Chapter 2: Web-based Services

CU-Boulder is in the position to take full advantage of new and emerging web technologies to provide a virtual, one-stop shop for university services, from registration and online ticketing, to calendaring and procurement.

Data from focus groups and surveys indicate that the campus should move toward a portal\(^1\) strategy that will facilitate student, faculty, and staff access to the academic content and the academic and administrative services they need.

The primary challenges of providing web-based services for the campus are less technical in nature than cultural. Although there is broad conceptual support for creating a cohesive interface for accessing discrete services provided by dozens of units, the campus will need to provide leadership and support to facilitate cooperation by units that have worked independently in the past.

Security, privacy, and a reliance on the campus’s Enterprise Directory compose the technical basis necessary for successful web-based services initiatives. Recommendations for web-based services that are common to both sections of this chapter include:

- Academic, student, and administrative services should be accessible through the web and tailored to users.
- To accomplish this, a standard portal framework should be implemented.
- Steering committees should provide strategic direction and tactical buy-in for web-based services.

Due to demand, the campus should implement a student portal first, followed by a faculty and staff portal as resources permit. Strong collaborative leadership from the Vice Chancellor for Student Affairs and from the Associate Vice Chancellor for Academic and Campus Technology will be required for a successful implementation of both.

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\(^1\) A portal can be defined as unified, web-based student services that are tailored to individuals based on their affiliation with CU-Boulder.
2.1 Web-Based Student Services

Recommendation: Provide excellent, unified web-based student services that are tailored to individuals based on their affiliation with CU-Boulder; in summary, a campus student portal.

To achieve this recommendation, four components are required: cross department collaboration, student involvement, selection of appropriate technology, and allocation of sufficient funding.

Discussion of the Recommendation

Rationale

Personal Look-Up Services (PLUS)\(^2\) is now used by 99% of CU-Boulder undergraduate students on a regular basis. It has the highest use and highest satisfaction rating of any student service on campus. Student responses on a recent questionnaire indicate a desire for more unification of campus web services, and fewer logins. (See Appendices for details) While PLUS as a student service is highly successful, it is based on outdated technology, proprietary programming language, and it can no longer be expanded to include the new services that students want and need. In addition, the campus must develop better security, reliability, and scalability through new software for its web-based services.

Student services have been splintered across multiple, independent structures: hosted locally on PLUS, hosted on the mainframe in SIS, hosted by a third party distinct from the University, or provided through a combination of mainframe and locally-supported databases. These services are difficult to create, hard to maintain, and present a fractured view of administrative services to our students. The current situation has also encouraged duplication of effort in developing sites.

In the future, when a new service is proposed, all departments that are critical to the success of the service delivery must be involved and able to participate in the effort.

PLUS and web-based services provide convenience by providing answers to routine and simple student service questions. While a web-based environment augments and enhances the student service experience, it does not take the place of meaningful, in-depth interactions between faculty and students, and staff and students. Developing a robust, unified, online student portal would allow more time for substantive interactions between students and the university. Ideally, a web-based student service infrastructure would be matched by an actual physical, centrally-located service center.

Current funding of the campus’s centralized student web services is inadequate. Although there is a modest general fund allocation for web-based student services, no current student fees are specifically earmarked for critical development and maintenance of PLUS. There may be opportunities through consolidation of multiple services to create a financially efficient service model.

Specific Recommendations Include

1. Build on the success of PLUS by strengthening and strategically expanding the services available on a single, student-centered web site.

\(^2\) PLUS, or Personal Look-Up Service, allows students to take care of 26 transactions from various administrative offices such as the Bursar, Registrar, Financial Aid, and Wardenburg, and provides important academic information to students.
PLUS currently allows 26 separate transactions from the Bursar, Financial Aid, the Registrar, Wardenburg Student Health Center, and ITS. Other services from departments such as Housing, Orientation, Libraries and Advising are vital to student success at CU and should be considered for the new, unified service site as it is developed. New services requested by students, including personal calendaring, online ticket purchases, announcements and academic alerts, would be appropriate additions to a portal. Other services, important to smaller populations, should be expected to meet campus-wide programming standards in order to be available to students on the central site. These other services might include Parking Management permit purchases, Student Academic Services Center workshops or tutoring information, study abroad applications or information, and telecommunications checkout processes.

2. The campus also needs to keep in mind that some faculty and staff need to be able to see the same view of academic and financial records that the student sees. As new student web services are developed, the campus should keep faculty/advisor access to information in the student portal as a goal. To support the development of this next generation of PLUS, a collaborative, interdepartmental structure is required to set policies, identify criteria and develop processes, priorities, and designate responsibilities by which services are added to and maintained in this new web site. This structure must work with other systems and system owners to ensure success.

Web development of services requires input from many different sectors: content providers, both service and academic departments, technology specialists from ITS and UMS, and web specialists and designers. These offices are in different divisions, yet need to work together closely to create the best service for students.

3. Develop a standard portal framework and infrastructure utilizing open, non-proprietary, component-based, reusable standard modules to support unified student services on the web.

4. Review and reassess the current levels and distribution of student fees and general and auxiliary funds in support of campus and university technology to assure adequate funding of all aspects of the development and maintenance of web-based student services.

**Steps**

**Implementation**

- Web-based student services are only a part of the overall IT strategic plan addressing the development of unified, integrated service delivery. The campus needs to set overall priorities and direction for the web, which include student services as a critical component.
- A cross-departmental team(s) with student representation, and a policy-setting group should be appointed by the chancellor or vice chancellor to
  - develop policies, criteria, processes, and priorities;
  - designate responsibilities; and
  - recommend a structure by which web-based student services can be expanded and improved.
- ITS should appoint a team to focus on selecting or developing appropriate technology to support web-based services for students and eventually, faculty and staff (see Section 2.2 Faculty/Staff Web-based Services).
Communication
A plan for a campus-wide discussion of these recommendations and their implications is important to the long-term success of web-based student services. This would be a long-term effort. Ultimately, a comprehensive communication plan for the marketing and promotion of the portal to students, staff and faculty would be essential.

Required Involvement

Governance & Authority
A campus web strategy group convened in 2000 noted that there was no campus-wide or system-wide management of web development and use, and that Institutional Relations (IR), now University Communications, and ITS both were managing web development. The group noted a need to clearly define campus-wide accountability, especially between ITS, IR, and individual departments. This representation of the campus’s web environment is still true in May of 2002. In the case of student web services, it is particularly important to understand the role and scope of the Division of Student Affairs and UMS, as well as ITS and University Communications. Project management, budgets, and final approvals are all critical issues for an expanded student services website.

Leadership and guidance need to be provided by the appropriate authority, specifically in the Office of the Vice Chancellor of Student Affairs, in the Office of the Associate Vice Chancellor Academic and Campus Technology and the Office of the Executive Director of University Communications. Their leadership would acknowledge and encompass student services and communications provided by all departments on campus, not just those in student affairs.

Required Departmental Involvement & Responsibilities
A shared commitment to a unified student web services site by all service providers is required. The collaborative effort between student information providers, ITS, and Web Communications must be led by the designated campus champion of student web services.

The following is a partial list of departments, divisions, and existing committees, which have interest in, or control over, some aspect of student services on the web:

- Student Affairs, Enrollment Management and the departments within this division
- Academic Affairs, College and School Dean’s offices, advising, and libraries
- Administration, particularly Parking Management
- Budget and Finance, particularly the Bursar’s Office
- Continuing Education
- UCSU
- ITS
- UMS and System Administration
- University Communications, particularly Web Communications
- Boulder Campus SIS Working Group
- Committee on Electronic Communication
- IT Council
- Student Fee Advisory Board
- Web-based Student Services Committee
**Expected Costs**

**Annual IT Infrastructure Investment**

Hardware infrastructure needs to be robust, redundant, fault-tolerant, and capable of supporting the entire Boulder campus student population during the heaviest usage period of fall enrollment. The hardware should be on a three-year replacement cycle.

A recent Gartner study states, “Although many enterprises think that the major costs of the portal go into the product acquisition and initial release, those that have done their homework recognize that the long-term TCO of the portal is driven more by the subsequent customization work.”

$236,000 hardware outlay  
$10,000 IDE (Integrated Development Environment)

**Operating and Maintenance**

Hardware maintenance: $30,000 per year for 24 by 7 support

**Personnel**

Commitment to open, platform-neutral, standards-based computing helps lessen the up-front costs, but increases the campus’s reliance and dependency on well trained IT professionals who understand leading-edge technologies. In addition to technological upkeep, web sites need updating, revising, and retirement in the same way as paper publications. The positions listed below would not all be rostered in ITS.

- Training: $7,000 per FTE per year (new or reallocated)  
- $30,000 for service site maintenance of content (new or reallocated)  
- 1 FTE for portal technical administration  
- 2 FTE for presentation programming,  
- 1 FTE for content continuance, project management, and planning (portal manager)  
- $250,000 per year would include new or reallocated salaries, benefits, and operating expenses.

**Funding**

Creating a central, unified area for services to the campus requires a stable source of centralized funding. This funding should be allocated from a number of areas.

Current general funds in involved and responsible departments should be reviewed for appropriate allocation toward the goal of unified web services. Funding for web-based student services has not kept pace with volume of student usage and the number of student services that have been shifted to the web. If a web process replaces an in-person or paper process the funding should be reallocated to support the web process costs.

The distribution of SIS and student technology fees should be reassessed to assure adequate funding of the development and maintenance of web-based student services. The campus should investigate the need for an increase in student fees to support web-based student services. A questionnaire with more than 500 student responses indicated a willingness to increase student fees for better and expanded web-based services.

**Timing**

Enhancements to PLUS including the financial aid award acceptance and several bursar transactions have already begun and should be completed by summer of 2002. ITS and Web Communications should continue to support PLUS, but consider only critically vital additions or improvements to PLUS after summer 2002.
ITS should dedicate resources to the development of a portal software framework for campus-wide use with special consideration for web-based student services. Production of the portal technology should be a goal for spring 2003.
2.2 Faculty/Staff Online Services

Recommendation: Provide unified, web-based information services for faculty and staff utilizing a standard portal framework.

The campus should design and implement a campus-wide Information Portal to support the delivery of personalized web-based services to faculty and staff. A single intuitive gateway should be developed to integrate web-based information and applications, and provide a personalized interface to information resources in a secure, consistent and customizable manner.

Discussion of the Recommendation

Current Situation
Campus web-based services are delivered primarily through static web pages and a wide range of unconnected general web applications that are not directly oriented toward a person’s role within the University or toward specific customer communities. Content, data and applications cannot be delivered in ways tailored to a user’s needs. Authentication and authorization methods for accessing campus web services are inconsistent and present security risks, requiring users to enter separate, (and often unprotected) login names and passwords for each web application accessed.

In the simplest definition, a portal is an aggregation point of information, applications, views, and services brought together into a single view, and often customized for the viewer based on a user’s profile or preference. Portals streamline access to content and applications by becoming a one-stop interface for the user providing web services relevant to the user’s needs. Information consumers only care that services are accessible and delivered efficiently. This assumption has led other universities to orient their portals to offer services according to “user intentions” or campus role.

Rationale
CU-Boulder must develop enterprise-wide thinking that leads to easy, seamless information access for faculty and staff regardless of where the data resides. The campus should consider developing multiple portal services oriented toward faculty and staff roles within the University community, based upon a standard portal framework and infrastructure that utilizes open, non-proprietary component-based, reusable standard modules. These infrastructure components will allow the portal services to provide a consistent interface to a disparate set of back-ends including PeopleSoft, mainframe systems, and numerous departmental legacy systems. By leveraging a common portal framework and underlying infrastructure, the campus can create true end-to-end systems for any community of interest, personalized to deliver a full range of academic and administrative services, campus intranet offerings, student/faculty communication, distance learning resources, community tools and Internet content from a single login and fulfill the need for online communities.

Specific Recommendations
- Determine functional requirements for Faculty/Staff portal services including security, privacy and access needs, transactional services, data and information requirements, priorities and goals for portal development and implementation.
- Create and fund a portal infrastructure implementation plan.
- Fund and implement a centralized, highly scaleable platform for hosting the portal, portal infrastructure and applications.
• Fund software development for portal integration, portal operations and software maintenance activities.

Implementation
• Design and develop a test/prototype portal for use of a limited number of faculty/staff.
• Create core technical teams and representative faculty/staff portal steering groups and processes for defining project scope, determining core portal services, prioritizing business requirements, formulating policies and standards for the appropriate development and use of the portal.
• Analyze and evaluate alternative approaches for meeting portal infrastructure requirements, select acquire and implement infrastructure framework components.
• Develop training programs, development standards and best practices for campus software development staff to adhere to portal infrastructure integration requirements.
• Design, develop and implement a full production faculty/staff portal.

Communication
Create and fund a plan to communicate to the campus regarding portal design goals and objectives, portal implementation schedules and solicit input to focus groups. Provide a feedback mechanism.

Policy and Standards
• Create a policy to resolve issues related to accessing campus departmental data sources and information through a campus-wide portal framework.
• Create policy and technical standards for web-based content and applications to ensure adherence to campus infrastructure requirements.

Required Involvement

Governance and Authority
Office of the Associate Vice Chancellor of Academic and Campus Technology.

Required Departmental Involvement and Responsibilities
• IT Council to provide guidance and programmatic direction.
• ITS to provide project management, systems analysis and design, software development, training, technical standards, operation and maintenance of portal initiatives.
• University Communications to provide web content consulting and collaboration.
• University Management Systems (UMS) to provide Human Resource, Financial and Student information resources.
• Staff and faculty representative groups to provide overall portal design guidance and prioritization of requirements.
• Campus departments as web service providers to consult and collaborate on portal integration issues.

Estimated Costs

Annual IT Infrastructure Investment
Implementation of an infrastructure to support portal development and deployment is a necessary foundation for multiple portal efforts. As such, the infrastructure costs should be considered separate from individual portal development and deployment efforts. Infrastructure costs include web portal software, web server hardware and software, web application hardware and software, database hardware and software and network connectivity. These costs will range from $200,000 to $400,000, based upon the alternative approach selected.
Operating and Maintenance
Depending upon alternative selected, hardware and software infrastructure maintenance costs will average between $40,000 to $80,000 per year.

Personnel
Personnel for development and implementation of a faculty staff portal needs to be increased by approximately 2.5 full-time employees (FTE), over a period of 1 year, which will cost approximately $235,000 (including salaries, benefits, training, travel etc).

Personnel for maintenance and support of a faculty staff portal software application needs to be increased by .5 full-time employee (FTE) which will cost approximately $45,000 per year.

Funding
Funding will likely include a combination of charge-back fees for specific portal web-based services and institutional funding for campus-wide core portal services.

Timing
A faculty and staff portal development initiative can commence in fiscal year 2002-2003.