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## ADVANCES IN RESOURCE SHARING AND SYSTEMWIDE LIBRARY SERVICE AT THE UNIVERSITY OF CALIFORNIA

*Note: This is an evolving document, subject to further revision.*

For 25 years, the University of California libraries have worked together to realize a vision that is encapsulated in the phrase *one university, one library*. Pursuing this ideal, they have built nine campus libraries of distinction, and have launched the development of a tenth, while supporting world-class research and instruction across the university. They have also won an unparalleled reputation for innovation and service.

At UC, all faculty, students, and staff have access to nearly all of the 31 million items that make up the libraries' collective holdings; that is, to the largest university research library in the world. Melvyl, the system's union catalog, together with a fast and reliable online interlibrary loan service, assures this. Other achievements are equally significant. They give competitive advantage to UC's researchers and offer inducements to faculty that are as powerful at Merced and Santa Cruz as they are at Berkeley and UCLA.

The campus libraries provide high-quality and personalized services to faculty, students, and staff, and to the people in their local communities. The range of services extends from onsite print and digital holdings to personalized reference support; from instruction in information literacy to electronic reserves that are tied to locally taught courses; from websites that customize access to a world of scholarly knowledge to civic programs that enrich and enliven the region's cultural life. By sharing some common costs (electronic content, storage facilities, technology services) whether by library co-investment or by central university funding, the campus libraries are better able to serve local research, curriculum, social, and civic needs.

This achievement results from both strong campus support for libraries and a Universitywide strategic approach to development of library collections and services that has emphasized multi-campus collaboration, application of new technology, and expanded Universitywide sharing of the information resources within UC library collections. These strategies have been successful in applying the leverage available to a multi-campus system of strong and distinguished institutions in order to maintain high-quality research collections and services in the face of rising costs and other challenges to traditional library models. Moreover, each successive restatement of this overall planning strategy has extended the concepts of collaboration, sharing, and systemwide leverage into new domains of library service, from expedited intercampus lending to a shared online library catalog and regional library facilities, a shared digital collection, and beyond. Each new planning effort has been accompanied by a budgetary strategy that both adapted library budgeting to the evolving budgetary policies and practices of the University and the State and focused funding on support for the collaboration, resource sharing, and technology initiatives arising from the restatement of strategy.

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A formal comprehensive planning process for libraries began in 1976, triggered by the State's perception of substantial duplication among campus collections, competition among campuses to increase collection size, and concerns about the capital cost of housing growing collections. In response, the University made strategic use of emerging technology (an online union catalog, support for automation of circulation and cataloging operations) and shared physical infrastructure (two Regional Library Facilities) in the expectation that these strategies would leverage systemwide capabilities in order to maintain and improve service while containing costs.

By 1996, the combined and cumulative effects of unfunded inflation in the costs of library materials and growth in enrollments and academic programs that put additional pressure on library collections had significantly eroded the quality of collections. Furthermore, library budgets had to cope with the additional strain of adopting newly emerging technologies for the publication and distribution of information. The problems were exacerbated by significant cuts to the University budget beginning in 1990-91. While campuses made every attempt to protect libraries from the full effects of these cuts, there were significant staffing and service reductions and little funding to compensate for inflation or program growth. To respond to these pressures, the Library Planning and Action Initiative (LPAI) (<<http://www.slp.ucop.edu/initiatives/lpai.htm>>) was launched in September, 1996, and incorporated work on planning for digital libraries that the University Librarians had started in 1994 (<<http://www.lpai.ucop.edu/ucdl/>>). The March 1998 final report (<<http://www.lpai.ucop.edu/outcomes/finalrpt/>>) of the LPAI Advisory Task Force recommended seven key strategies that were ultimately endorsed by the University:

1. UC should seek innovative and cost-effective means to strengthen **Resource Sharing**.
2. UC should build one shared digital collection to serve all campuses, the **California Digital Library**.
3. UC should sustain and develop mechanisms to support campus **Print Collections**.
4. UC should seek mutually beneficial **Collaboration** with Libraries, Museums, other Universities and Industry.
5. UC should develop an **Information Infrastructure** that supports the needs of faculty and students to disseminate and access scholarly and scientific information in a networked environment.
6. UC should lead the national effort to transform the process of **Scholarly and Scientific Communication**.
7. UC should organize an environment of **Continuous Planning and Innovation**.

The Universitywide infrastructure for support of library services that has evolved as a result of these planning initiatives includes:

1. Two shared physical facilities for low-cost housing of infrequently-used library materials of enduring research value
2. Integrated online library services
3. Shared digital collections

4. Creation and preservation of access to specialized collections of libraries, museums and other cultural heritage institutions
5. Publishing innovations and alternatives in scholarly communication.
6. Applied research and sharing of professional and technical expertise

### **Shared Facilities**

The two Regional Library Facilities at Berkeley and Los Angeles were completed and occupied in the early 1980s and expanded in the early 1990s (an additional expansion for the Northern Regional Library Facility is scheduled for occupancy in 2004). Current holdings of the facilities total about 10 million volumes. All Regional Facility holdings are included in the Melvyl Online Union Catalog, their collections are extensively used, and the RLFs have been thoroughly integrated into the operations and services of all campuses and of Universitywide systems.

### **Integrated Services**

The Melvyl union catalog, implemented in the early 1980s, combines in a single place information about the bibliographic and serial holdings of the University of California. The catalog serves as the main access point to UC collections, integrating the holdings information of the libraries as if they were part of a single collection and thereby facilitating access to and use of campus collections on a systemwide basis. In 2001, the CDL undertook the enormous project of improving the functionality of the Melvyl union catalog by contracting with a vendor to supply the underlying technology for a new system. The resulting enhancements to the Melvyl system include the ability to combine books and periodicals into one integrated search, general keyword searching, limiting of searches to electronic resources only, options for sorting results, and the ability to browse subject headings. The new system is expected to expedite information retrieval and to be more transparent and flexible for library patrons. These system enhancements return a quality of service that meets and anticipates the expectations of the UC community.

Patron-initiated *Request* is a service developed and introduced by the CDL that streamlines interlibrary loan by providing library patrons with a quick and easy option for ordering an item not available on their home campus directly from a record in the union catalog. On the back end, *Request* ensures an efficient and effective transaction between campus systems to fulfill patron orders. As an integrated service built upon Melvyl, *Request* reduces the complexities of interlibrary loan, thereby encouraging and supporting the use of a virtual Universitywide library.

As shown in Figure 1, the use of Melvyl alongside an efficient intercampus delivery service doubled the number of interlibrary loan requests for returnable items over a ten-year period, with the greatest growth occurring since the introduction of the *Request* service. Further upward progress is expected with the introduction of an electronic document delivery service in the 2002-03 academic year, through which requests for materials are met and delivered to a patron's computer desktop rather than sent via interlibrary loan.

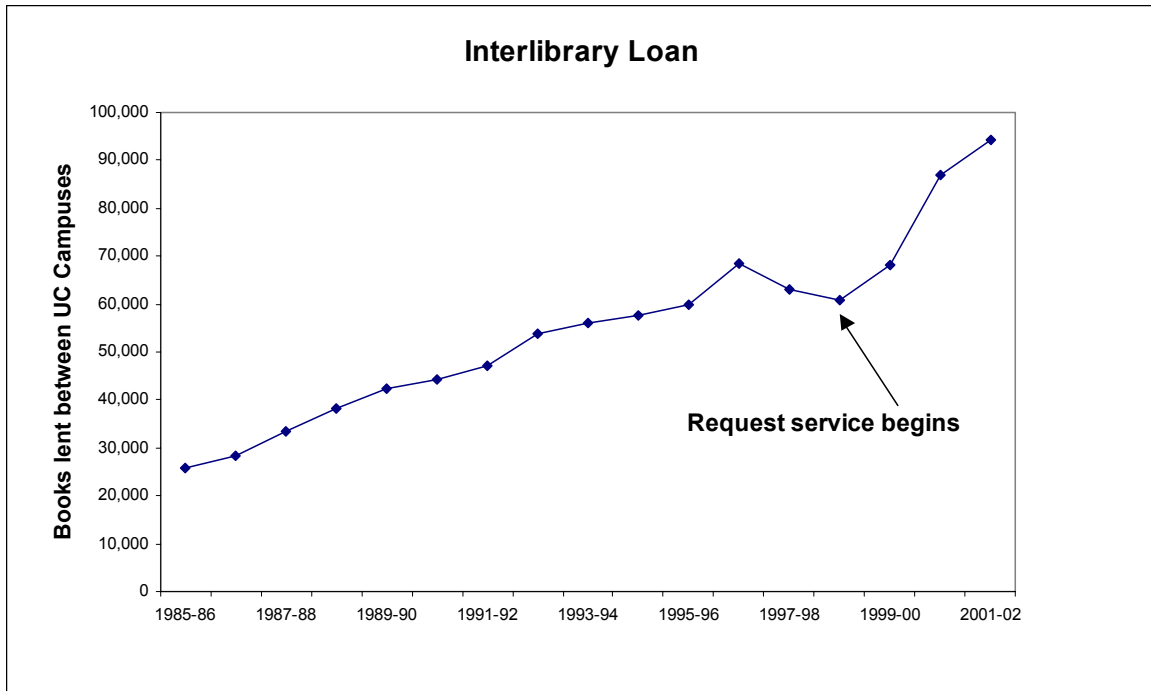


Figure 1: Use of the Systemwide Collections

*UC-eLinks* is another service that builds upon the foundation of existing Universitywide systems to provide enhanced and integrated access to information resources. The service enables libraries to link a citation to the full text content (e.g. online journal article) to which the citation refers. While the service has yet to be formally rolled out or advertised, it has already proven enormously popular. Figure 2 illustrates the use of *UC-eLinks* from its implementation in the spring of 2002 through the beginning of December.

A virtual Universitywide library collection provides each campus equal access to the University's wealth of materials. For example, faculty at Santa Barbara share access to the library holdings of Berkeley and vice-versa. Economics professor Theodore C. Bergstrom has noted that he came to Santa Barbara from the University of Michigan and found library service at UCSB to be fully the equal of that at his previous institution, despite the smaller size of the local campus collection. The formidable holdings of the University of California coupled with the functionality of CDL's integrated services fortifies the strength of the UC libraries; realizing the vision of "one university, one library."

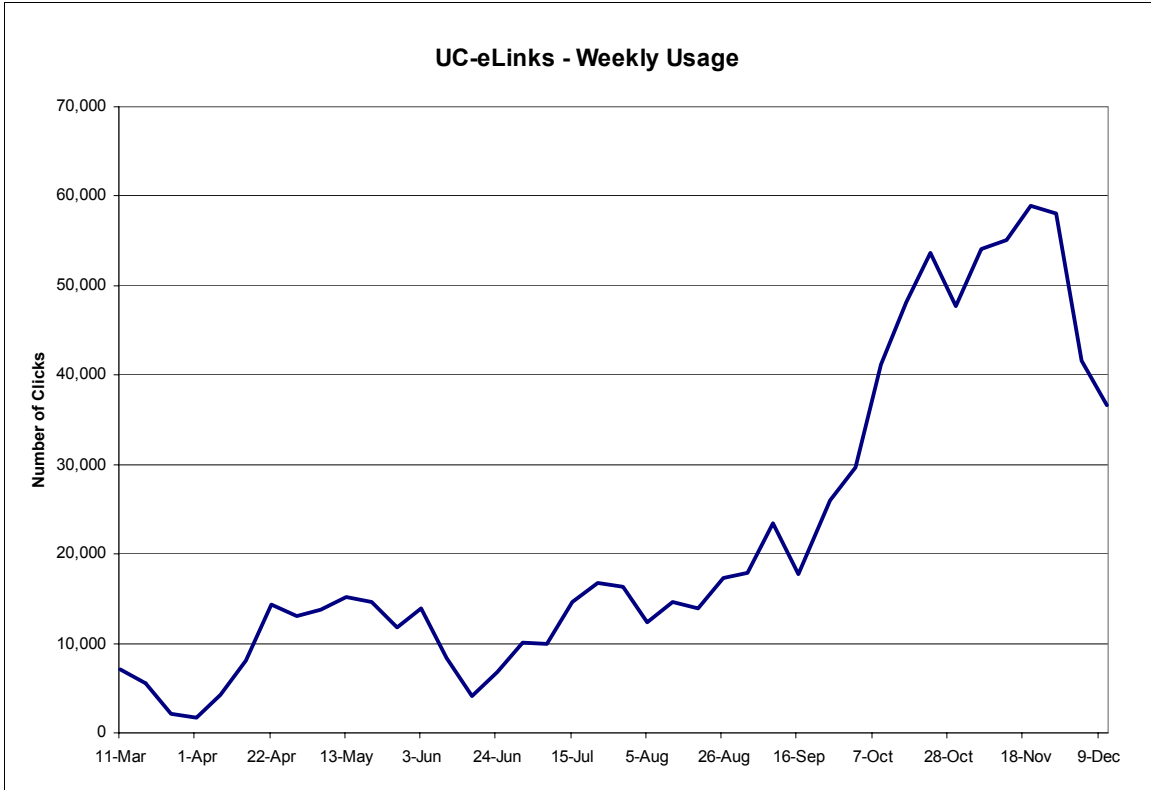
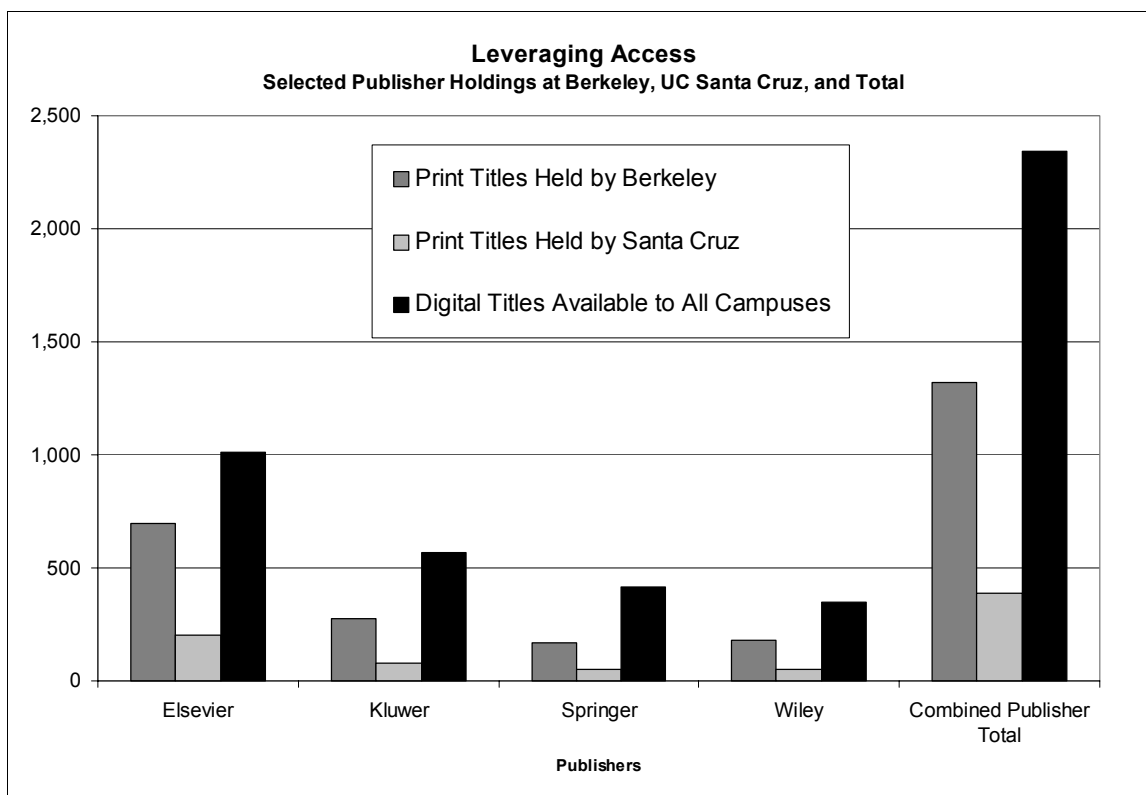


Figure 2: UC-eLinks

### Shared Digital Collection

With leadership from the CDL, the University of California libraries act as a single entity in developing a shared collection of online digital material. At present the shared digital collection is comprised of more than 7,000 journal titles and 200 databases, as well as other material. This shared collection complements and expands the digital collections of the UC campus libraries, and its use has grown dramatically since it first became available in June 1999, as illustrated by Figure 3.

In addition to enhanced access to resources, the shared digital collection represents a significant organizational innovation in collaborative, systematic collection development and acquisition. Phyllis S. Mirsky, Deputy University Librarian at San Diego, summarizes the systemwide benefit of the shared digital collection from the campus perspective. “By emphasizing and reinforcing the institutional unity of the UC system in the face of vendor perceptions and insistence that we were nine separate universities, we were able to significantly reduce the license cost and administrative overhead by unifying our negotiations. But at least as important as these budgetary economies was the growing conviction that we were serving with equal determination the whole of the UC community.”



**Figure 3: Leveraging Access**

Supported by CDL resources and expertise, campus librarians increasingly serve and represent systemwide interests, and take action to create and extend information resources for the UC community as a whole. From the campus perspective, a collection development officer noted in a survey that the “collaborative approach has been successful – in a very short period of time a large number of licenses have been drawn up, innovative vendor models pursued, and access radically increased... Librarians are encouraged now to think beyond their campus and take a more collective approach – many have become involved in speaking to vendors about systemwide pricing possibilities and licensing conditions.” The shared collection enables UC libraries to think systematically about and provide for persistent access to electronic journal titles and database holdings, and also about rationalizing print holdings where electronic equivalents exist. At present, the UC libraries are investigating options for managing print journals that also exist electronically in the shared collection.

The shared collection drives down the costs associated with acquisition of commercial electronic content. An analysis of the top eleven digital journal publishers showed that UC effectively achieves a 58% discount from the average print subscription price, and a gain of more than 13,000 additional subscriptions systemwide, through consortial purchasing. This means that some campuses get access to publications they would not have purchased in print due to price constraints; in fact, the value of these 13,000 additional subscriptions, if they had been purchased by campuses in print format at list prices, exceeds \$25 million. Similar savings have been achieved with database subscriptions. One campus representative noted, “We primarily want to acquire digital

resources through CDL. We know a consortial approach will be more efficient and economic, that the license/contract will be more closely scrutinized, and the vendor better supervised and informed about such things as importance of archiving.”

By leveraging their buying power in the marketplace, the UC libraries have also had a significant influence on publishers’ business models for commercial electronic information. The CDL is responsible, for example, for the emergence of the “preservation clause,” now a standard feature in licenses between publishers and libraries that ensures that libraries have perpetual access to the digital information to which they subscribe. The CDL model works for the system and for campuses. David L. Fisher, Electronic Resources Coordinator at Geisel Library, UC San Diego, states: “The model agreement sets standards and provides boilerplate language to work from...[The guidelines] imbue the process with more integrity than if I were acting out of my own instincts alone.”

In addition to the negotiation and acquisition of digital resources, campuses benefit from the University Libraries’ Shared Cataloging Program (SCP). The digital resources are cataloged by one campus and the resulting catalog records are distributed among all the campuses for inclusion in their local library catalogs. Vicki Grahame, the head of UC Irvine’s Cataloging Division states: “SCP has been beneficial to our campus. We wouldn’t have been able to catalog electronic resources on our own, especially the journals.” The CDL leverages system resources to ensure vital library operations.

### **Digital Collections**

The CDL’s digital collections serve the public good while supporting campus efforts to meet specialized needs. The CDL enables the creation of digital content and leverages use of existing UC digital collections to preserve resources of civic and cultural heritage institutions. While current efforts are focused in large part on the Digital California Project as it seeks to assemble supplementary curriculum materials for online use in California K-12, there is considerable interest within the broader non-UC user community to provide public access to unrestricted collections, and the CDL’s accomplishments in this area, such as the Online Archive of California and Counting California (described below) have always been characterized by close partnership with other California institutions

Through the CDL, the UC Libraries provide California citizens access to scholarly digital collections of images, texts, sound files and other special collection items of the University of California libraries, museums and academic departments. The CDL supports the creation and integration of digital content, and serves as a single gateway site. With the launch of a new public site in January 2003, the CDL becomes a destination library that explicitly serves the broader public. An unsolicited comment from a CDL user attests to the vision of making materials available online, “This is what the Internet was supposed to be all about! Access to information and art that you wouldn't otherwise have accessed. Great work. Thank you!”

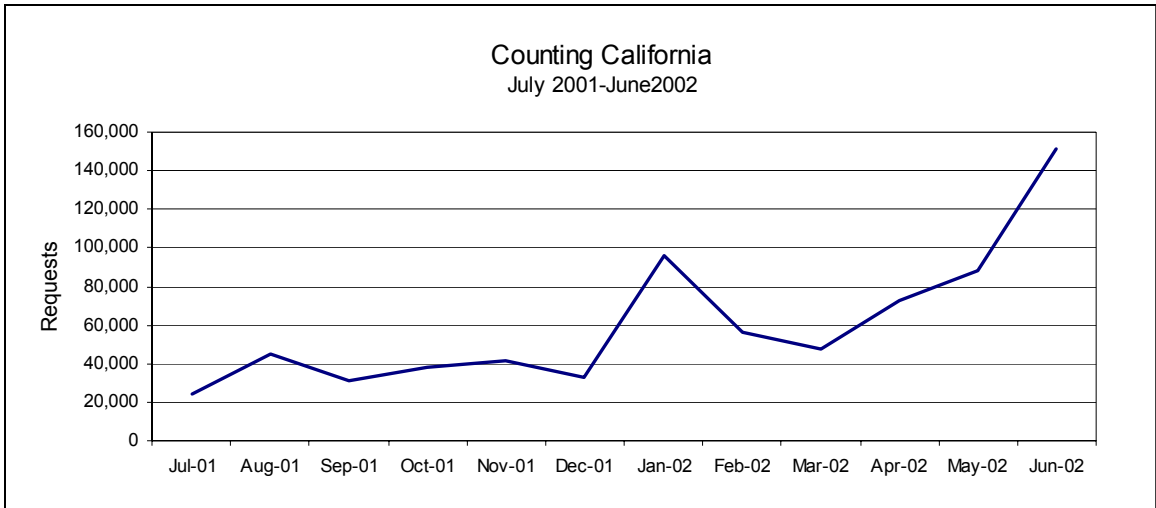
Efforts to develop publicly available content through the CDL include the Online Archive of California (OAC) and Counting California. These special collections, which have

increased dramatically over time, allow public access to information previously available only to scholars and researchers who traveled to collection sites, or waded through a myriad of disparate print publications to locate relevant material. The OAC provides online access to manuscripts, photographs, and works of art held in libraries, museums, archives, and other institutions across California. Figure 4 shows past and projected growth of the Online Archive of California, which currently includes over 7,000 finding aids from more than 60 institutions.

Online Archive of California	1997-99	6/30/2000	6/30/2001	% Growth 00-01	6/30/2002	% Growth 01-02	Projected 6/30/03	Projected 6/30/04	Projected % Growth 02-04
Finding Aids		5,801	6,317	8.90%	7,104	12.46%	n/a	n/a	
Images	28,000	28,500	38,500	35.09%	73,500	90.91%	152,500	166,500	126.53%
Text pages			15,000	n/a	15,000	0.00%	30,000	55,000	266.67%
Total	28,000	34,301	59,817		95,665		182,500	221,500	

**Figure 4: Online Archive of California Collection**

Counting California offers a range of social science and economic data produced by government agencies. It provides “one-stop-shopping” for government data and statistics about California. The interface offers access to a database of the actual raw data compiled by federal, state, and local government agencies. Users may simultaneously search or browse data from over eleven different government produced datasets, including *Census 2000*, the *California Statistical Abstract*, *County Business Patterns*, *Legal Immigration to California by County, 1990-1998*, and more. The growth in requests for information from the Counting California web site (shown in Figure 5) illustrates the usefulness of the collection.



**Figure 5: Counting California Usage**

These special collections represent more than growing content; they enable the development of additional services at local levels that serve specific populations and optimize local resources. For example, the system architecture developed by Counting

California offers campus libraries a modular, flexible, and extensible infrastructure that reduces redundant development costs related to government information. Campuses may then deliver data that best meets the needs of their users. Before Counting California, data of this kind were available only on multiple CD-ROMs or libraries of computer tapes, and required substantial professional expertise to access and use. Not only does Counting California open these valuable datasets to a vastly wider range of users, but the underlying technology gives UC Data Archivists new tools to deliver additional sets of crucial research data to an extended UC community.

Services like Counting California eliminate previous constraints related to maintenance of outdated technology and present a shift for campuses away from their reliance on intermediary publishing models. From the UC/Stanford Government Information Librarians list, one writer notes: “I have a link on my Stanford page of California resources; and I plan to use [Counting CA] as a central reference point for statistics. Because it is available, I plan to remove paper copies of some California titles to storage and I definitely will not purchase CD-ROMs of data now available online via this source... Having this source available means that we don't need to network CD-ROM products to serve all our branch libraries.”

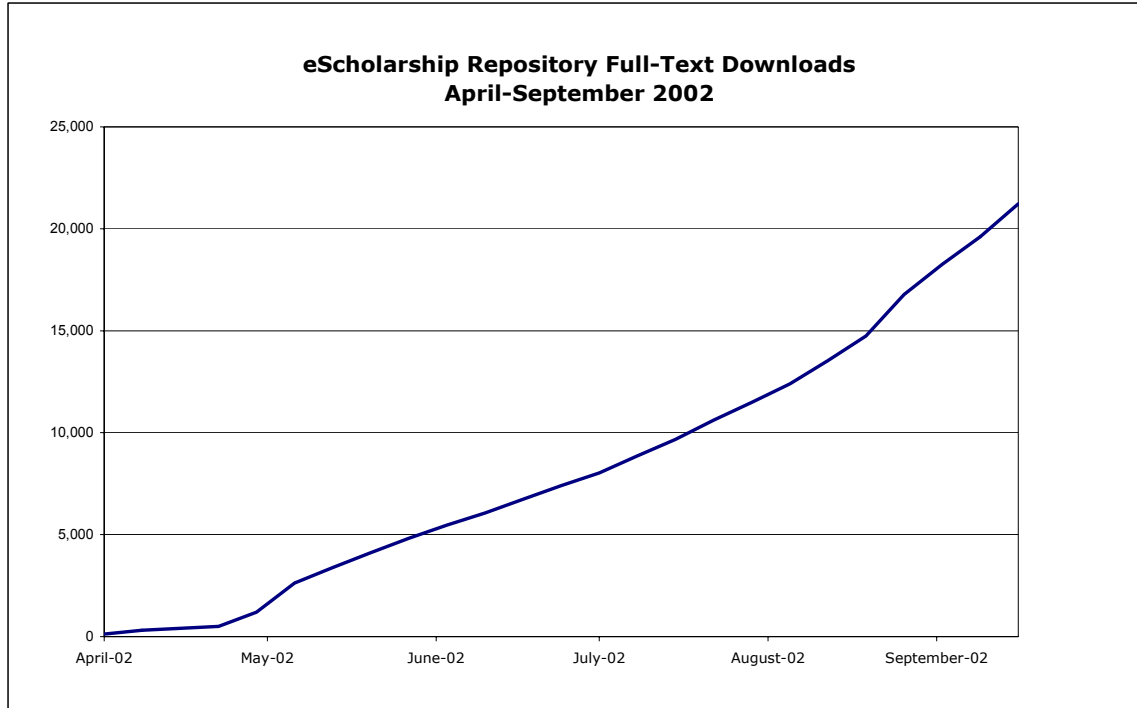
The Online Archive of California (OAC) similarly influences professional practices in the production of digital content by providing a platform for access. A member of a multi-institutional working group noted, “[OAC] definitely makes production worth it by providing a union-database outlet for our collections. The OAC provides the platform for integrating our collections with other institution's holdings. In that way, it allows us to proof the concept of marking up our collections in a standards based format – we can justify the investment we make in XML encoding because the tangible outcome is greater contextualization of our materials.”

The UC Libraries leverage their digital content not only by establishing through the CDL a single point of access to UC's collections of distinction for the public, but the development work on professionally based standards and practices builds an infrastructure that enables generative activities yielding even greater collections of breadth and depth across disciplines and cultural heritage.

### **Scholarly Communication**

The CDL's *eScholarship* program provides leadership that stimulates and facilitates innovation in scholarly communication. eScholarship features a repository through which UC faculty and research units can persistently manage and distribute pre-prints, working papers, articles, monographs, scholarly journals, and other products of their research and teaching. The program also enables and facilitates online peer review. One aim of eScholarship has been to encourage faculty to seek alternatives to commercial publishing vehicles that, because of their pricing structure or their protracted publishing process, have become impediments to scholarly communication. The eScholarship repository has been available since May 2002, when the CDL began systematically soliciting interest from organized research units, campuses, and departments. The repository has been enthusiastically received, and to date consists of nearly 700 articles and working papers

from 63 organized research units, academic departments and centers throughout the UC system representing over 1,000 faculty. Use of the papers in the repository is growing at a phenomenal rate, as demonstrated in Figure 6, which shows downloads of papers in the eScholarship repository since launch.



**Figure 6: Use of eScholarship**

Use of eScholarship demonstrates the acceptance of an emergent model for scholarly communication that includes the following components:

1. Disciplinary-based knowledge archives of working papers and research results that encourage “self-publishing,” allow open dissemination of basic scholarship, and simplify attention to long-term preservation, integration across disciplines, and integration into digital libraries.
2. Support tools for submission, expanded peer review, discovery and access, and use of scholarship.
3. New scholarly products drawn from the e-print archives, including potential innovative “packaging” of scholarship into digital journals and other compilations, new alerting, citation, and annotation services for scholars, and integration and summarization services for students.

The eScholarship server and tools comprise an innovative platform that promotes experimental use by communities of scholars, leading to new activities and relationships in the scholarly communication process. David Leonard, dean of international and area studies at UC Berkeley, comments, “The UCIAS Digital Collection [in eScholarship] represents an important development in scholarly publishing. By enabling the rapid publication and dissemination of individual peer-reviewed articles – accessible to any

scholar in the world with a Web connection – UCIAS has dramatically increased the access of scholars around the world to the international research being done at UC. It also links the publication of working papers from UC research units, peer review of articles at the standard of the best professional journals and the development of edited collections whose contents have been individually peer-reviewed – thereby setting high standards for all three types of publications. This development will be welcomed by scholars, students and promotion committees.”

Campuses draw upon CDL services to support the creation of digital content in communities that lack the technical and social infrastructure to do it alone. Marc Mayerson, Assistant Dean of Social Sciences at Los Angeles acknowledges the benefit of UC’s defining role in changing scholarly communications, “I am thrilled that an institution as large and influential as the University of California is providing a viable option for social scientists and humanities scholars to share their work. What better role could the CDL play than to help us help ourselves in creating faster, broader, permanent means of building upon each other’s work, or to manage the output from the University’s investment in scholars and scholarship.”

### **Applied Research and Expertise**

The CDL works collaboratively with UC libraries, computer science departments and schools of library and information science to conduct applied research into areas that are critical to the development of the infrastructure described throughout library and information services. Its participation in national and international associations and initiatives also ensures that digital library development activities at UC are informed by and contribute to such efforts as they evolve globally. The CDL effectively supplements the scarce resources that individual campus libraries bring to this essential activity. The applied research agenda is a testament to the historical significance of the ongoing outcomes of UC’s strategic library planning.

Through their collaborative efforts, the UC Libraries have created, pioneered and developed numerous methods and applications that have gone on to become national and industry standards including:

- Z39.50; a network search and retrieval protocol that enables distributed online databases to be searched as if they were a uniform database.
- UC-eLinks, which uses the OpenURL emerging NISO standard to enable linking between citations and their associated service. UC-eLinks enables consistent, electronic full text service across divergent platforms and is the glue between complex systems.
- Encoded Archival Descriptions (EAD), the international standard for creating and encoding online finding aids for archive and special collections.
- Data Documentation Initiative (DDI), an emerging metadata standard for social scientific numeric data; the CDL is now considered a major player in the national and international Social Science Data community.

- Metadata Encoding and Transmission Scheme (METS), a mechanism for recording information about a digital object as required for its persistent management and interchange

Development of shared digital content and services emphasizes and promotes standardization and influences professional practices.

The CDL shares best practices and professional knowledge in the UC library community and beyond. Expertise is a by-product of this work – one that is itself of significant value to UC libraries. The CDL packages information, documents, links and tools related to the operations and development of various library components and collections for consumption by the UC libraries and the digital library community. The CDL provides templates for use in negotiating licenses for commercial electronic content, guides on best practices for data creation and developing online finding aids for archives and special collections, and methods for assessing use of online services to help UC libraries evaluate and iteratively extend and improve their digital library initiatives. The number of guides, toolkits and descriptions of CDL resources speaks to the depth and breadth of the expertise available for knowledge transfer. References to and downloads of the CDL's online materials demonstrate acceptance and endorsement of the professional standards and practices created at the CDL.

The CDL hosts and actively participates in digital library forums, and presents its achievements to professional and industry communities. Feedback on a 2002 digital library forum emphasized the effective organization and usefulness of discussions of digital library developments with key participants. The CDL is primed for contributing and supporting a network of professional activities. CDL Staff are invited and acknowledged regularly at professional and industry events. On the local front, workshops for library staff, organized and supported by the UC Libraries and the CDL similarly evoke wide praise for effective organization and high quality presentation of standard practices. One participant articulated the benefit of the CDL's usability workshop. "The workshop takes you through the full process and leaves you prepared to begin usability testing on your own campus."

### **Current Challenges**

While a great deal has been accomplished as a result of these initiatives, much remains to be done. Among the more formidable challenges confronting research libraries today are the continuing growth in scholarly publishing, inflation in the cost of scholarly materials, the integration of digital information into scholarship, teaching and learning, and addressing the cultural, operational, financial and managerial challenges arising from the growing development of digital and print library collections that are developed and shared by multiple institutions, rather than being "owned" by a single library. Solutions require focused efforts over an extended period to restructure existing methods of scholarly communication through innovative applications of information technology.

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- Lack of state funding threatens our momentum. The vision is a synergistic one. Its success and vitality rely on the success and vitality of the contributing libraries - that is, on UC's 10 campus libraries and the CDL. A dollar invested in one is leveraged by and returns two or more dollars in value to the system. Negative or reverse leverage is also possible. An electronic resource (an online journal subscription, reference database, etc.) that is acquired by the CDL with funds contributed by the 11 university libraries is threatened if only one of them can no longer afford its share of the costs.
- The escalating cost of scholarly publications combined with huge annual increases in their volume seriously threatens collection currency that is so essential to research. The university's partnership agreement with Governor Davis recognized the threat and proposed to provide \$5 million a year to make up for deficiencies in campus collections, and \$2.5 million a year for the shared collections acquired by the CDL. Partnership funding was not received in 2001/02 and 2002/03. Prospects for acquisitions budgets are further clouded by the state's budget crisis.
- Shared collection development strategies can minimize the impacts of inflationary collection costs, but are seriously constrained. UC libraries have had great success with digital materials. They are acquired by CDL, made accessible systemwide, and counted as a part of every library's collection. Progress is slower with print holdings despite the fact that these too are readily accessible systemwide through fast and effective interlibrary loan service. Impediments to progress are structural and beyond the libraries' ability to effect alone.
  - Libraries need to demonstrate, and faculty need to understand that local maintenance of infrequently consulted print collections can undermine rather than enhance access to research collections. Funds that could be used to add to the breadth of UC's shared collection are directed instead towards acquiring and managing redundant local holdings.
  - The measures that are used by the national Association of Research Libraries (ARL) to rank its 120 members – seven of them UC campus libraries – do not adequately count electronic or print materials that are owned and managed by library consortia. As such they impede shared collection strategies like the ones being developed at UC. The impact these measures have is exacerbated by their use locally to leverage library collection funding, recruit and retain faculty, and bolster a campus's case membership in the Association of American Universities (AAU).

Notwithstanding these impediments, the University is moving forward with plans to complement its growing shared digital collections with selected shared collections of print material. In August, 2002, a systemwide group was charged to begin planning for a unified repository for print and digital government publications for the University of California Libraries. Operational planning

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began in October, 2002 for development of a shared archival collection consisting of selected print journals that are presently available at no additional cost with the systemwide licenses to the electronic versions. Finally, pursuant to a recommendation of the UC University Librarians, the University's Collection Management Planning Group (a subcommittee of the UC Systemwide Library and Scholarly Information Advisory Committee) has launched a review of the desired characteristics of shared print collections and preliminary identification of additional prospective and retrospective shared collection development efforts.

*University of California, Office of the President  
Systemwide Library Planning  
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