a commodity, simply zeros and ones out of which fascinating conclusions can be drawn, without sensitivity to the privacy of the individuals represented. Once databases are electronically avail-
able, this ability to match them becomes one of the most serious pitfalls on the EDI trail.

Most dangerous of all are those unthinking, but perhaps well-intentioned, members of our communities who begin too many sentences with the phrases "what if we..." or "just think, we could...." At one institution, a new geographical information system details every university building, room, laboratory, and the grounds surrounding each, in minute detail. The system manager for that system is striving to match the GIS database with the student and personnel databases, among others. In a surge of enthusiasm he recently told a news reporter, "Just think, if we could match those databases, then you could have access to all of this. If something happened in one of the countries of the world and international reporters wanted information about our students from that country, you yourself, from your desk, could tell them where they lived, how many such students we had, their names, and how to locate them."

The trail looks new and enticing, the possibilities on this trail hold promises (about which we are hearing a great deal) and dangers (about which we hear little), and lots of people are stampeding along it at an increasingly fast pace. However, some of the tough questions that we need to continually ask ourselves as we embark on this trail of EDI are: Who is determining this purpose and direction? What evidence do we have that the needs of our community will be met by marching on this trail? Will this enhance the mission of our institution? What evidence do we have that the trail is ready to be traveled? What evidence do we have that our community is ready to be taken on this trail? Is now the time?

**Focusing and staying the course**

If we are clear about why we have selected this trail—if we know that we have selected it through reasoned planning and are not stampeding simply because others are pushing us along—then we should be very clear about what destination we will reach and how we will evaluate our success, or failure, at the end of the trail.

Is our goal a reduction in the cost of handling applications? If so, how will we measure the outcome of implementing electronic data interchange? What costs are being included in the baseline, and what costs will be included in the comparison of outcomes from this new way of doing business?

If we seek to reduce the number of people that it takes to process applications, financial aid paperwork, and other such processes, then what are the numbers that are being included as the baseline for our current operations, and what will be collected to show the outcomes of EDI for these processes?

If speed is the central issue, and the impetus has come from student desires, how will we measure their satisfaction with the new process? Particularly for public institutions, when a new trail has resulted in significant output or redirection of public funds, we must be prepared to show outcomes.

If we start along this trail unclear about our purpose, unclear about who is setting the pace, unclear, perhaps, about the trail itself, then we may become distracted by the side trails, the new technological developments that can solve yet one more problem that may not even have been identified. A trail that doesn’t quite get you to where you need to go—but gets you somewhere else—might be a serendipitous achievement, but it is more likely to be a disastrous detour.

There is growing concern about the handling of personal data within the new electronic environment, about its secondary uses, and its potential misuses. As we develop electronic data interchange, we will likely not restrict this capability to those data which are public, but will rapidly use the technology for sensitive, personally identifiable data as well. Medical records, for example, generally fall into the latter category in the opinions of most individuals, and the concern within the populace regarding electronic handling of medical data has grown significantly in the past few years.

As universities and colleges participate in this stampede to EDI, it is critical that they be determined to hold the line until necessary safeguards against inappropriate use of data have been put in place. They cannot, must not, be drawn to secondary uses of the data they are handling. Once data are easily accessible in electronic databases, such secondary uses become compellingly attractive. Many campus administrators already view the stores of student data—and the data that will be tied with them from testing services, funding sources, and others—as having value for developing new marketing strategies. Information gathered for one purpose can easily, and, in this author's opinion, wrongly, be redirected for secondary purposes. This is another serious pitfall, but a likely consequence, of the trail we are following.

One university administrator recently explained a scheme for matching accepted students with faculty members expert in the student's stated areas of interest. This process would match the student's statement of interests from national testing data with university admissions data. Having a personalized contact from a faculty member, reinforcing the student's interest in
specific subject matter, the student would find the school more friendly and inviting, and thus be more likely to accept admission.

But would that really be true? What was the student's expectation at the time that he or she expressed interest in a particular subject to the testing agency? Would this contact from the school feel like friendly support, or an intrusion? The central question is, "What was the purpose for which the information was originally given, and is the individual empowered or disempowered by such secondary uses of the information? Does he or she feel encouraged and supported, or pressured, targeted, and harassed?"

Even more damaging than secondary uses which seem to mix motivations are those, attractive in this new environment, where profit is the sole motive. As budgets become increasingly tight, will we consider selling entire data sets—the personal data of individuals—for the income that many companies are already too willing to offer? As we follow the EDI trail, we must be aware of the pitfalls of secondary uses of data. The way we handle personal information can either increase or destroy trust between our institutions and the members of our communities.

**Fulfilling our responsibilities**

We university and college administrators, participating in this stampede, carry with us backpacks filled with the many responsibilities we have assumed as part of our institutional roles. We are responsible for implementing federal and state laws regarding the privacy of data, regarding notice to individuals in the use of data, regarding third-party access to sensitive data, and many other features of data management. We are also responsible for implementing the policies and standards of our own institution and the expectations of our communities.

Since EDI of student records includes data that are highly sensitive and personal in nature, as well as those which are public and not sensitive in nature, the trail selected by universities and colleges is of great importance to individuals within their communities, whether student, faculty, or staff. Their rights and privileges, their privacy, their reputations, and careers—the representations of them as individuals—are at stake.

A phrase coined by U.S. Supreme Court Justice Louis Brandeis, "the right to be let alone," is often used when reference is made to the Constitutional provision for privacy. But a more complete look at Brandeis' words better captures the Constitutional basis and fullness of this right for U.S. citizens:

The makers of our Constitution undertook to secure conditions favorable to the pursuit of happiness. They recognized the significance of man's spiritual nature, of his feelings and of his intellect. They knew that only a part of the pain, pleasure and satisfactions of life are to be found in material things. They sought to protect Americans in their beliefs, their thoughts, their emotions and their sensations. They conferred, as against the Government, the right to be let alone—the most comprehensive of rights and the right most valued by civilized men.¹

Administrators trying to fulfill their responsibilities in the stampede to EDI often find their responsibilities too heavy, and their backpacks too bulky, for the trail that is being forged. As universities and colleges attempt to meet the needs of their communities, it is not uncommon to find technology designed for one purpose being harnessed for another with a less than perfect fit. There are often times when someone stating a particular value or need of a community is told, "this technology cannot do that." Electronic mail privacy is an example of such a dissonance between the values of users—their desire for private communication—and the current capabilities of the technology.

As we move to EDI, administrators will be faced with two distinct paths. They can try to interpret the risks in not fulfilling all of their legal obligations in the handling of student information, interpreting the laws as narrowly as possible in order to smooth over the problems with technical implementation. Or they can refuse to continue down the trail until the technology answers the demands of their responsibilities at a level which fulfills the intent, not just the letter of the standards they are responsible for implementing.

If the levels of data protection, or the processes for verifying the integrity of data, required by the law (and by the ethical standards of the community), cannot be provided by the currently available technology, administrators will have to make choices. Some organizations have tried to protect themselves by asking individuals to sign blanket consent forms. Others have designed their processes to maximize their chances for obtaining consent by selecting times when the subject feels particularly vulnerable, and will be most willing to give permissions. Neither of these approaches reflects the highest ethical ground, nor the intent of laws and standards regarding privacy.

At a hospital recently, in the waiting room with about a dozen other patients waiting for preoperative procedures, I was given a printed form and told to "just sign the bottom and hospital personnel will take it from there." The form

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Killing the Electronic Messenger

by Robert Morley

With the expanding growth and implementation of new and emerging technology in general, and electronic data interchange (EDI) in particular, misconceptions and fears about adherence to existing privacy and confidentiality requirements have arisen. While privacy and confidentiality require constant vigilance on our part, EDI presents very little in the way of new challenges. Existing legal protection currently speaks to this. The fact that we’re using a new technology, in this case EDI, is not a threat unto itself. It’s another tool of information management. The obligations to privacy and confidentiality remain, regardless of the technology.

EDI has been in use in the private sector since the early 1970s. In 1988 the American Association of Collegiate Registrars and Admissions Officers (AACRAO) began work on transaction set 130, the student record, later adopted as an official standard by the American National Standards Institute (ANSI). During this time post-secondary education has adopted computer-based record systems, microfilm, touchtone/voice-response technology, FAX, e-mail, World Wide Web, kiosks, and imaging systems, among others, as well as EDI. Why EDI in particular is being singled out as a threat to privacy and confidentiality of student information is unclear to me.

EDI is currently used by other industries to transmit your financial history, your medical history, your insurance history, your census information, your tax information, and a significant portion of Department of Defense purchase requests, among others. Educational institutions, with over twenty years of experience with legal obligations and constraints in the collection, maintenance, and release of protected information, has begun to transmit its information utilizing EDI technology. Is there suddenly a problem?

Much of the fear and misunderstanding is based, in part I believe, on the misconception that we will suddenly ignore our current policies and procedures and begin the release of protected information simply because new and emerging technology provides another technical capability to do so. Many if not most of the fears about EDI and privacy/confidentiality often begin with “what if” statements. What if the data/information are released to unauthorized third parties, or what if secondary usage is not controlled? How is the EDI transmission of student data, aggregate or personally identifiable, less secure or more threatening than current methods, e.g., tape exchange? Currently we send hardcopy records into that great unknown called the U.S. Postal System. Does the record actually arrive, does it arrive in time, is it actually handled by the appropriate person? (Never mind what address or addressee you’ve indicated, mail handling procedures are concerned with speed and sorting, not security and confidentiality.)

The irony is that new technology, especially EDI, can provide far superior protection of information than that which is currently in use. Currently we are perfectly willing (and within legal obligations) to accept anonymous mail requests signed with signatures we don’t recognize from people we don’t know. We then expeditiously send protected information to people we don’t know at an address we’re not familiar with for purposes unknown to us, and not knowing if it ever arrived in the hands of the correct person. In the same scenario using EDI, possibly with the use of public/private keys, the request for the student record might arrive in encrypted format, be authenticated, the student record encrypted, sent to a previously agreed upon address, and its receipt acknowledged.

(continued on page 53)
When Bad Things Happen to Good Campuses

by Sally Webster and Frank W. Connolly

Gene Washington, director of academic computing, is buzzed by his secretary to take an urgent call from Provost Marion Mossback. “Washington,” yells Mossback, “what kind of trouble have you got Ypsilanti University into now?”

After a few minutes of gentle probing, Washington has the outline of the “trouble.” Mossback has just received a letter from a prominent alumnus and benefactor, Mr. Martin Memorable, threatening to withhold from Ypsilanti his promised $2 million contribution towards the renovation of the University library.

Memorable’s daughter, Mary Lou, has tearfully told her parents that members of the football team were discussing, on a University-sponsored computerized discussion group, her body parts and sexual practices. Mary Lou is distraught, especially since the men are bragging about their conquest of Mary Lou—a conquest she hotly denies. Mary Lou is so upset by the behavior of the football players that she wants every one of them who discussed her thrown off the team and maybe out of school.

Provost Mossback holds Director Washington directly responsible for the problem, since the football players are using software bought and maintained by the academic computing group, which teaches students like the football players how to use the software. Furthermore, Washington and his faculty cronies talked Mossback into agreeing to computer networking, against his better judgment.

Washington makes some phone calls to his own staff and to Bucky Tough, Ypsilanti’s winningest football coach, and by the afternoon, he has many more details of the situation.

Early this fall, some members of the Ypsilanti football team asked Coach Tough to authorize the creation of a computerized discussion group, called a listserv, so that they could discuss football matters. For students to create and “own” a listserv at Ypsilanti, they have to get a faculty member or administrator to sign a document with the academic computing department agreeing to be responsible for the way the list is used.

Tough knows nothing about computers, nor is he particularly interested in learning; but he does know that his players have taken YU to bowl games in six of the past seven years. Revenues from bowl games have made Tough a popular University administrator. The players are stellar fellows, and Tough is inclined to be somewhat indulgent with them.

Upon investigation, information from his own staff convinces Washington that Academic Computing has just cause to suspect a breach of its guidelines for using computers, and he has

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read some of the listserv discussion. The players, at least some of them, have indeed made vulgar, sexually explicit, and possibly untrue comments about Mary Lou and her memorable parts. Somehow, Mary Lou has found out about it, and she’s reacting predictably.

Now Mr. and Mrs. Memorable have heard Mary Lou’s tale of woe and are trying to protect their beloved daughter. The whole sordid tale has dropped into Mossback’s lap, and he’s trying to control the damage before the president and Board of Trustees hear about it and before Mr. Memorable carries out his threat.

**What should Gene Washington do?**

We presented this scenario to a group of CAUSE94 attendees who came to our session, “When Bad Things Happen to Good Campuses.” Groups of attendees assumed the roles of Mary Lou, Mr. Memorable, Gene Washington, Bucky Tough, some football players, and the dean of students. For forty-five minutes, the characters discussed what had happened, who was at fault, what ought to be done, and who was responsible for doing it.

At the end of discussion time, we had absolutely no consensus about who should do what. Everybody did agree that Ypsilanti, and particularly Academic Computing at Ypsilanti, were in deep doo-doo. The discussions accurately reflected far too many real-life ones during such a crisis. Two major themes dominated: campus politics and the pernicious effects of technology, especially the Internet.

The coach, the provost, the dean, and the director played hot potato with blame. If the responsibility was not explicitly theirs, they wanted somebody else to shoulder the blame and take necessary actions. Washington’s group had written computer use policies, but nobody else at YU knew much about them. Discussion of who was getting hurt centered on YU (loss of at least $2 million, bad publicity, and possible censure by the Board of Trustees), Gene Washington (bringer of sin), and maybe Marion Mossback (for not being vigilant enough). A few participants mentioned damage to Mary Lou’s reputation and relationship with her parents; some mentioned damage to the young men who so cavalierly discuss body parts and sexual acts and their relationships with eventual sweethearts, wives, and daughters.

Mary Lou and her parents threatened to hire lawyers to sue Ypsilanti. The football players claimed they told the truth and that Mary Lou wants her parents to believe she’s an angel when she’s not. Discussion turned into argument and, in some cases, into shouting matches. And a good time was had by all. Except that nobody addressed the real wrongs in the situation or saw how to use the crisis as a teachable moment.

**What is missing from this discussion?**

Campus politics and unreasonable fear of computer technology exacerbate an otherwise ordinary, human conflict that is handled more gracefully if approached from a different direction. In institutions where students, faculty, and administrators agree on the educational values to be preserved, the Internet and its services are not seen as bogeymen to be feared or avoided, and those who use them or support and teach others to use them are not agents of Beelzebub. Nor is the method of delivery mistaken for the message or the human agents of conflict.

Clearly, limiting the discussion to campus rules and jurisdictions, official responsibilities, and the dangers of technology didn’t get us very far towards a useful set of actions. Indeed, many of the participants didn’t notice that the situation presented an opportunity for everyone concerned to learn something about acceptable ways for people to treat each other.

In his article “The Role of Government in the Evolution of the Internet,” Robert E. Kahn says, “The most important use of the Internet, and indeed the NII (National Information Infrastructure), will be to allow individuals to communicate with each other and to rapidly access the information they require or desire.... A combination of ethics, technology and law are needed to insure the effective development of this important aspect of the network of the future.”

Kahn’s juxtaposition of ethics, technology, and law is telling and invites further examination.

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**CAUSE/EFFECT**

Spring 1996 45

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characteristics that are important to our discussion. First, the Internet is not bounded by geopolitical boundaries. Second, the Internet is not, nor likely ever will be, centrally controlled. Third, we have no national or international enforcers in cyberspace. Cyberspace at present is inhabited by rugged individuals from all over the globe, answering to no authority and recognizing few laws. It is, truly, the ultimate fantasy.

Law, on the other hand, is reactive and minimal. Law seeks to establish a minimum level of behavior. Not being indicted or not being convicted is sufficient "vindication" for ordinary citizens and celebrities. With the law, we study to avoid failing (being caught), rather than to embrace growth or success.

Law is created in response to problems, not in anticipation of them. Cars came first, then driving tests, licenses, rules of the road, and laws specifying penalties for sinking below the minimum acceptable level of behavior.

To be effective, law requires a means of enforcement. Fear of being caught, charged, convicted, fined, or jailed is a reasonably effective deterrent for some. The possibility of enforcement works only to keep citizens above the minimum acceptable level of behavior.

And finally, law is limited by local, state, and national interests.

Given these important differences between law and technology, law always lags behind technology, and therefore is an ineffective means to create or maintain a sense of community among the users of the Internet.

Ethics, on the other hand, differs from law in that it is based on personal responsibility, internal controls, and common understandings of right and wrong. And thus it might be an effective means of creating community, even on the Internet. Amitai Etzioni in The Spirit of Community says, “The only way the moral integrity of a society can be preserved is for most of the people, most of the time, to abide by their commitments voluntarily.”

Kahn rightly understands the need for voluntary compliance with community standards and reliance on ethical practices as elements of one of the pillars of the Global Information Infrastructure.

**How would we apply these understandings to the Ypsilanti situation?**

Since much of the Ypsilanti discussion centered on politics and technology, it was doomed from the start not to reach a satisfying conclusion for any of the participants. First, it was clear from the discussion that the campus had no strong sense of the way its educational values or community standards applied to this situation.

True, Academic Computing had a written computer use policy, but it was distinct from other campus policies regulating human behavior, such as the student code of conduct, the faculty handbook, policies developed by the dormitories, and the administrative policy manual. Therefore, unacceptable behavior using computing equipment was seen as distinct from unacceptable behavior of the sort addressed in regular campus policies, even though it isn’t.

Second, worried about whether some piece of paper did or didn’t require them to be concerned or to act, too many of the administrators forgot to act like human beings at the scene of suffering. At an accident, bystanders instinctively identify and help the wounded while waiting for the paramedics and the police. They don’t need a piece of paper telling them to be compassionate or responsible. The Ypsilanti situation was like an accident, and its satisfying resolution required human beings acting without portfolio, so to speak, to identify and help the wounded.

What educational values should underlie the discussion? Who was wounded and needed succor? Who was ignorant and needed to learn? What were the lessons? Who was responsible for healing and teaching?

Ypsilanti U’s educational values might be academic freedom, access to information, equity of access to education, life-long learning, personal responsibility, initiative, respect for one another and one another’s points of view, and possibly most important, the value of education itself.
The people most intimately wounded were Mary Lou and the football players: Mary Lou, because her reputation and her relationship with her parents were at stake; the football players because they were permitted or encouraged to discuss women as sexual objects with consequences which have been widely discussed in America for the last twenty years.

Mr. and Mrs. Memorable have also been injured, because they entrusted their daughter to Ypsilanti and had reason to expect YU would protect her better. Furthermore, they give generously to YU’s academic program, which they believe in; now a potential scandal links their name with YU in an unfortunate way. And the libelous allegations on the list cast doubt on their success as parents.

The provost, dean, and director of academic computing at YU were also injured to the extent that their jobs or reputations rest on a misunderstanding of what happened with the listserv. What happened was locker-room talk which took place in a virtual locker room: no more, no less. It had nothing at all to do with technology, although newish technology facilitated it.

Ypsilanti U itself was injured to the degree that it mishandled the people involved and failed to use this teachable moment. This kind of “crisis” is the perfect time to discuss again with students, faculty, and staff the mission of the University and its educational values; to examine ways in which members of the University can learn about the values and how they apply in different situations; and perhaps to revise the policies which are taken when one member treats another badly. The immediate consequences may be loss of lots of money and momentary bad publicity, and these are bad; however, it would be a serious mistake for YU to act primarily for its short-term gain.

What is a good outcome?

Let’s imagine a good outcome of the Ypsilanti situation, rather than a usual outcome. A good outcome has these characteristics: (1) it fits in with, if not furthers, the educational values of YU; (2) it goes beyond a sterile adherence to any policies or recommendations of University lawyers (remember that law alone is inadequate to deal with these kinds of issues); (3) it comforts the wounded; (4) it satisfactorily addresses the immediate situation; and (5) it works to prevent or retard future occurrences by writing new or strengthening existing policies and by educating students, faculty, staff, and administration.

Before anything else happens, Mr. Memorable’s letter and Mary Lou’s feelings have to be acknowledged in some way. All too often, a complaint is handled well in every way except acknowledgment of and sympathy with the injury, leaving the injured party to feel badly treated in spite of all. Someone has to talk to or write to Mr. Memorable to say the letter was received and that investigations are under way. But it has to be done carefully, possibly after consulting with the University Counsel so the institution doesn’t make itself liable.

A word of caution: YU needs to walk a fine line here, because too much fear of potential legal action will cause the institution to appear unsympathetic. If the only tool you have is a hammer, everything looks like a nail; in the same way, if the only opinion you seek is a legal one, every action (even the humane one) appears to be the basis of a lawsuit. Maybe the persons at YU who have worked with Mr. Memorable about the gift to the library can advise the provost if Memorable is the litigious kind.

YU should worry more about failing to do what is ethically correct than about being sued. Too often in our litigious society decision-makers abdicate responsibility to lawyers, even when situations are better handled in a non-legal way.

Someone, perhaps the dean of students, should talk to Mary Lou about her feelings and recommend some sessions with the University counseling service, if that would be useful.

Now that the wounded have been acknowledged and first aid started, some investigation is necessary. Washington has already satisfied himself that the football players were discussing Mary Lou on the list. He should also check that he has a copy of the document Tough approved when the list was set up. What he and Provost Mossback now have to do is review existing policies, including the computer policy, to see if they cover this situation. If time permits, Mossback should call a meeting of people charged with revising or enforcing such policies and ask them to say how existing policies do or could cover the players’ actions.

Here we have two possibilities: either existing policies cover this situation and it can be handled in a “regular” way, or they don’t. Even policies that do not explicitly mention computer networks may be interpreted to cover the situation, if the focus is on the behavior, not its method of delivery.

If existing policies do cover the situation, Washington and Mossback can turn over the case to the appropriate body (such as a judicial board) for disposition. Washington should send a member of his staff to the meetings of this body to explain how a listserv works (in particular, how it’s an electronic version of a locker room conversation).
If the situation isn’t covered by existing policies, YU has three major tasks: to handle the immediate situation, to make sure any future similar situations are covered by policies, and to educate students, faculty, and staff about the policies and their relationship to YU’s educational values. Now YU, probably in the person of the provost or some group he assigns this to, must decide how such behavior should be handled and by whom. If the small group on University policies is meeting, they can suggest remedies and consequences.

Once a decision has been made on this, the provost should talk to Tough and explain his responsibilities. Tough’s “contract” with Academic Computing forms part of the paperwork for this meeting. One of the sanctions should be a note in Tough’s personnel jacket. Ideally, the other sanctions are the same as they would be if the players did the same thing without using the electronic list.

The provost can now meet with the team members, in Tough’s presence, to explain what is wrong and what the consequences are going to be. Note that in all this, Mary Lou’s actual actions are irrelevant. The players may try to excuse themselves by saying they just told the truth about her. Even if the content of the list discussions of Mary Lou’s behavior is accurate, using University resources to discuss the situation is off limits.

Following these meetings, but not by too many days, are a series of actions which fall into the “prevention” category:

• Revise existing policies to cover misbehavior concerning computers and computer networks. Here, the computer policy may be folded into existing policies, or at least all policies should be made consistent.

• Schedule a series of meetings through regular sources (i.e., in the dorms, through the student government, sororities and fraternities, faculty meetings, dean’s council, and so forth) to review the revised policies and notify students, faculty, and staff of their responsibilities toward others. Use the campus newspapers and newsletters for more notification.

• Develop a written policy for owners of YU-sponsored lists, so they understand what they have agreed to as owners. Consider requiring list owners to regularly monitor list activities.

When these actions have been taken or planned, the provost should notify the Memorables what the resolution is going to be. Again, YU’s lawyers probably have to be involved, because both liability and privacy rights may be at issue. At a minimum, the Memorables ought to be told of the various activities undertaken, even if they aren’t told all the details.

In the ideal resolution, Mr. Memorable, in addition to being a doting father, is a man of the world and accepts YU’s response to his complaint as appropriate, acceptable, and one that helps all parties learn about themselves and their roles in a community. From YU’s perspective, the resolution is one that furthers its mission and principles, educates its community about the responsibilities of those who use and sponsor listservs, and establishes a framework and precedent for addressing such issues in the future. It is the best that can come from a regrettable incident.

Telecomm Act...

(continued from page 5)

temporary order restraining the government from enforcing the Communications Decency Act (CDA) provisions of the telecomm bill in response to a suit filed by the ACLU and nineteen co-plaintiffs.

In the Congress, Senators Leahy and Feingold have introduced a bill to repeal the CDA. The constitutional struggle over the indecency provisions of the bill will take center stage for some time. In addition to deciding how to deal with the constitutional challenge, the Justice Department is going to have to develop guidance for owners and operators of servers as to what “reasonable, effective, and appropriate” measures to avoid transmission or display of indecent content to minors actually means. The D.C.-based higher education associations are in the process of working with the university legal counsel organization and others to develop recommendations in the compliance area.

In a recent conversation with a campus CIO, I was reminded that a well formulated policy on permitted uses of university computing and information resources, including Internet access, is necessary for more reasons than complying with a law that may be struck down. As the network becomes more pervasive in teaching, research, administration, and public service, there is a need to ensure that activities such as theft, fraud, plagiarism, sexual harassment, and invasion of privacy—to name a few—are no less sanctioned in the Internet environment than they are off line.

The foregoing comments are not meant to be exhaustive, and in particular do not deal adequately with the wide diversity of individual circumstances within the higher education community. The new telecommunications bill provides a range of opportunities for every school to one degree or another. The challenge for each of us is to seize them.
The Standing Meeting

by David L. Smallen

As our environments become more distributed and team-based, how can we foster staff “togetherness” and a more coordinated approach to delivering information services? At Hamilton College, the “standing meeting” has become a “standing” management practice that has helped to meet these challenges.

Providing excellent information services has become an increasingly team-oriented activity—little can be accomplished by individuals operating in isolation. Rather, providing excellent services requires the coordinated efforts of many individuals, each contributing his or her particular expertise, talents, and perspectives. Teams change from day to day, and providing mechanisms so that these team members can maintain contact is a challenge. Even in small organizations, once the day begins everyone scatters around the campus, and maintaining contact, even electronically, becomes problematic. Also, individuals are often physically separated from each other, perhaps as a result of moving support personnel closer to the users, or due to a scarcity of appropriate office space, or because formerly separate organizations have been consolidated but not co-located. Whatever the reason, there needs to be a mechanism for keeping the entire organization moving in the same direction on a regular, consistent basis and facilitating team work. Part of a solution can be the “standing” meeting. This is a technique that I, and other colleagues who have tried it, have found to be an amazingly simple and effective means of building organizational cohesion and improving the delivery of services. Any organization—small or large—can do this!

At Hamilton College, there are fourteen individuals who are collectively responsible for providing computing, telephone, networking, and institutional research services to the college community. Each morning at 8:45 our entire organization gets together for a meeting that generally lasts from five to fifteen minutes. The three main purposes of the meeting are: (1) to provide anyone with an opportunity to make an announcement, particularly about something that might affect others in the organization, (2) to enable any team of individuals to get together (generally right after the meeting) to plan the delivery of some service, and (3) to allow everyone to see one another at least once during each day.

Announcements do not have to be profound or earth-shaking. Some recent examples included: computers were to be installed in a particular department that day; the power was off for a period of time over the weekend and everyone should be aware that people who forgot to reset their surge suppressors will be calling in with “computer” problems; or that the latest survey about the help-desk services was very positive. Announcing who is on vacation, or sick that day, is something that we do every day.

Interestingly—and especially if this technique is used every day—there are many times in which there are few announcements. I sometimes have to prod people to announce something that they know, and that I think might be important to the group. Some of this reticence to speak comes from personality dynamics, which are always interesting to observe and which often change over time. Nevertheless, the most consistent value of the morning meeting is getting everyone in one room so they can find each other. Once the day begins, they scatter to their various responsibilities around the campus.

Some tips for success

Make sure the meeting is short. One way to accomplish this is to conduct the meeting in a place where all or most people have to stand (hence the origin of the term “standing” meeting). This reinforces the notion that this is not a meeting in which to relax or get comfortable, but rather to get geared up for the day.

Encourage brief announcements rather than long pronouncements. Don’t use this meeting to do strategic planning. If someone begins to go into great detail, suggest that he e-mail everyone, or arrange for another meeting time. This provides practice for everyone in organizing their thoughts in a concise manner—something that is valuable professional development.

Encourage announcements that bring insight into services being provided, especially ones that will help others in the organization understand a service area that they are not generally involved
For Successful Standing Meetings:

✓ Make sure the meeting is short
✓ Encourage brief announcements
✓ Encourage announcements related to services
✓ Don’t worry if there aren’t always substantive announcements
✓ Use the meetings to recognize birthdays and other special events
✓ Hold the meeting regardless of who can attend
✓ Schedule the meeting at the beginning of the day

Just when I was ready to despair, and considered dropping the whole idea, my staff pointed out that I was missing the most important part of the meeting for them—namely the opportunity to get together, get to know each other, and plan the delivery of services.

Use the standing meeting to recognize birthdays and other special events. We have a cake for each person’s birthday, and the standing meeting provides a reminder that the birthday person has to cut the cake before others can eat. However, the morning meeting shouldn’t be a substitute for a party at other times.

Hold the meeting regardless of who can make it. Vacations, illness, etc., will mean that not everyone can attend every meeting. The value of the meeting is for those who can attend. Knowing that this meeting will take place makes it possible for members of the organization to plan to get together each day.

Schedule the meeting at the beginning of the day, before everyone on campus begins to request services. Regular activities should not conflict with this meeting. This is an important activity for members of the organization, and it should be possible for them to attend almost all the time.

Variations on a theme

Colleagues who have tried this technique at other institutions have reported a very positive reaction by their staffs. Each site has modified the technique in some way, usually in the frequency in which the meeting takes place. Regardless of the exact implementation method, providing regular opportunities for all members of the organization to get together encourages teamwork, and teamwork is central to delivering excellent services.

Stampeding...

(continued from page 42)

had lines for my name, address, and other demographic information. It indicated that permission was being given for Dr. (left blank) to release the following information (left blank) to the following recipients (left blank). The waiting room was filled with anxious people; each one signed the form without questioning the procedure ... with one exception.

Personal information is increasingly becoming a commodity, a thing which benefits not only the person to whom the information refers, but also those who seek to use that information. Indeed, in this information age, personal information is becoming a commercial commodity from which a second entity can make a profit. Consent, therefore, must be given knowledgeably and with full understanding, not under duress in an unbalanced power relationship, or in ignorance of its implications. The importance of this act of giving consent must be endorsed and supported by universities and colleges as we travel the EDI trail.

Some administrators have already indicated that following this trail may take precedence over fulfilling the letter, or even the intent, of their responsibilities at this time. This would indeed be a loss, for higher education has the opportunity to lead the way, to set the pace, and determine the direction in the electronic handling of student, faculty, and staff personal data. We need to ask what is driving this stampede at this time, and we need to determine how to influence the movement both in destination and route.

Conclusion

University and college administrators will need to confirm their own purpose and direction in the stampede to electronic data interchange. They will need to stay the course, avoiding the enticements of secondary and inappropriate uses of data. They will surely seek to fulfill the responsibilities of their roles according to law, standards, and policies and do so in the face of technology that may only partially fit their needs. Insisting that they keep to the highest ethical ground, empowering individuals over institutions or corporations, and maintaining the trust of their communities, will be the surest route to success.
Partnering with a Vendor to Prototype a Data Warehouse in Ninety Days

by Robert G. May and Teresa Stankiewicz

Many organizations have strong motivation to weigh the benefits of a data warehouse against the investments required to build it. The University of Texas College of Business Administration/Graduate School of Business partnered with a vendor to develop a data warehouse within a ninety-day window to overcome the investment barrier by testing the value of data warehousing with a real program.

Unless specific measures have been taken to enable additional functionality, most campus legacy mainframe systems are being used for operational purposes. They are transaction-based and commonly rely on hierarchical databases. These systems are still functioning effectively for their original purposes. But times change, as do our work requirements and expectations of the computing tools we use. If, for example, you want to prepare a report on how data have changed over time and must query a production system with a hierarchical database for this information, you are likely to find this new task a challenge.

Besides the fact that such a query usually must be performed by and accommodated into the workload of the central data processing staff, it is also the case that many legacy systems keep only current data, which makes it difficult to perform ad hoc queries for purposes of analysis and comparison.

To change this picture, many campuses are turning to a data warehouse solution. It is one new technology that the computer services unit within the College of Business Administration/Graduate School of Business (CBA/GSB) at the University of Texas explored last year. Computer Services envisioned that the data warehouse concept would enhance administrators’ effectiveness and ability to manage their areas of responsibility proactively, with the goal of working within their familiar microcomputing environment for such ad hoc queries.

A tangible need to fill, yet a leap of faith to develop

Our Educational Resources Data Warehouse (ERDW) project began last April, when the vendor [Software AG] who had created the database and extract languages used with the University’s mainframe approached us with the idea of accomplishing a working data warehouse. The proposal was to install a client/server system and model, on a limited scale, with genuinely useful capabilities, as the precursor of a new, comprehensive system—all in a ninety-day burst of work that would limit our investments of time and money and enable us to readily evaluate the potential of the solution. Quality metrics collected during the project were used to validate the usefulness and effectiveness of the data warehouse.

Our prototype ERDW encompassed the CBA/GSB need to support future course and instructor scheduling activities. From meetings facilitated by our vendor and interviews with executives and administrators, we designed the prototype with an efficient interface to the warehouse and the software tools administrators would need as they schedule “resources” (courses, classes, and instructors) to resolve scheduling conflicts and obtain historical information for trend analysis on class enrollment and faculty evaluations.

Even a test project of this nature required a high level of interdepartmental collaboration and cooperation, starting with evaluating the data being captured and maintained. The University’s data processing department keeps the course, instructor, and student data on the mainframe. The DP department served as consultants to the project and provided the staff member to administer the new database. DP also assumed responsibility for supporting the new client/server operating system and hardware underpinning the ERDW. The prototype was work-
En route solutions

As with any proposal for data warehousing, the time required for downloading data from the mainframe to the server was an early concern. In Phase 1, the prototype contains over 375,000 records, using 200 MB disk storage. However, the issue of data transfer performance, which can potentially prevent “refreshing” the data warehouse in a timely fashion, proved not to be a concern in Phase 1 and subsequent phases, due to the particular design for the data warehouse. Our first experiences at downloading data from the mainframe (daily during student registration and at several other scheduled times) proved the ERDW concept was indeed feasible. Server performance was such that we quickly dispelled concerns over data transfer feasibility.

We were also very interested in ensuring fast query response times for users. When we saw response times from the ERDW were matters of seconds rather than days—due to a combination of hardware performance and design of the application itself—we were confident enough to move ahead with subsequent phases and expand the ERDW project by adding still more functionalities and quickly making it available to other colleges.

Benefits earned, lessons learned

Computer Services analysts and developers worked from a very detailed, methodical approach supplied by our vendor's consultants. The outside perspective proved invaluable in applying numerous best practices for successful transitions such as basic project preparations, business drivers and needs identification, model definition and refinement, prototype development and incremental refinement, hardware/software infrastructure construction, procedures for operations, and user training and ERDW support planning. Key to these results was the teamwork between Computer Services, Data Processing, and vendor personnel; we proved to skeptics that it was possible to meet our goal of building a working data warehouse in ninety days.

One of the very first real uses of the ERDW is to support faculty review and analysis of student evaluations of teaching performance in the CBA. Preparation for evaluation meetings using the ERDW is far simpler now than in the past, and can be accomplished in a handful of steps. These steps can then be saved as a macro and icon, so the entire process can be repeated in the future in just one step by clicking on the icon that represents that query.

Those reviewing these reports will have as-

Freeing Resources

...the impact of these efficiencies has been enormous, and the benefits have been enjoyed just three months after the start of the project.

Transaction data, which continue to be stored on the University mainframe in ADABAS C, are periodically transformed into business information and loaded into the ERDW—an ADABAS D relational database running on a separate application server (Hewlett-Packard Model 817 UNIX). This client/server environment, which will contain three to five years worth of historical data, is something that CBA/GSB administrators can freely access from client microcomputers in their offices. They use the query tool Esperant to readily access and extract information and import it directly into Excel, Lotus 1-2-3, QuattroPro, or Esperant as they construct their graphs, reports, slides, or other documents.

This is the improvement we had been looking for.

Justifying Investments

The ERDW provides a preview for administrators of important functionality and benefits:

- Timely checks for class scheduling conflicts (required classes offered at conflicting times and instructors with too many assignments on one day).
- An early warning system for instructors lacking TLCs (required teaching load credits for state-funded instructors receiving state-funded salaries).
- Performance reports (analysis permits evaluation of the College's performance of educational services for students, including comparison of instructor evaluations, class size, cost per student per credit hour, and so forth).
- Educational resource measures (analysis of how well the college is utilizing its teaching "resources").
- Queries of historical data for comparative purposes.

The system answers queries with previously unobtainable data that ultimately help our administrators picture the dynamics of the University educational setting and courses, and make better scheduling decisions.

“...the impact of these efficiencies has been enormous, and the benefits have been enjoyed just three months after the start of the project.”
surance that the presentation accurately reflects trends in a real-time fashion. For example, previously run reports—such as those that reveal student satisfaction with CBA/GSB and student ratings of teaching performance—can be compared to current results to track the school’s trajectory toward its goal of consistently high satisfaction. This kind of analysis and reporting is important, because faculty rewards and tenure are tied to merit and demonstrated performance. Furthermore, news that can be readily understood, in pie-chart form for example, is ideally suitable for public dissemination via student and alumni newsletters, the local news media, and so forth.

Another representative use of the ERDW is helping to take the once-a-semester frustration out of course planning. As departments construct schedules of courses, the dean’s office must evaluate the entire schedule. A review by the dean’s office assures students that they will not find required classes offered by the different departments scheduled at conflicting times. Previously, these conflicts were identified and resolved by a tedious manual process that involved office staff posting notes for each class to the office wall and checking for same-day, same-time conflicts. This process is now completed quickly and accurately using the new system.

Early results like these demonstrate the value of continuing our investment in the data warehouse concept and additional phases of implementation. As one of the next steps, we will again collaborate with administrators, who have now become familiar with the potential of the ERDW, in order to develop pre-built objects that will handle as much as 75 percent of most administrators’ querying needs and greatly increase the convenience of the system. The balance of ad hoc queries will be done by users themselves using the query tools. In Phase 2, we will add to the library of queries and bring in all relevant student data, followed by the addition of financial data in Phase 3.

Conclusion

One of the key lessons learned is that the system should be designed in such a way that it can be expanded or enhanced later in increments. In addition, the vendor’s commitment at the very beginning of the process is an important key to a successful, ninety-day launching. We were gratified that our software vendor shared our commitment to spending the time necessary to clearly research and understand the University’s needs before beginning to devise new hardware/software recommendations. Following a standard but flexible approach thereafter enabled us to consistently meet project milestones and the ninety-day completion target. The collaborative approach and focus on the original goals, phase by phase, helped us avoid distractions that can easily sabotage projects of this nature.

The authors would like to thank Sara Gill, Lead Systems Analyst for the CBA/GSB Computer Services, who was team leader for the ERDW project.  

Electronic Messenger...

(continued from page 43)

However, increased levels of protection of information is analogous to protection of your home. It’s a balance, an attempt to find an appropriate comfort level. Using bars on your home windows (like using high level/complex encryption algorithms on data transmission) provides security, but limits the number and types of communication exchanges. Institutions will make determinations as to their comfort level with new technology just as they currently do with phone, e-mail, FAX, etc. The greatest threats to privacy/confidentiality are similar to the greatest threats to security of any correspondence or information. That is, the greatest threat is not in the transmission or interception of the information/correspondence, but rather with the particular level of integrity and commitment of staff in the originating and receiving offices.

Unfortunately, some people are demanding that new and emerging technology interpret and establish new and more expansive policies and procedures surrounding privacy and confidentiality. We seem to be ready to hold technology hostage while we try to come to consensus on matters of privacy and confidentiality. The application of technology within privacy and confidentiality context is somewhat analogous to writing instructions for the computer: It will do your bidding; you only need be clear as to what exactly it is that you think you’re asking for.

Educational institutions, quite often in the locus of the Registrar’s Office, have routinely made decisions and evaluations regarding the collection, maintenance, and release of information within the context of privacy and confidentiality. New and emerging technology, particularly EDI, does not change the way we’ve been “doing business” for the past twenty years. As long as the stewards of protected information continue to act in their heretofore responsible manner, new and emerging technology should be considered an opportunity and not a threat.
“...the goal of the Management Master Series— to provide concise ... information on today’s best management practices— is laudable, and one about which a beleaguered IT manager could truly become enthused.”

**Management Master Series**
William F. Christopher, Editor-in-Chief
(Productivity Press, $13.95 each volume)

Reviewed by Howard W. Bell, Jr.

Being the head of a campus information technology organization is one of the more challenging positions in higher education. Not only must we be leaders of our own organizations, we must also work with the other members of senior management to transform our institutions to meet the many challenges and changes confronting them. For this reason, the goal of the Management Master Series— to provide concise leading-edge information on today’s best management practices— is laudable, and one about which a beleaguered IT manager could truly become enthused.

Written by prominent authorities in their respective fields, each volume (kept to about fifty pages) is designed to deal with a single topic of importance to managers in today’s fast-paced and changing environment. Eventually this project will create a comprehensive library of over 100 brief, easy to read, and affordable books about management tools. I found four of the first six books in the series particularly relevant and worth recommending to my colleagues.

**Management Alert: Don’t Reform— Transform!**
by Michael J. Kami
53 pages, ISBN 1-56327-064-1

According to Kami, in “today’s fast-changing world, CEO’s and their executive teams must change their ways, adapt faster, act differently, and perform better.” Managers and employees at all levels “must also undergo a revolution through new organization, better training, and broader empowerment.” The author provides a number of helpful hints on strategies that top management can take to begin transforming their organization. While the book is targeted towards an organization’s CEO, I felt that it provided a good background piece on the challenges facing all members of an institution’s top management team.

**Vision, Mission, Total Quality: Leadership Tools for Turbulent Times.**
by William F. Christopher

Christopher’s thesis is that total quality should be the ultimate goal of every organization. He defines vision as “a short statement” that should be used as your institution’s “guiding light,” and states that proper use of an organization’s vision and mission can both focus the institution and unite its employees towards attaining total quality. “Vision,” he says, “sets the direction for the future.” While his definition of an organization’s vision is fairly standard, his description of mission is more extensive than those I am used to seeing. I found this volume to be a useful general description of sound principles for helping the management of an organization achieve and maintain excellence in a changing world.

**The Power of Strategic Partnering**
by Eberhard E. Scheuing

Scheuing takes the position that “no organization, no matter what the size, can go it alone anymore.” According to this author, there are so many internal and external forces beyond an organization’s control that the only way to survive in today’s global marketplace is by partnering. More specifically, the author proposes that an organization form a series of strategic alliances with other companies in a way that builds upon each other’s strengths and compensates for each other’s weaknesses.

While I do not know if any of the author’s proposals will work for higher education institutions in general, and public higher education institutions in particular, I do plan to recommend this book to both the head of purchasing and some of my fellow officers to see whether the author’s proposals may in fact offer us a strategy worth pursuing.

**Motivating Superior Performance**
by Saul W. Gellerman

According to Gellerman, “money is seldom the most effective motivator [because] to get the most effective results, you have to know how to use it wisely.” Fortunately, the author does not stop with a description of what does not work, but goes on to both ask and answer the question, “If money doesn’t work, what does?” Gellerman offers specific guidelines on what does and doesn’t motivate individuals and groups in both unionized and non-unionized environments. I found this book to be a useful guide that managers of all types can use to get more from both their employees and themselves.

Each of the books in this series can be read in about an hour and is well written and informative. I believe that this series of books is, on the whole, well worth reading.

Reviewer Howard W. Bell, Jr., is Vice President for Administrative Services and Information Technologies at the University of Cincinnati. He has been involved in Total Quality efforts at his university for over eight years.
Transforming the Mature Information Technology Organization: Reenergizing and Motivating People

by Robert A. Zawacki, Carol A. Norman, Paul A. Zawacki, and Paul D. Applegate

Reviewed by Mark Sheehan

A mid all the talk about total quality management, business process reengineering, downsizing, rightsizing, and transformation, we’ve heard relatively little useful information about the impact of change on human behavior and the role of that behavior in effecting change. In their new book, Transforming the Mature Information Technology Organization: Reenergizing and Motivating People, University of Colorado business professor emeritus Robert Zawacki and associates have made a good attempt at filling that gap.

Anyone who’s gone through an organizational transformation understands that the fallout in human terms can be severe. Some employees find it easy to adapt to self-directed work teams, for example, while others find the sudden empowerment paralyzing or find the lack of hierarchical guidance leaves them feeling directionless. These problems are compounded, the authors point out, when key stakeholders in upper level information technology management think of transformation as a one-step process and walk away from it after unilaterally declaring victory. “The error many IT leaders made in the 1990s,” they suggest, “… was that … they put more effort into planning than they did into implementation and followup.”

Zawacki et al. lay out a humane change management process for transformation in IT organizations. It begins with securing the buy-in of staff and management on a profound change in approach, securing an agreement to principles—values and goals—that all parties can believe in. It goes on to identify “Core Job Dimensions” that provide motivation for the affected employees. It evaluates the nature of the newly defined roles and matches people to them by considering the needs of each individual for technical challenge, a sense of productivity, and social interaction. And it proposes (and provides) a number of tools for assessing the human impact of change, appraising the effectiveness of employees’ work in new situations, and extracting essential feedback from employees and customers.

One of the most appealing and encouraging recent visions of the future IT workplace is the “learning organization,” in which change is recognized as a constant, lifetime learning is emphasized, and organizational roles and relationships are free to evolve in response to a fluid environment. If ever a business model applied to IT in higher education, this is it! The authors purvey a special brand of learning organization, which they call the “STAR organization.” While soft-pedalled in their book, the STAR model provides a firm basis for any higher education IT organization wishing to adapt itself to the demands of the coming century.

One caveat: this book is privately published and it appears that the authors may have taken a few editorial shortcuts in getting it to press. If you’re distracted by errors in spelling, grammar, and syntax, you may find it hard to concentrate on the book’s message. You’ll scratch your head a few times as you work through some of the more tangled sentences, but overall you’ll find the effort worthwhile.

Reviewer Mark Sheehan is Senior Manager, University Computing Services, Indiana University, and a member of the CAUSE Current Issues Committee.

NetLaw—Your Rights in the Online World: The Guidebook to the Changing Legal Frontier

by Lance Rose

Reviewed by Kenneth D. Crews

A uthor Lance Rose has committed the most extraordinary feat: he has written a book that is a clear exposition of the law relevant to online systems, and that demonstrates a technical and lucid grasp of the implications of online communication. In a series of chapters that encompass censorship, contracts, copyright, and privacy, Rose demonstrates that existing law for traditional transactions may not fit perfectly to the needs of the online world, but established principles and doctrines can apply without complete overhaul. He successfully and eloquently bridges the gap between the earthly “physical world” and cyberspace. Most of Rose’s attention throughout this book is on the management of the online world from the perspective of a system operator, who is providing the facilities and connections that enable groups of people to locate and communicate with one another. The author frequently keeps his attention on the responsibilities, rights, and potential legal liabilities of system operators as users employ the systems to transmit
pornography, libel friends and strangers, and conduct their business transactions.

The book is technical without needless detail. It has sophistication without condescension. It carries a positive tone of advice and caution without planting fear and unwarranted threats of liability. Overall, Rose explores concepts such as torts, privacy, and searches and seizures, and he consistently leads the reader to a clear understanding of the author’s recommendations for developing workable online systems while avoiding the clear pitfalls and needless liabilities.

As with all legal analyses, one must scrutinize their source. Mr. Rose’s perspective is neither detrimental nor hazardous, but his preferences and predilections are apparent. His biographical sketch published in the book tells that he is an attorney in private practice in Montclair, New Jersey, and “works with many kinds of businesses in the online world ....” His chapter on contracts has a lawyer’s preference for elaborate advanced plans for online transactions in order to anticipate and prevent legal problems before they occur. Rose also demonstrates a strong belief in the social need for rigorous protection of free speech, but he advocates strict protection of copyrights and the right of individuals to pursue private claims in tort or for the protection of property. In his extrapolation of traditional doctrine to the online world he also occasionally asserts the need to rely on “common sense.” Such simple advice may be easy for an attorney to expound, but it is nevertheless a comforting affirmation that while readers should exercise appropriate caution about legal dilemmas, they should not be intimidated either by spurious threats or by the lack of clear law.

This book is generally well written, although it is at times redundant and includes a hodgepodge of confused pronouns. Yet the substantive strengths make such foibles forgivable. Rose also brings pleasure and humor to his writing. Even readers not interested in analyzing legal issues will enjoy browsing this book’s many sidebars and boxes to explore the author’s thinking about cyberspace as a “singles bar” or his good summaries of actual legal challenges that have haunted college students and monumental corporations alike.

NetLaw is an excellent addition to anyone’s personal and professional library of reading related not only to the law but also to the management and utilization of online communication systems. The text includes general principles of advice from which systems managers may begin development of operative policies, and the appendices include model contracts for some fundamental transactions. The balance of sophistication, practical advice, and good reading make this book a bargain.

Reviewer Kenneth D. Crews is Associate Professor of Law and of Library and Information Science and Director of the Copyright Management Center at Indiana University-Purdue University at Indianapolis. Crews specializes in copyright issues as they relate to higher education, and has spoken on copyright matters at numerous colleges, universities, and professional conferences.
At Hamilton College, the Web effort is managed by a committee with representatives from Admission, Publications, Alumni Affairs, Academic Affairs, Student Affairs, the Library, and Information Technology Services. The committee makes policy decisions. Each division (button) on the main home page has a coordinator who is responsible for implementing the guidelines in that particular division.

The committee has developed general and technical guidelines for those interested in being part of the institutional Web effort. These guidelines, along with an overview of the Hamilton Web effort, can be found at [http://www.hamilton.edu/html/help/](http://www.hamilton.edu/html/help/).

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University of Saskatchewan is in policy development now, but our major emphasis will be on looking to existing institutional policies (i.e., sexual harassment, intellectual property, copyright, etc.) and making certain the language is inclusive of electronic activity. We’ll keep a close eye on what happens in the courts, though that may not end up being “good enough” in liability situations.

The University has established a management plan, after study by a steering group and subcommittees that investigated issues related to technical assessment, training/support, policy development/administrative “home,” and “look and feel”/graphics. This plan recommends that Computing Services and Public Relations share Webmaster responsibility, with a person in each area designated—on the CS side as technical advisor, on the PR side as content advisor.

Additionally, recommendations called for:

- establishment of a “Web team” of front-line experts in audio-visual services/multimedia, information systems, computing services, and public relations to contribute to coordination of services and implementation of a management plan of activities;
- creation of an “Information Provider’s Group” on campus for sharing information and conducting professional development to support the activities of those around campus responsible for creating/maintaining Web pages;
- prioritization of key general projects for the institutional pages (i.e., admissions forms, campus map, phone directory) and an implementation support strategy;
- a public relations/promotion/launch strategy from now until an official “launch” in September 1996.

Our experience has been that we will need to develop full-time positions to support this vast and ever-changing communication vehicle. Our site currently has about 1 million connections/month and contains the equivalent of more than 56,000 pages. (For an FAQ sheet on our site and demographics of our users from a recent survey, please e-mail me.)

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At Northern Arizona University, we are in the long and rather painful process of getting a set of policies and guidelines approved for “high profile” University pages. Student, staff, and faculty have space to create personal or class-related home pages. Our ethics statement requires that they hold to state, federal, and local laws as well as abide by the student handbook and other University codes of conduct. We review these pages from time to time and alert people of problems—the most common being copyright violations.

The “high profile” pages include the main NAU Web page and the links to departmental and college pages. The current proposal is to require certain common elements on the first entry page, including the NAU logo, a date, a link to the main NAU page, and an e-mail address of who’s responsible for the page. The content of these pages is the responsibility of the appropriate administrator for the unit (dean, director, etc.).

Recommended guidelines have been proposed to address style and technical issues, and it has been suggested that various units take an active role in constantly reviewing “high profile” pages in order to identify problems (content, visual identity, style, technical). These policies have not yet been approved—so this paragraph reflects our current thinking but not an actual adopted policy.

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Lewis & Clark College created a grass roots committee last year to deal with issues surrounding the World Wide Web. The committee consists of myself, our Web administrator, a student representative, the directors of Publications and Public Relations, representatives from the Alumni Office and the Graduate School, the associate dean of the Law School and associate director of the Law Library, and a representative from Admissions.

The first self-charged activity was an update of our Responsible Use Policy. We purposely

NOTE: We received more responses to this question than we are able to publish here. A text file including all responses is available by sending e-mail to search@cause.colorado.edu including the two-word message: get cem961readers.

In addition to the summarized policies and URLs printed here, we also received a number of policies too lengthy to include in print. These may be accessed on the “policy” page on the CAUSE Web server under ISSUES [http://causewww.colorado.edu/issues/policy.html](http://causewww.colorado.edu/issues/policy.html). CAUSE welcomes additions to this collection. You may send your policies or policy URLs to Jane Ryland (jryland@cause.colorado.edu).
chose a policy that did not go very far into specifically prohibited items, but focused on a distinction between “primary” and “secondary” activities and that covered all technology resources from telephone and data networks (from office, dorm, and dial-in) to staff consulting time.

Primary activities are defined as using the available technology “... primarily as tools for enhancing and facilitating teaching, learning, and scholarly research...” Secondary activities are defined as any other use.

The policy then goes on to state, “Should such secondary activities in any way interfere with primary activities, they may be terminated immediately...” This gives us a mechanism to cope with issues such as someone viewing nudes for an art class (considered “primary”) vs. someone looking at Playboy on the Net.

Of course, having a policy worded the way we have chosen also means that we will not have to rewrite it every time some new technology arises, or new laws are passed.

"... having a policy worded the way we have chosen also means that we will not have to rewrite it every time some new technology arises, or new laws are passed."

You can see the complete policy at http://www.lclark.edu/GENERAL/WEB/POLICY/use.html

Our committee is also responsible for overseeing “official” pages and creating the flow and look of our site. Students, faculty, staff, and departments may create their own pages. Each department has an “official” page maintained by the committee that can point to their own departmental page.

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Philadelphia College of Pharmacy and Science has a brand-new homepage, but even so we have found it necessary to have the following policies:

The library is in charge of designing and mounting the home page; we do not write ANY text other than what refers to the library. Any unit on campus may have information on it, but those in the unit write the text and supply it to us in machine-readable form. Faculty who want to create their own home pages may have a link on our home page, so long as it is curriculum-oriented.

Mignon Adams
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At Presbyterian College we are discussing policies, but for now we have only two things in place:

(1) an “exit sign” from our official Web server. We use this to link from the campus directory to personal pages (for an example, look at http://www.presby.edu/cgi-bin/php.pl/).

(2) a standard “responsibility statement” which should be linked on every personal home page. It is available at http://cs1.presby.edu/rs.html

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The University of Toronto is currently developing a policy for the WWW. It is very much under construction but will be ready in the not-too-distant future. I will forward a copy to you when it gets the seal of approval.

We also have a homepage-coordination committee consisting of representatives from Admissions, Student Affairs, Public Affairs, Computing and Networking Services, the Library system, Engineering, Financial Information Systems, and the Provost’s Office which is looking at improving the composition of our Web site. We are aiming to finish construction by April. However, with the speed at which the WWW is evolving, this might become an ongoing process!

This committee will continue to deal with matters relating to the Web at U of T until all the bugs are ironed out and resources have been dedicated to its maintenance and development.

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University of Missouri-Columbia’s Web policy:

Documents on the World Wide Web are being recognized as publications of the University. The Chancellor has asked that Web publication guidelines be established. Almost simultaneously the Health Sciences Center (HSC) at MU has created a Web Team to manage publishing and marketing issues. A draft document currently in circulation from the Chancellor’s office suggests policies that for the most part parallel those for print publications, but with additional consideration for the broad reach of the Web and for the ease with which changes occur. The policies are divided into three categories: general Web pages, departmental pages, and personal pages.

General guidelines for MU’s Web pages are:

• That MU as an institution be represented accurately, with high-quality, current, and pertinent information in keeping with and promoting MU’s mission in teaching, research, and service. The URL for a library of electronic images that can be used in MU Web publications is provided.

• That Web authors abide by all current copyright and patent laws.
Guidelines for Departmental Home Pages are:

- That publications on the Web are subject to the University's communications and public information policies.
- That all department or unit Web pages should be authorized and reviewed through appropriate channels; and that the name and e-mail address of the individual who maintains the Web page, date of the information, and copyright notice be placed on the page.

Guidelines for Personal Web Pages are:

- That personal pages of MU faculty, staff, and students are the sole responsibility of the individual page author.
- That the resources must be used as per University policy (URL of University policy is provided).
- That the personal page must include a disclaimer stating that the page does not reflect an official position of the University.

Finally, a URL is provided that contains aids for local Web authors.

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Oregon State University's Web policy? It is unofficial and evolving. A campus Web Advisory Group, appointed by the head of Information Services, began structuring the central Web (http://www.orst.edu) in late 1994.

One of the first decisions was to represent the entire campus in the structure, using official information. News and Communications has designated a staff member to manage Web pages providing official information about the University. Other information is pulled from electronic versions of official documents, like the general catalog. Users get a broad view of OSU. Over 700 pages include at least a hyperlinked e-mail address for information. The new Web debuted last fall.

Oregon State is encouraging departments to set up sites that follow simple guidelines (http://www.orst.edu:80/aw/polpro/fivreq.htm). Creativity is welcomed.

Departments and student groups may put their sites on the central Web server. Individuals approved by their department heads or group advisors produce pages directly on the Web via accounts.

Many courses are being developed on department servers. Central instruction accounts are offered. An instruction server soon will be the location recommended for course development. Many policy issues are related to Web course offerings. Examples: copyright, curriculum wording. Watch “Courses on the Web” (http://www.orst.edu/fe/extedu/couvia) as we learn.

Staff and students may create personal pages in University-issued accounts. Their html directories are linked to the central Web by an nfs-mount, which allows the individuals with accounts on ucs.orst.edu to see their pages with a tilde (~) before their user name at www.orst.edu. To be listed in the personal page search index, staff and students ask to be linked. A student employee checks each request to be sure the home page was created by the applicant.

Advisors communicate with the Web working group to identify and solve policy issues. University and central computing policies are reviewed. Frequently, the Web issues are not yet addressed in OSU policy statements.

The Web Style and Help directory (http://www.orst.edu/aw.htm) documents the progress of Oregon State Web development.

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Yes, Williams College has WWW policies:

1. Only offices and departments already recognized by Williams College are eligible for links from the top of the College's page to any pages they maintain.
2. The chair or administrative officer of an office or department must agree to serve as "editor-in-chief" and must participate in a brief discussion about what that means (vis-à-vis copyright law and fair use exemptions).
3. An editor is responsible for conveying responsibilities to contributors to pages under his/her purview.
4. Individuals who wish to have their own pages referred to must either attend a "network responsibilities briefing" or sign a form assuming responsibility for adherence to law.

See http://www.williams.edu/www/www-proc.html, which delineates the above in more detail.

The Center for Computing at top levels is considered responsible for coordinating the site, though with exceptions as above.

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The primary locus for WWW responsibility at Duquesne University is within the Center for Communications and Information Technology, with the University's Public Affairs office also taking an active role. Support for central Web server is provided by the Institutional Technology group, while WWW training, consultation, and
assistance with page creation are provided by the Educational Technology group. Several schools and departments also run their own Web servers.

During early 1995, formal policies were established for making information available on the Duquesne Web. Mandatory elements have been established for "official university pages" and include items like standard headers, titles, graphics, and contact information. It is required by University administrative policy that before making any official University information available via the Web, the office providing the information must contact Public Affairs for document review and approval. The full text of the developer guide material can be viewed at the URL http://www.duq.edu/computer/devguide.html. 

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California State University, Northridge, recently adopted a number of policies concerning use of the Internet, including one specifically dealing with use of our campus World Wide Web site. This policy originated and developed in the Academic Computing Committee, and was subsequently adopted by the Faculty Senate and the President in 1995.

Its general purpose: "...to provide for some uniformity in public image and accountability for information presented in the name of the University, while supporting and encouraging creativity in the academic use of computing resources."

Primary stated policies governing Web use:

1. There will be only one California State University, Northridge Home Page. The University WWW home page will include references to home pages created and supported by campus schools, departments, and administrative areas.
2. The University WWW home page will be maintained by personnel from Information & Technology Resources' Networking & Computing Services area. A campus Webmaster will appointed by the Vice Provost/Information & Technology Resources to administer and maintain the University’s home page.
3. The University WWW home page may link to other departmental, organizational, and campus personal home pages and documents deemed appropriate by the University’s Webmaster. These sites are encouraged to use the University name and logo; should contain the name of the organization/individual responsible for the content and maintenance, and the date last updated.
4. Information offered by an entity identified with the University should be in "good taste" and accurate; personal opinions should be clearly labeled as such; and advertisements for personal gain are not allowed.
5. These policies should not be used to abridge academic freedom or constitutional guarantees of free speech.

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Florida State University has formed a committee to coordinate the structure and format of our home page as well as to establish standards for units' home pages linked to the "official" home page. Overall responsibility has been set with our publicity officer. This seems to be the trend.

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Southeastern Louisiana University's current efforts are to look at the various and varied Web pages created by departments and individuals around the campus and coordinate some standards. These pages show different levels of creativity and artistic flare, and since they in effect represent the University to the outside world, they should follow some common style and standard. Also, we are investigating to what extent the Web pages can serve as the basis for information kiosks around the campus. A campus committee has been chosen and has met to discuss the policies that should guide those engaged in Web page management.

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Summer 1996 Readers Respond Question

What is your campus doing regarding authentication of users accessing information resources on your network? If you are using PGP (Pretty Good Privacy) and/or Kerberos, to what extent are they solving real end-to-end problems for you today? What are your plans for the future?

Please send your response, along with your name, title, e-mail address, phone and fax numbers by electronic mail to eharris@cause.colorado.edu by fax to 303-440-0461, or by regular mail to Elizabeth Harris, CAUSE/EFFECT Managing Editor, CAUSE, Suite 302E, 4840 Pearl East Circle, Boulder, CO 80301.