ACADEMIC INITIATIVES

A major intended outcome of the Integrated Technology Strategy (ITS) is to facilitate the use of information technology in the service of Excellence in Learning and Teaching. Of the original 11 ITS initiatives, four focus directly on the creation, collection, and distribution of technology-mediated instructional resources for use in on-campus and off-campus education. In the "first wave" of initiatives, priority for funding was given to projects thought to have a) the greatest immediate benefit to instructional programs, b) the highest likelihood of engaging CSU faculty to work collaboratively, and c) the strongest potential for demonstrating the cost-effectiveness of using advanced networking technologies to help contain growth in costs associated with expanding enrollments.

Four initiatives comprised the initial rollout of systemwide academic technology projects: Library Resource Sharing, Multimedia Repository, Distributed Learning and Teaching, and Campus Centers for Instructional Technology Development. Progress on these initiatives has been part of the MOS reporting process since its inception.

As noted in the Introduction, a series of "second wave" academic technology initiatives has been recently launched. Work has progressed on a number of these initiatives as described below: Digital Marketplace, Transforming Course Design, and Institutional Teaching Commons.

Library Resource Sharing

The upward spiral in the cost of books and periodicals had been a drain on campus resources and a threat to academic program quality maintenance for years prior to the campus presidents' decision to adopt the CSU Integrated Technology Strategy. The benefits of distributing the purchase of books among campuses and sharing them via interlibrary loan were offset by unacceptable time delays and rising costs of handling remote borrowing requests. Moreover, students and faculty increasingly prefer electronic access to publications and data sources over print materials. The decision was made to address this common problem by exploiting emerging network technologies and cooperative resource acquisition.

Cooperative Library Resource Acquisition and Sharing

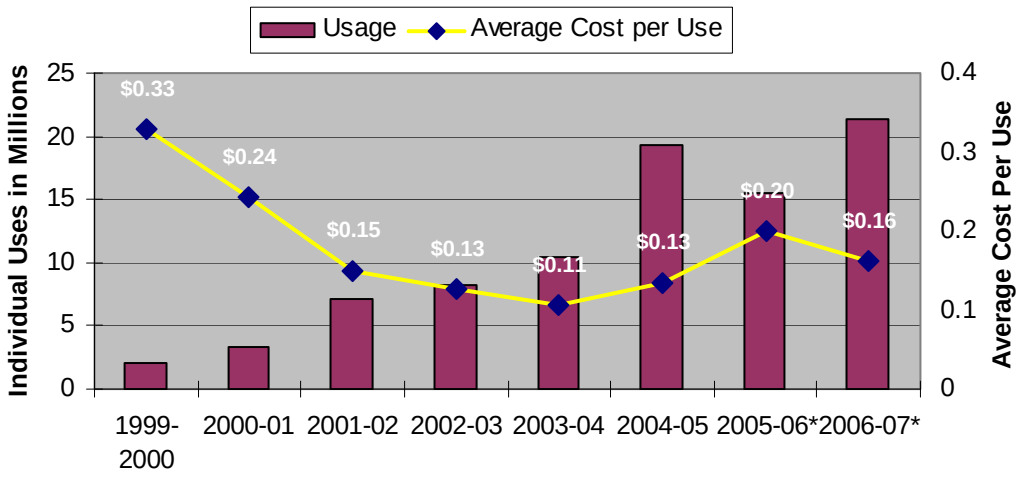
CSU library directors responded to the challenges and trends described above by agreeing to collaborate in the purchase of high demand library resources and to share them electronically. The office of Electronic Information Resources (SEIR) at the Chancellor's Office provides the body and structure of a successful cooperative program guiding the evaluation and selection of learning materials that benefit all of the libraries in the CSU system. The cooperative program succeeds by leveraging the collective buying power of CSU libraries to obtain maximum value for its dollars, by reducing the duplication of effort in the negotiation and acquisition process, and by raising the strategic profile of library activities and programs.

The Electronic Core Collection (ECC), the outcome of this collaborative approach, is a collection of online bibliographic and full-text information resources selected to support common core curricula. Core curricula are defined as those offered by at least two-thirds of the 23 CSU campuses. Since it became operational in 1997, the number and variety of information resources made available through the ECC have grown to a collection that in 2006-2007 comprised over 40 databases and more than 35,000 full text titles. These online resources are used by students and faculty in the Arts and Humanities, Life and Physical Sciences, Social Sciences, and Professional Programs (including Engineering, Computer Sciences, Nursing, Education, and Business and Public Administration). The ECC was expanded in 2006-2007 to include several additional resources. These include: JSTOR Collections, American Chemical Society (ACS) Web Editions and Archives, ACS Chemical and Engineering News, American Institute of Physics Journals Online, GenderWatch, Grove's Art and Music, MathSciNet, Mergent Online, and Modern Language Association Bibliography Online. Upgrades were acquired for the Project Muse Premium Collection, the Oxford English Dictionary Online, and the Springer Journals.

Figure 4A illustrates the benefits to CSU students and to CSU campuses that have been achieved through the collaborative purchase of electronic information resources. The dramatic growth of this program is due mainly to the rapid development of the Internet as a vehicle for content delivery and access point for information, and to the dual economic pressures of tight library budgets and rising prices of information resources. Several additional factors have

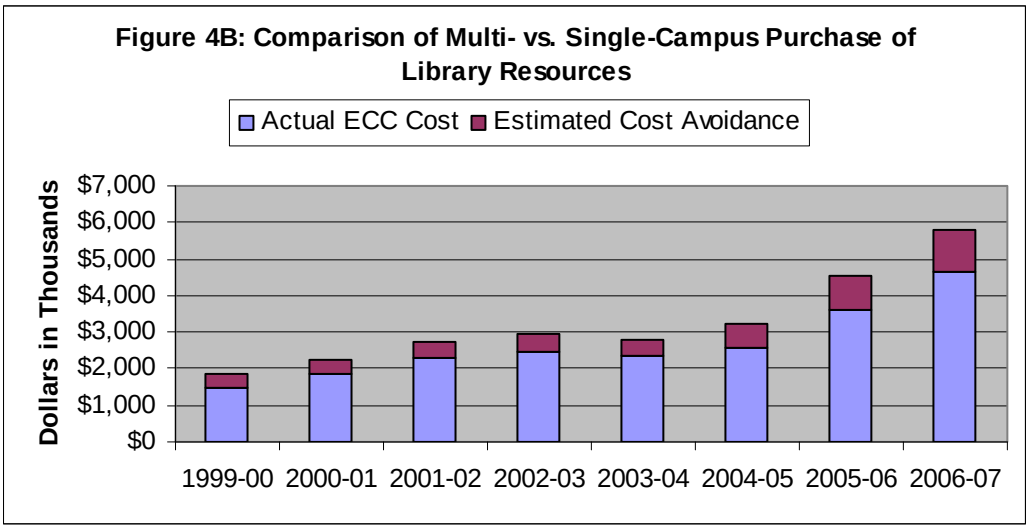
contributed to increased usage. These include: greater availability in electronic format of key library materials; greater ease in accessing these resources remotely; enhancement and growth in scholarly electronic collections; enhanced search capabilities; including the ability to search more than one resource simultaneously; increased awareness of electronic resources in general; and the continued success of training and teaching programs promoting the use of licensed electronic resources to support the research and teaching needs of CSU students and faculty. Since the FY 1999-2000 report, the cost per usage for the ECC databases examined in this study has declined overall by more than half. The margin of use continues to outpace the rate of cost increase for core electronic resources. In 2006-07 ECC database use increased by 37 percent over 2005-06, resulting in a decline of 18 percent in overall cost per use. Over the eight year period, the annual growth in use has averaged just under 46 percent while cost per use has fallen by an annual average of 5.6 percent.

Figure 4A: Online Database Usage - CSU Electronic Core Collection



*Usage statistics have fluctuated from 2005-06 and 2006-07 due in part to the continued emergence of so called "federated searching". Federated searching allows users to query multiple databases with a single request from a single source; i.e., a single search is "broadcast" to multiple databases and the results are delivered to the user. Because these types of searches are not initiated at each individual vendor's search platform, it affects the way database queries are aggregated and counted. Consequently, it complicates for vendors and for libraries the task of monitoring and reporting accurately uses of a particular database. SEIR worked with vendors in 2006-07 to minimize the effects of federated searches on reports of resource use. New metrics were employed to report ECC usage for 2006-07. Data for the previous year were adjusted to bring the 2005-06 numbers into line with the 2006-07 figures. The counts for 2004-05 could not be recalculated for this report.

Figure 4B shows the total actual costs of the ECC and the cost avoidance achieved through collaborative purchasing. Cost avoidance is defined as the difference between what campuses actually paid and what they would have paid had they purchased the resources separately. All program administration costs are included in the "actual ECC costs". The amount of annual cost avoidance remained stable at between one-third and one-half million dollars annually. For FY 2006-2007, the cost avoidance attributable to the ECC program is estimated to be just over $1.1 million.



High volume use of electronic library resources is confirmed by the responses of faculty and students in surveys conducted since 2000. In these surveys between 85 and 90 percent of faculty and between 80 and 85 percent of students reported using online information resources such as databases, catalogs, and electronic journals. (See Table 8.1 in Appendix A.) They rated the level of satisfaction with the quality and ease of use of those resources as fairly high (i.e., mean scores between seven and eight on a zero-to-ten scale).

Unified Information Access System (UIAS)

The Unified Information Access System [UIAS] is designed to complement the California State University libraries' collections of owned print/microfilm and licensed electronic content. Students and faculty members can discover information that may suit a need and then, when an article, paper, report or book has been identified, retrieve these information items as quickly and as easily as possible. Information technologies have evolved continually and rapidly in the eight years that have passed since *Measures of Success* began reporting on the progress of ITS initiatives. Library resource sharing systems developed at the beginning of the decade to accomplish goals of the UIAS, including the automation of interlibrary loans, have been superseded by newer, more powerful tools. Pharos was succeeded by RSS, which in turn has been shut down in favor of systemwide adoption of the Link+ system.

In addition, the UIAS introduced new tools designed to simplify the discovery and delivery of information resources such as *Metalib* and SFX. *Metalib* is a user interface that enables simultaneous searching of multiple information resources. It is designed specifically for an academic environment to reduce the amount of time students and faculty spend locating journal articles, reports, papers, and books for research projects. SFX works with *Metalib* and proprietary cataloging applications to identify the appropriate copy. (An "appropriate copy" is a publication already owned or licensed by a university library for use by members of that campus community.)

Remote Borrowing of Journal Articles

First implemented in 2002, the SFX OpenURL Link Resolver maintains a database of journals and books and other resources that all CSU libraries own or have licensed for use. SFX instantly can identify whether or not a desired journal article is available. Where an appropriate copy is not available, SFX offers an easy way for users to request a copy of the article from another CSU, UC or other library. In the past two academic years the SFX system has each year delivered just under 4.5 million menus where CSU students and faculty could find hypertext links to the electronic or print version of a desired periodical publication. The number of actual retrievals of information available through the electronic and print collections physically located in or licensed through CSU libraries and beyond grew by over 20 percent over this period, from 2.3 to 2.8 million. The sheer volume of use testifies to the value that the SFX services offers to CSU students and faculty.

Remote Borrowing of Print Materials

Interlibrary loan was established in the United States a century ago as a mechanism for temporarily sharing print materials not available in local libraries. Increasing demand and rising costs have made it progressively more difficult for CSU campuses to sustain these services. One goal of the UIAS project is to employ information and telecommunications technologies to reduce the cost and accelerate the speed of borrowing requests.

Figure 4C profiles fluctuations in the number of remote borrowing transactions handled by CSU libraries over the past six years. It also shows the percentage of all transactions that were mediated (i.e., requiring the individual attention of library staff) and automated (processed without staff involvement). During this period, the percentage of transactions handled by automated systems has grown from a fourth to a third of all remote borrowing requests.

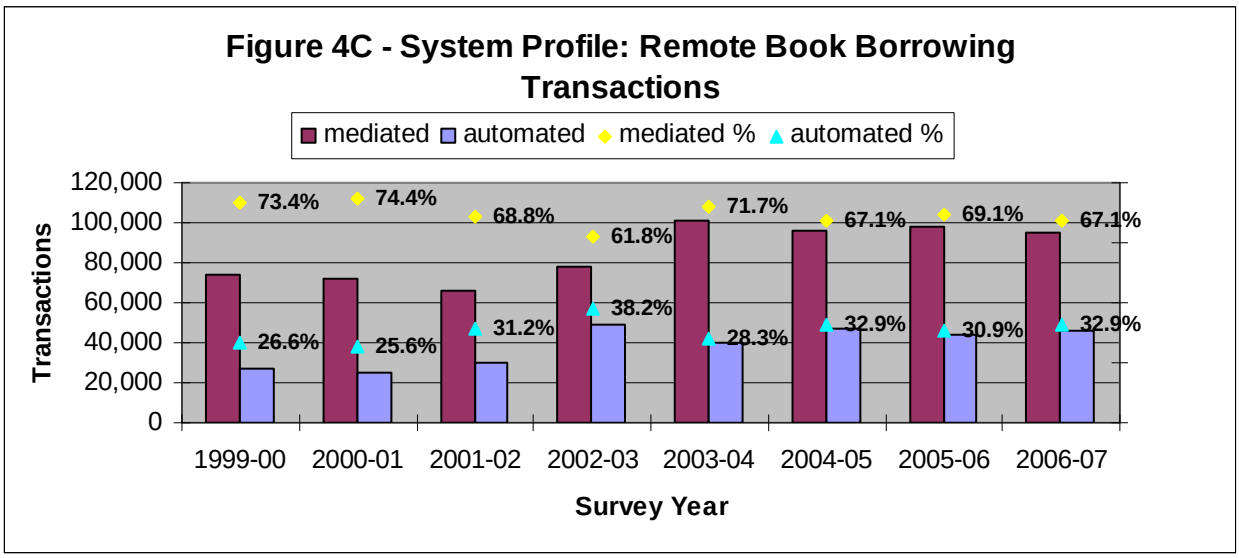
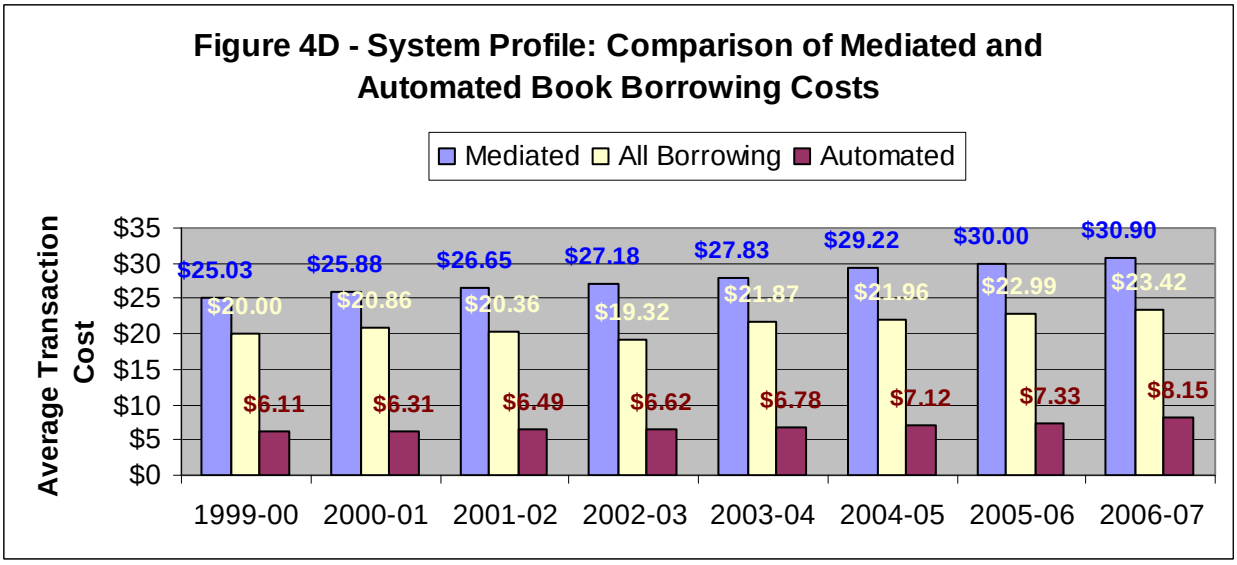
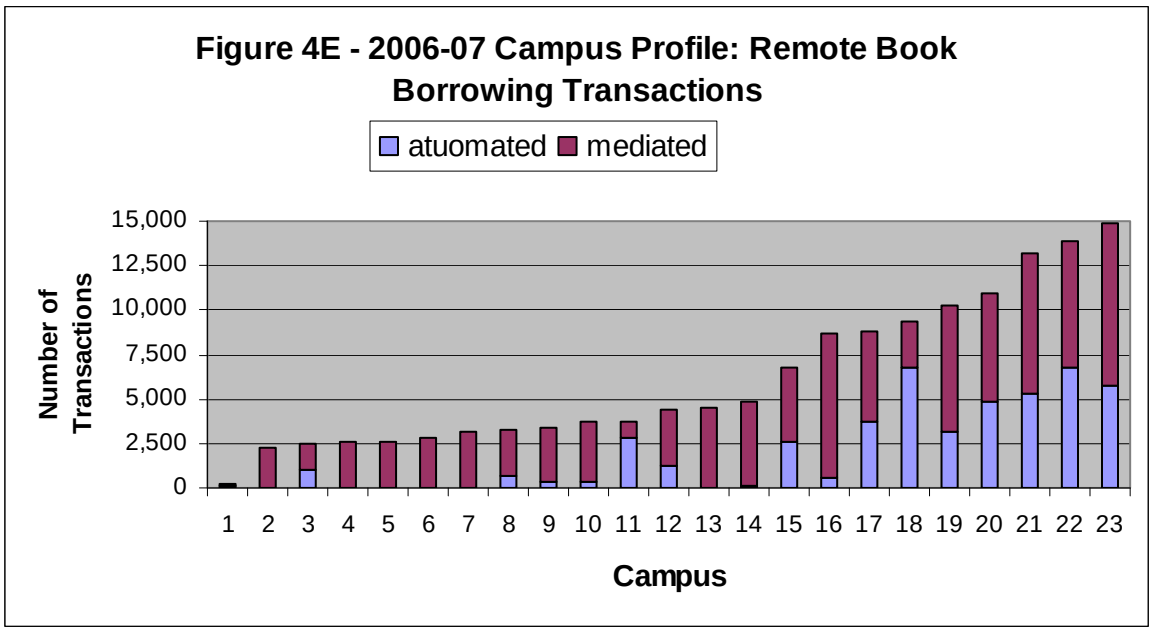


Figure 4D shows the impact of automating borrowing transactions on the cost of providing interlibrary loan services. The average cost of processing such requests varies with the ratio of automated to mediated transactions: the greater the proportion of automated transactions, the lower the average cost for interlibrary loans. The rise in average cost per transaction over the years reflects general inflationary trends.



Campuses vary greatly in the volume of remote borrowing that occurs and in the percentage of such requests that are handled by automated systems, as depicted in Figure 4E. The percentage of automated borrowing is expected to go up substantially when all campuses have converted to the Link+ system by the end of 2007-08.



The Student Information Competence Project

Since the mid-1990s, the CSU has sought to define and promote the development of students' ability to use digital information processing and communication tools that have become the standard means of accomplishing work in the knowledge economy. Previous editions of *Measures of Success* have highlighted steps the CSU has taken to develop instructional tools and strategies that campuses can use to measure and to develop these competencies.

In 2003-04 the CSU took the lead in forming a partnership with the Educational Testing Service (ETS) and several other colleges and universities to develop an interactive, Web-based assessment tool employing realistic scenarios and simulated search environments to measure students' skills in using information and communication technologies (ICT). Among the participating institutions were UCLA, Purdue, the CUNY system, University of Washington, University of Texas, and University of Central Florida. ICT literacy is now considered a "second wave" academic technology initiative.

The first large-scale administration of the assessment tool, now called *iSkills*™, occurred in spring 2005. More than 3,300 CSU students participated, and the results, while preliminary, strongly suggest that much work needs to be done to improve skill levels for success in the university and in the workplace. The *iSkills*™ assessment was released in its final version for ongoing use in August 2006.

In 2006 eighteen grants were awarded to CSU campus faculty and librarians to explore the use of *iSkills*™ as a tool for assessing entering students' ICT skills and for integrating the assessment in first-year experience and other academic programs. Several of the centrally funded projects involve longitudinal assessment studies that will continue into the 2007-08 academic year. More the 3,700 administrations of the assessment will be conducted over the course of the studies. Information about the projects can be found at http://www.calstate.edu/ls/infocomp.shtml.

Consistent with these efforts, CSU campuses are slightly more likely to have a computer literacy or information competency requirement for undergraduates than comparison institutions nationally (57 percent versus 50 percent), according to the latest Campus Computing Survey. Very few campuses in the CSU or the comparative institutions have formal requirements that students own a computer. Based on the CSU biennial user surveys, almost all students have access to or own a personal computer.

Multimedia Repository

The goal of the Multimedia Repository Initiative is to provide electronic access to instructional resources not normally available in the academic market. The initiative focuses on the conversion into digital form of images, audio, and video materials, and on the storage of interactive learning tools that use computing technologies to model complex processes.

For many years, individual CSU campuses and the CSU system have provided financial support for special projects designed to improve learning and teaching in various disciplinary fields. One consequence of these many projects is the accumulation of large collections of non-proprietary instructional materials accessible only to the faculty and students on the campuses where the project activity occurred. Impediments to shared use of these resources include the high costs of duplicating, warehousing, distributing, and (in some cases) updating them. Ignorance of the existence of the resources and the technical incompatibility of equipment and software are major barriers to resource sharing among colleagues and across campuses. Finally, even if such collections could be distributed at a reasonable cost, there would be little demand for them absent an understanding of how to use them effectively.

The emergence of digital technologies and the ubiquitous availability of high-speed telecommunications networks offer practical, affordable ways to remove these barriers. Once images, video, and audio recordings are converted into digital form, resources not restricted by copyright protection can be shared and used at low cost by anyone connected to a high-speed network. The ITS Multimedia Repository Initiative was launched to make non-proprietary multimedia resources available to the broader CSU community.

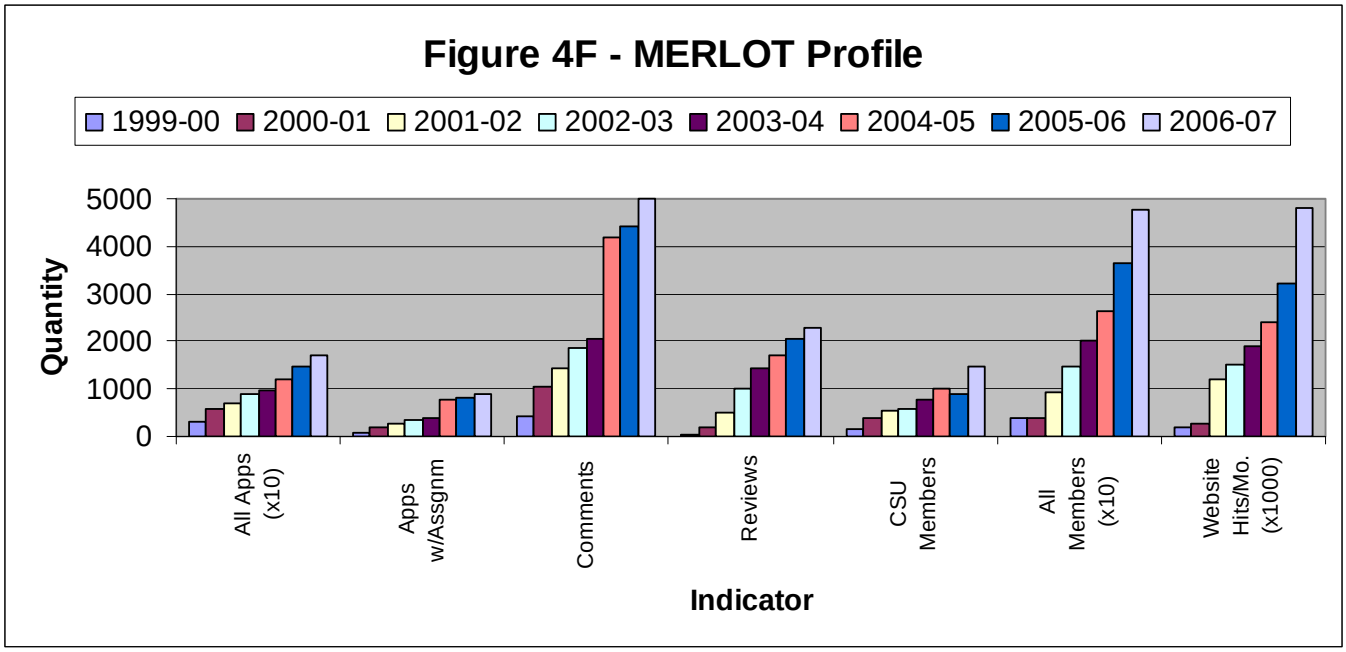
With ITS support, the CSU Center for Distributed Learning (CDL) was established on the Sonoma campus in March 1997. Its mission is to create, store, and distribute Web-based multimedia instructional materials and information of academic value to CSU faculty and students. The CDL has supported the projects and activities described below in fulfilling this mission.

Multimedia Educational Resource for Learning and Online Teaching (MERLOT)

MERLOT became the incubator for all of the projects under the Multimedia Repository initiative and is the de facto name for the initiative itself (www.merlot.org). MERLOT has grown in quantity and quality in each of the seven years since the first *Measures of Success* report was published in November 2000 (Figure 4F). The number of learning applications available by the end of FY 2004–05 was 12,108, exceeding the 10,000 targeted for 2008. By the end of FY 2006-07, there were over 17,000 learning materials in the MERLOT repository. In 1999, the number of learning applications with sample student assignments was targeted to reach 500 by 2002. By the end of FY 2004–05, that target had been exceeded by half (780); the collection numbered 889 as of June 2007. As the chart below shows, the quantity of user comments and faculty reviews also continues to increase. Comments and reviews provide pedagogical assistance similar to sample assignments.

Individual memberships in the MERLOT community increased to 47,541 members in 2006-07, continuing the annual 30 plus percent gain in membership of over the past four years. CSU membership increased by almost half over the previous high of 2004-05, bringing the total to 1,473. 1,473 MERLOT Website hits, a good indicator of interest in the repository, increased by a third over the previous year to an average of 4.8 million in 2006-07.

Currently, 23 institutions and systems of higher education are paying members of the MERLOT project. Alliances established with more than a dozen professional and disciplinary organizations serve to increase the quantity and quality of materials available to faculty and students. MERLOT has established partnerships with commercial organizations to support its programs and to strengthen its financial base. MERLOT services can now be integrating into all major Learning Management Systems (e.g. Blackboard, WebCT, Desire2Learn, Angel, Moodle, Epsilen), making access to online learning materials even easier for faculty and students. Technical innovations facilitate efforts to enlarge and improve the repository. MERLOT now has the capability to search international digital libraries of learning objects from Japan, Australia, Canada, and the European Union (see http://fedsearch.merlot.org/search.jsp), digital libraries from professional societies (IEEE Computer Society, American Association for Physics Teacher) and from other institutions (University of North Carolina's Professional Development Center). Collectively, this global consortium brings about 100,000 online learning resources to the fingertips of CSU faculty, staff, and students.



* The definition of Website "hits" and "visits" has changed over the years, as have the technical means for tracking them. The data presented here are a best effort to indicate changes in the volume of requests for information from the MERLOT Website.

MERLOT Faculty Development Activities

Creation of more effective and less costly means to develop faculty skills for using online curricular resources effectively is a critical factor in realizing the benefits of these collections. MERLOT supports a three-tiered professional development program for faculty:

- Tier one: Campus faculty development personnel receive training on strategies for teaching faculty how to use MERLOT resources. The goal of this "train-the-trainer" approach is to produce local and sustained support for faculty development within campus cultures.
- Tier two: Professional development programs are delivered directly to faculty at the MERLOT International Conference as well as national and regional conferences sponsored by discipline-based professional societies.
- Tier three: Both faculty and faculty development personnel use MERLOT's digital library of materials on how to teach with technology to develop and deliver self-directed or formal professional development programs.

In addition to these faculty development initiatives, MERLOT sponsors a professional recognition program. To recognize outstanding authoring of online learning resources, MERLOT provides the Editor's Choice and Classics Awards. To recognize faculty's contributions to developing and evaluating the shared collection of online resource, MERLOT provides the Volunteer of the Year Awards, the Distinguished Service Award, and new Community Contributors program which reinforces increasing participation in building MERLOT's collection. MERLOT also maintains a Website and a set of management tools ("Personal Collections") through which faculty can build electronic portfolios of learning objects together with information about how to use them.

The community of MERLOT users continues to expand. Formal alliances exist with nationally recognized faculty development organizations such as the EDUCAUSE Learning Initiative, the TLT (Teaching and Learning with Technology) group, the New Media Consortium, and the Carnegie Foundation for the Advancement of Teaching.

The IMAGE Project

The IMAGE project (http://image.calstate.edu) provides online access to digitized collections of copyright-cleared images for CSU faculty, students, and staff. With the addition of 8,049 new images this year, IMAGE provides electronic access to a total of over 62,000 images of art, architecture, science, technology, and culture images from around the globe. Images added this year cover the areas of Asian and Western art, literature, theatre and film, undersea life, technology instruments, and history. Over 4,500 images have been donated to the collection from outside the CSU, from other universities or individuals.

With the addition of 166 new portfolios this year, IMAGE now has over 700 portfolios that facilitate easy access to subsets of the collection in fields such as geography, science and technology, history, music, dance, and commerce. Among these portfolios are 24 specifically designed to meet K-12 curriculum standards adopted by the California State Board of Education. Over 200 faculty have requested accounts in order to create their own portfolios and to contribute images to the collection. Use of images in the collection was robust again this year, with a peak six-month total of over 76,800 unique users and over 6 million hits.

The IMAGE Project team continues to make presentations within the CSU and at conferences of professional association to raise awareness of the availability of the repository among faculty and staff, and to develop support materials to assist faculty and staff in effectively utilizing the IMAGE database. New outreach efforts were made this year to 1600 CSU arts faculty, and a similar effort is being mounted for Social Science faculty.

The IMAGE Project continues to collaborate with campus visual resources curators in digitizing and cataloging images and in coordinating group software licensing where appropriate. The Project also continues to collaborate with two other national projects to provide tools to faculty for presenting and authoring materials that use images. Almagest is an open-source image presentation program and Pachyderm is an open-source interactive-media authoring tool. Progress was made on providing an Almagest server for faculty classroom presentations, and on linking the IMAGE Project collection to the Pachyderm authoring system.

Distributed Learning and Teaching

The Distributed Learning and Teaching Initiative shares the goal of providing affordable access to high-quality instructional resources with the academic initiatives described above. It focuses on the collaborative development and use of technology-mediated teaching and learning applications that promote active learning and that can be employed in "distributed learning environments."

The term "distributed learning" refers to instruction that connects teachers and learners, usually via the Internet, with each other and with resources physically located at multiple sites. "Distributed learning" differs from "distance education" as traditionally understood. The former places greater reliance on asynchronous interactions through use of the Internet and Web technologies, the latter emphasizes televised instruction or in-person instruction at off-campus sites.

Distributed learning techniques and technologies are currently most often employed as extensions to or partial replacements for traditional instruction: i.e., some portion of the instructional activity for a class takes place over the Internet rather than in a classroom. A combination of traditional, scheduled, face-to-face instruction and some portion of class work conducted online is often referred to as a "hybrid" or "blended" instructional model. Courses taught completely online i.e., with no or very limited face-to-face contact between students and instructors and among peers are uncommon in the CSU. The number of both "hybrid" and wholly online courses offered by CSU campuses is growing, however, and some degree programs are now offered only online.

Effective application of distributed learning techniques is strategically important to the CSU because of its potential to expand the capacity of existing physical instructional facilities. If a class that normally uses a classroom three times a week meets in the room only two times, or not at all, that space can be reassigned for other uses. In the 2006 and 2007 surveys, two CSU campuses reported taking steps to retrieve classroom space made available as a result of hybrid instruction. *Information about the amount of distributed learning occurring in the CSU can be found in the section of this report focusing on Master Plan Goals.*

Distributed Learning and Teaching was incorporated into the first wave of ITS initiatives to create precisely the kind of enriching, engaging learning activities that are needed to build faculty support for online instruction. Responsibility for implementing projects within this initiative was initially assigned to the CSU Center for Distributed Learning (CDL). The main focus is on the development of computer-based applications that require the active engagement of students of the kind that occurs in laboratory settings. In addition to producing virtual laboratory simulations, the CDL supports programs and activities to expand the community of simulation users and to build local campus capacity for developing technology-mediated instructional materials.

Web-Based Laboratory Simulations

To date, CSU faculty working together with CDL support have produced seventeen Web-based virtual laboratory simulations applicable for instructional use in 18 curricular fields. No new simulation development activities occurred in 2006-07 due to a refocusing of resources in support of projects within the "second wave" Academic Technology Initiatives described below.

Experiments using these online laboratories are similar to those conducted in physical laboratories in an essential respect: the outcome of the experiment depends entirely upon the input of the person conducting it. These simulations enable the user to visualize consequences—generational changes, for example—in a way not often possible in traditional laboratories. The complexity of the modeling employed in the CDL laboratory simulations is powerful enough to support experiments ranging from the introductory to the graduate level. Detailed information about applications as well as other programs and activities sponsored by the CDL can be viewed on the CDL Website: http://www.cdl.edu.

Figure 4G summarizes changes in the use of a sample set of laboratory simulations. The frequency of individual virtual laboratory uses appears to have declined from the levels of previous years. The volume of actual use is masked, however, by institutional subscriptions (for entire series of applications) or site licenses (for multiple application use), which permit multiple uses not monitored by the tracking system. In addition, the availability of broadband network connection to the home enables students to run simulations from off campus, thus contributing to reductions in the number of uses associated with specific campuses. In the 2007 student technology survey about one in four students said that he/she had been required to use a virtual laboratory, a dramatic increase from previous years, indicating that these cutting edge applications are finding their way into the instructional mainstream.

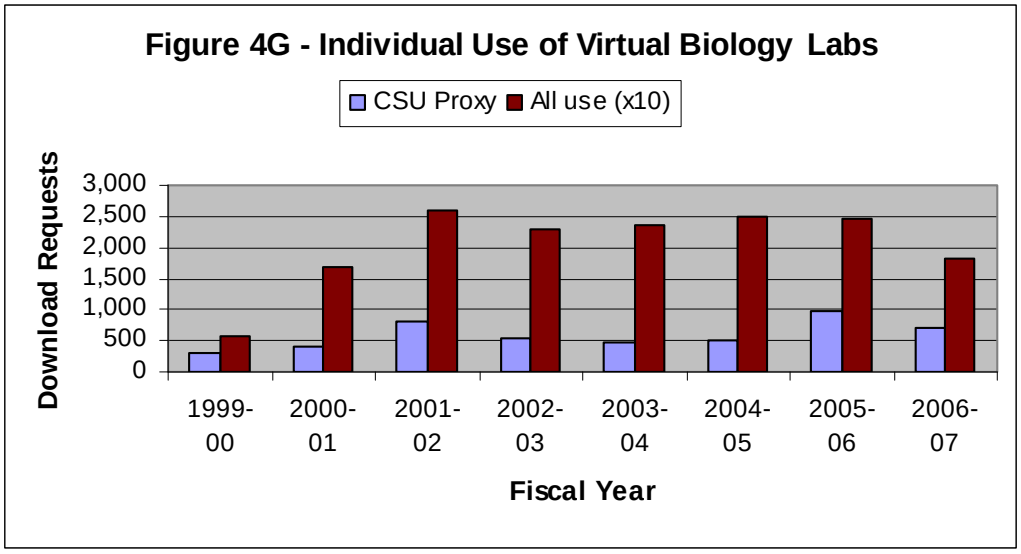
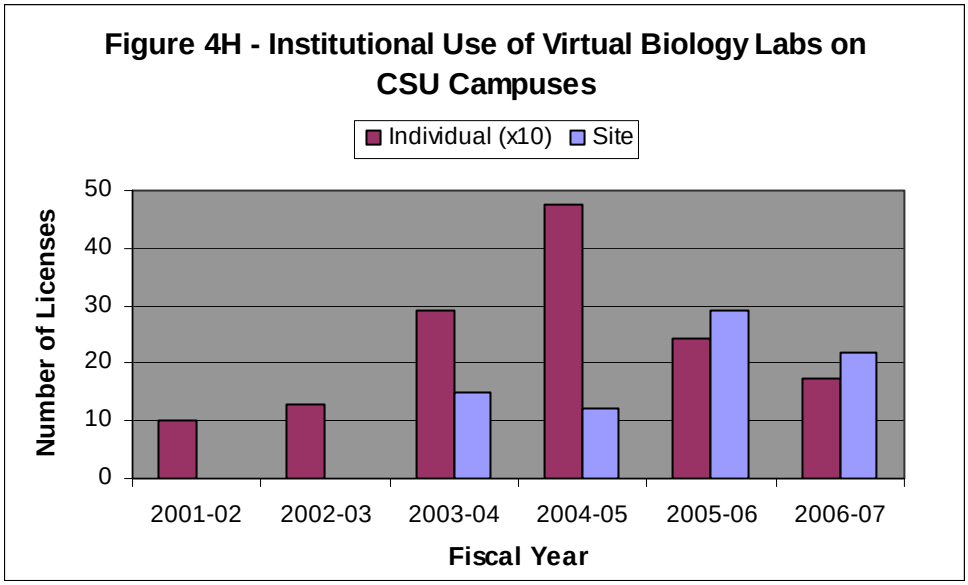


Figure 4H traces changes in the number of licenses purchased by individuals and organizational units in the CSU. Increases in the purchase of licenses indicate growing recognition of the pedagogical effectiveness, as well as the cost effectiveness, of Web-based computer simulations. Site licenses enable any number of individuals to run multiple simulations. The apparent decline in individual licenses has been offset by the increase in number of site licenses, a change consistent with the findings of the 2007 student technology survey.



Web-Based Authoring Tools

As an additional strategy for making Web-based learning content available, CDL has undertaken development of Web-based authoring tools to support faculty in creating media-rich, interactive learning materials that are delivered over the Web. The Video Oriented Instructional Lesson Authoring tool (VOILA) was developed for the LightBridge teacher education project: http://lightbridge.sonoma.edu. It has been used to develop over 40 Web-accessible examples of classroom practice.

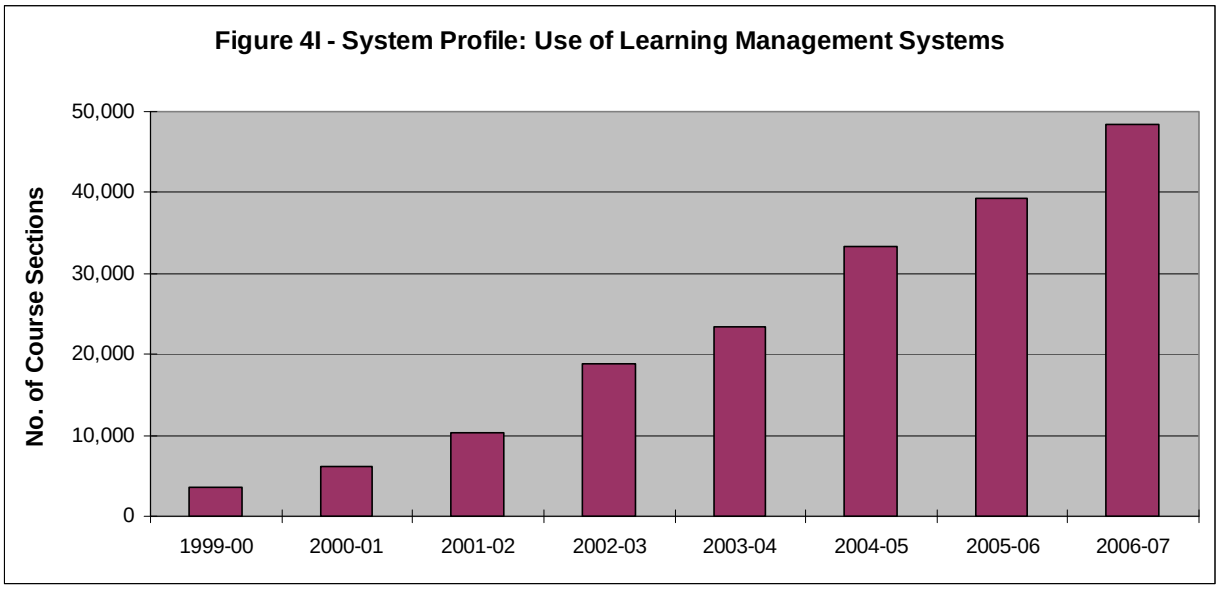
This year, CDL began rolling out the first release of the Pachyderm 2.0 open-source authoring tool for use by faculty, students and staff <http://pachyderm.cdl.edu>. Created in collaboration with five other higher education institutions and five museums, and supported by a grant from the Institute of Museums and Library Services (IMLS), Pachyderm 2.0 provides easy to use web based authoring for faculty and students. This Web-form authoring environment simplifies creation of Web content for non-technical faculty and students. Pachyderm's templates provide sound information design, navigation, and interaction design to support authors in creating effective web-delivered rich-media content; its asset repository allows authors to build a collection of digital assets and to share those assets with other others. During 2006-07, more than 200 accounts were created on the CSU instance of Pachyderm for faculty, students and staff. Pachyderm was also used by the CSU ELIXR project (http://elixr.merlot.org) to create case stories of exemplary faculty practice to support faculty development. It will be used in the coming year by projects in the recently initiated, systemwide initiative in Transforming Course Design (see below).

Web-Based and Web-Assisted Instruction in the CSU

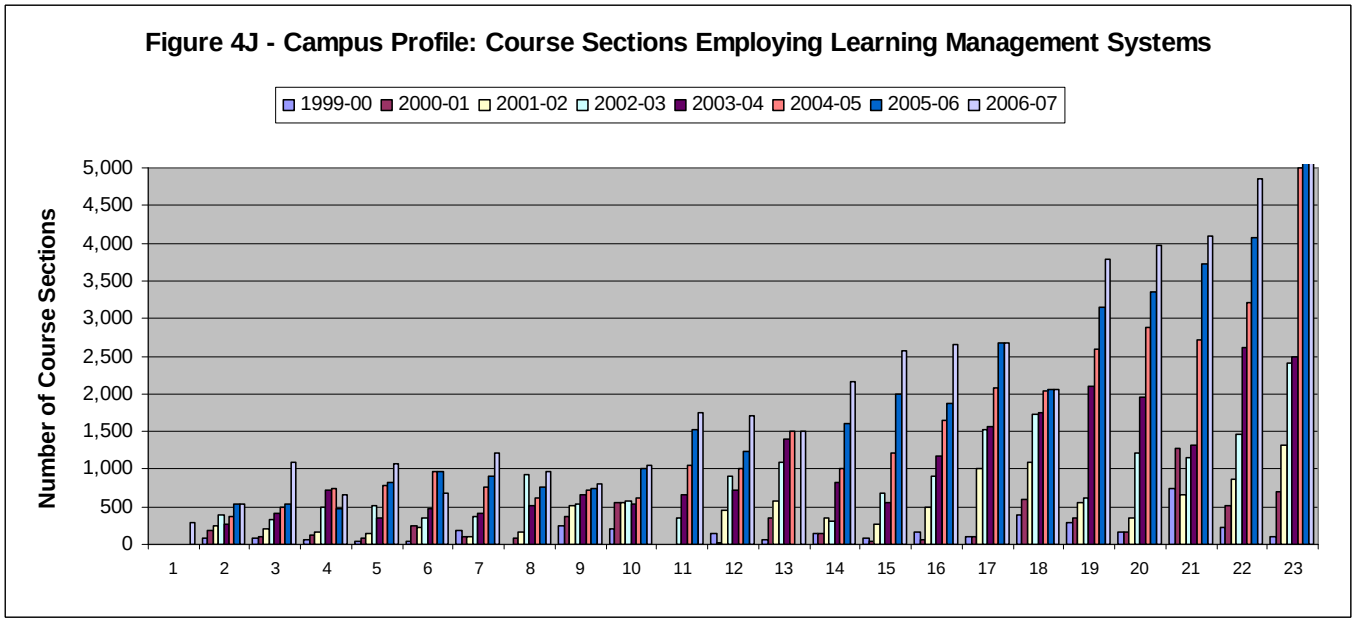
All CSU campuses now deploy a learning management system (LMS) designed to facilitate teaching and learning in the Web environment. Seventeen campuses reported use of ePortfolios, and 11 support instructional application of Web conferencing technology.

Learning Management Systems

Learning management systems provide Web tools for multiple purposes; they connect students to content sources of various kinds, support communication between members of a class, deliver and publish student work (in various media), and facilitate testing and counseling. Figure 4I depicts growth in the use of learning management systems across the CSU. The number of classes (course sections) supported by Web-based LMS grew from 2.8 percent of all course sections offered in 1999–2000 to 33 percent in 2006-07.



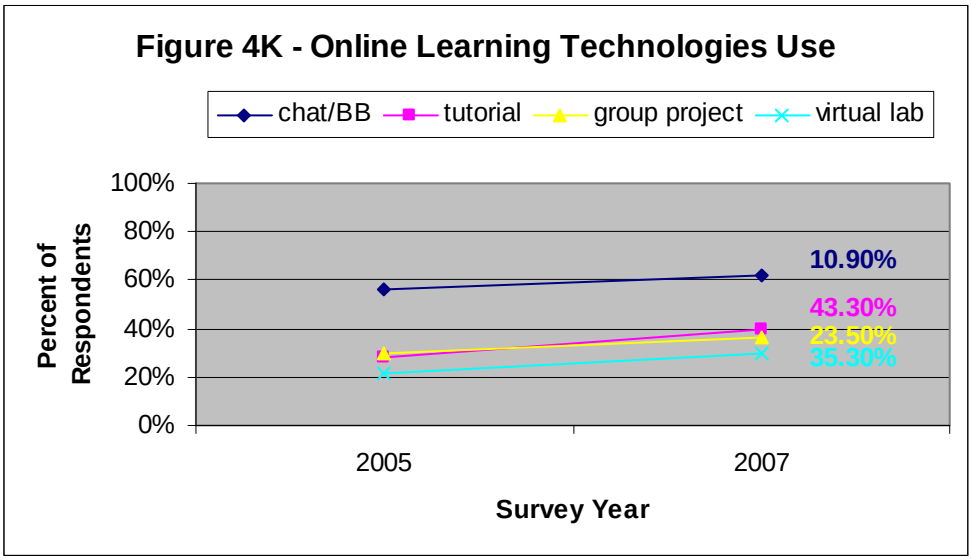
On some CSU campuses, a learning management system is employed for every course section. Figure 4J illustrates changes in the number of course sections offered by the individual campuses that employ learning management systems. Individual campus patterns closely parallel the system trend displayed above. Based on the Campus Computing Survey, almost two-thirds of CSU and peer institutions nationally had a strategic plan for deploying course management tools in 2007.



The CSU spends over two million dollars each year purchasing licenses, hosting fees and other professional services on LMS. This does not include the cost of hardware and labor for maintenance and support. LMS have grown from small niche applications used by leading edge faculty in the late 1990s to “mission critical” enterprises. Today, LMS is integrated with other large campus systems accessible by all faculty and students. Licensing initially cost about $3000 per year; current costs are now approximately $100,000 or more per campus depending on size and other services needed. Budget cuts, rising licensing costs, LMS growth, and IT and faculty support demands have outstripped available resources. This has led the CSU to strategically plan LMS implementations by working more collaboratively across the campuses.

In October 2005, CSU hosted two systemwide summits, which provided a framework for campus collaboration and decision making concerning the deployment and use of learning management systems. Four initiatives for CSU campus collaboration were identified: LMS Business and Partnerships, LMS Integrations, LMS Open Source, and LMS Best Practices.

In 2005 and again in 2007 researchers asked CSU students about Web-based or online technologies faculty required them to use. Many of these technologies are supported in an LMS environment. Figure 4K traces the increase in the use of these technologies that has occurred in the brief span of two years. The number of students reporting use of online tutorials grew by more than 40 percent. Those using virtual laboratories (simulations) increased by more than one third. One in three students said they were required to participate in group project work online, up by almost 25 percent in two years. Two out of three students said they used a chat room to meet course requirements, ten percent more than in 2005

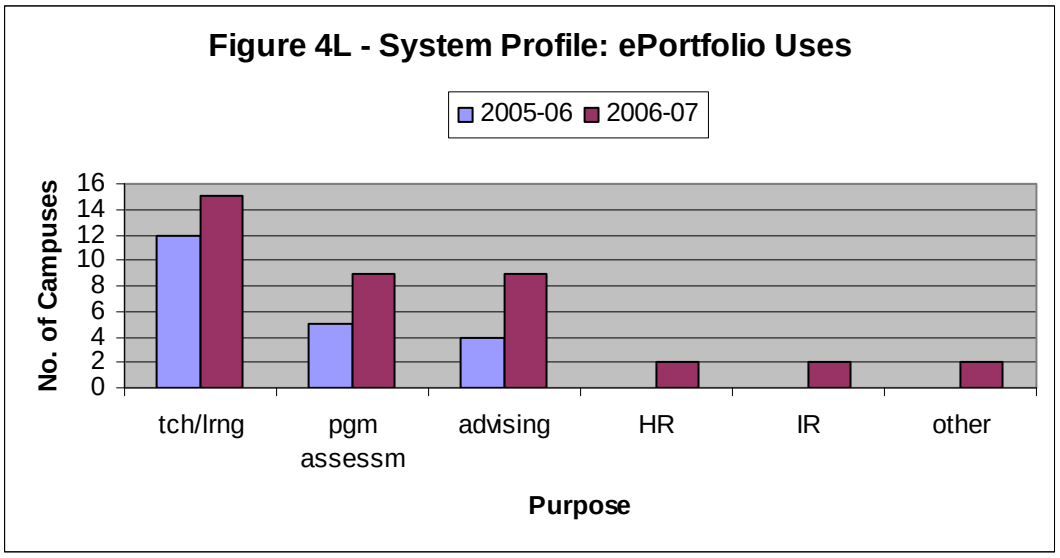


ePortfolios

The following description of ePortfolios is helpful for understanding why educational institutions are increasingly choosing to adopt this technology:

> *An e-Portfolio is a digitized collection of artifacts including demonstrations, resources, and accomplishments that represent an individual, group, or institution. This collection can be comprised of text based, graphic, multimedia elements archived on a Web site or on electronic media such as CD-ROM or DVD. It may be contained in, or part of, an electronic database such as a CMS/LMS or student information system. An e-Portfolio is more than a simple collection, it can also serve as an administrative tool to manage and organize work created with different applications and tools. A key component of e-Portfolio systems is to encourage personal reflection and often to involve the exchange of ideas and feedback.* (John Ittelson and George Lorenzo in a paper for Educause)

As noted, all but six CSU campuses now deploy ePortfolios. Figure 4L provides an overview of the various purposes for which they are used.



Web Conferencing

As broadband connection to the Internet becomes ubiquitous, web conferencing becomes more practical and preferable to videoconferencing for several reasons. In marked contrast to the latter with its demands for special facilities and expert technical support, and its high line charges, web conferencing technology allows typical Internet users to meet virtually from anyplace with a broadband connection at very low marginal cost. Wikipedia offers the following description of web conferencing:

> *"In a web conference, each participant sits at his or her own computer, and is connected to other participants via the internet. The most basic feature of a web conference is screen sharing, whereby conference participants see whatever is on the presenter's screen. Usually this is accompanied by voice communication, either through a traditional telephone conference, or through Voice over Internet Protocol, although sometimes text chat is used in place of voice."*

In 2006 and 2007 eleven CSU campuses began using web conferencing for instructional purposes. They employed six different Web applications to support learning teaching and learning in just under 400 course sections in academic year 2006-07. The number of classes ranged from two, at a campus experimenting for the first time with the technology, to 150 classes at the campus with several semesters experience with it. This pattern is similar to the early deployment of learning management systems in the nineties. The advantages of web conferencing to facilitate collaborative learning and research are obvious. When the current shake-down period has run its course, Web conferencing will no doubt be as routine in CSU instructional programs as learning management systems now are.

Campus Centers for Instructional Technology Development

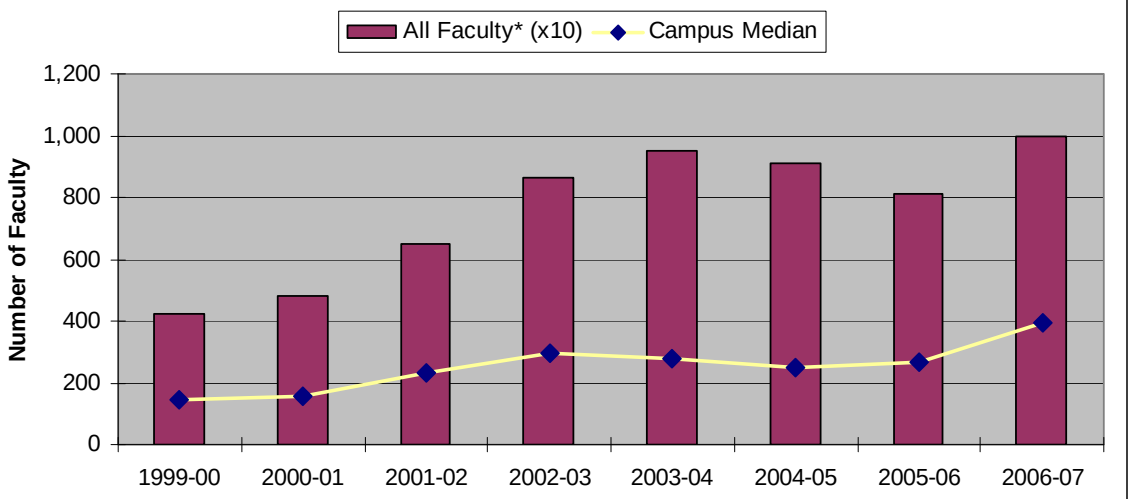
Decisions about what to teach and how to teach it are the prerogative of faculty members. Acceptance of distributed learning technologies depends on their adoption by faculty. The Integrated Technology Strategy encouraged each campus to establish a service or center where faculty can learn about the latest uses of instructional technology in their fields and work together with their colleagues and technical staff to produce learning materials for local use. The systemwide Center for Distributed Learning was charged with supporting this effort by demonstrating best practices in the use of new technologies and by serving as a professional development resource for all of the campuses in the system. To support the work of the campus centers, the CDL provides logistical and programmatic support through a systemwide professional development program known as CATS (Community of Academic Technology Staff) <http://cats.cdl.edu>.

In the 2007 survey, 20 CSU campuses reported that they have central instructional technology development centers to assist faculty in creating and using technology-mediated teaching and learning resources. In 1999–2000, only five campuses had such centers. Ten campuses had both a campus-wide center and one or more divisional centers in

2006-07. Almost all of the campuses continue to provide incentives to individual faculty in the form of release time or compensation for time spent in excess of their normal workload.

Demand for instructional technology development services varies greatly across the campuses, from only ten participants (or participations, allowing for duplicative counts) per year at the low end to over 1000 at the high end. Figure 4M shows continuing strong faculty interest in the instructional technology services available through these centers.

Figure 4M - System Profile: Faculty Use of Instructional Technology Development Support Services



*Duplicate counts may occur through participation in multiple activities.

Campus investments in the development of technology-mediated instructional materials are of two types: personnel support, as reflected in the number of full-time equivalent positions for faculty and staff, and direct support, or dollars expended to purchase materials and services.

Figure 4N profiles the median level of campus support for instructional technology development as reflected in the assignment of personnel positions. The variation in the level of faculty participation noted above is mirrored in differences in the number of personnel positions campuses invest to support instructional technology development activities. Four campuses reported that they assigned no faculty positions to these efforts in 2006-07; at the other extreme, one campus assigned ten faculty FTE. Staff positions assigned to instructional technology development ranged from a fraction of one FTE on one campus to 13 FTE at the high end. Median staff support rose to 5.5 FTE, the highest level since the high investments in the start-up years for the campus centers (Figure 4N).

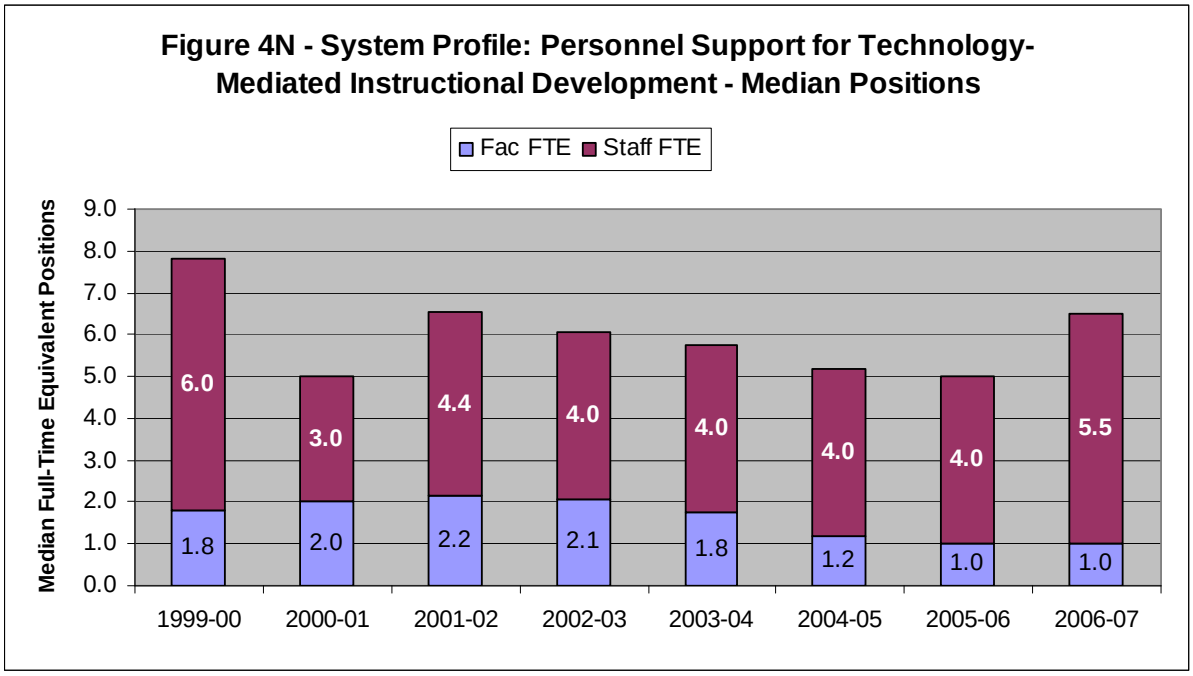
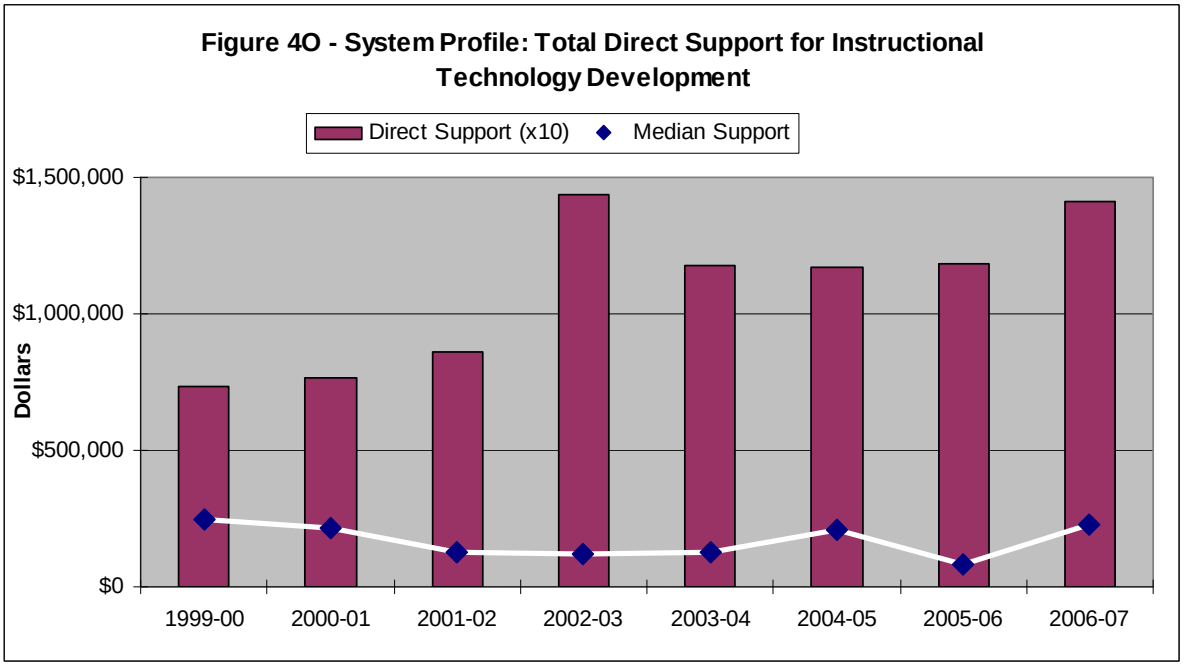


Figure 4O traces changes in the level of direct support for instructional technology development. Strategies for funding instructional technology development vary greatly among campuses. Some rely extensively on services provided by staff and/or student assistants. Others focus on enabling faculty to devote more time to such activities. Dollars received from non-state sources are a major factor governing the total level of center support. The wide gap between total spending and the median is often attributable to the receipt by a single campus or very small number of campuses of very large grants of non-state funds.



The 2007 Campus Computing Survey asked respondents about use of a wide range of classroom and instructional technologies, from multimedia equipment to specialized software applications. In most instances, CSU campuses were even with or slightly ahead of comparison institutions nationally in providing support for academic technologies.

The one exception occurred in "having a formal program to assess the impact of IT on instruction," where only 13 percent of CSU campuses responded in the affirmative compared to 29 percent nationally.

Second Wave Initiatives

Since 2000, Measures of Success has reported on the progress of the first wave academic initiatives described above, focusing on the ITS outcome of Excellence in Learning and Teaching. These initiatives have all matured to the point where they have become mainstreamed on campuses and are now part of the infrastructure underlying further attempts to improve learning and teaching through academic technology. (See Figure 2B in the Introduction section.)

In 2003, the Academic Technology Planning Committee identified eight initiatives in which CSU should engage to further this goal.

- Digital Marketplace enables the effective distribution of network-based digital goods and resources in support of CSU academic programs.
- Student Success employs electronic degree audit and technically assisted academic advising to improve progress towards graduation.
- Foundational Skills focuses on ensuring that students enter the CSU adequately prepared for college-level work. Two of these projects, Math and English Success, are discussed in the Master Plan section of this report because of their implication for reducing facilities needed for remedial instruction. The third project within this initiative is ICT Literacy.
- E-Learning Framework focuses on the design and integration of the academic technology "infrastructure" (see IT Infrastructure Initiatives section). That infrastructure facilitates interoperability among LMS's, library systems, MERLOT, authoring tools, etc.
- Professional Development supports programs for faculty and staff who are involved in providing accessible academic technology on CSU campuses. Projects such as ELIXR are part of this initiative.
- Research Dissemination informs CSU faculty about the results of research on academic technology and synthesizes disciplinary knowledge on teaching with technology. The Journal for Online Teaching is an example of a project within this initiative.
- System Support creates and manages integrated services teams involving faculty in the development of online learning materials or courses. An example of this initiative is the Center for Usability in Design and Assessment (CUDA).
- Cooperative Development supports collaborative identification, development, and sharing of digital learning materials. Projects include the CSU Teaching Commons and IMAGE.

Presidents gave priority to the first four initiatives. In the last few years, work has progressed on these and has started on the other four as well. Below are short discussions of an initiative and project that illustrate the continuing evolution of the Integrated Technology Strategy. More recently, CSU has added an initiative on transforming course design.

Digital Marketplace Initiative

The university has a growing need to acquire, share, market, and distribute commercial and non-commercial digital learning content and resources within the institutional environment. While MERLOT focuses on non-commercial resources, the goal of the Digital Marketplace (DMP) initiative is to enable the cost-effective distribution of commercial network-based digital goods and resources in support of CSU academic programs.

The objectives of the DMP are to:

- provide leverage with vendors for campus academic technology products and services to reduce costs through volume purchases.
- establish a one-stop, web-based service for the selection, contribution, sharing, approval, procurement and distribution of no-cost and cost-based academic technology products and services.
- manage the digital rights and use of academic technologies reliably and securely.

A U.S. Congressional subcommittee identified the CSU Digital Marketplace as the leading innovation to reduce the cost of textbooks. Publishers are active participants in the project. Over 50 faculty have volunteered to produce case studies for selecting course content.

Institutional Teaching Commons (ITC) Project

The term “teaching commons” refers to the Carnegie Foundation's idea of a community of faculty within a discipline committed to enhancing the scholarship of teaching and learning through the exchange of ideas, best practices, discussions of policy changes, and promotion of pedagogical innovations for their students. Technology permits much of this activity to occur virtually thus transcending the physical boundaries of campus and academic departments.

The CSU Center for Distributed Learning has expanded its MERLOT initiative of "discipline communities" to create teaching commons in a variety of disciplines. To date, eight such teaching commons have been formed: Business, Science Education, ePortfolios, Teacher Education, Educational Leadership, Student Learning Outcomes Assessment, ICT Literacy, and Expository Writing. In addition, a number of international organizations are considering adoption of this concept. For example, the MERLOT African Network (MAN) is in the process of developing a customized ITC that will be used by members of a consortium of African Higher Education institutions to bring online learning resources and services to their members.

Transforming Course Design

Transforming Course Design is an initiative to improve student learning while simultaneously addressing the issue of instructional costs. Measures of improved student learning include reducing failure rates, increasing retention, and enhancing application of knowledge after course completion. Metrics for containing instructional costs include reducing the time student and faculty need to achieve desired learning outcomes and increasing access to courses within existing budgets.

Strategies include applying exemplary practice, scholarly research and shared resources for teaching and learning, assessment of student learning outcomes, and collaborative course development with subject area colleagues across campuses. In 2007, the Chancellor’s Office awarded grants totaling over $300,000 to support individual and multi-campus projects.

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