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who participates”³ – refers to the shift from small scale and individualistic inquiry to a process of large scale, collaborative research that has financial, political and organizational implications far beyond the implicit technological issues. Because cyberinfrastructure promises to “revolutionize what [scholars] do, how they do it, and who participates,”⁴ its deployment will affect every aspect of the communication of that scholarship. With its far-reaching impact on the nature and processes of research and scholarship, CI has also been framed as an important factor in the global competitiveness of the nation’s research enterprise.

Some people equate cyberinfrastructure to research computing and computational science. The initial thrust of investigation was instigated by the National Science Foundation (NSF), reinforcing the association of the term with high speed computing and the sciences.^{5 6} NSF continues to support the development of a national and regional computing infrastructure through its reports and funding programs. The impact on all disciplines is becoming apparent. The American Council of Learned Societies (ACLS) followed NSF in issuing a report on the opportunities and concerns from the perspectives of the humanities and social sciences.⁷ In late 2004 an ARL/CNI Forum⁸ presented an opportunity for the North American research library community to explore the topic.

Illustrative Challenges

Libraries often tailor services and collections to meet specific disciplinary needs, yet little is known about how institutional investments in cyberinfrastructure are affecting research at the discipline level. The distributed nature of cyberinfrastructure presents a challenge in determining the roles and contributions of individual institutions or their constituent parts, including libraries. Libraries have not always been at the table when research and high performance computing services have been discussed, priorities determined and funding distributed. Documenting and sharing information about investments in and management of cyberinfrastructure is needed. This work is urgent and important for libraries to redefine and assert their role in the creation, dissemination, and preservation of scholarship.

Research agendas and scholarly practice can be transformed by ubiquitous access to computing and network resources. How academic institutions choose to employ and distribute funding and computing resources will determine the future of scholarship and scholarly communication in all disciplines. How cyberinfrastructure is viewed, funded, and governed on campus will be a pressing issue for scholars, libraries, and IT to co-determine.

Research Possibilities

- Collect systematic data about academic library expenditures on technology and infrastructure. [http://www.libraryinvestments.org/](#)

- Review funding patterns of the National Endowment for the Humanities (NEH), Institute of Museum and Library Services (IMLS), and the National Science Foundation (NSF) to identify past and planned funding for cyberinfrastructure projects. Examine the assumptions about related impacts on the communication and management of research results.
- Study institutions receiving grant funding to track the degree the institutions have absorbed the funded projects into their budgets. Determine what elements of cyberinfrastructure development and deployment have been sustained beyond grant funding and examine how costs can be identified and tracked.

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Existing organizational models in the academy are collapsing or reforming in response to shifting values and behavioral changes, technological innovations, and new expectations. For example, more

- Create sophisticated modeling and simulation of current costs projected into the future to test

- Explore the relative value, importance, and significance of traditional journal and book publication compared to newer, informal forms of scholarly communication for a sample of representative scholars. This could build on studies by the CIC and Estabrook that indicated that in the humanities there is some acceptance of digital publications and new forms, while the scholarly monograph was still the standard for promotion and tenure.²⁴

A n n o u n c e m e n t

Innovation – its nature, pace, drivers, and characteristics – is an underlying concept for many of the other themes explored at the meeting. The process of assimilating innovations into communication practices depends upon our ability to characterize and to understand their sources, trajectories, and potential benefits. Roger's *Diffusion of Innovations*²⁵ speaks to the processes of adoption (and rejection). Moving beyond incubation necessitates an understanding of how to deploy innovations so they can be scaled for widespread adoption.

Assessing the potential of scaling innovations requires criteria for evaluation that allows the useful recognition of “failures.” It is the nature of some experiments to fail. Acknowledging and sharing results from failures may help others avoid wasting time and resources.

Illustrative Challenges

Innovation is difficult to track and may not be recognized for some time after it occurs. Even useful innovations aren't necessarily recognized and used by those who stand to benefit from them. Adoption of new communications approaches is varying widely within disciplines and even within sub-disciplines. Scholars want the fastest possible access to new approaches and technologies, but don't want to waste time on things that don't work. Publishers are often uncomfortable with taking the risks inevitably associated with innovation. Libraries attempt to deal with the full range of domain change in scholarly communication and struggle to act as change agents to accelerate the spread of useful developments.

Librarians may not be asking questions or listening to their faculty in ways that can elicit how innovation occurs and how it can be encouraged through partnerships, new services, practices, business models, and support systems. Is it possible to determine whether traditional methods and practices inhibit innovation and creative intellectual insights? What new examination of our own services can inform our ability to foster innovation?

Research Possibilities

- Analyze the nature, pace, and drivers for innovation in scholarly communication systems by drawing from the extensive literature on innovation and cultural change.
- Case studies characterizing successful innovations from various perspectives, such as valuing and reward systems, research acceleration, and new avenues of research and inquiry.
- Studies surveying, documenting, and suggesting mechanisms to encourage or reward publishing in alternative channels, the creation of large datasets, scholarly software, and other new modes of scholarly activity.

²⁴ Leigh Estabrook, “The Book as the Gold Standard for Tenure and Promotion in the Humanistic Disciplines,” (2003), http://www.cic.uiuc.edu/groups/CIC/archive/Report/ScholarlyCommunicationsSummitReport_Dec03.pdf. *CIC Report: Report of the CIC Summit on Scholarly Communication in the Humanities and Social Sciences* (Champaign, IL: Committee for Institutional Cooperation, 2004), http://www.cic.uiuc.edu/groups/CIC/archive/Report/ScholarlyCommSummitReport_Feb04.pdf. eternal 6/vz6O&wzMwMEtHO6WWVv

Introduction

Enormous efforts are directed toward preservation, primarily and historically to traditional materials. Recent significant initiatives, including the National Digital Information Infrastructure and Preservation Program (NDIIPP) at the Library of Congress and its grantees, are addressing digital materials. The scholarly community has ongoing concern about the relationship between the preservation of materials – whether legacy, digitized, or born-digital – and the emerging systems of scholarly communication. It is unclear whether institutions are attempting, or able, to match preservation and archival methods with increasing demands, even though long-term stewardship is crucial to future access and use by scholars.

Preservation of digital material is a technological problem, but also an economic and political problem. Long-term preservation solutions depend on scalable economic, technical and organizational infrastructures, and public policy agendas and an intellectual property regime that accommodate preservation concerns. Despite efforts at many levels for preservation of digital materials, we are still seeking clear directions and responsibilities. For example, who takes responsibility for archiving the web, including selection, rights clearances,

including selection, rights clearances, eab?t9&kwEiHI96v999wMEbHIW6vM/vkEiI96z&w9W/EeHIw6z&w/kEaHHIW9kv//EdHifrifOefHIO69W/EpHIW6vv//EeHIw6z&w/kEsH96&9&kwEpHIW6vM//vkEiHI96v999wMEgHIW6vM/vkEiHI96v9w/kEcHIM6v&v999wMEoH96M999w9W em foudttonh twan uervatiohei rvativIW6vM/vk9W/EiHI96v9W/EuHw6v99wkw

- Survey leaders in all sizes of academic libraries to assess a) where they believe responsibility resides for preservation of print materials and of born-digital content and b) what local actions or policies exist on preservation.
- Study the potential cost savings of reducing the acquisition, processing and shelving of print books and journals to reallocate funding to digital content creation and preservation. On a system-wide basis, suggest methods to determine how many copies of a particular book or tangible resource are needed and for what purposes.
- Propose and pilot new ways to assess enduring value and to preserve scholarly software, data sets, web sites, blogs, wikis, and other components of th

Illustrative Challenges

With regard to copyright, we need to understand better the ways in which universities could maximize fair use to repurpose materials for distance education, K-12 teaching, public service and outreach, other research uses, accessibility for special population

Appendix A: Attendee List

The following individuals participated in the discussions and helped formulate the report's central themes. Statements in the report do not necessarily reflect the views or priorities of participant's home institutions.

Karla Hahn
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Appendix B: ACRL Scholarly Communications Committee Roster 2007-2008

John Ober, Co-Chair
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University of California

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Director, J. Willard Marriott Library
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Brent Allison, Member
Director, Social Sciences & Professional
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University of Minnesota Libraries

Barbara Jo DeFelice, Member
Director, Digital Resources Program
Dartmouth College

Emily Anne Dill, Member
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Georgie Lynn Donovan, Member
Assistant Professor, Collection Development
Appalachian State University

Kimberly Douglas, Member
University Librarian
California Institute of Technology

Richard C. Fyffe, Member
Rosenthal Librarian of the College
Grinnell College

Douglas K. Lehman, Member
Director, Thomas Library
Wittenberg University

Lee C. Van Orsdel, Member
Dean of University Libraries
Grand Valley State University

William C. Welburn, Member
Associate Dean of the Graduate College
University of Illinois

Karen A. Williams, Member
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