University of California
# Systemwide Strategic Directions for Libraries and Scholarly Information
Systemwide Library and Scholarly Information Advisory Committee[*]
DATE

## EXECUTIVE SUMMARY

Great universities have great libraries. In fact, great universities achieve their standing in part because of their libraries, because information resources are at the foundation of effective research, teaching and learning.  To provide the library services required to enable the University of California to continue to excel in its instructional, research and service missions, the University Libraries strive to:

- Enhance and enrich access to well organized, professionally managed, coherent, and comprehensive collections of scholarly information of the depth and breadth needed to realize the goals of the University's academic programs
- Enhance and improve upon the availability of timely, expert, relevant, and personalized services needed by faculty and students to make effective use of these vast and complex information resources
- Ensure persistent access to the high-quality digital materials that result from research and teaching at UC

In achieving this vision, the University Libraries must confront a number of challenges, some enduring and some of recent vintage (see Section 3), including:

- Diminishing budgets, including the effects of budgetary austerity on the library collections, the value of which lies in part on the continued accumulation and preservation of information resources
- Proliferation in the amount of scholarly information produced, and continuing hyper-inflationary increases in its cost
- Proliferation in the number of formats in which scholarly information is produced and disseminated

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- Lack of any unifying technology (either worldwide or within UC) that would facilitate the easy capture, organization, presentation, use, preservation, and long-term management of that growing component of scholarly information that is produced in digital form
- Much higher expectations among users about the speed and ease with which such information (and associated user support services) should be discovered, located, accessed, and used
- Rapid change in information technology, and the accompanying need to adopt and adapt new technology to serve the information needs of UC's faculty and students
- The increasing financial and operational interdependence of the campus libraries in providing services to each other and supporting shared systemwide collections and services, and the resulting effects of independent campus budgetary and operational decisions on the quality of systemwide library service

The strategies that are put forward here in order to successfully confront these challenges and achieve our aims are ones that continue and extend the 25-year history of progressively growing cooperation and collaboration among the UC Libraries to share collections, leverage technology and pool financial resources (see Section 2). The current strategic directions for collaborative development of the UC Libraries lie in five key areas (see Section 4):

- Expanded development and management of shared collections (Sections 4.1 and 4.4)
- Elaboration of shared services (Section 4.3)
- Greater utilization of shared facilities (Section 4.2)
- Ensuring persistent access to digital information that results from and supports research and teaching at UC (Section 4.4)
- Changing the economics and influencing the development of new forms of scholarly communication (Section 4.5)

### *Summary of Recommended Actions*

- **Collection Management and Coordination**. Develop a detailed planning and evaluation framework for shared collections in all combinations of formats that, for each existing or proposed collection a) explicitly specifies the key characteristics (e.g., physical location, access and management policies), b) identifies resource needs (e.g., processing, shelving space and environmental requirements, access and delivery services, requirements for infrastructure services such as bibliographic access and inventory control) and costs, c) assesses implications for campus operations, services, preservation strategies, and budgets, and d) identifies the affected user communities and delineates the nature and level of expected demand for use of the collection, and applying the guidance provided by this framework, proceed to selectively implement the development of specific shared collections.

- **Shared Facilities.**
  - Consolidate the governance of the Regional Library Facilities and take steps to ensure that they are fully integrated into planning and operations in support of the strategic directions and collaborative programs of the UC Libraries.
  - Regularly review the policies, operations and resources needs of the shared Regional Library Facilities to ensure that they continue to optimally support the strategic directions and collaborative programs of the UC Libraries.

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   - o Acknowledge that the scope for continued expansion of the Regional Library Facilities is necessarily limited (by site constraints, availability of capital resources in the context of UC capital program priorities, etc.), and begin long-range planning for this eventuality.

- **Shared Services**
   - o Develop a programmatic framework and plan of action to effectively leverage the collective resources of the UC libraries, including deep staff expertise and shared infrastructure, to both more effectively manage and deliver essential ongoing services (e.g., systems and services for bibliographic control, management, discovery and access, for collection acquisition, processing and management in all formats and including shared and campus-based collections where relevant) and to collaboratively develop, deploy and support advanced user services.
   - o Develop and implement pilot programs to test concepts, refine planning, establish and revise priorities, and clarify resource needs and sources.

- **Persistent Access to Digital Information.**
   - o Develop a digital preservation infrastructure, adhering to established standards and open-source practices and in collaboration with national and international efforts, that can be used centrally to preserve the digital information that is at risk and in which we share a common interest (commercial journals and databases, web-based government information) and that can be used by campus libraries to preserve digital assets in which they take a unique interest (for example, selected collections of web-based materials, UC dissertations, digital materials produced by faculty for research or teaching, etc).
   - o Investigate the extent to which the digital preservation infrastructure may assist in the preservation or protection of deteriorating print materials.
   - o Seek opportunities to coordinate with University units responsible for information technology, records management, and others with interest in and responsibility for preservation of digital content, at Universitywide and campus levels, to foster development of and financial and technical support for a robust common information technology infrastructure that can meet the University's diverse needs for reliable archiving, management and retrieval of essential digital information of all kinds.

- **Scholarly Communication.** Working collaboratively with faculty, management, the UC Press, information schools, and national associations and bodies, develop and implement a program to comprehensively alter the scholarly communication process so that it is economically sustainable and ensures the widest possible access to the scholarly record. The program should identify concrete steps and the resources necessary to support our taking them.

## 1. INTRODUCTION

Great universities have great libraries. In fact, great universities achieve their standing in part because of their libraries. Libraries assemble and conserve the world's scholarly knowledge and its societies' cultural record, and they make the assembly available in support of research, teaching, learning, and cultural and civic enrichment. Just as recent and major advances in the biomedical sciences are built upon comprehensive assembly of information about the human genome, advances in all frontiers of knowledge require the comprehensive collections that only great research libraries supply. Further, universities leverage their libraries to recruit and retain world-class faculty whose work and the eminence it reflects upon them relies in some measure on their access to scholarly information. Maintaining the breadth and depth of collections is the single greatest challenge confronting university libraries today. Failure to confront this challenge successfully fundamentally threatens the university's core mission – excellence in instruction, research, and public service.

The University of California has built nine campus libraries of distinction (and has launched the development of a tenth) comprising outstanding collections that give a world-class competitive edge to UC research and instruction.  The UC Libraries and their staffs have also won an unparalleled reputation for innovation and service. Campus library staff 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 highly personalized and specialized reference support; from instruction to students in support of information literacy to electronic reserves that are tied to locally taught courses; from websites that customize access to the world's output of scholarly knowledge to civic programs that enrich and enliven the region's cultural life.  Every UC student and faculty member is served by a rich campus collection of print and digital resources that is tailored to the campus academic program and includes specialized research resources, many of which are unique in the world.  These collections are supplemented by fast, convenient access to the world-class information resources of all the other UC campuses, as well as a rapidly growing shared collection of digital resources.

The challenge for the University's libraries is to sustain this excellence in the face of budget constraints, continuing increases in the cost of information, changing information technologies, and the shifting service expectations of the libraries' clientele.  That the libraries have met this challenge is the result of both strong ongoing campus support and a Universitywide strategic approach to development of library collections and services. That approach 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. As a result, UC faculty and students have enjoyed increasingly faster and more convenient access to a broader universe of information in a wider variety of formats, even in the face of rising costs and constrained budgets.

Building on the successful collaborative programs spawned by the University's 1977 Library Plan[1] and the 1997 Library Planning and Action Initiative,[2] and with the leadership, advice and support of the University's Systemwide Library and Scholarly Information Advisory Committee,[3] the UC Libraries have launched an ongoing planning process that has begun to identify new strategic initiatives to further enhance the quality and cost-effectiveness of the library program through expanded collaboration.  This paper seeks to establish a framework for ongoing dialog about the current state of the Libraries and strategic directions for the near future.

## 2. EVOLUTION OF THE UC LIBRARY SYSTEM

In pursuing a strategy of more extensive resource sharing over the last quarter century, the UC libraries have passed through three stages of cooperation, and are poised to enter a fourth stage.  Each stage has built upon the foundation of the distinguished collections and excellent services of the nine campus libraries, and can be characterized by progressively greater levels of cooperation and interdependence among the campuses and increased leverage of the library system's resources, which include collections, staff expertise, and funds.

### 2.1.    Stage I: Stand-Alone Libraries

Over time, each of the UC libraries has built, and is continuing to build, a rich and distinguished collection tailored to the teaching and research needs of its campus.  Prior to the mid-1970s, however, each campus library operated largely independently.  Most library users satisfied their information needs with the books, journals and other materials acquired by their campus library. Free jitney services, established in the late 1960s, allowed the most dedicated to travel to Berkeley or Los Angeles (depending on the region in which their campus was located) to use the larger collections at those two campuses, but at a considerable expenditure of time, and with no guarantee that the materials they needed would be held in one of those collections.  Items could be requested via interlibrary loan (ILL), either from another UC campus or a non-UC library, but the success of this strategy depended on the local library staff's knowledge of the holdings and strengths of other major libraries, since there was often no way to know whether or where a particular item might be held in another library.  Success for the patron often took weeks.

### 2.2.    Stage II: Coordination to Support Regional and Systemwide Services

A formal comprehensive planning process for libraries began in 1976, triggered by the State of California'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 in its 1977 Library Plan 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.

These innovations leveraged the libraries' resources to improve efficiency and service to users. The shared space resources of the regional library facilities made it possible for the libraries economically to accommodate infrequently-used print collections and thus to devote a greater portion of their high-value campus shelf space to current and high-use materials.  The shared infrastructure of the Melvyl catalog enabled each UC library to provide its students and faculty

with ready access not only to the wealth of resources in the campus collection, but also to the expanded universe of information available throughout the UC system.

Library users now could use the Melvyl catalog to easily discover books not held by their local library and order it using interlibrary loan (ILL).  If needed items were not held within UC, library staff could search newly available national library databases to locate the item and place a request.  Library staff could also use the Melvyl system, not only to assist users in finding the material they needed elsewhere in the UC system, but also to inspect the holdings of the other UC libraries as an aid in developing their local collections.  The addition of journal abstracting and indexing databases to the Melvyl system beginning in the mid-1980s meant that immediate Universitywide discovery and access was possible for scholarly material in all formats, not just books.  These developments exposed library users to a bibliographic universe broader than the local campus, greatly increased the likelihood of locating needed material not held locally, improved the performance and productivity of ILL services, and provided users with better results and faster response times.  As a result, intercampus interlibrary loan grew dramatically – from about 36,000 items per year in 1975-76 to 135,000 in 1996-97.  During the same period, library users also benefited from the local online catalogs implemented at each campus library. This investment speeded the discovery of information and cut libraries free from the costs in time and space to maintain their massive card catalogs, while putting into the hands of students and faculty powerful computer-based tools that both simplified and improved the process of locating the information they needed within the vast collections of the libraries.

### 2.3.   Stage III: Cooperation to Develop a Shared Digital Collection

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.  To respond to these pressures, the Library Planning and Action Initiative (LPAI) was launched in September 1996.[4] The report of its advisory task force, released in March 1998, ushered in a further period of library collaboration, one that has focused on the shared development of digital collections and the further application of technology to enhance library services.[5] The LPAI also recognized that any costs that were avoided by libraries through collaborative action and resource sharing would in time be eaten away by hyper-inflation in the cost and rate of scholarly publishing. Accordingly it recommended that the University search for and support alternative means for distributing scholarly publications – means that did not impose such debilitating access cost on universities, libraries, or individual scholars. To accomplish these aims, the LPAI recommended the establishment of what was then the tenth university library, the California Digital Library (CDL).[6]

At present the shared collection of digital content assembled through the CDL comprises more than 8,000 journal titles and 250 databases, as well as other material. The shared digital collection represents a significant organizational innovation in collaborative, systematic collection development and acquisition because the campus libraries act as a single entity. 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

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13,000 additional subscriptions systemwide, through consortial purchasing by the California Digital Library on behalf of the UC libraries. This means that all 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. 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. Collaboration helps to leverage system resources to ensure vital library operations.

Now library users at every campus have, in addition to their local collections, immediate access to an extensive and growing collection of high-quality digital information.  With a click, bibliographic citations to books, journal articles and other information resources come into view, and in many cases users can view, download or print the information itself online.  Moreover, these services are available 24 hours a day, seven days a week, from any computer with access to the Internet.  Through the CDL's Online Archive of California, students and faculty throughout the University are exposed to treasures of UC's special collections, archives, and museum collections, resources that previously were not well known or readily accessible even to those at the collections' home campuses.  Through the CDL's Counting California, library users have access to the wealth of government-produced statistical information about our state and its people, information previously available only through local government documents collections or arcane data archives.

At the same time, the shared technical infrastructure that supports the Melvyl catalog and the California Digital Library has been further leveraged to enable the libraries to provide even more effective access to print resources.  Patron-initiated *Request* is a service 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. As an integrated service built upon Melvyl, *Request* reduces the complexities of interlibrary loan, thereby encouraging and supporting use of campus libraries as virtual Universitywide library. In the past ten years, the number of interlibrary loan requests within UC has more than doubled, with the greatest growth occurring since the introduction of the *Request* service. *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.

### 2.4.  Accomplishments of the University Libraries' Collaborative Strategy

Many of the benefits that have been achieved through this strategy of progressively expanding collaboration are described in "Advances in Resource Sharing and Systemwide Library Service in the University of California: A Five-Year Progress Report" (January 29, 2003).[7]  Recent efforts at a financial assessment of these benefits suggest that:

- If campus libraries were independently to negotiate for, license, catalog, and collect user statistics for the 8,000 journal titles and 250 databases in the systemwide digital collection described in Section 2.3, UC libraries would have to spend $34 million more per year than they do currently.

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- Through the development of the shared print journal collection described in Section 4.1 below, the libraries may avoid subscription costs for print journals of up to $3.1 million per year, plus additional savings in on-campus shelf space to house those journals.
- The savings in high-value on-campus library space attributable to the Regional Library Facilities described in Section 2.2 (after accounting for the cost of the facilities themselves) have an estimated annualized value of $11 million per year.
- If the libraries had been compelled to purchase and add to their own collections the items they were able to borrow from each other via interlibrary loan in 2002-03, the total purchase cost would have been $31 million.

Additional benefits accrue from the technologies that enable the libraries more effectively to share, integrate, and present the University's systemwide print and digital library collections, including the Melvyl catalog, interlibrary loan enhancements, and other services described in Sections 2.2 and 2.3.

### 2.5.    The Next Stage: Collaborative Development and Operation of Shared Collections and Services

The UC Libraries are now poised to take the next steps to optimize the shared management of their resources, by working together to collaboratively design, develop, and share in the operation of an even wider range of services.  These strategies leverage the ascendance of scholarly information in digital form, while continuing to improve access to print resources and further enabling each campus library to provide needed information in all formats along with advanced services for its campus communities.

To accomplish this, the UC Libraries must develop services and collection management strategies that simultaneously take advantage of the economies of scope and scale inherent in systemwide infrastructure and sharing of resources and are sufficiently flexible to allow each campus to tailor shared services to meet campus needs.  The libraries must therefore collaborate broadly and deeply to design these services, pool financial resources and expertise to develop and continuously operate them, and seek ever greater opportunities to leverage available resources in order to achieve systemwide solutions that can be effective in meeting local needs. Specific strategic directions to achieve these aims are fully described in Section 4 below.

## 3. CURRENT CHALLENGES CONFRONTING THE UC LIBRARIES

The accomplishments described above have provided enormous benefits for the University and its scholarly community, allowing the UC Libraries to maintain and enhance service affordably and effectively.  However, these achievements have not fully addressed the traditional challenges facing our libraries, and have as well created new challenges that must be addressed.

### 3.1.    The changing nature of library collections.

Increasingly, the information resources needed and used by campus communities for teaching, learning and research consist of:

- *Traditional print resources*, most of which have no digital equivalents and remain essential for support of the University's teaching and research programs.
- *Licensed digital collections*, consisting of traditional scholarly publications, such as journals and books, produced in new digital formats by for-profit and non-profit publishers, and acquired for the UC shared digital collection.

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- *Digital "built content,"* materials created internally by UC or converted into digital form from existing UC collections, such as manuscripts, maps, visual images and sound files, often exposing these unique collection assets for the first time to a wider University and public audience.
- *The World Wide Web,* the conglomeration of information resources in all formats (and of highly varying quality and persistence) available to any user of the Web.
- *Other UC digital assets*, such as datasets and other primary research materials, and teaching materials, created in digital form by the UC community.

The emergence of new forms of digital library collections raises fundamental challenges to traditional concepts of building, servicing, and preserving library collections. While the adoption by libraries and their patrons of licensed digital journal collections has been relatively straightforward (perhaps because they have print equivalents and can be treated similarly), it remains critical to gain greater understanding of the conditions under which a digital publication can be considered an adequate substitute for print,[8] and of the ways in which digital publications can be preserved in order to assure their longevity and usability. The creation of new digital content ("built collections") is also proceeding rapidly, but raises additional questions about technical standards, cost of compliance, and what methods are likely to be successful, affordable and sustainable for describing and providing access to the contents of these collections (answers may vary according to the nature of the material, but it is increasingly evident that traditional methods, such as library catalogs and bibliographic databases, cannot be successfully adapted to meet this challenge).

A greater challenge to traditional concepts of collection development lies in the area of information available on the World Wide Web. UC experience and national studies show that both students and faculty make extensive use of these resources, often in preference to higher-quality resources available from the library. However, information on the open Internet is hard to find, of varying quality, and often ephemeral. To develop a "collection" of relevant material from the open Internet, virtually every aspect of settled library practice must be answered anew, including how to identify and select relevant and authoritative resources, how to "acquire" and preserve them, and how to provide effective access to the content; these questions, in turn, are further complicated by uncertainties about technology, copyright, privacy and other matters that currently characterize national discussion about the Internet. The scope of the problem is so immense that, in the wake of a major report by the National Academy of Sciences,[9] in December 2002 Congress appropriated $100 million to the Library of Congress to establish a National Digital Information Infrastructure and Preservation Program[10] to begin to address the issues. The challenge of the World Wide Web, although daunting, is important to address, as information resources needed for teaching and research are increasingly available only on the Internet; examples include the publications and key documents of government agencies at all levels,[11] and virtually all the routinely-produced government and private reports needed for economic research.

Capturing and curating digital materials produced by UC faculty, staff and students in the course of their teaching, learning, and research activities presents a different, but no less demanding, set of challenges. These traditionally have not been within the scope of library collections, but represent assets worth capturing, managing, preserving, and making accessible to support teaching, learning and research. MIT's Open Courseware Initiative (<http://ocw.mit.edu/index.html>) provides both a rationale and a compelling example of this kind of collection.

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Taking action to acquire, organize and preserve research information and pre-publication products brings the benefits of the libraries' information management skills to new areas of the knowledge life-cycle, promising both to relieve faculty and their departments of the considerable burden of managing and preserving this information and to position the University to more effectively pursue new opportunities to change and enhance the scholarly communication system.

### 3.2. The changing role of the library.

The academic community's needs and expectations for library service change constantly as a result of evolution in the focus and methods of academic and professional disciplines and programs, the changing demographics of the faculty and student body, increasing enrollment, the effects of information technology, and society's shifting expectations for the University and the outcomes of its teaching, research and service programs. For libraries to remain a vital and essential part of the communities they serve, they must anticipate and adapt to the requirements of these ongoing changes.

While the digital revolution in the provision of scholarly information has afforded enormous leverage to libraries in providing access and service to their users, the same technologies have, paradoxically, served to diminish the profile of the library as an authoritative source of information for the campus community for some disciplines and constituencies, even while the use of library facilities and services is increasing. By most reports, more people come to the library than ever before, and both national studies[12] and UC research[13] show dramatic increases and heavy use of the digital collections that libraries provide; but nationally, some traditional measures of the use of library collections are declining. The Association of Research Libraries reports that, according to annual statistics provided by its members, "starting in 1996 circulation service transactions began to decline, in 1998 reference transactions began to fall, and in 2000 both categories dropped below 1991 levels for the first time. Last year for the first time we reported data regarding in-house use, which had previously gone unpublished, that also show declines."[14] A recently-completed national study of faculty and students, conducted by the Digital Library Federation and Outsell, Inc., found that "about half (49.2%) of undergraduates reported that they used electronic materials exclusively or almost exclusively."[15]

This evidence implies that faculty and students continue to be drawn to the library, but increasingly for purposes other than checking out books. The significant contributions of the library to meeting the information needs of its community through the kinds of digital collections discussed previously may be increasingly obscured by two fundamental problems:

- Many students (and some faculty) are increasingly unable to distinguish between the kinds of authoritative information provided in electronic form by the library and the welter of unverified (and often erroneous) information available on the Internet and readily accessible through innumerable Web search engines.
- The substantial contributions of the library to the provision of scholarly information in digital form – acquiring (at significant cost), organizing, cataloging, integrating – become increasingly invisible to campus users – it's all "available on the Web."

As a result, UC's libraries are challenged both to identify the reasons that users continue to flock to the library and promote these new roles for the library as a "place" in the life of the campus, and to explain, expand, and solidify their roles as organizers and providers of a host of new
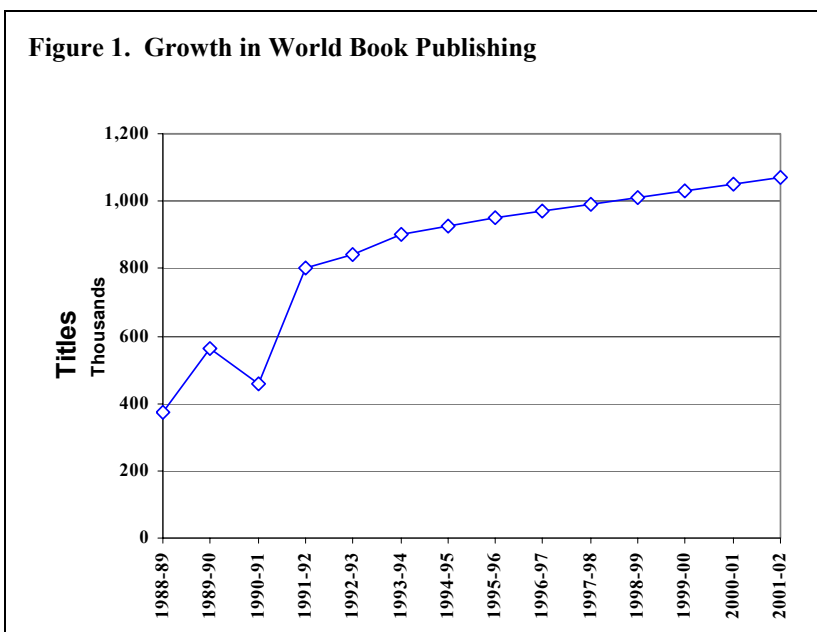
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forms of digital information.  Fortunately, the UC Libraries remain well positioned to explore these roles and thereby enhance their ability to serve the University community.  The Digital Library Federation/Outsell study found that, notwithstanding the growing role of digital information in academic life, "the library has a commanding authority. Slightly more than 98 percent (98.2%) of those surveyed agreed with the statement, 'My institution's library contains information from credible and known sources.'"[16]

In addition to these challenges, the increasing role of digital information and of shared Universitywide collections and services threatens to blur the distinctiveness of each campus' library program.  The character of each campus library, comprising its unique collections, specialized services, and overall culture, has been built over decades and partakes of the distinguishing characteristics of the campus itself.  The distinctiveness of each UC library is a critical asset, as it embodies the tailoring of collections and services to meet the needs of the campus community, as well as adding to the strength and diversity of the Universitywide library system.  The challenge is to maintain and further strengthen the individuality of the campus libraries in the face of increasing economic and technological forces that lead to greater homogenization.

### 3.3.  Technology infrastructure.

Libraries face the challenge of continually acquiring new information technologies, modifying their operations and services to accommodate new systems, and adapting new technologies to meet academic needs.  The conventional wisdom is that the application of technology increases productivity, especially in industries that must devote a high proportion of their expenditures to labor costs, such as higher education and library service.  There is no question that the application of technology to library operations has indeed improved organizational productivity and helped to mitigate the increase in the cost of library operations, but technology has so far done nothing to mitigate risings costs of the information that libraries must acquire to attain their mission, and the production of information in traditional formats continues unabated, as shown in Figure 1.  As a result, the cost of new library technologies is rarely offset by savings, and represents an additional cost to libraries and their parent institutions.

Of more importance, investment in new technology is needed both to improve access to information and to support the acquisition and delivery of new forms of information that are based upon new technologies. Recognizing the central importance of digital information to the University's mission, the report of the University's 1997 Library Planning and Action Initiative noted that:

**Figure 1.  Growth in World Book Publishing**

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> A sophisticated and robust inter- and intra-campus technological infrastructure is an essential prerequisite to the distribution of digital information and the establishment of the California Digital Library. Without such an infrastructure, the CDL cannot deliver expected content and services. It is important to emphasize that this infrastructure must be designed with the understanding that content will outlive generations of access, storage, and retrieval technology and data formats and must migrate repeatedly without loss or distortion. It is important, however, to recognize that infrastructure development will require continuous investment centrally and by the campuses. The Office of the President and the nine campuses should continue and expand their investment in information technology networking infrastructure and in equipment and software that will facilitate faculty/student/staff access to digital content.[17]

Since the LPAI report, the importance of robust technology infrastructure for high-quality library service, and the interaction of technology-based library services with other campus and systemwide infrastructure and applications has grown. Not only do libraries depend on campus technology infrastructure to provide access to and delivery of scholarly information, but they must interoperate with other campus systems for administrative information (e.g., with payroll/personnel and student systems to maintain library circulation and authentication services) and, increasingly, with academic technology services (e.g., with course management systems to integrate library resources in course Web sites).  A significant example is the capability to authenticate authorized members of the UC community to third-party systems that host our licensed digital collections.  With assertive leadership from the UC Systemwide Library and Scholarly Information Advisory Committee, the libraries have been able to provide an interim solution through the use of proxy server technology, but this resolution involves significant workload and does not scale well to the size and diversity of digital collections we can expect in the future; a broader approach that is capable of simultaneously addressing the University's other network authentication and security needs on a systemwide basis will soon be required.

These trends and this example highlight two important issues:
- It is increasingly important that the UC libraries are involved when the University and its campuses plan and implement their information technology strategies, to make sure that library requirements are included and that necessary coordination and systems interoperability is ensured.
- As has been true in the past, neither libraries nor computer centers can be the sole source of innovation or investment for the development and ongoing operation of critical information technology infrastructure to meet the needs of library users.  Ultimately, the University will need to develop and maintain an information technology infrastructure that is driven by and responsive to the entire range of programs and operations that it must support.

### 3.4.    *Preservation of Digital Information Resources*

To achieve the UC Libraries' goal to enhance and enrich access to collections of scholarly information of world-class depth and breadth, it is necessary to ensure that these essential information resources remain available and accessible into the future, long after they were first created, published and distributed.  As a result, for the world's great research libraries, including those of the University of California, "a principal goal […] is to preserve the record of knowledge from the past and present represented in the collection and to carry out this basic responsibility into the future. To invest in protection of this asset is a wise and responsible act to insure against loss."[18]

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While the costs and challenges facing research libraries in meeting this goal for their print collections are formidable, the problem and the means of addressing it are generally well understood.  For the burgeoning array of scholarly information resources in digital form (see Section 3.1 above), the challenges are even more intimidating.  As described in the project plan for the Library of Congress' National Digital Information Infrastructure and Preservation Program,

> Digital technology is radically transforming the ways that we create and disseminate information. This new technology has spawned a surfeit of information that is extremely fragile, inherently impermanent, and difficult to assess for long-term value. The technology has enabled and encouraged many creators: It is possible for everyone to be his or her own publisher on the Web, in large part because it is not filtered for content or quality, as traditional modes of publishing have been. Digital formats are no sooner created than they are superseded by others. As a result, it is increasingly difficult for libraries to identify what is of value, to acquire it, and to ensure its longevity over time.

> Never has access to information that is authentic, reliable, and complete been more important, and never has the capacity of libraries and other heritage institutions to guarantee that access been in greater jeopardy. Recognizing the value that the preservation of past knowledge has played in the creativity and innovation of the nation, the U.S. Congress seeks, through the Library of Congress, to find solutions to the challenges posed by capturing and preserving digital information of cultural and social significance.[19]

The issue is further complicated by the fact that in many cases the library does not have custody of the information resources it seeks to preserve; these are often located on publisher Web sites (in the case of licensed publications), personal or departmental computers and servers (in the case of work produced by UC's faculty and students), or distributed across the World Wide Web (in the case of publicly-accessible Web resources).

Thus, added to the other challenges presented by burgeoning information technologies in the areas of collection development, provision of services, and ensuring a robust technology infrastructure, must be added the challenge of identifying, capturing, and providing for the persistent storage and management of digital information resources of enduring research and teaching value.

### 3.5.    *Governing, Managing and Financing an Interdependent Library System*

This discussion has provided ample evidence of the increasing interdependence of the UC libraries, an interdependence fostered by deliberate strategy and supported by a shared infrastructure that dramatically lowers the cost of resource sharing and leverages the University's library investment to improve services for all UC students and faculty.  Paradoxically, the growing interdependence of the libraries has been accompanied by a simultaneously growing decentralization to the Chancellors of administrative and budgetary responsibility.  In the period of free-standing libraries before 1977, the campus libraries enjoyed substantial programmatic independence, but budgets were closely controlled by the Systemwide Administration.  It was logical to locate at Systemwide Administration the programs called for in implementing the 1977 Library Plan (most notably, the Melvyl catalog and the Regional Library Facilities), as well as the budgetary resources allocated by the State for their support.  In the wake of the budgetary difficulties of the early 1990s, the clear demarcation between campus and systemwide roles and responsibilities for components of the library system began to blur.  Administrative

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responsibility for the Regional Library Facilities was transferred to their host campuses at Berkeley and Los Angeles, along with their operating budgets, although responsibility for policy remained with the two Regional Library Boards appointed by and accountable to the Provost and Senior Vice President for Academic Affairs.  In 1996-97, the University implemented the President's Budget Initiative, a program that transferred most administrative authority and budgetary responsibility (and most of the discretionary budgetary resources previously held at the Office of the President) to the Chancellors.  When the California Digital Library was launched in 1997-98, it was administratively located within the Office of the President, and its start-up funding, consisting of an initial allocation of UCOP discretionary funds and substantial new funding from the State, was included within systemwide budget provisions.  However, even by the time of the CDL's official opening in 1999, the scope of the University's shared library infrastructure had grown past the point that it could be supported by budgeted funds that were available at, or could reasonably be expected to be secured by, the Office of the President.  To continue to achieve greater leverage through shared infrastructure, co-investment by the campus libraries was necessary.

Under the provisions of the Partnership Agreement with California Governor Gray Davis (<http://budget.ucop.edu/NP.html>) and the internal UC budget management initiative implemented in 1996-97, libraries are considered as part of the University's requests for new State funds to support additional enrollments, salary increases, and non-salary price increases. These funds, when provided by the State, are block-allocated to campuses, where Chancellors have considerable discretion to re-allocate to campus programs to meet local priorities and needs. Funds for Systemwide programs are not requested routinely, and are usually over and above the amounts provided in the Partnership.  As a result, in 2002-03, for example, 91% of the $63.7 million UC budget for library materials was held in campus budgets, while 9% ($5.5 million) was in Universitywide accounts supporting shared collections.  During that same year, the budget for the Shared Digital Collection was $24 million, including the cost of print subscriptions "bundled" with digital access.  Since Systemwide funds could provide only $5.5 million, or 23%, of this amount, the remainder, $18.5 million (77%), has come from voluntary co-investment of funds from campus library collection budgets.

As a result, much of the burden of financing the shared collections and services of the UC libraries falls to the campuses.  Even in the best of times, the health of this shared infrastructure, and hence the quality of service that each campus library can offer to its students and faculty, depends increasingly on the ability and willingness of the campuses to co-invest in shared programs and services: while 7-8% of the University's library budget is allocated to systemwide programs, about 10% of the total UC library budget, and nearly 20% of the collections budget, are currently devoted to shared collections and services.  It is now evident that the UC Libraries will share in the substantial budget cuts currently facing the University as a result of the State's fiscal crisis.  These cuts come at a time when the cost of acquiring library materials continues to increase at a rate that outpaces inflation, challenging the campuses and their libraries to find ways to sustain the quality of current collections and services while adding new forms of knowledge and coping with growing enrollments.  In a time of budgetary contraction, the shared financing of shared services can place an extraordinary strain on campus library budgets.  As campus library commitments to shared solutions increase, libraries will have less flexibility to make discretionary investments (or take cuts) to meet both local and systemwide needs.  In 2002-03, almost 19 percent of the total of campus library collections budgets was devoted to direct investment in the shared licensed digital collection; when campus commitments to continuation

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of print subscriptions required by some publishers' license agreements are included, this percentage increases to about 29%. Owing to the combined effects of the increase in national and international publication output, the ongoing increase in the cost of both books and journals, and a 7-8% annual increase in the cost of the shared licensed collection, it is problematic simultaneously to sustain the shared digital collection and the currency and vitality of campus collections without additional sources of funding.

Building and housing a growing collection of information resources for research and teaching is a cumulative process, so that periods of budgetary austerity that constrain or reduce operating and capital budgets not only affect current services, but have ramifications that echo far into the future. The budget cuts currently being experienced by the campuses present serious challenges to the quality of campus libraries, as well as the integrity of the shared Universitywide library programs upon which all campus libraries depend. The impact of local decisions about library investment must now also be considered in a systemwide framework. Resource allocation decisions at one campus can have effects on all the other campuses through their impact on shared collections and services, and these effects in turn can be reflected back to the campus and magnified, owing to the high degree of leverage that characterizes the shared programs. The challenge facing the University at all levels will be to make budget decisions that balance the necessity for local library investments that support campus quality, distinctiveness, diversity, and local needs with the need for continued investment in shared systemwide resources, recognizing the existing differences among the campuses in ability to invest and the effect on systemwide services of campus decisions to co-invest in them. While the University Librarians consult extensively with each other and with their respective campuses about plans for shared collections and services in the context of local resources and have taken collective responsibility for planning and managing shared collections and services, additional funding strategies and broader consultation may be needed to strike a balance between shared systemwide and local campus investment priorities, to consider intercampus equity in investment in systemwide programs, and to support the deployment of library resources to meet Universitywide and campus needs.

## 4. STRATEGIC DIRECTIONS

In response to these issues and the opportunities afforded by technology and collaborative action, the University of California Libraries have launched an ongoing strategic planning process. Current directions for strategic development include expanded collaboration to manage collections in all formats on a systemwide basis, a shared infrastructure to support cost-effective development of library services that can be tailored by each campus to more effectively meet local needs, the development of shared facilities programs including some repurposing of the roles of the existing Regional Library Facilities, continued expansion of UC's scholarly communication initiatives, and new efforts to communicate widely with the UC community about the libraries' challenges, opportunities and strategic directions.

### 4.1. Collection Management and Coordination

The University's library strategy has resulted in a carefully coordinated and collaboratively managed hierarchy of library collections and services in which the collections of the individual campuses are augmented and enriched by ever-improving capabilities to access and make use of the resources of all the others.

More recently, campus collections have been enhanced by the development of shared digital collections that are held in common and are equally available and accessible to all members of

the University community. As a result, each UC faculty member and student can make use of a campus library that not only offers rich local collections, but provides a portal to the extensive resources of the entire UC system, integrated and presented by the campus library in a way that responds to the particular needs of the campus community. Of equal importance, collaboration on acquisitions and preservation helps ensure that the diversity of the Universitywide collection is maximized and increases the likelihood that information needed for research and teaching will be available somewhere within the UC system.

Looking forward, the University Librarians, at their November 2002, retreat, built upon the University's successful experience with the shared digital collection by endorsing and creating an initial working definition for the concept of a shared print collection. The overall aim of this concept is to further optimize the management of and access to information resources for students and faculty by reducing unnecessary duplication, leveraging shared assets (such as the Regional Library Facilities and rapid intercampus information delivery capabilities), and expanding the breadth and depth of information resources available systemwide, while meeting the unique information needs of library users at each campus and enhancing the distinctiveness of each campus library's collections and services.

For example, the libraries' first collection management action initiative, the Shared Print Journal Collection, aims to acquire an archival print copy of most journals available in the Shared Digital Licensed Collection. Campuses can then consider whether to cancel local subscriptions to the print equivalents of these journals, or to retain their print subscriptions to meet particular local needs, while faculty and students can be reassured that one print copy of each of these journals will remain available in highly secure and environmentally controlled conditions (at a UC Regional Library Facility) in the event of failure of the digital version. This initiative gives campus libraries greater flexibility to manage their collections, allowing them to free up financial and space resources to acquire new material to meet high-priority local needs. A similar initiative to rationalize and reduce duplication in the libraries' extensive holdings of government publications promises similar benefits. Efforts to capture and ensure persistent access to digital information, described in Section 4.4, will also result in the creation of new shared collections in the digital realm.

Possible savings are to be had in space and in staff required to acquire, process and manage these collections. Where collections are large and highly redundant savings are likely to be considerable. The University Librarians are currently investigating the cost-benefit characteristics of various shared print collection concepts. The all-campus Collection Development Committee also has proposed an investigation into the utility of an online service infrastructure that will enable campus bibliographers dynamically to track what monographs are being purchased by other UC libraries. The 66 academic libraries that make up OhioLink have implemented such a system. Evaluation of that system suggests that it extends the breadth of collections that are available to users of OhioLink libraries while minimizing the libraries' expenditures on redundant items.

### 4.1.1.    <u>Recommended Actions</u>
- Develop a detailed planning and evaluation framework for shared collections in all combinations of formats that, for each existing or proposed collection a) explicitly specifies the key characteristics (e.g., physical location, access and management policies), b) identifies

resource needs (e.g., processing, shelving space and environmental requirements, access and delivery services, requirements for infrastructure services such as bibliographic access and inventory control) and costs, c) assesses implications for campus operations, services, preservation strategies, and budgets, and d) identifies the affected user communities and delineates the nature and level of expected demand for use of the collection, and applying the guidance provided by this framework, proceed to selectively implement the development of specific shared collections.

### 4.2.   Shared Facilities

Since the early 1980s, the Northern and Southern Regional Library Facilities have provided for the campus libraries economical, environmentally controlled and secure space for infrequently used library material of enduring research value.  The emergence of the shared collections and shared services initiatives discussed above will require the University Libraries to develop new collection management, public service and technical service strategies to support them.  The Regional Library Facilities, as Universitywide assets, are well positioned to assume additional new roles in support of these initiatives.  While the nature of these additional roles awaits the results of ongoing planning for those initiatives, it is evident that a higher degree of coordination, consultation, and integration will be required, both between the RLFs and among the RLFs and the ten campus libraries, and that issues of governance, operational budgeting and financial administration, and capital budgeting and planning will need to be addressed as the RLFs make the transition from regional services accommodating campus-based collections to systemwide services accommodating a mix of campus and shared collections.

#### 4.2.1.     Recommended Actions

- Consolidate the governance of the Regional Library Facilities and take steps to ensure that they are fully integrated into planning and operations in support of the strategic directions and collaborative programs of the UC Libraries.
- Regularly review the policies, operations and resources needs of the shared Regional Library Facilities to ensure that they continue to optimally support the strategic directions and collaborative programs of the UC Libraries.
- Acknowledge that the scope for continued expansion of the Regional Library Facilities is necessarily limited (by site constraints, availability of capital resources in the context of UC capital program priorities, etc.), and begin long-range planning for this eventuality.

### 4.3.   Shared Services

Collaborative development and use of information technologies creates new opportunities for design of innovative and cost-effective services that address the changing library roles discussed in Section 3.2 and the new kinds of collections discussed in Section 3.1.  While library users now have access to an enormous range of print and digital information resources, they must locate and learn to use a wide variety of disparate systems and services and find ways to assemble the results from these multiple sources to accomplish the task at hand.  Complicating the problem further, a host of important digital sources are *not* now acquired, organized, supported and serviced by the user's campus library, including the myriad forms of content available on the open Internet.  Of more importance, the products of our faculty and students' own work – writings, data sets, art works and other resources  – are increasingly created in digital form, and are a rapidly growing component of the University's research and scholarship.  In addition,

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library systems and the environments employed to support online learning presently do not integrate (technically or otherwise). The wealth of information available through the library is underutilized because it cannot be accessed dynamically from online course materials and is not readily integrated into them. Considering that state funds devoted to university libraries amount to about $240 million (of which about $60 million is spent on materials) and state funding for instructional technology is about $170 million annually (not including sums allocated from other campus or departmental funds to acquire or support instructional technology and its use), the potential benefits of more effective integration of library and online learning systems and resources is enormous.

Strategies are needed to help students and faculty to be effective and efficient in creating, managing, sharing, and ensuring the longevity of the digital resources they create, as well as in effectively using these resources in their teaching, learning and research activities.  The challenge is twofold: to develop services that effectively enable every UC faculty member and student to discover, access and make effective use of information from a variety of sources (including the formidable print resources of the UC Libraries), in a single interface or portal, and in a form that can be customized to meet the needs and preferences of each user; and to ensure that the digital products created with these resources can be effectively captured and managed as significant additions to the store of knowledge.  The aim, in other words, is to enable each campus library to provide services that are tailored to meet the needs of campus communities, effectively make the world's scholarly information resources available to each member of those communities through their desktop computer, and ensure that the digital products of their scholarly work remain available and accessible as building blocks for the creation of new knowledge.

The potential for collaborative solutions to this challenge lies in advancing technology that has now made possible a new "layered" service model.  This model would have libraries take responsibility for building local and highly customized services based upon shared service components that are made available by a number of different organizations. The layered service model promises the same degree of flexibility, innovation, and customization that is associated with local service provision without sacrificing the economies that are achieved through the shared centralized model. It also promises to strengthen the library's historic and essential mediating role between users and the information they seek.

The UC libraries have very limited, but highly successful, experience with these layered services. The current viable example is UC eLinks – the service that allows users to move seamlessly from a citation (as may be discovered in an online reference database or online journal) to the underlying full text of the cited article.  Current thinking points toward a substantial redesign of most existing centralized digital services to bring them into a layered service environment by providing both the shared infrastructure and the configurable tools that will allow each library to design and deliver customized services to its users.[20]  Development in this direction promises several significant benefits, including:

- Library services are tailored explicitly to meet users' local needs. Thus, a library builds services that integrate a world of information with its own local and distinctive collections and presents the body of material in a way that supports and reflects local research and teaching needs.

- New services can be developed more efficiently.  Just as libraries benefit more from the holdings managed by others, they benefit as well from services developed by third parties. For example, a successful alerting service, developed by one institution to inform users about new materials having to do with aspects of thermonuclear dynamics, may be readily adapted at another institution to inform its users about advances in human genome science.
- Opportunities are created to extend library services to new domains, such as integration with online course management systems and other instructional technologies.
- A flexible infrastructure allows campus libraries to capture a wider range of the University's digital assets, and cost-effectively integrate these into campus library services while simultaneously making them available systemwide if desired.

Services developed in this framework promise better integration of a greater variety of information sources and an enhanced ability for each UC library to create and integrate collections and services to meet campus needs and reflect each library's strengths.

The same factors that encourage a collaborative approach to innovative services – greater efficiency, flexibility, and tailoring to campus needs – invite rethinking of the libraries' existing bibliographic services infrastructure. This infrastructure consists of the campus and Universitywide systems, operations and services that support the creation, management, manipulation and presentation of the bibliographic information, or metadata, that is necessary for libraries to acquire and manage scholarly materials and for patrons to discover, access, retrieve, and use those materials.  The parts of the infrastructure that are visible to library users include the Melvyl union catalog and the campus online library catalogs; the *Request* service that allows Melvyl users to directly request items on interlibrary loan and similar campus-based services; UCeLinks, which allows users to navigate via links from citations to online content; SearchLight, which allows simultaneous searches across multiple journal databases, book catalogs, and other information sources available through the CDL and the UC campuses.  The "invisible infrastructure" that supports these services includes automated systems for the acquisition, processing cataloging and circulation of library materials of all kinds, and the skilled library staff responsible for these complex operations.

While the libraries have been enormously successful in exploiting this infrastructure to accommodate new kinds of collections and support new services, it should be recognized that:
- This infrastructure has been developed over the last quarter-century from building blocks, including professional concepts, campus practices, and systems that are rooted in the model of a single library that acquires, manages and provides its users with access to books, journals, and other physical material.  These building blocks may no longer be adequate to deal with a library service that is collaborative and multi-institutional and must manage and provide access to a host of kinds of materials in a variety of physical and electronic formats, much of which is not acquired and owned by any library in the collaboration.
- While systems provide essential infrastructure to support these services, it is skilled and experienced library staff who must provide the services themselves.  Owing to a variety of factors – the national economic downturn, California's cost of living, a general contraction in the library labor market, the approaching retirement of a large portion of the library workforce, the University's current budgetary environment, and the libraries' changing needs for staff expertise among them – it is becoming increasingly difficult for the UC Libraries to recruit and retain the quality and number of staff needed both to provide the full range of existing services and to design and offer innovative new services.

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Although these issues must be addressed in large part at the campus level and in the framework of campus needs, priorities and aspirations, collaborative approaches should be pursued when these can:
- Leverage existing resources – staff, dollars, systems – to achieve cost avoidance and increased cost-effectiveness
- Create shared infrastructure that can cost-effectively support improvements in existing services and deployment of new innovations
- Allow campus libraries to be more responsive to the needs of their faculty and students by affording them greater flexibility to locally configure shared systems and services
- Provide an enhanced experience for library users by more effective integration of information resources and services.

At the same time, the layered service model increases the level of interdependence of each library on the others and on third-party providers, and challenges each Library to develop the service vision and technical capabilities needed to gain maximum advantage from the layered service infrastructure.

### 4.3.1.    Recommended Actions
- Develop a programmatic framework and plan of action to effectively leverage the collective resources of the UC libraries, including deep staff expertise and shared infrastructure, to both more effectively manage and deliver essential ongoing services (e.g., systems and services for bibliographic control, management, discovery and access, for collection acquisition, processing and management in all formats and including shared and campus-based collections where relevant) and to collaboratively develop, deploy and support advanced user services.
- Develop and implement pilot programs to test concepts, refine planning, establish and revise priorities, and clarify resource needs and sources.

### 4.4.    *Persistent Access to Digital Information*
Addressing all the intellectual, organizational, technical, legal and financial issues involved in the digital preservation challenge described in Section 3.4 above will be the work of many hands over many years.  Indeed, many of these issues cannot be addressed by a single institution, but must be attacked at national and international levels.  Numerous collaborative initiatives in this area, such as the Library of Congress National Digital Information Infrastructure and Preservation Program (see note 19 above) have emerged to address various aspects of the problem, and the UC Libraries are and must continue to be involved in many of them.

However, UC cannot wait for external solutions, and collectively we can begin addressing these problems with two constructive steps.  The first is to provide the UC Libraries with the technical means to successfully play their essential custodial role with digital information assets.  To ensure long-term access to the digital scholarly information that supports and results from research and teaching at UC, the libraries require digital preservation repository technology and the accompanying tools to support the identification, capture, description, organization, presentation, and persistent management of digital scholarly information. This capability should be developed as a "utility" infrastructure, sharing common components and accessible Universitywide, but available for each library to use flexibly to meet campus needs.  Also included will be a host of tools that will enable the effective use of the utility infrastructure,

including implementation guidelines, support services, and guidance for collection planning, rights management, and other key components of the preservation process.  This model will enable UC libraries to cost-effectively act as guardians over the University of California's digital scholarly assets without having to individually invest in the requisite deep technical infrastructure.

A shared digital archival repository infrastructure will enable the libraries to ensure persistent access to:

- **Licensed content.**  In support of faculty research and teaching, the UC libraries have developed substantial collections of licensed content, including online scholarly journals at an annual cost of more than $20 million. Unlike collections of paper journals that remain on library shelves even after subscriptions are cancelled, online journals are volatile and at risk. Although the UC libraries have succeeded in including perpetual access clauses in their subscription licenses, they lack the means of implementing the clauses should the need arise. Journal publishers are no better prepared than libraries to persistently manage online journal content. Accordingly, the UC libraries assign the highest priority to developing the means of persistently managing online journals. To this end, the libraries are in discussion with some of the largest journal suppliers about partnerships through which the libraries will preserve the vendor's online journal publications.
- **Web-based information.**  Information publicly available on the World Wide Web is an increasingly vital part of the scholarly and cultural record and is increasing at risk. It is also an essential means of collection development. In many areas where the UC libraries have substantial and historic collection strengths, information is being made available largely and in some cases exclusively via the worldwide web.
- **Digital objects managed or created by UC libraries**. The UC libraries have produced millions of digital objects including bibliographic records for monograph and serial holdings, finding aids that assist users in locating materials held in archives and special collections, and digital surrogates for selected analog materials (rendered as digital images, encoded texts, digitized maps, graphs, sound or video recordings). By capturing these assets and bringing them into persistently managed collections, the libraries stand to protect the very substantial investments they have made in creating them.
- **Online research and learning materials created by UC faculty**. Presently, we have only a very limited ability to provide support for the digital scholarship of our faculty.  Without easy-to-use systems that provide the capability to capture, persistently manage, and encourage re-use of the research, learning, and course materials that scholars and teachers digitally produce as a natural by-product of their work, individual faculty are often left to grapple with these problems alone, and we may be deprived of some of the very best that UC scholarship and pedagogical practice have to offer. We also place at risk of loss one of the greatest intellectual assets of the University of California.

A second important step is to gain a greater understanding of the range of needs for reliable preservation of digital information that increasingly exists throughout the University, and assess the extent to which the Libraries' digital preservation repository infrastructure can be leveraged to address them.  Increasingly, the vital records of the University – about students, staff, budget and finance, and myriad business transactions – are created and maintained only in digital form. These are subject to a bewildering variety of operational, policy and legal requirements and constraints, and both the technical and operational responsibility for their maintenance is widely

distributed throughout the University. While it is not, and should not be, the responsibility of the UC Libraries to manage this information, the application of the Libraries' digital repository infrastructure to these problems may have potential to enhance cost-effectiveness, improve operations and services, and more equitably distribute the administrative and financial responsibility for building and maintaining a shared technical infrastructure for persistent management of digital information.

### 4.4.1.      Recommended Actions

- Develop a digital preservation infrastructure, adhering to established standards and open-source practices and in collaboration with national and international efforts, that can be used centrally to preserve the digital information that is at risk and in which we share a common interest (commercial journals and databases, web-based government information) and that can be used by campus libraries to preserve digital assets in which they take a unique interest (for example, selected collections of web-based materials, UC dissertations, digital materials produced by faculty for research or teaching, etc).

- Investigate the extent to which the digital preservation infrastructure may assist in the preservation or protection of deteriorating print materials.

- Coordinate closely with University units responsible for information technology, records management, and others with interest in and responsibility for preservation of digital content, at Universitywide and campus levels, to foster development of and financial and technical support for a robust common information technology infrastructure that can meet the University's diverse needs for reliable archiving, management and retrieval of essential digital information of all kinds.

### 4.5. *Scholarly Communication*

Scholarly communication, defined as the range of published and unpublished literature, datasets, bibliographies, working papers, and pre-published drafts, is at a crossroads. The traditional model of scholarly communication based on journal publications has become expensive, restrictive, and increasingly limited in its ability to make information accessible. Challenges facing traditional models of scholarly communication include:

- Increasing volume and escalating costs.
- Few opportunities for efficient dissemination among peers.
- A lack of protection for intellectual property.
- Uncertain long-term access and preservation.

These issues affect the faculty who publish in traditional journals, the scholars who use the information, and the libraries who provide access to the materials.

The Library Planning and Action Initiative's Advisory Task Force acknowledged the University's opportunity and responsibility to influence the direction of change in publishing and distribution of scholarly information in order to maximize benefits for the academic community in 1998:

> The free flow of information required for scholarly and scientific communication is now threatened by rising costs in a monopoly-like marketplace that is increasingly dominated by large commercial publishers and information vendors. Universities subsidize the costs

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of faculty research. Faculty then give the results of that research to publishers, who sell it back at ever increasing costs and, in the case of digital information, with unprecedented new restrictions on distribution and use. Libraries have been among the first partners in the scholarly and scientific communication system to feel the ill effects of this model, but in the long-term, it will restrict the entire flow of scholarly discourse. Libraries have been first because the effect of changes in the information marketplace has been coupled with the growth in demand for digital documents and with minimal relief in the demand for print and other formats. This has resulted in a non-sustainable "business model" for campus libraries individually and for the University as a whole. Old formulae developed for State funding of libraries are no longer relevant to new situations and no longer operational under the University's budget compact with the Governor. UC's librarians are in an increasingly untenable position of trying to mediate between and among faculty/student needs and increasingly onerous budgetary constraints.[21]

To address this persistent structural problem, the Task Force recommended that: "To capture and distribute effectively the fruits of the knowledge developed by UC faculty requires new forms of scholarly and scientific communication. Since such a transformation also promises a long-term solution to the financial problems facing our libraries, the newly formed California Digital Library should play a leadership role in developing, supporting, and implementing practical opportunities for faculty to publish and archive material in digital form."

The subsequent experience with encouraging and supporting faculty-led experiments in scholarly communication through the *eScholarship* program has been successful, but this success has shown the need to re-examine and broaden the scope of our scholarly communication efforts.  It is both timely and critically important to extend the library role in UC's attention to influencing scholarly communication processes, in five ways:

- Articulating principles and goals with regard to the economically sustainable development and maintenance of high-quality and readily accessible research collections.
- Deepening expertise, partnerships and effective communication to shape and support systemwide and campus-based efforts.
- Extending the organizational capacity for innovation and building resulting services into the layered service structure of the library system in order to a) ensure effective and flexible management of the products of these innovations, b) provide a platform to share the results of these innovations with the world academic community, and c) provide a platform that reduces the overhead for faculty who wish to participate in these groundbreaking activities. The *eScholarship Repository* is a successful example.
- Informing the University community about the characteristics of the current system of scholarly communication, the options that are available to them to influence the system, and library strategies for dealing with the issues that facilitates understanding and practical support.
- Investigating areas where too little is known about the scholarly communications process and its impacts on library practices and programs. Researching the costs and benefits of hosting and acquiring alternative forms of publication and exploring new metrics to describe a publication's value to the university are two relevant examples.

Recent events have both heightened faculty interest in these issues and increased the urgency of addressing them.  These include the widely publicized launch of the Public Library of Science open-access journal *PloS Biology* (<http://www.plos.org/>), the protest by UCSF faculty

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members Keith Yamamoto and Peter Walter to the business practices of Cell Press (<https://mx2.arl.org/Lists/SPARC-OAForum/Message/211.html>), and UC's aggressive negotiation stance with Elsevier Science Publishers and other publishers of print and online scholarly journals (see, e.g., <http://www.universityofcalifornia.edu/senate/committees/ucol/aclibrarians1003.pdf>) and related announcements about Elsevier renewals from Harvard and Cornell Universities.  A recent series of UC faculty seminars on scholarly communication, co-sponsored by the Academic Council leadership and UC Systemwide Library Planning (<http://libraries.universityofcalifornia.edu:8081/scholarly/fall_03_facultyforums.html>) have both demonstrated faculty interest and willingness to take action and generated ideas for specific strategies.

Methods for effecting change within UC include an education campaign to inform faculty and scholars of the consequences of current publishing agreements (both between authors and publishers and between universities and publishers) and the benefits of open access publishing. Particular foci include:

o  Publisher **economics**: Elements of commercial publisher business models – high prices, large yearly increases – are unsustainable for library budgets and will limit the ability to maintain much less increase the breadth and depth of library collections. With the leadership and support of the Systemwide Library and Scholarly Information Advisory Committee [cite relevant Resolutions], the UC Libraries, in close consultation with faculty, are taking an aggressive approach to negotiations with publishers of journals in the Shared Licensed Digital Collection.

o  Alternative and experimental **forms of scholarly communication**: there are viable alternatives for disseminating research that are speedier, yield broader reach and impact, allow for innovation, and may, in aggregate, influence the field toward greater sustainability. Initiatives in this area reach deeply into the scholarly research lifecycle to capture and make more effective use of research information and products before publication.

### 4.5.1.     Recommended Actions

Working collaboratively with faculty, management, the UC Press, information schools, and national associations and bodies, develop and implement a program to provide leadership in the comprehensive alteration of the scholarly communication process so that it is economically sustainable and ensures the widest possible access to the scholarly record.  The program should identify concrete steps and the resources necessary to support our taking them, and should evolve along a shared services model (see Section 4.3) with appropriate use of utility (centrally provided) services and collaboratively developed campus-based efforts and at a minimum provide:

- ❑ Additional infrastructure that supports alternative means of scholarly publishing (e.g., facilities to support production and distribution of online journals and monographs)
- ❑ Expertise, leadership, outreach, and consultation services to support UC faculty who wish to influence scholarly communication processes, including their pursuit of alternatives to traditional scholarly publishing
- ❑ Mechanisms and implementation strategies that enhance our ability to license and purchase scholarly materials in accordance with principles of economic sustainability
- ❑ A network of highly engaged and informed staff to shape and support systemwide and campus-based efforts.

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## NOTES

[*] Prepared for SLASIAC by the UC University Librarians through the Office of Systemwide Library Planning, UC Office of the President

[1] *The University of California Libraries: A Plan for Development 1978-1988*, Berkeley, CA: University of California, Systemwide Administration, Office of the Executive Director of Universitywide Library Planning, July 1977.

[2] *Library Planning and Action Initiative, Advisory Task Force Final Report*, University of California, March, 1998 (<http://www.lpai.ucop.edu/outcomes/finalrpt/>).

[3] See <http://www.slp.ucop.edu/consultation/slasiac/>.

[4] For the Library Planning and Action Initiative see http://www.slp.ucop.edu/initiatives/lpai.htm

[5] For the report of the LPAI task force see http://www.lpai.ucop.edu/outcomes/finalrpt/

[6] See http://www.cdlib.org/

[7] Available at <http://www.slp.ucop.edu/documents/Expanded_Progress_Report.pdf>.

[8] The University's Collection Management Initiative (<http://www.ucop.edu/cmi/>) has begun to address this issue in the case of journal publications.

[9] *LC21: A Digital Strategy for the Library of Congress* (Washington DC: National Academies Press, 2000 (further information and an online version available at <http://www.nap.edu/catalog/9940.html>).

[10] Information about the Library of Congress program is available at <http://www.digitalpreservation.gov/index.php>.

[11] At the federal level, many, but not all, such resources will be captured and archived through an innovative collaboration between the Government Printing Office and the National Archives and Records Administration, but the Web-based documents of state, local and foreign governments and agencies in most cases currently elude capture and control.

[12] Amy Friedlander, Dimensions and Use of the Scholarly Information Environment: Introduction to a Data Set Assembled by the Digital Library Federation and Outsell, Inc., Washington, D.C.: Digital Library Federation and Council on Library and Information Resources Version 11/7/02 (<http://www.clir.org/pubs/reports/pub110/contents.html,> accessed 7/29/03.)

[13] University of California Libraries, Collection Management Initiative (<http://www.ucop.edu/cmi/>).

[14] Martha Kyrillidou and Mark Young, "ARL Statistics 2001-02: Research Library Trends," June 12, 2003 (<http://www.arl.org/stats/arlstat/02pub/intro02.html>, accessed 7/29/03).

[15] Friedlander, *op cit.*

[16] Friedlander, *op cit.*

[17] University of California, Library Planning and Action Initiative Advisory Task Force, Final Report, March 1998 (<http://www.lpai.ucop.edu/outcomes/finalrpt/>, accessed 8/27/03).

[18] Association of Research Libraries, "The Responsibility of Research Libraries for Preservation," May 22, 2002 (available at <http://www.arl.org/preserv/responsibility.html>, accessed 1/14/04).

[19] Preserving Our Digital Heritage: Plan for the National Digital Information Infrastructure and Preservation Program, Washington, DC: The Library of Congress, October 2002, p. 1 (available at <http://www.digitalpreservation.gov/repor/ndiipp_plan.pdf>, accessed 1/14/04).

[20] See, for example, *A framework for planning shared library services,* D Greenstein, May 12, 2003.

[21] Library Planning and Action Initiative, Advisory Task Force Final Report. University of California, March, 1998 (<http://www.lpai.ucop.edu/outcomes/finalrpt/>).