

Chapter 8
**Portal Technology Opportunities, Obstacles, and Options:
A View from the California State University**

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Web Portals and Higher Education
Technologies to Make IT Personal

Richard N. Katz and Associates

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Portal Technology Opportunities, Obstacles, and Options

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What is a portal? A portal is a gate, a door, or entrance. In the context of the World Wide Web, it is the next logical step in the evolution toward a digital culture.

Portals have become one of the most visible information technology (IT) issues in higher education, as well as the commercial sector. The latest Gartner International *hype cycle* curve places portals at its apex. That firm estimates that at least 5 percent of U.S. higher education institutions will have partially or fully implemented portals by Fall 2000. By 2006, Gartner predicts that 80 percent of universities with a thousand or more students will have enterprise portals. According to Merrill Lynch, the total corporate portal market reached \$4.5 billion last year and is projected to reach \$14.8 billion by 2002.

This chapter provides an executive university readership with an understanding of portals and offers an overview of portal benefits, together with the potential problems and policy issues associated with them. It does not explain portal technology but describes some basic design principles, and it is offered as a starting point for developing a coherent, campus-wide portal strategy. Some options are offered as to how campuses might proceed, either individually or as part of a university system.

As defined by IBM, an Internet portal is “a single integrated, ubiquitous, and useful [point of] access to information (data), applications,

and people” (IBM, 2000). A portal may look like a Web site, but it is much more than that. Although a Web site is an important part of any university’s communications strategy, it is primarily a way to provide static information.

Christopher Connolly of Villanova University writes that “a portal . . . is a gateway to the Web that allows the plethora of information available on Internet and Intranet Web sites to be organized and customized through a single entry point. A good portal provides seamless access for non-authenticated users until sensitive information is requested, when it then prompts for a username and password. Authenticated visitors or those known to the site by cookies (textual information passed to the client to be stored on the client’s system) are presented with a more individualized view of the organization’s Web site” (2000, p. 38). A portal “knows” the individual using it, and it changes with the individual; it is an individual’s personal assistant or proactive agent, ready to act on his or her behalf.

As Strauss suggests, there are three kinds of portals:

1. *Vertical portals*, which provide access to a variety of information and services about a particular area of interest. For example, Wine.com is a vertical portal. Such portals offer information and services customized for niche audiences (such as undergraduates, faculty members, and alumni).
2. *Horizontal portals*, which are often referred to as “megaportals.” These portals target the entire Internet community. Sites such as Yahoo.com, Lycos.com, and Netscape.com are megaportals. These sites always contain search engines and provide the ability for a user to personalize the page by offering various channels (for example, access to other information, such as regional weather, stock quotes, or news updates). Providers of megaportals hope individual users will go to their sites first, to access the rest of the Internet. Their financial models are built on a combination of advertising and “click-through” revenues.

3. *University or enterprise portals*, which can be either *vertical*—focusing on a specific application, such as human resources, accounting, or financial aid information, or *horizontal*—offering access to almost all the information an individual within the university needs to carry out his or her function. Authentication and access are based upon the role or roles the individual plays in the organization. Horizontal enterprise portals (HEPs) can be customized and personalized. If properly designed, they can replace much of the user's computer desktop.

Like a TV remote control, portals offer a number of channels. These might include reports and documents needed for class assignments, calendars, such administrative information as grades and degree audits, campus news and events, collaboration and discussion groups, reference material and links to other sources, and personal leisure, financial, or family information. Portals represent the next logical step in home page, Intranet, and general Web evolution because they integrate all three.

In addition to a sophisticated search engine, portal development and implementation depend on a number of interrelated technologies: authentication and security, caching, automated taxonomy engines, application integration middleware, relational databases, and metadata dictionaries. Many of these are “under the hood” technology functions but are essential for enabling e-services and for evaluating vendor alternatives. This chapter focuses on HEPs in a university environment.

Should a University Have a Portal?

A Web portal may be the answer to a question that has not been and may never be asked. However, the hype surrounding portals, as well as the plethora of vendors knocking on the door, makes them impossible to ignore. Compelling reasons to develop a portal are that an increasingly Internet-savvy student body expects it, and the

horse is already out of the barn. It would be hard to find a campus where someone—whether in the alumni association, in sports, in university development, or in a large academic department—has not either built his or her own portal or ordered one. This may have occurred without the knowledge, coordination, and assistance of the institution's chief information officer or another in campus executive management.

In the heyday of enthusiasm about the so-called New Economy, portal vendors often approached higher education executives with promises of revenue generation, cradle-to-grave (or at least application-to-endowment) relationships with students, and productivity gains for all university constituencies. Although financial benefits may be a potential outcome, revenue generation also involves broader policy questions about the appropriateness of advertising on an academic portal. Still other e-commerce applications may generate privacy concerns. Individual campuses engaged in selling merchandise or services on the Web may also run the risk of complaints from local businesspeople, who may object to competition from a public institution. For these reasons, it is doubtful if revenue generation should be the primary reason for development of a university portal.

However, all universities are likely to someday use portal technology. The key questions are *when* and *how*. Developing a campus portal is a strategic technology decision that will affect the entire campus community. The decision on a portal strategy requires careful analysis of long- and short-term needs.

Who Will Benefit from a Portal, and How Will They Benefit?

Whether the campus is looking for recognition, ease of operations, productivity gains, cost savings, or a combination of these, the portal will succeed or fail based upon the perceived benefits to the

university community. The portal should make it easier and more efficient for every stakeholder to carry out his or her role in the institution.

One obvious reason for deploying portals is to improve productivity by increasing the speed and customizing the content of information provided to internal and external constituencies. Portals also serve a knowledge management function by dealing with information glut in an organized fashion. In some ways, portals offer a technical solution, but not a total answer, to knowledge management. Creating the potential for campus constituents to personalize and tailor their preferred sources of information is a powerful step in the right direction.

Another real benefit is that many of the technical issues that must be addressed in a portal implementation (such as authentication, authorization, security, and messaging) are aligned with efforts to build out the technology infrastructure. Those issues (often referred to as middleware) are central to a robust inter- and intra-campus network and end-to-end Internet connectivity.

University portals can be a means for individuals to establish a long-term relationship with the institution. In particular, portals provide views of the institution that reflect an individual's relationship at various stages of his or her life. A patient of the university's hospital sees less of that university than do students, staff members, parents, and others. Portals facilitate the presentation of the institution's many faces. They not only make it easy to do business, they also allow for interaction and collaboration among students, faculty members, staff members, and alumni with similar needs and interests. Properly implemented, portals can be strategic assets for institutions. In that sense, they do far more than traditional Web sites of static information ever could.

Beyond institutional gains, portals offer obvious benefits to students, faculty members, staff members, and external stakeholders.

Students benefit from

- Web interface with courseware and required information about courses
- Increased and easier communications with faculty members
- On-line access to grades, financial aid information, class schedules, and graduation checks
- Access to the communities of interest within the university, such as sports, clubs, and community service opportunities
- Increased lifelong learning opportunities

Faculty and staff members benefit from

- Real-time communications with students
- Simplified course management tools
- Instant access to information for advising students
- Easily accessible information for every facet of their job

How Does an Institution Get Started?

At this point, the challenge is not to get started, but, rather, to corral the disparate efforts on campus and take a unified approach to portals. This may involve some level of executive intervention.

A consensus seems to be emerging among students of portal development concerning best practices and potential obstacles. The major points of agreement include the following:

- There should be one and only one horizontal portal on campus. Theoretically, each member of the university

community will sign on to the portal every day, whether to access class schedules, class notes, homework assignments, calendars, e-mail, or daily task lists. This point does not preclude the possibility, indeed the probability, of several vertical portals being nested behind the single horizontal enterprise portal.

- It should be built iteratively. First-generation portals emphasize content; second-generation portals focus on institutional processes, services, technology applications, and process integration; third-generation portals will likely strive to integrate data, voice, and video on a variety of platforms (such as handheld computers), perhaps over wireless networks.
- There should be a single sign-on for each individual, regardless of his or her campus role. That sign-on should be designed so that an individual can access whatever information he or she is permitted to have, including access to the vertical portals. The sign-on should follow the user through any campus vertical portals.
- The sign-on should allow for the possibility of overlapping roles. For example, some students are part-time employees, some staff members are either part-time students or alumni, administrators may be part-time faculty members, and so forth.
- Institutions should consider both academic and administrative legacy systems, as well as newer applications. Campuses should neither build nor buy a portal without having a clearly defined strategy for migration from legacy systems to new software, either with the design team or with the vendor. This strategy should be communicated to the campus community.

- Because the goal of a portal is to be a single, seamless interface with all necessary applications, whatever course software packages a campus uses should interface with the portal. To the extent possible, campuses should attempt to limit the number of course software packages that will be supported by the portal.
- Although revenue generation should not be the driving force behind development of a portal, the design should not preclude revenue from advertising or e-commerce applications.

Who Are the Leading Vendors and What Do Portals Cost?

The portal vendor industry is in the early stages of development. Major shakeouts occur on a near-monthly basis among the roughly one hundred vendors. The risk for any institution in choosing a vendor under these conditions is considerable.

Gartner International estimates that it could cost an institution anywhere from \$50,000 to \$250,000 for a portal license fee, plus 15 to 20 percent for maintenance. Services and training can cost two to four times the price of the license fee. Accordingly, they recommend that institutions always deploy and test a pilot system first, and then build the basic functions of content integration, database and applications integration, and process integration in an iterative fashion. Other critical functions—such as security, caching, taxonomy development, searching, and personalization—should also be approached in phases rather than all at once. Gartner goes on to suggest that although there are plenty of visionary and niche players in the portals market arena, there still are no leaders in the industry and no challengers.

Portal Provider Options for Higher Education in 2001?

Typically, a portal should provide personalized access to information, integrated access to data systems and attendant applications, and process integration between individual schedules and institutional calendars (often the most difficult requirement to satisfy).

Selecting a portal source has become very complex and risky. It is interesting to note that one informal survey of fifty U.S. research universities showed a *reduced* penetration of this technology between May 2000 and May 2001.¹ From July 2000 to July 2001, a number of commercial suppliers entered and exited the commercial marketplace. Early enthusiasm for financing the portal investment through the recovery of advertising and click-through charges has in general yielded to a more narrow and conservative definition of portal products and to cost recovery through traditional licensing fees or through bundling of portal products with other products, such as enterprise resource planning (ERP) systems. Increasingly, the commercial choice among vended portal products requires due diligence regarding the business viability of the portal suppliers under consideration.

Another major factor in choosing a portal vendor is the extent of a supplier's business partnerships and relationships, both horizontal and vertical. A successful portal vendor must borrow from the best practices of companies that specialize in critical areas, such as content providers, systems integrators, search engines, operating systems, middleware, and even mobile networks.

Table 8.1 lists eight portal vendors in this volatile market that were active in higher education between July 2000 and July 2001, together with brief descriptions of their revenue models and key selling points. Obviously, the advertising and e-commerce features of these products are both controversial and uncertain and could involve higher education institutions in matters beyond their

Table 8.1. Some Portal Vendors in Higher Education

Providers	Revenue Model	Differentiators
Blackboard	Bundled with Level 3; e-commerce optional	Productivity tools, revenue sharing; Datatel alliance
Campus Cruiser	Ads, e-commerce, fees	Productivity tools, revenue sharing; Datatel alliance
Campus Pipeline	Ads, e-commerce, fees, sponsorship	Integration APIs, local hosting, SCT & WebCT alliances
Jenzabar	E-commerce, fees, sponsorship	Own four higher education ERP companies, instructional support, nonenterprise accounts
Mascot Network	Limited ads, e-commerce, fees, connectivity revenue	Community niche orientation, free implementation, coexistence strategy
PeopleSoft Portal	Free to PS customers; e-commerce optional; fees	Preintegration with PS; community tools alliance with iSun
uPortal	Community sourced	JA-SIG sponsorship; JAVA-based architecture; IBS partnership
Z University	Ads, sponsorship, e-commerce	Focus on alumni relations niche; revenue sharing

By the time of publication, some of these commercial portal providers had exited the market.

expertise or interest. However, in the words of Looney and Lyman, “the entrepreneurial world has looked around the Internet and realized that the most connected population with the best commercial demographics is in higher education” (2000, p. 33). The e-commerce implications of portals will never be far away, however much some may wish them to be. The challenge for higher education is to adapt portal technology intended for commercial purposes to academic pursuits and academic virtual communities.

In addition to commercial vendors, the Java in Administration Special Interest Group (JA-SIG) has released the first portal framework designed by and for higher education institutions. Created in part through funding from the Andrew Mellon Foundation, uPortal

combines a set of technical specifications and software designed to allow institutions to build customized portals using a publish-and-subscribe interface and functional channels developed and shared among the uPortal user community. The software is available for download, free of charge from the JA-SIG clearinghouse site at JA-SIG.org. At this writing, the production version of this product was released in late 2001.

The potential advantages of uPortal are lower costs, compared with commercial products, and greater institutional control over content. uPortal requires a Java-capable programming staff that is available to support the framework's implementation. Community sourcing is the key feature of and the key challenge to JA-SIG. Although community sourcing spares much of the cost of in-house development, uPortal still requires significant interface design, and users may have to develop their own channels. As of this writing, nine universities were operating either production or test uPortal sites.

Although there will be frequent leapfrogging in this new area of technology development, based on discussions in the professional literature, the following universities are among those with the most well-developed portals in higher education. Together, they offer a variety of design formats, content, and funding alternatives. Their experiences should inform any campus decision.

- University of Washington—MYUW—
<http://myuw.washington.edu>
- UCLA—MYUCLA—<http://www.my.ucla.edu>
- Boston College—uPortal—<http://www.ja-sig.org>
- LSU—PAWS—<http://paws.lsu.edu>
- University of Minnesota—My ONE STOP—
<http://onestop.umn.edu>
- University of British Columbia—MYUBC—
<http://my.ubc.ca>

- University at Buffalo—MyUB—
<http://www.buffalo.edu/aboutmyub>

In the final analysis, portal deployment is much like anything else—one can have it fast, have it good, or have it cheap. The catch is that only two out of three are possible.

What Policy Issues Should Be Considered?

In the current environment, extreme due diligence is the only protection against the volatility of the portal industry. If an institution can wait to deploy a portal, it should wait until a likely consolidation among vendors and price competition occurs. Moreover, the portal industry has not yet reached agreement on certain basic standards. If a university cannot wait, then the following questions and issues should be considered:

- *What short-term problem is the campus attempting to solve with a portal? Why is the portal the only, or the best, solution?*
- *Is executive management willing to mandate a single portal for the campus? A portal can be a tool for building a virtual campus community. It can also drive process transformations that result in cost efficiencies. Multiple nonintegrated portals defeat both of these purposes.*
- *Does executive management understand, and is it willing to communicate to the campus, that the investment in a portal is not a one-time event? Portals require a continuous investment as they evolve and migrate from interfacing with legacy systems to interfacing with new software systems and all of the version changes inherent therein.*

- *Who “owns” what data and how will conflicts between data owners be resolved? Who manages the portal?* The CIO is (or should be) the person on campus charged with the resolution of conflicts among data “owners.” The CIO ultimately should be responsible for access to all information systems and the seamless integration of these systems for presentation through the HEP.
- *Is advertising appropriate on an academic HEP?* Each campus must make this determination for itself. The answer will be driven by a number of factors, not the least of which is campus culture.
- *Is e-commerce acceptable through the campus HEP?* E-commerce is a far broader topic than can be addressed here. There are aspects of e-commerce that are already commonplace on campuses. These include on-line catalogs and on-line purchasing, electronic funds transfer, and bill payments.

One example of e-commerce is an arrangement between the campus and Amazon.com, where every time an individual accesses the on-line bookseller through the campus portal, the campus receives a small percentage of the purchase price of goods. This could pose a potential conflict with the campus bookstore and other campus auxiliaries. Another issue that should be considered relative to e-commerce is competitive pressure from local businesspeople.

Other policy considerations include

- *Security and ensuring the privacy of student and employee data.* These have always been serious issues. However, when the possibility exists for a single sign-on to virtually every existing university information system, security becomes more than a line in someone’s job

description. It becomes mission critical and the responsibility of every campus employee.

- *Intellectual property*. This could become as big an issue in portal deployment as infrastructure integration (for example, witness the Napster controversy). This is an especially sensitive issue for faculty members, and policies should be established in advance of deployment.

Want a Portal? What's Next?

There are at least three routes to portal development. The first is to build it. Experts are nearly unanimous in arguing against this approach because development and maintenance of a “home-grown” product can be a problem. The second option is to purchase a preintegrated, packaged product. The third alternative is to purchase a portal service—in effect, to outsource. The choice among these alternatives is complex and is rooted in the culture, traditions, infrastructure, and workforce of the institution.

Each approach has opportunities and challenges. Developing institution-specific solutions will likely result in a highly tailored solution but will often cause the campus to lag the marketplace as new functions and features emerge in the commercial marketplace. Commercial portal functionality is driven by a larger marketplace, and the pace of innovation in portal technologies is often driven by sectors other than higher education. The integration of custom-developed portal technologies may enhance interoperation with other campus-developed software applications, or it may necessitate painful adaptations to vended applications in use by the institution.

Buying is also not a risk-free proposition. Vendors have various financial models. Some depend on advertising revenue, whereas others depend on click-through revenues for e-commerce. Still others offer a model by which the institution is charged for the num-

ber of Web pages the constituents access. All of these vendors will sell their products outright—usually at a very high price. These are not turnkey systems, and they still require technical support and expertise on the part of campus personnel.

Another potential pitfall is the relative immaturity of the industry. These are dot-coms in the truest sense, fraught with all the problems recently reported in the news. Most have seen the wisdom of partnering with larger, more experienced firms. However, in some cases the partnership dictates the “back room” system or course software solution, severely limiting campus choice. Everyone claims that their product can interoperate with everything else. As with all other enterprise software decisions, *caveat emptor*.

Note

1. Survey of participants in EDUCAUSE and NACUBO forums, May 2000 and May 2001. In May 2000, 25 percent of invited participants indicated that their institution had implemented an “enterprise information portal.” In May 2001, 20 percent answered the same question affirmatively. The sample sets in this survey did not match completely, but the results and ensuing discussion suggest an atmosphere of cautious enthusiasm among participating information and business officers.

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