The Social Mission of 21st Century Research Libraries: Building Data Literate Communities

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The Argument

- Data literacy is a fundamental requirement for all citizens.
- Data literacy education is typically limited and partial, neglecting life-wide and life-course perspectives.
- Research libraries are uniquely positioned to lead the way:
  - broad and deep engagement with data
  - experience and expertise in literacy instruction
  - frameworks and models as structural foundations
  - academic and professional relationships and networks
  - roles and strengths as interdisciplinary facilitators

“Data literacy focuses on both the technical and social aspects of data. It encompasses activities related to data management, including data curation, data citation and fostering data quality.” (OECD, 2019, p. 4)
The Social Mission of 21C Research Libraries

Outline of Presentation

• Research context, methods and frameworks
• Datafication of society and data penetration of libraries
• The data literacy landscape
  – Recognizing the need, Analyzing a complex pluralist concept
  – Identifying the salient stakeholders
• Building blocks for library-led educational development
  – Models for service delivery, Innovations in library instruction
  – Collaborations with key stakeholders
• Questions for reflection and discussion
Research Context

• Triple helix of university-industry-government interactions and relations
• The social turn in higher education and research
  – Knowledge exchange
  – Economic development
  – Community engagement
• Commercial, social, cultural and civic entrepreneurship
• Strategic alignment of library and university missions
• The rise of the data society…
Data Sources & Methods

• Review and critical appraisal of related literature
  – academic, professional, trade
  – gov. docs., special reports, etc.
  – handbooks, non-specialist texts

• Environmental scan of salient organizations and websites
  – R&D funders/grant agencies
  – advocacy groups, education and training providers, membership organizations, research centres

• Stakeholder analysis and evaluation of data actors
  – collaborators, partners and sponsors for data literacy projects
  – roles and strengths of libraries

Theoretical Frameworks

• Radical Change Theory
  – used to frame the complex pluralist environmental context
  (Dresang & Koh, 2009)

• Wicked Problem Theory
  – used to analyze the problem and identify potential solutions
  (Danken et al., 2016)

• Theory of Stakeholder Identification and Salience
  – used to identify interested actors and assess potential involvement
  (Mitchell, Agle & Wood, 1997)

• Intellectus Model of IC
  – used to review and appraise actual and potential library roles
  (Bueno et al., 2004)
Datafication of Society
• Data-intensive science and digital computational humanities
• Open government data
• Volunteer data collection and citizen science
• Data journalism, infographics, and data-driven storytelling
• Biobanks and P4 medicine (predictive, personalized, preventive, and participatory)
• Activity tracking and personal health information management
• Data as the medium of exchange in business and scholarship

Data Penetration of LIS
• Research data management and curation
• Bibliometrics and altmetrics
• Collecting and licensing internal and external datasets
• Data literacy instruction
• Consumption and publication of linked open data
• Consulting on and crowdsourcing for metadata
• Library/learning analytics and data-driven decision-making

21C research libraries are data-intensive organizations
Data Literacy: Recognizing the Need

Data literacy: What it means and why it’s essential for your business

Putting data in the hands of a few experts is a powerful thing, but making it available to everyone in an organization can be a game-changer.

Data and analytics leaders need to encourage an organizational culture that is data-literate and that values information as an asset.

Data literacy is no longer defined as just the ability to read and write. There are several other skills people must master in order to solve problems and gain knowledge. Data literacy — the ability to read, write, and communicate data in context — is among the most important abilities for organizations today.

Why All Employees Need Data Skills In 2019 (And Beyond)

Data: It’s not just for the analytics team anymore. While data scientists are still in demand, the newest conundrum facing today’s organizations concerns the rest of the staff. Data isn’t used in a vacuum; it touches many other roles, and those employees need the literacy to handle it effectively.

Let’s explore why data skills matter company-wide, what data literacy involves, and how anyone can start learning it to grow in their careers.
Evolving Conceptions of Data Literacy

- Social Science Data
  - Analysis, Interpretation, Evaluation
    - Data Literacy
    - Statistical Literacy
    - Information Literacy
  
  (Schield, 2004, p. 8)

- Technical skills
  → Applied practice
  → Critical interpretation

From Niche Skillset to Transversal Competence

(Carlson & Johnston, 2015)

(Bhargava et al., 2015)
Alternative Conceptions of Data Literacy

- Data-Based Decision Making
  - 2013
  - 2016
  - 2017

- Statistical Literacy
  - 2015

- Building a Data Culture
  - 2016

- UG Research Skills (Secondary Data)
  - 2016

- PG Research Methods (Primary Data)
  - 2017

- Data for the People: How to Make Our Post-Privacy Economy Work for You
  - 2015

- Data Literacy for Educators
  - 2016

- Data Fluency
  - 2017

- The Basics of Data Literacy
  - 2013

- How to Become Data Literate
  - 2015

- Data Coach’s Guide to Improving Learning for All Students
  - 2008

- Building Global Interest in Data Literacy: A Dialogue
  - 2016
Common Conceptions – Data Literacy is about…

- **Data protection, security and privacy** for participating in social networks and managing personal data – understanding digital footprints and data silhouettes
- **Life skills** for everyday problem-solving – enabling community engagement, citizen empowerment, activity tracking and personal health management
- **Data-based and data-driven decision-making**, supporting business strategy, classroom practice, library assessment, etc. – implementing applied analytics
- Required education for the human subjects of business and learning analytics – explaining data doubles, practising business ethics and professional conduct
- **Data-driven storytelling** in the media and business – producing and interpreting data visualizations or infographics
- **Research skills** for students and professionals – accessing existing data sets to produce and communicate new knowledge, making original scientific experiments robust and reproducible
- Building blocks – a critical success factor for rolling out data science in business, government and research
- The new *lingua franca* or second language for organizations
Data Literacy Stakeholders

- INSTITUTE of Museum and Library SERVICES
- iassist
- International Association for Social Science Information Services & Technology
- apdu
- ASSOCIATION of PUBLIC DATA USERS
- EDC OCEANS of DATA INSTITUTE
- TeachingWithData.org
- Pathway to Quantitative Literacy in the Social Sciences
- Open Government Partnership
- DataKind
- Data Literacy Project
- UK Data Service
- RDA
- RESEARCH DATA ALLIANCE
- DATA POP ALLIANCE
- DATA CARPENTRY
- Building communities teaching universal data literacy
- DATA ETHICS
- United Nations WORLD DATA FORUM
- School of Data
Tiered Delivery Model for Research Data Services

Level 3 – Specialist RDM Service Providers
Explicit job responsibilities:
understanding of local, national and
global RDM landscape; collaborating
with RDM stakeholders at Pitt and in region;
expertise in one or more specific aspect/s
(e.g., DMP, metadata, data storage)

Level 2 – Advanced RDM Service Providers
Volunteer RDM team members – points of contact for disciplines:
aware of relevant funder requirements; understanding of disciplinary
research workflows; familiar with DMPTool, and subject data repositories
and practices (e.g., file formats and naming, data storage and documentation)

Level 1 – Basic RDM Service Providers
All public-facing university library staff – first point of contact for reference questions:
basic understanding of RDM, drivers, research lifecycle, and how RDM applies to cycle;
familiar with ULS RDM web resources; knowledge of RDM services, staff, and who to contact.

+ Internal Library Education Model
Learning by Teaching about RDM
(Mattern, Brenner & Lyon, 2016)

(University of Pittsburgh ULS
RDM Working Group,
Version 5, 2016)
Examples of Pedagogical Innovations

• Data Information Literacy Instruction in Business and Public Health: Comparative Case Studies (Macy & Coates, 2016)
  – Liaison librarians at Indiana University-Purdue University Indianapolis used Calzada Prado and Marzal’s (2013) Data Information Literacy framework to prepare undergraduate and postgraduate students for workplace data use. See https://www.ifla.org/publications/ifla-journal

• A Multi-Framework Approach to Teaching Data: A Case Study in Modern Languages (Pullman & Zilinski, 2017)
  – A liaison librarian and research data specialist at Carnegie Mellon University combined/adapted the ACRL Framework and Maybee and Zilinski’s (2015) principles for Data Informed Learning to teach a postgraduate workshop. See https://commons.emich.edu/loexquarterly/vol44/iss2/5/

• Show Me the Learning: Navigating Information Literacy through Multiple Life Perspectives (Ruleman, Horne-Popp & Hallis, 2017)
  – Librarians at U Central Missouri used scenario assignments in a gen ed course to help students meet academic, professional and personal information needs. See http://www.alan.org/acrl/conferences/acrl2017/papers
Examples of Stakeholder Collaborations

• Creating Data Literate Students: Supporting Librarians in Adding Data Literacy Skills to Information Literacy Instruction
  – University of Michigan iSchool faculty member and UMich learning librarian collaborating with data and curriculum experts to support school librarians teaching data literacy in classroom research projects and real world contexts

• Civic Switchboard: Connecting Libraries and Community Networks
  – University of Pittsburgh Library System partnering with the Carnegie Library of Pittsburgh, Western Pennsylvania Regional Data Center and local civic data intermediaries to build data literacy and technical skills
Building Data Literate Communities

Questions for Reflection and Discussion

- **What model should we adopt or adapt to teach data literacy?**
  e.g., abilities and understandings, specialist lenses (SCONUL)
  frames/threshold concepts, knowledge practices and dispositions (ACRL)
  high-level definition, supporting statement and key contexts (CILIP)

- **How should we present or pitch data literacy to stakeholders?**
  e.g., survival skill, personal empowerment, workplace requirement,
  employability enhancement, scholarly competence, scientific expertise…

- **Who should we work with to develop and deliver data literacy?**
  e.g., participants and collaborators in our libraries and on campus,
  people in our local communities, practitioners in public libraries,
  professional associations, funding agencies, other bodies…