Roles in E-Science for Health and Science Librarians

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Roles in E-Science for Health and Science Librarians

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University of Massachusetts and New England Area Librarian E-Science Symposium, April 6, 2009
Science Libraries at Minnesota

Minneapolis Campus
Science and Engineering

Academic Programs
Karen Williams

Health Sciences Libraries
Linda Watson

St Paul Campus
Agriculture, Biology, Environment

Bio-Medical
Veterinary Medicine

5 miles
“Science in the 21st century will be conducted in a fully digital world.”

Interagency Working Group on Digital Data, 2009
What is E-Science?

• “Cyberinfrastructure, e-science and e-research are shorthand terms for new forms of data-intensive, information-intensive, collaborative, distributed forms of scholarship.” (Borgman, 2008)

• “The entire e-science infrastructure is intended to empower scientists to do their research in faster, better and different ways.” (Hey, 2006)
Cyberinfrastructure and E-Science

PEOPLE (Scientists, virtual organizations)

CONTENT (data, databases, digital libraries)

SERVICES (tools, standards for sharing, data preservation)

HIGH PERFORMANCE COMPUTING (hardware, software, networks)
The Interdisciplinary Challenge

Patient Care

- Hospitals and Clinics
- Onsite and in the community
- Professional Education
- Universities

Research

Inter-institutional and global
The Interdisciplinary Challenge

“the most formidable challenges in the evolution of biomedical research…require expertise from disciplines that fall at the boundaries of most AMCs and their parent universities. These include disciplines that encompass the applied and theoretical physical sciences, including engineering, as well as the social sciences, law, and business...

As intellectual campfires of interdisciplinary research and learning form, significant barriers born from entrenched institutional practices and culture surface, and, if unchecked, these barriers may drown the flames of discovery.”

Balser and Baruchin, 2008
The Interdisciplinary Challenge

“Sharing biomedical research and health care data is important and difficult... Many initiatives fund, request or require researchers to share their data. These initiatives address the technical aspects of data sharing, but rarely focus on incentives for key stakeholders.”

Selected recommendations:

• Educate trainees and current investigators on responsible data sharing and reuse practices;
• Encourage data sharing practices as part of publication and funding policies
• Fund the costs of data sharing and support for repositories

Piwowar et al, 2008
IAIMS: Integrated Advanced Information Management Systems

- Grew from **Matheson-Cooper Report** which defined a future role and changed paradigm for the academic library operating within the complex information environment of the academic health center
- Since 1984, librarians at institutions receiving IAIMS funding from the National Library of Medicine have had key roles in leadership and implementation
- Among lessons: challenge of integration is more about information policies/politics and human behavior than about the technology
CTSA: Clinical and Translational Sciences Awards

- Similar goals and challenges as IAIMS
- NIH goal to develop an infrastructure to support the effective and efficient translation of scientific discoveries into medical practice
- 38 institutions to date; 60 by 2012
- Likely areas for librarian involvement
  - Bioinformatics Core
  - Community Engagement
  - Support of clinical scholars and other communities of practice – librarians as connectors
- Libraries in CTSA - a new blog: http://ctsa-lib.blogspot.com
The Data Challenge

• “collaborative scientific enterprises…require access to very large data collections, very large scale computing resources and high performance visualization back to the individual user scientists” (UK’s National e-Science Centre)

• “data is the currency of science, even if publications are still the currency of tenure. To be able to exchange data, communicate it, mine it, reuse it, and review it is essential to scientific productivity, collaboration, and to discovery itself” (Gold, 2007)

• The data challenge applies to both “big science” as well as the individual scientist
The Data Challenge

“E-science fundamentally alters the ways in which scientists carry out their work, the tools they use, the types of problems they address, and the nature of the documentation and publication that results from their research. E-science requires new strategies for research support and significant development of infrastructure.”

ARL Agenda for Developing E-Science in Research Libraries Final Report and Recommendations…November 2007

“digital content creates opportunities for new forms of research and scholarship that are qualitatively different from traditional ways of using academic publications and research data” (NSF and JISC, 2007)

Can librarians add data management to their repertoire of information management skills and engagement?
life cycle model of research knowledge creation

FIGURE 1: THE LIFE CYCLE MODEL OF RESEARCH KNOWLEDGE CREATION

[Charles Humphrey, U. Alberta, 2006]
The Data Landscape and Challenge

• Production and management of large amounts of information in more “raw” formats
  – Discovery / identification / interoperability
  – Retention / preservation
  – Access / policy issues

• Non-digital collections
The Data Challenge

• “Reinventing Science Librarianship”
  – Increased nimbleness and flexibility
  – New skills related to data

• New information disciplines
  – Digital curators
  – Digital archivists
  – Data scientists
  – Informationist

• Opportunity or threat to librarians?
Library Roles
(from IWGDD: NLM and Wellcome as examples)

• Analyze and revise data to improve their quality or usefulness
• Collect derived data products, principally publications
• Combine data from multiple sources
• Convert analog information or materials to digital formats
• Create bibliographic and other reference data
• Develop instruments, techniques, or processes for data collection or production, processing, management, or dissemination
• Develop and enhance software tools that will enable gene discovery
• Preserve publications
• Preserve original and/or derived data
• Provide access to bibliographic or other reference data
• Provide access to publications
• Provide financing for projects in other organizations to produce, disseminate, or access data

Health and science libraries: we already do some of this.
Example at Minnesota

• Loose coordination among science librarians
• 2006/2007: University funding for three new science librarian positions
  – Recruited simultaneously as a “science cohort”; one new librarian for each of the main science libraries
  – Science Assessment Project [http://purl.umn.edu/5546](http://purl.umn.edu/5546)
• 2008: expanding the “cohort” to include additional science librarians
  – NIH Public Access Policy Implementation (with our Scholarly Communications Collaborative)
  – E-Science and Data Services Collaborative formed
• CIC Spring Conference on E-Science (May 2008)
• ARL/CNI Forum (October 2008)
E-Science and Data Services Collaborative – U Minnesota

Internal Environmental Scan/Gap Analysis
UofM Science Assessment
What questions still need to be answered and audiences need to be approached?

Data Stewardship & Archiving Focus for Early Efforts
U of M Geospatial Consortium collaboration – Potential Pilot Project
Archiving Geospatial Data
Where does new capacity need to be developed?

Digital Data Preservation Standards & Strategies
Digital Preservation Strategist position created Fall 2008.

Review External Reports, Models, & Projects
ARL E-Science Report
Purdue Data Interview and Research Collaboration Model
MIT Guide to Data Management & Publishing

Campus Education & Advocacy
Open Access & Data Reuse
Assisting with grant mandated data preservation policies.

Library Liaison Education Program
Defining new roles for librarians throughout the data lifecycle. Where can we insert ourselves successfully?

RCA Website Development
Library group will develop site to provide information on current support services for e-Science activities on campus.

From ARL/CNI Poster by John Butler and Kristi Jensen
What's Ahead for Science Librarianship?

• There are blurring distinctions between data, scientific publications, and synthesized knowledge; and likely expansion of data-sharing mandates. We need to
  – develop more skills in data management; and model the Informationists (dual domain individuals)
  – is this on the radar of our library schools? Are the iSchools taking on eScience?
  – embrace a learning curve; step outside our comfort zone to provide assistance to our researchers
  – be at national and campus tables where infrastructure is being designed and implemented, including standards work
  – Work with our professional organizations to advance e-science engagement and with each other
For Discussion (here or at home)

• Has your institution been addressing data management and data-sharing issues? Is your library involved?
• Is your library involved in any campus-wide or academic health center-wide e-Science initiatives, including CTSA?
• Does your library’s strategic plan specifically address engagement in e-science or e-research?
• How interested / comfortable / knowledgeable / expert are your library’s staff in understanding or contributing to the data landscape and challenges at your institution?
• What should NLM or MLA or AAHSL or ARL be doing to support our engagement in e-science?
• What else? Your turn!!
References


References (cont)


