

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

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Building Data Literate Communities

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 Society Terms and Concepts

Data Capitalism

Dataclasm

Data Revolution

Interactivity

Connectivity

Access

Data Deluge

Data Exhaust

Data Explosion

Datafication

Data Double

Learning Analytics

Data Fluency

Data Literacy

Data Security

Dataveillance

Data Privacy

Data Protection

The Quantified Self

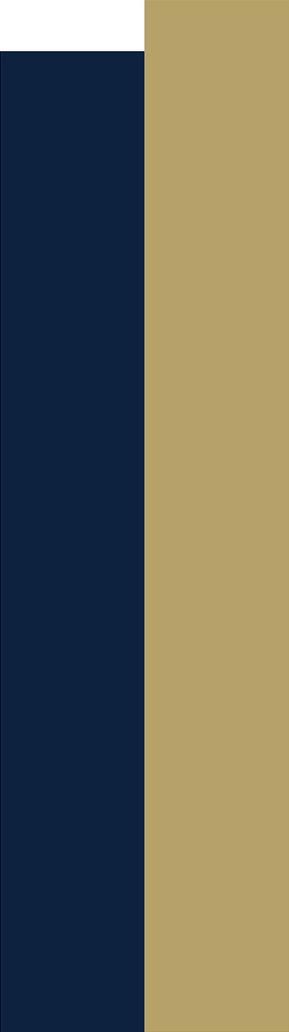
Prodsage

Precision Medicine

Data Warehouses

Data Refineries

Smart Cities



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

Knowledge & opinion > Blog >



Assessing data literacy needs in government

Thu Dec 14, 2017

< Share

Peer networks | Skills and literacy

As part of its work with the OD4D-funded project Building an Africa Open Data Network (AODN), the ODI conducted a learning needs assessment of people working in government.

Data Literacy: Recognizing the Need

InfoWorld

Search for **Go**

IDG CONTRIBUTOR NETWORK [Want to Join?](#)

THE DATA COMPLEX
By **Doug Bordonaro**, Contributor, InfoWorld | MAR 1, 2018
Opinions expressed by ICN authors are their own.

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 throughout an organization can be a game-changer

[Twitter](#) [Facebook](#) [LinkedIn](#) [Reddit](#)

Forbes

9,600 views | Oct 11, 2018, 03:58pm

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

Laurence Bradford Contributor
Careers
I write about tech companies, careers, and in-demand skills.

f 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.

t 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.

Smarter With Gartner **Gartner**

CDOs Must Take the Lead to Improve Data Literacy

Data & Analytics

[in](#) [t](#) [f](#) [e](#)

October 23, 2018 | Contributor: Sarah Hippold

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

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.

ET

Blogs > Higher education > The importance of data literacy in higher education

The importance of data literacy in higher education

Oliver Brown, Academic Programme Manager EMEA at Qlik, says that education institutions need to provide the data skills that employers are looking for

Friday 5th January 2018

The job market has changed. Academic Programme Manager EMEA at Qlik, says that education institutions need to provide the data skills that employers are looking for when they enter the workforce.

Information/Age

2017: the year of data literacy?

Over the past 12 months there has been an explosion of data, an increase in processing it and a move towards information activism

Topics
Cloud & Edge Computing

INSIDE DEVELOPMENT | UN WORLD DATA FORUM

Data literacy and storytelling at the UN World Data Forum

By **Lisa Cornish** // 25 October 2018

Media And Communications | Innovation & ICT | Social/Inclusive Development | Trade & Policy

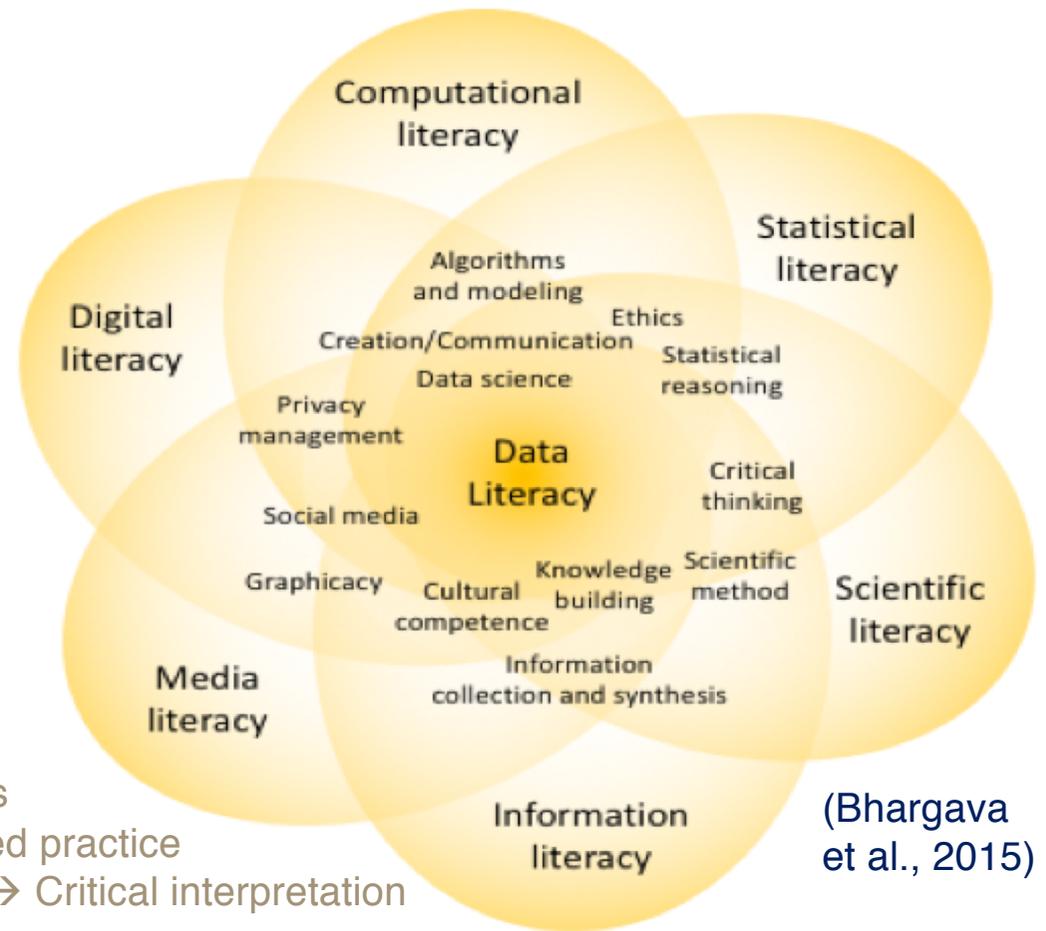
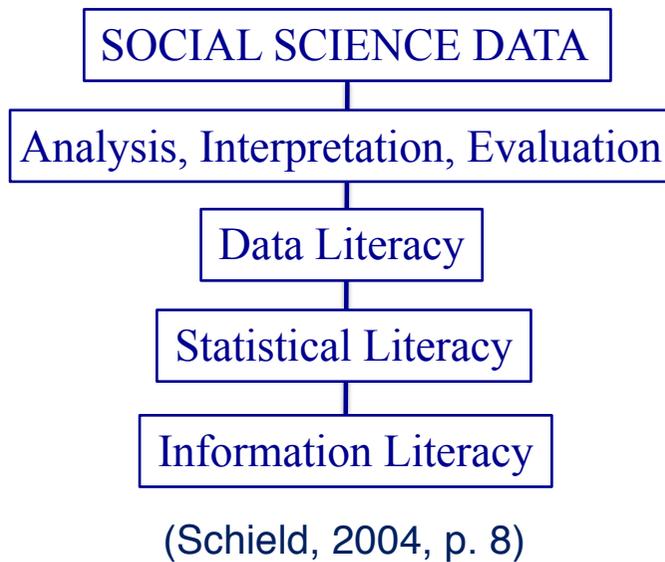
Dubai, United Arab Emirates | South Africa | Uganda

United Nations **WORLD DATA FORUM**

منتدى الأمم المتحدة العالمي للبيانات

Analytics meeting people... solutions developed to support... situation, as well as the... getting out to do some data... of data means... es actively able to... - the huge amounts... , such as data... velopers, and... become an... ty.

Evolving Conceptions of Data Literacy



(Carlson & Johnston, 2015)

Technical skills
 → Applied practice
 → Critical interpretation

(Bhargava et al., 2015)

Alternative Conceptions of Data Literacy

2013 **THE BASICS OF DATA LITERACY**
HELPING YOUR STUDENTS (AND YOU!) MAKE SENSE OF DATA
MICHAEL WORN
ANTHONY BARTLEY
NSTA

2016 **DATA LITERACY**
A User's Guide
David Herzog

2017 **DATA LITERACY**
HOW TO MAKE YOUR EXPERIMENTS ROBUST AND REPRODUCIBLE
MELISSA SMITH

2015 **Beyond Data Literacy: Relearning, Community Engagement and Empowerment in the Age of Data**
September 2015
Working Paper for Discussion
DATA POP ALLIANCE WHITE PAPER SERIES
Internews
Center for Education Excellence
CIVIC MEDIA
DATA POP ALLIANCE
LIT
OAI

2017 **DATA FOR THE PEOPLE**
HOW TO MAKE OUR POST-PRIVACY ECONOMY WORK FOR YOU
ANDREAS WEIGEND

2015 **HOW TO BECOME DATA LITERATE**
The Basics for Educators, Second Edition
Susan Bennett Carroll and David J. Carroll

2017 **DATA FLUENCY**
EMPOWERING YOUR ORGANIZATION WITH EFFECTIVE DATA COMMUNICATION
WITH DR. RICHARD VALENTINI & DR. PATRICK SCHWENK
WILEY

2016 **Building a Data Culture**

2016 **Data Literacy for Educators**
Making it Count in Teacher Preparation and Practice
Ellen B. Mandinach and Edith S. Gummer
Foreword by Barbara Schweder

2014 **Building a Data Culture**

2016 **Building Global Interest in Data Literacy: A Dialogue**
Workshop Report
EDC INSTITUTE
IBM

2008 **The Data Coach's Guide to Improving Learning for All Students**
Unleashing the Power of Collaborative Inquiry
Nancy Lurie
Katherine E. Sides
Susan Manday
Kathryn Brinkman
Foreword by Paul Hargrave
A CORWIN PUBLICATION
CORWIN
LITMIND

Statistical Literacy

Data-Based Decision Making

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

1996



INSTITUTE of
Museum and Library
SERVICES



1950



iassist

International Association for Social Science
Information Services & Technology

1974



ICSS
WORLD DATA SYSTEM

2008

UK Data Service



2012



2013



DQC
DATA QUALITY
CAMPAIGN

2005



ASSOCIATION of PUBLIC DATA USERS

1975



TeachingWithData.org
Pathway to Quantitative Literacy in the Social Sciences

2008



RESEARCH DATA ALLIANCE

2013



INFORMATION
LITERACY
GROUP

2004



2013



2011

2013

DATA CARPENTRY
BUILDING COMMUNITIES TEACHING UNIVERSAL DATA LITERACY



2012

2015

DATAETHICS



2018

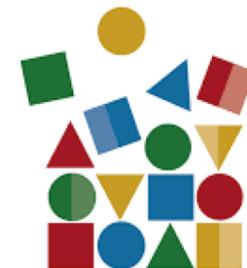
DataKind

2011



2012

2017



United Nations
**WORLD
DATA
FORUM**

Tiered Delivery Model for Research Data Services

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

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

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.

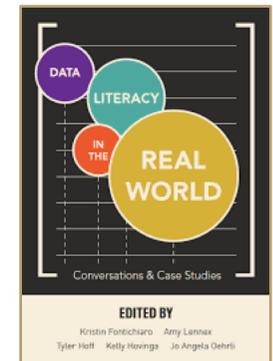
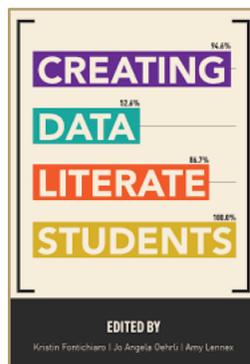
Examples of Pedagogical Innovations

- 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 <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 <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 <http://www.ala.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
<http://datalit.sites.uofmhosting.net> (funded by IMLS, 2015–2018)
- 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

<https://civic-switchboard.github.io> (IMLS, 2017–2019)



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...





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Repositioning data literacy as a mission-critical competence.

Roundtable discussion. *ACRL 2019: Recasting the Narrative*, April 10-13, Cleveland, OH. Discussion handout available at <http://d-scholarship.pitt.edu/36975/>

The wicked problem of data literacy: A call for action. Long presentation.

LILAC: The Information Literacy Conference, April 24-26, Nottingham, UK. Slides and references available at <http://d-scholarship.pitt.edu/36759/>

