

Updating UC Berkeley's Campuswide IT Strategic Plan (2007–08)

The Campus Technology Council (CTC)¹ is refreshing the campuswide Information Technology (IT) Strategic Plan. By identifying current and emerging trends and related IT needs for the critical areas of research, teaching and learning, student experience, and administration, the updated Plan will both provide context for anyone developing IT Funding Requests for FY 2008–09, and provide context for members of the CTC both when they evaluate and prioritize the requests and when they identify the IT priorities for the campus.

Overall Campus Environment

The openness and dissemination of information and knowledge via technology has created the expectation that research and teaching materials will be accessible beyond the lab, classroom, and physical libraries and will be available to members of the campus community at all times, along with campus services and data.

Specifically, the campus community needs and expects:

- basic IT resources that are adequately supported and refreshed in order to carry out their research, teaching and learning, and administrative work;
- seamless, integrated, immediate, and continuous self-service access to information and services;
- robust technology tools to support collaboration; and
- access to tools and data/information that enable community members to develop their own integrated solutions.

Challenges and opportunities related to meeting these needs and expectations are numerous, for example:

- New and emerging technology solution-building capabilities (Web 2.0, SOA, mashups, social networking, etc.) have democratized the development of solutions by enabling faculty, staff, and students to create their own unique solutions without ever needing to know the inner workings of IT programming and delivery. This evolution fundamentally changes the traditional model of IT service delivery, and raises significant questions about how the University should deploy IT resources to best meet the needs of its constituents.
- The barriers that prohibit using research resources in support of teaching and learning, restrict both the workflow and the flow of information between research and teaching and learning, thereby limiting the opportunities for research to enrich the inquiry-based learning environment, and vice versa.
- It is critical that the campus creatively and effectively use IT services to meet ever more sophisticated research, planning, and reporting needs.

¹ An important outcome of UC Berkeley's 2004–2006 campuswide information technology strategic planning process was the formation of the Campus Technology Council (CTC) as the new, consolidated, campus IT governance structure at Berkeley. Chaired by UC Berkeley's CIO, the CTC consists of ten Associate CIOs representing different areas of campus IT consumption, and two representatives from the Academic Senate: the Chair of the Committee on Academic Planning and Resources Allocation (CAPRA) and the Chair of the Committee on Research (COR). The CTC identifies and prioritizes campuswide information technology needs and opportunities, in support of UC Berkeley's mission and priorities. During its first year, the Associate CIOs worked as a group to review and prioritize IT proposals submitted during the FY 2007–08 campus budget process. Approximately \$6 million in central funds were allocated to projects prioritized by the CTC.

- The progressively more complex regulatory and compliance environment, and the resulting focus on risk management, security, and business resumption preparedness, has prompted managers to look to technology to help reduce costs and eliminate redundancy. It also further underscores the need for effective collaboration, greater flexibility, and data integration across the campus.

DRAFT

Current and Emerging Trends in Research

- 1) **Increased reliance on IT across all research areas**, with heterogeneity in specific needs across departments and functional areas.
- 2) Increased focus on **interdisciplinary research** by faculty and funders.*
- 3) Increased emphasis on **multi-campus research** programs and projects.*
- 4) Increased emphasis on **research collaborations with industry**.*
- 5) Increased need to **collect, archive, manipulate, and mine large data sets**.*
- 6) Increasingly **sophisticated research tools and environments**.

UC Berkeley's Research Technology Needs and their IT Implications

- **Research 1: Basic IT resources.** Researchers and research support staff across disciplines require a minimum level of research support with technical compatibility to facilitate research and the sharing of data, and to avoid significant reinvestment and training for each new research initiative.*
- **Research 2: Technical support.** Campus research units have considerable hardware and software resources that often are administered part time and are poorly and / or insecurely configured.*
- **Research 3: Data stewardship and digital asset management.** Disparate, massive data sets require next-generation metadata management solutions and application archiving practices and tools to ensure availability, accessibility, and, where appropriate, security of data.
- **Research 4: Advanced collaborative and multi-site research tools and services.** Research endeavors between campus departments, among campuses, and with the private sector increasingly rely on shared resources located at multiple academic and for-profit institutions. Standards and templates are needed to effectively manage these collaborations.
- **Research 5: High-performance computing for analysis, simulation, visualization and modeling environments.** Even though computing power now doubles on average every 18 months, research requirements for network capacity, storage, and visualization tools grow even faster.*
- **Research 6: Campus strategy for housing computing clusters.** Researchers increasingly need high-performance computing clusters to conduct their work. As clusters take up valuable on-campus space and require expensive retrofit to provide adequate electrical and HVAC accommodation, a new strategy for housing and managing the clusters is needed.

*Priorities, trends and implications originally identified during 2004-06 IT Planning process.

Current and Emerging Trends in Teaching & Learning

- 1) **Delivery of instruction and assessment** of student learning have moved from traditional classroom to **blended or hybrid environments** that include both face-to-face and virtual interactions.
- 2) Discovery- or inquiry-based learning pedagogies supplement traditional lecture-based modes of transmitting instruction and create **opportunities for stronger linkages between research and teaching missions**.
- 3) **Instructional design and assessment of student learning have transitioned** from solitary to collaborative activities among and across instructors, students, GSIs, and academic partners, which transcend traditional departmental and disciplinary lines and **require new models of partnership** across the academy and with the larger community.
- 4) **Access, management, preservation, sharing, and assessment of digital content have become daily activities** for faculty and students as course content and products of student learning become predominantly digital.
- 5) **New policy challenges concerning intellectual property and privacy** have been exposed by digital course content and products of student learning.
- 6) Students' comfort levels with multitasking in multimedia environments have **changed their learning styles and expectations about knowledge delivery**.

UC Berkeley's Teaching & Learning Needs and their Technology Implications

- **Teaching and Learning 1: Basic learning environment.** New instructional methods and changing student learning styles have increased the baseline requirements for installed technology in classrooms, labs, libraries, and other learning environments, as well as the demand for robust and well-integrated campus computer systems to support the full range of new teaching and learning approaches.
- **Teaching and Learning 2: Collaborative teaching and learning.** New and existing computer-based tools and physical spaces need to be designed, constructed or updated to facilitate discovery-based and collaborative teaching and learning activities among students, instructors, and other campus and community learning partners.
- **Teaching and Learning 3: Preservation of instructional content.** As instructional content moves from print format to digital, a well-designed technology infrastructure is needed to support the management, storage, and long-term preservation of content; and discipline-specific pedagogical tools are needed to access and engage with such content. Also needed is a coherent policy about copyright and intellectual property that maintains the rights of faculty, students, and the institution.
- **Teaching and Learning 4: Technological proficiency of faculty.** As educational technology becomes fully integrated with instruction, faculty need to develop facility with technology, and educational technologists partnering with faculty need a sophisticated understanding of teaching and learning practices in order to best support them.

Current and Emerging Trends in the Student Experience Area

- 1) Increasing use of **social networking tools and Web 2.0 software** services is fundamentally **changing student expectations** about how they access and receive information.
- 2) **Students' service expectations**, such as being able to seamlessly cross institutional boundaries for coursework, are **outpacing current delivery models**.
- 3) **Students are being asked to carry more of the financial burden** for the new and expanded services that are required to meet their expectations. At the same time, rising costs of education are **raising the expectations of students and parents about the quality, breadth, and depth of services provided by universities**.
- 4) Growing reliance on alumni donations highlights the **need to provide an outstanding experience so current students** can build a positive relationship with Berkeley and **become future donors**.

UC Berkeley's Student Experience Needs and their Technology Implications

- **Student Experience 1: Student services.** Ongoing support for existing and emerging student service improvement projects are needed to provide student experiences comparable to those at our peer institutions.
- **Student Experience 2: Student systems.** Projects such as Quali, Student Systems 2012, and the Student Data Warehouse are being designed to streamline student services and improve customer experience and satisfaction.
- **Student Experience 3: Web 2.0.** Web 2.0 technologies need to be investigated and incorporated into the delivery of student services.
- **Student Experience 4: Privacy.** Privacy of student data must be protected as student data usage expands.*
- **Student Experience 5: Metrics.** The effectiveness of new systems/approaches will need to be monitored and refined through the use of targeted surveys and data analysis.*

* Priorities, trends and implications originally identified during 2004-06 IT Planning process.

Current and Emerging Trends in the Administration Area

- 1) **Increasing need for accurate, consistent, and credible data**, both for planning and for compliance with external oversight and reporting demands.
- 2) The decentralized campus environment calls for **self-service solutions** that are easy to use and **available at all times**.
- 3) Self-service solutions must be balanced against the needs of **data security and integration**.
- 4) Administrators and users expect technology to support **improvements in productivity and accountability**.
- 5) **Increasing development of local and UC-wide systems** can divert resources that could be invested in campus-level solutions.

UC Berkeley's Administration Needs and their IT Implications

- **Administration 1: Data integrity, management and analytics.** The growing importance of data integrity for reporting and compliance demands improved data management practices, tools and analytics.
- **Administration 2: Improved systems integration.** The growing number of systems housing critical institutional data requires use of architectures that allow full and transparent integration of those systems.
- **Administration 3: Universal tools.** As the need for access to systems and data becomes more universal and user-centered, tools and systems that are easily accessible for all levels of users is essential.
- **Administration 4: Campus commitment.** A built-in commitment to frequent upgrades for enterprise systems.
- **Administration 5: Identity management solution.** A common authentication, authorization and access framework is needed to provide seamless, integrated access to critical business systems.
- **Administration 6: Data security best practices.** As security and privacy of data become increasingly legislated, clear communications about best practices in the protection of data, as well as the availability of the tools to achieve them, are critical.
- **Administration 7: Representative IT governance and transparent investment decision-making.** The continuing decline of state funding makes it increasingly important to ensure campus participation in and transparency of the prioritization of IT investments.
- **Administration 8: Immediate versus best solutions.** Immediate needs balanced against finding the best solutions for the campus and or UC system as a whole.