

# *Untangling the World Wide Web*

*How Colleges and Universities Can Develop  
a Strategic Approach to the Internet*

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The Internet is the only tool in history that has given us the potential to literally be connected to every other person in the world. Yet 10 years ago, a relatively small number of faculty members and researchers knew about the Internet. Today, that electronic communications network connecting computers worldwide is used by almost every student, faculty, staff member, and at least half of college alumni, thanks to the World Wide Web (the graphical user interface that provides point-and-click access to the Internet.) The growth and acceptance of this tool into our professional and personal lives has been dramatic and unprecedented. The opportunities that the Internet and the World Wide Web offer for building communities and conducting business are seemingly endless.

The Internet will continue to become more ingrained in our daily lives as companies develop faster machines, more robust infrastructures, software with more bells and whistles, wireless connections, and a variety of devices such as PDAs, cell phones, refrigerators, and even toasters that connect to the Internet. The quickening pace of new developments and the continued financial pressure from supplying today's technology require colleges and universities to make strategic decisions about how they will use the Internet and the Web, and supporting technologies, to deliver their missions.

By its very nature, the Web is a decentralized, distributed tool well-suited for independent content development. Remember the saying of the early '90s that "all you needed to start a business was a computer, a modem, and a Web page?" The Internet's adoption and integration on campus in many cases evolved haphazardly as a result of the ease of getting "online." Often a department director or an innovative professor would create a web page and then others people, seeing its success, would follow, perhaps using that initial template or creating their own. On many campuses, a hodgepodge of content, visuals, and functionality emerged with very little shared vision about how the Internet and Web should serve the institution.

Institutions responded by developing "Web policies" that sought to police their sites rather than developing "Web visions" that could lead and inspire the institution toward common, shared goals. These Web policies generally provide guidelines for content and use, and in many cases provide a template for a consistent "look and feel" to the campus web site. More often than not, they are a laundry list of rules, potential violations, and sanctions. When the marketing and public relations value of the web became apparent, the Public Relations office began managing the "official web page" at many institutions. While these efforts to standardize, organize, and police the Web resulted in improvements in the institution's Web presence, they are classic cases of reactive management and rarely provide the guidance and leadership that come from strategic thinking and purposeful direction.

Even now, a reactive approach to the Web still prevails at many institutions. Our goal is to help institutions clarify their thinking about how the Web should serve their missions. We provide an approach for developing institutional Web strategies, as well as justification for integrating the Internet and Web into the institutional planning process.

### **It's All About Mission**

We believe an institution's mission is the foundation for all strategic choices. Period. Everything an institution does should be linked to its fundamental reason for being — the people who are served by the institution and the ways in which they are served now and will be served in the future. Peter Drucker taught the importance of this tenet more than a half-century ago, and current thinking supports the power of this concept. Peter Senge's work at MIT has confirmed the relationship between organizational "greatness" and its deeply shared mission, goals, and values. The focus on mission is not a new concept, but it is often shelved or obscured by daily distractions and the lure of glamorous new programs or technologies. When it comes to mission, many institutions "talk the talk" but relatively few develop mission-driven vision, set

## LINKING MISSION AND STRATEGY

**Strategy** involves connecting the institution's "internal world" to its "external environment." It is about positioning the institution relative to its competitors in order to best serve its customers. For a decision to be strategic, both internal and external elements should be present.

**Mission** represents the fundamental framework for the way institutions think about themselves "internally." The mission should reflect the fundamental, enduring purpose of the institution (not simply a laundry list of all its activities or even a sanitized "formal mission statement"), and it should have relevance to those served by the institution as well as internal support for delivering it. For this reason, it provides the most important "internal" filter for evaluating institutional strategic choices.

If an institution's "internal reality" does not correlate with its mission, then the institution has either veered off course or the mission is no longer valid. In either case, the institution would be better served spending time re-examining its mission and realigning itself to this mission, rather than developing an Internet strategy that is linked to an inaccurate or moving target.

direction with strategies linked to that mission and vision or achieve alignment of resources with strategy. This is especially true in the case of the Internet and supporting technological tools offered by vendors to help "transform" our institutions. (see sidebar)

Amid the advertising hype and vendor promises of technological miracles, the institution faces the question "Will this technology help us deliver our educational and research programs and services in a way that has the greatest impact for the least marginal cost versus other available options?" The answer is much more likely to be "yes" if the process of planning, selecting, and implementing the technology has been guided by a focus on the institution's mission and vision.

## The Web as a Tool for Mission Delivery

The Web is simply one of many tools to support delivery of the institution's mission. To harness the power of this technology, we propose thinking about the Web in terms of the institutional processes it can support. This "process thinking" is the secret to untangling the Web and achieving clarity of purpose and direction.

Why do we propose thinking in terms of institutional process, rather than campus departments or software functionality? For several reasons:

- *Everything* that an institution does can be described in terms of a process.
- In contrast to people or departments, processes are more readily and clearly linked back to the mission of the institution. Processes describe *what* an institution does rather than *who* does it or *where* it is done.
- Institutional stakeholders, such as students, faculty, staff, and alumni, think in terms of process rather than functional area. (A person says, "I want to enroll in college" not "I want to Admissions Office")
- A process approach provides a methodical framework for evaluating specific needs, priorities, and decisions. Such an approach frames an issue in terms of what the institution truly wants to accomplish. (Thus a goal might be to "enable prospective students to apply on-line" not "to upgrade our Web page.")
- A view toward process shifts the focus from the Web itself to the processes that the Web supports. Once that shift is made, genuine progress can occur.

## INSTITUTIONAL PROCESSES SERVED BY THE WEB

Broadly, the primary institutional processes where the Internet and the Web can have impact are:

**1) communication, 2) information and research, 3) teaching and learning, and 4) services and commerce.** As a mission-delivery tool, the Internet

should enhance, and in some cases transform, these processes.

**Communication** — communications solutions available via the Internet and the Web include email, instant messaging, individualized Web portals, video conferencing, listservs, and group calendaring, among others. Most email communication happens directly via the Internet, and not the Web. However, Web-based email is a common way for people to access email when they are away from campus and Web-based event calendaring is an effective way to communicate daily events to a broad audience.

**Information and Research** — The Internet has revolutionized the process of accessing and retrieving information. This is currently the most common process enabled on most college Web sites as evidenced by pages such as “About the College,” “How to Apply,” “Alumni News,” “Athletic Information & Scores,” “How to Find Us,” “Employment Opportunities,” and so forth.

Information can be thought of in three general categories — static, active, or interactive. Static information rarely changes (academic policies, for example); active information may change frequently (sports scores, campus events); and interactive information requires some sort of processing or response from the Web site or someone at the institution. Many colleges and universities also offer access to scholarly research materials on their sites, such as research databases, library resources, and specific projects.

**Teaching and Learning** — How an institution employs the Internet and Web to facilitate teaching and learning depends heavily upon its mission, vision, competition, and positioning. Large universities may benefit from scale and convenience inherent in distance education. And while most small, liberal arts colleges might not establish a distance-learning program, they can consider Web-assisted learning opportunities to enhance the personalized educational experience.

## VENDOR MADNESS

How many ads in *The Chronicle of Higher Education* for Internet tools, software, and infrastructure components tout their products as “Higher Education’s solution for...?” Almost all of them. And there is no shortage of vendors with upgraded versions of products, new service agreements, and “revolutionary” new ideas. The possibilities — and costs — are endless. Yet with more than 3,700 institutions of higher learning (not to mention the proprietary and corporate universities), no single Internet or technological solution is appropriate for everyone.

Publications like *The Chronicle of Higher Education*, *University Business*, and *NACUBO Business Officer* and groups such as EDUCAUSE provide useful information and reviews of new technology. However, most information comes from vendors themselves, though advertisements, white papers, sales calls, trade show pitches, and so forth.

Such self-serving credentialing makes objective, strategic thinking about the role of the Internet and the Web all the more difficult. Institutions should minimize any links between a vendor’s pitch and institutional planning. Planning should be based primarily on the institution’s goals and needs, given its mission and place in a rapidly changing, technologically driven world. Planning should drive the relationship with the Internet and the vendor, not the other way around.

Examples of teaching and learning tools include: online instructional and course management software (WebCT, Blackboard, Prometheus); online class content; audio/video capabilities; instructional chat rooms; and distance education.

**Services and Commerce** — Many services and commercial transactions benefit—in terms of timeliness, accuracy, cost, convenience, and customer satisfaction—from Web enablement. As off-campus customer expectations for online transactions continue to rise, institutions face

increasing pressure to give students, faculty, and staff tools for conducting campus business online. With these pressures come significant opportunities for scale in mid-to-large size institutions and modest opportunities at smaller ones. Many service and commerce processes require a substantial investment to create and maintain links between the Web and the institution's administrative systems.

Examples of services and commerce that institutions provide online include: enrollment and financial aid application; registration, degree audit, and advising; grade posting; updating demographic information for students, alumni, and employees; purchasing (including product catalogs and requisitions); budget development and financial reporting; donation solicitation; employment applications; and many others.

Many institutions that have embraced Internet- and Web-based solutions have literally transformed the processes in question to the benefit of the institution and corresponding stakeholders. However, while technological solutions offer potential benefits, each institution must carefully select the solutions that fit its particular culture, support systems, and resource base. To realize the benefits and ensure proper fit, an institution must take a rigorous, strategic, mission-driven approach to any decision to employ Internet- and Web-based technology in any capacity.

The Appendix provides examples of ways that institutions are currently using the Internet and the Web to support each of the process areas listed above.

### **AN APPROACH TO INTERNET AND WEB PLANNING**

How does the institution develop an Internet/Web vision and corresponding implementation strategy?" Through our client work, we have developed a seven-step process that several institutions have

used successfully. It is presented here for institutions to review and modify to fit their own cultures, organizational structures, and operating peculiarities. In fact, we expect that many colleges and universities will improve this methodology or develop alternative methodologies that achieve similar goals (and would appreciate readers' feedback, suggestions, and success stories.)

#### **Step 1: "Begin with the End in Mind"**

With thanks to Steven Covey for this "habit" of highly effective people (and organizations!), the institution's executive leaders should begin by clearly defining the expected outcome for this

#### **COMPONENTS OF A SUCCESSFUL VISION**

- Clearly describes a desired future state
- Respects campus culture and resources
- Supports the institution's mission
- Reflects desires and needs of process stakeholders
- Is challenging, yet realistic

planning project: a comprehensive, institutional vision of the role that the Internet and the Web play now, and can play in the future, in delivering educational programs, conducting research and performing campus services.

At this stage, the goal is creative thinking. Vision calls for imagining one's future; strategy calls for defining and making choices about how to get there. Later in the project, as strategic options for implementing the vision emerge, decisions regarding direction and priorities will be necessary. However, those limitations should not be imposed on the "visioning" part of the process. In this step, the most open approach will produce the most creative results.

The vision will be described in terms of the four processes noted above rather than in terms of existing organizational structures. Those structures may need to change to better serve the institution. In addition, these processes are best thought of as continuums of opportunity. Formulating the vision entails making explicit decisions regarding where the institution should be on each continuum. In other words, which possibilities, among the entire range, would be useful or desirable for the institution?

For example, the teaching and learning continuum might span from no Web component to total digital instruction. While few institutions would choose either pole, there are many points in between worth considering. The services and commerce continuum encompasses various subsets for each functional area. For instance, in Admissions, the application sub-process might range from no electronic interaction to a totally paperless process. Each institution must determine the appropriately electronic functionality. Online request for information? Online application? Web-based document tracking? Electronic fee payment?

### **Step 2: Assemble an Internet Vision Project Team**

Many institutions place the responsibility for developing an Internet vision solely with the technical support staff. Doing so serves both the institution and the technical staff poorly. We recommend a cross-functional team of faculty, staff, and students that can represent the four processes discussed above as well as a strong “customer” perspective. Groups of 10-12 are most effective for these types of projects. A sample Internet Vision Team composition is shown in the accompanying sidebar.

### **Step 3: Review All Internet Processes**

As it reviews each process, the Internet Vision Team should perform six tasks:

#### ***Think like the process customer and identify his or her needs***

For each process, the team should identify the process “customers” — the people served by the process — and determine their needs and

#### **SAMPLE INTERNET VISION TEAM**

1. Academic Affairs representative (Dean/Provost/Assoc. Dean, etc.)
2. Faculty member that uses Internet in his/her teaching and/or research
3. Campus Registrar
4. Public relations representative
5. Admissions Office representative
6. Alumni Office representative (preferably someone with development experience)
7. Business Affairs representative (Procurement Office, for example)
8. Student Affairs representative
9. Information Technology Representative
10. Student with SGA credentials
11. Student known for strong technical skills

desires vis-à-vis the process. The goal is to understand the perspective of the people coming to the web site. What are they seeking to accomplish? How do they find the information or conduct the transaction? What features are most important to them?

#### ***Process customers should be broadly defined.***

Students, faculty, staff, alumni, trustees, vendors, media, the local community, prospective students, parents and guardians, among others, are all process “customers” to some degree. Sometimes the institution itself is a “process customer” with its own needs (public relations, for example). Including all process customers and their anticipated needs in this step saves massive amounts of time, energy, and money down the road.

#### ***Review other web sites to identify best practices and good ideas***

While every campus should develop its own identity and differentiation strategies, much can be learned about what works and what doesn't

from studying others. Team members should visit the web sites of institutional peers and competitors. Many of these institutions face similar customer needs, problems, and resource constraints. Seeing how they have addressed them (or failed to address them) will provide valuable information to the team.

***Obtain direct process customer feedback***

Asking for and receiving direct feedback from the people served by the process may be the most enlightening exercise the team will undertake. There are various methods of obtaining this feedback, including focus groups, hard-copy surveys, and personal or telephone interviews. The team must choose the most effective method for each customer type, in light of the institution's culture. In addition, the feedback mechanisms established at this stage should form the basis of a continual feedback loop for use after the team's work is complete.

***Obtain input from "thought leaders" on campus***

Take advantage of your institution's knowledge bank. As needed, the team should consult with inhouse experts on particular topics of interest, such as teaching and learning tools, budget methodologies, and non-academic student Web uses.

***Identify existing technological, operational, and organizational support systems and structures***

The team should know which tools and systems currently support the institution's processes. These include ERP or legacy information systems; servers such as web, mail, and data; the networking infrastructure; and the organizational support structure and staffing. These systems can make or break an institution's ability to realize its Web vision. The team should also learn about any current or planned changes to these systems and expected completion dates. The final recommendations must consider the timing and sequencing of those changes and their impact on achieving the Web vision.

***Develop an understanding of external competitive pressures***

The team must understand what the institution must do to respond to services offered by competitors. For example, if every admissions overlap school offers online applications, then offering similar functionality may become a top priority. If competing schools are saving money through online purchasing and other paperless processes, they may gain a competitive advantage that requires a response. The Internet Vision Team should flag any aspects of the vision that are particularly urgent due to competitive forces.

The team's goal in these six tasks is to define a vision of what the institution should strive to achieve, given its current and desired standing in the higher education universe. The goal is not to solve all the problems involved in getting there, nor is it to fix current problems. Potential technological, procedural, or organizational roadblocks should not stop the team from exploring all options. Impediments and limitations can be dealt with later. In fact, such roadblocks often diminish or vanish in the presence of a truly compelling vision of the future.

***Step 4: Identify Global Design Principles***

The project team is intentionally not composed of programmers and systems analysts. Since the team members may therefore lack the programming and design skills needed to create Web pages themselves, they must express their expectations in terms of "design principles." Design principles describe what the Web site or Web-based process should accomplish and its "look and feel," but not necessarily how these ends should be achieved. This approach gives the programmers and designers freedom to work creatively while they pursue the team's goals. Our experience has shown that this is the most effective way to align the project team and the technical staff.

Design principles can relate to an individual Web-based process or to all Web-based processes globally.

Global design principles provide a framework for the project—a set of common threads that engender cohesiveness. Examples of global design principles might include:

- The Web site should reflect the unique culture of the institution as well as its competitive strengths, such as the individual attention provided by a small liberal arts college or the comprehensive research facilities of a large university.
- A common Web-page template should be designed for all pages (academic and administrative) on the institution's Web server.
- The user should be able to navigate smoothly between academic and administrative pages and all pages should have a "search" feature and a link to the institution's home page.
- Expiration dates should be used to weed out old information.

The team should keep a running list of principles deemed "global design principles."

#### **Step 5: Draft Process Visions and Process Design Principles**

Process-specific visions should be developed for each process identified by the Internet Vision Team. These visions should be deeply rooted in the institution's mission and paint a compelling picture of what the team believes the institution should strive to achieve by applying the Web to that process. The sidebar (right) presents an abbreviated, sample process vision (for services and commerce processes) from an elite liberal arts college.

The process vision must then be supported by process-specific design principles. The combination of the vision and the design principles will guide the institution's leaders in their decision to move ahead with the project and guide the technical support team in their implementation efforts. The sidebar on page 8 lists design principles specific to services and commerce process at the same liberal arts college.

#### **SAMPLE INTERNET PROCESS VISION: SERVICES AND COMMERCE**

"Opportunities to conduct business through transactions on the College Web should be expanded in those cases where it is beneficial to our users and to the institution (through convenience or savings of time, money, labor, or paperwork) but with a cautious awareness that the Web is a suitable environment for some transactions but not others. We should be responsive to customer needs in providing services, but also be guided by the principle that Web transactions should not replace important community-building activities or seriously reduce opportunities for personal contact on our campus..."

"Possibilities recommended to incorporate into short-term planning include: securing admissions credentialing on-line; submission of application without a third party; on-line financial aid application; the development of a purchasing gateway; access to bookstore for on-line purchases; budget submission and change requests; electronic signature and approvals; and updating personnel records."

"Longer-term possibilities recommended for the institution include: degree audits/course schedule planning; room and catering reservations; student voting and polling; grade input and retrieval; on-line registration; on-line room draw; alumni database access without third party; on-line application for employment; and appointment and group scheduling."

#### **Step 6: Identify Strategies to Achieve the Vision and Assess their Feasibility**

Developing a comprehensive Internet process vision is itself a major accomplishment for the team and a rare feat in the world of higher education. However, a vision's existence does not ensure its implementation. The institution must identify the best strategies for achieving the vision, and this involves confirming institutional direction and choosing ways of moving in that direction.

**SAMPLE DESIGN PRINCIPLES:  
SERVICES AND COMMERCE  
PROCESS**

- Provide appropriate security for all transactions
- Data should be captured only once — no duplicate record keeping or repetitive keying of data
- Exercise caution about replacing valuable interaction with self-service (know the difference) and replacing community-building activities with on-line activities.
- Uniformity in the framework of transactions — “one log-in” principle
- Incorporate approvals into the on-line process and other work flow management activities
- Minimize process handoffs and approvals required
- Sensitive transactions should be available options only for appropriate audiences

Strategy also involves explicit decisions regarding priorities and sequence, because it is unlikely that all the changes needed to realize a challenging vision can be achieved in a single academic cycle.

We propose a three-pronged approach to developing a comprehensive strategy for bringing an Internet vision into reality:

- **Perform a gap analysis** to define the distance between the institution’s current capabilities and its Internet vision
- **Evaluate the recommendations**, rank them by priority, and develop a sequence for their implementation
- **Conduct a reality check** to evaluate the feasibility of the initiatives

**Perform a Gap Analysis**

A gap analysis measures the institution’s current operating capabilities relative to its vision and defines the gap that must be closed in order to achieve that vision. For each aspect of the vision, the gap analysis should honestly assess the following:

**Current Competency and Resources:** What are we currently doing in this area? What is our reputation? What is our “competitive advantage?” What do we do particularly well? What are our present staffing and skill levels? Do current policies support or hinder our Internet vision?

**Current Political Reality:** Does the institution have a “silo” mentality? Is there duplication of technical solutions and efforts across functional or college lines? What must the institution do to build consensus and overcome “turf” issues?

**Financial and Capital Resources:** What additional capital is required to realize this vision? Where will the capital come from? How will this vision be funded in the long-term? What is the financial “opportunity cost” of implementing this vision— that is, by undertaking this project, what others are we forgoing and with what financial impact?

**Talent and Management Structure:** Will additional people be needed to implement this vision? Can current management adequately support this vision? Which organizational structure would best support this vision? What is the human resource “opportunity cost” of implementing this vision— what projects are we forgoing by dedicating people to this project, and with what impact on our human and knowledge resources?

**Key Success Factors:** Which elements must be present to make this vision a success?

When specific aspects of the vision are analyzed and recommendations are discussed, the institution should ask and answer the question: “Can we

implement this in keeping with our quality standards?" If not, then a less ambitious proposal is warranted.

### Evaluate the Recommendations and Set Priorities

Most institutions do not have the structures in place to support the complete vision, nor the financial or human resources to implement all of the recommendations at once. The Vision Team must therefore assign a priority to each recommendation.

We recommend that the team rate each of its recommendations in the following categories:

**Total impact on the institution:** Regardless of cost, which items, if implemented, would have the greatest positive impact? The impact assessment should include expected increases in customer satisfaction, decreases in service delivery costs, decreases in process cycle time, and reduced need for "shadow systems."

**Financial cost of implementation:** What is the "best guess" expected total dollar cost of implementing the recommendation?

**Infrastructure changes needed for implementation:** Which new systems or changes to existing systems, such as ERP, will be needed to implement the recommendation?

**Human resources and time needed for implementation:** How much labor will be needed to implement the recommendation? What human resources are available for this effort? Must, or should, this work be performed by internal resources? Are they available? If not, have the external resources been identified?

**Ongoing maintenance requirements:** What financial, human, and technological resources are needed to maintain the recommended initiative after implementation? For example, what ongoing resources will be needed to keep the information at the Web site current, to field questions from visitors, or to process interactive transactions?

Only those recommendations whose impact exceeds their fully loaded costs should be retained. Items with high impact and low total cost will rise to the top of the list. Lower impact, higher cost items will drift to the bottom. And of course, those in between will present the more difficult choices. High impact, moderate-to-high cost recommendations will have to be reprioritized, phased in, or perhaps even excluded.

Don't forget the importance of "low hanging fruit"—items with positive near-term impact and little or no cost. Implementing these priorities early will enable the institution to realize (and enable the leadership to demonstrate) immediate progress and rapid returns on the effort. The progress thus gained will generate momentum that can carry the institution into the more difficult phases of implementation.

### Conduct a Reality Check

Once priorities are set, step backward to take in the institutional "big picture" and conduct a final "reality check" prior to implementation. This iterative approach—from vision to specific recommendation back to vision—keeps people focused on the larger goals and helps them cut through the muddle that detailed analysis and planning sometimes creates.

Key questions for the reality check include:

- Are these the opportunities that will have the greatest impact for this institution at this time?
- Do these opportunities enhance the institution's ability to deliver its mission more than other opportunities being considered?
- Can the institution implement and maintain all the high priority recommendations to the expected level of quality?

With this final check completed, the institution can move onto implementation with confidence.

**Step 7: Plan for Implementation**

Once the institution has defined its strategic priorities, the implementation plan involves a relatively standard management process of setting objectives, defining tasks and subtasks, assigning accountability, establishing milestones and deadlines, aligning the resources necessary to complete each task, and controlling to plan.

But don't underestimate the impact that the existing organizational structure, with its inherent rewards and incentives, can have on an institution's ability to realize its Internet vision. For example, organizational structure can impede the proper alignment of human resources. This can occur in institutions where the information technology area is still organized around "academic computing" and "administrative computing" rather than around processes and their users.

In other words, the technology and its applications change much faster than the organizational structures that support them. Therefore, realizing the vision may entail organizing those structures around institutional processes and the people served by those processes. Yet changing the entire structure—or a significant part of it—might be politically undesirable or impossible. In these cases, creative approaches will be necessary. One approach would be to form Internet "operational teams" that cut across functional boundaries and whose members can work closely together to implement the plan.

**NEVER QUIT**

The world of technology never stops changing. Moore's Law suggests that many exciting innovations lie ahead, and that they may arrive before many of us are ready to take advantage of them. The task of capitalizing on these changes must be integrated into the planning cycle.

Planning is an iterative institutional learning process and, as such, requires constant adjustment and adaptation. It simply cannot be viewed as a one-time or every-five-year event. Therefore, every institution must develop a system of planning—especially for the Internet and the Web—that is truly integrated into institutional life. The institution must constantly evaluate the potential impact that new technological tools can have on the ways in which it executes its mission.

We believe the approach we have provided enables institutions to develop their Internet Vision and incorporate that vision, and strategies for realizing it, into their planning and decision-making processes. We also believe that this approach provides a useful framework for evaluating new technologies in the context of the institutional mission and for deploying new technologies in ways that fulfill that mission.

## **APPENDIX: Current Uses of Internet and Web Technologies**

The following is a list of some of the currently deployed technological possibilities that could support each of the four Internet processes discussed in this paper. The nature of technological innovation suggests that at the moment this list was compiled, it was incomplete. There will always be new technological products and services just on the horizon. This list should, nonetheless, serve as a useful guide.

### **COMMUNICATION**

1. Web email accounts
2. Bulletin boards
3. Calendar of Events
4. Broadcast emails
5. Electronic directories (including the ability to personalize information by the user)
6. Instant messaging
7. Video conferencing
8. VoIP (voice over Internet protocol)
9. Collaborative software (shared white boards, document editing, etc.)
10. Lifelong email addresses for alumni
11. Affinity groups

### **INFORMATION AND RESEARCH**

1. Search features/site map
2. Customer "gateways" designed for specific user types
3. Departmental information
4. Virtual campus tours/flash videos
5. News/sports information
6. Admissions information
7. Student, faculty and staff handbooks
8. Course information
9. Media guides
10. Maps and driving directions
11. Access to library resources/catalog
12. Streaming audio/video content out of the campus
13. Campus "cams" for live views of campus
14. Organization charts
15. Benefits information
16. Institutional strategic plans
17. Assessment reports

### **TEACHING AND LEARNING**

1. Content development and management software (Web CT/ Blackboard/Prometheus, among others)
2. Course listserv mailing lists
3. Library/research access

4. Synchronous and asynchronous chat rooms
5. Streaming audio and video content
6. On-line testing/exams
7. On-line advance placement exams
8. Distance learning
9. Teleweb courses
10. Electronic student portfolios (art, engineering, etc.)
11. PDA linkages & innovations

### **SERVICES AND COMMERCE**

1. Electronic application for admission
2. On-line sign up for a video admissions interview
3. Electronic submission of supporting admissions documents
4. On-line status check of application process
5. On-line registration
6. Electronic application for financial aid
7. On-line purchasing: online catalogs, ordering, requisitions, creation of purchase orders, on-line auctions, and receiving
8. Electronic invoicing and vendor payment
9. On-line degree audits/degree planning
10. Event & resource scheduling
11. Electronic budget submission and change requests
12. Electronic tuition and fee payment
13. Electronic time and attendance collection
14. Electronic signature/approvals
15. On-line job search and employment application
16. Electronic update of personnel or demographic records
17. Online request of a transcript
18. On-line reserve a room, order catering needs, order room set-up needs
19. Electronic SGA voting and polling
20. On-line giving
21. On-line grade input and retrieval
22. On-line purchasing from Bookstore or Coop Store

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