

# Library-Led Data Literacy in Education

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BAHon, LITA, MI (LIS) 2019



# Agenda

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Definitions & Inspirations

Outline of Library -Led Data Literacy

**Identify**

**Address**

**Evidence**

**Apply**

**Inform/Reform**

Security & Privacy

Case Study

Resources & References

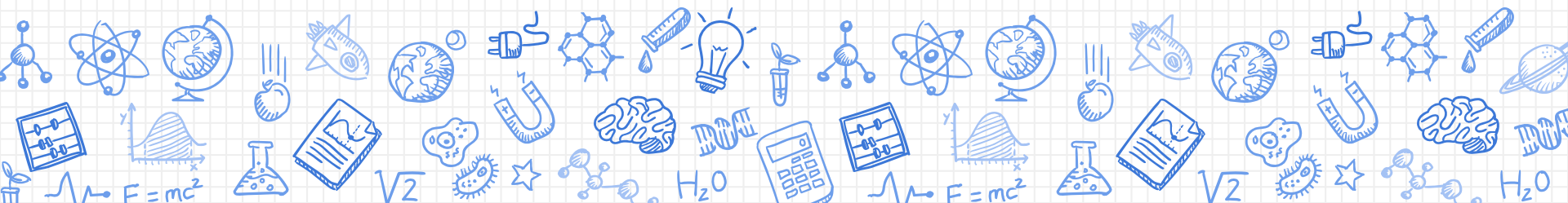
Q&A

Data Activity Takeaway



# Definitions & Inspirations

What is data literacy, and why talk about it?



# Defining Data Literacy

Data literacy includes the ability to read, work with, analyze and argue with data.

(Bhargava & D'Ignazio, 2015, p. 1)

Data literacy can be defined, then, as the component of information literacy that enables individuals to access, interpret, critically assess, manage, handle and ethically use data.

(Calzada Prado and Marzal, 2013, p. 126)

Data literacy refers to the ability to understand and use data, particularly in the context of the Internet.

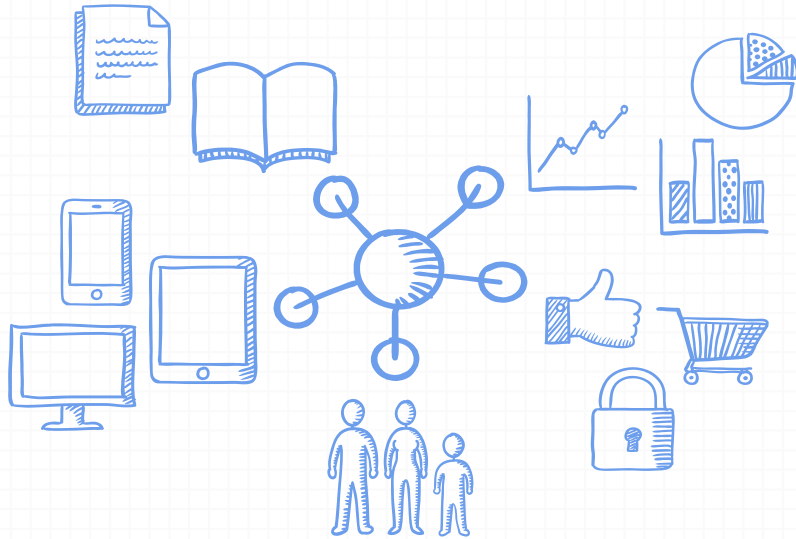
(Frank, M., Walker, J., Attard, J., & Tygel, A., 2016, p. 5)

Information  
Literacy  
+  
Digital Literacy

**Read  
Understand  
Analyze  
Use**



# Inspiration



Research Support

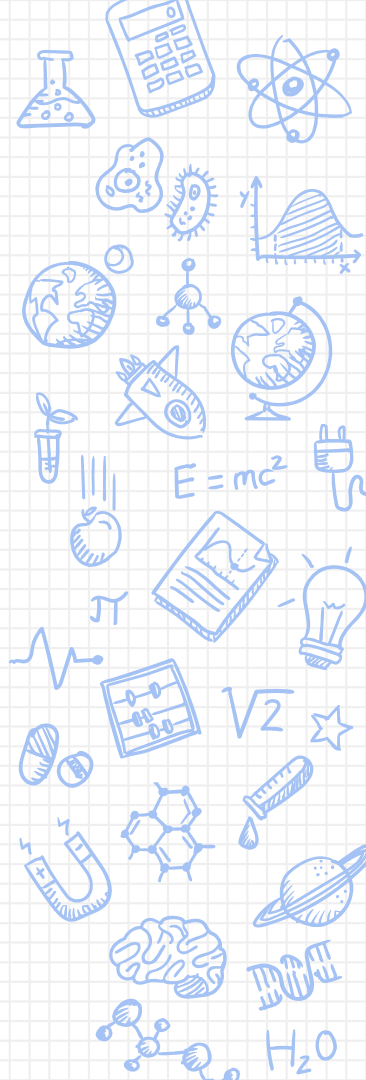
Infographics & Storytelling

Online Behaviour & Security

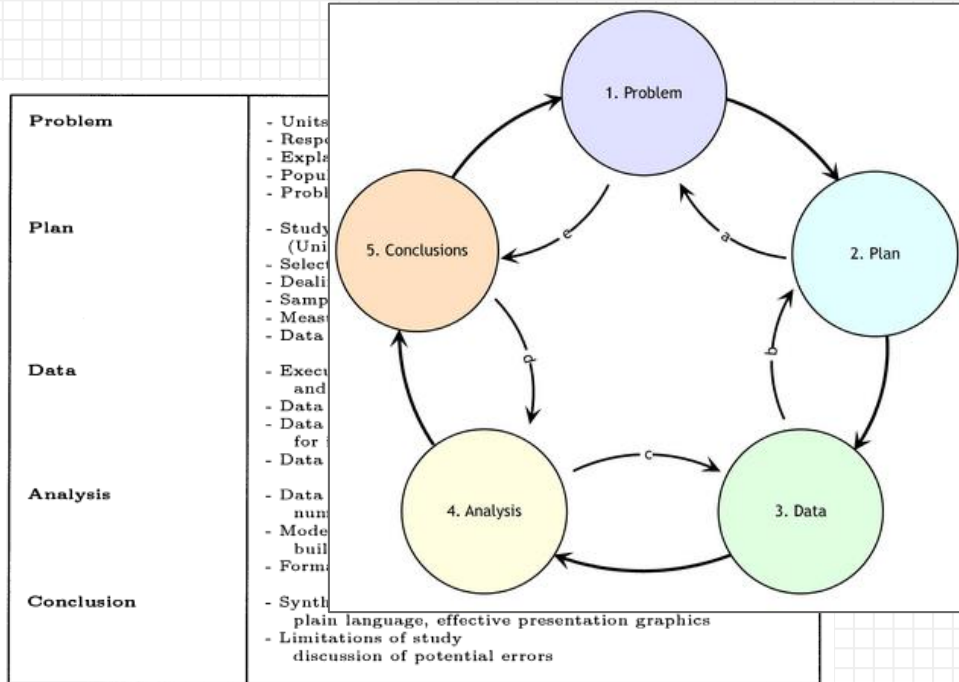
Technological Proliferation

Understanding People

**PPDAC Statistical Model + OLA's Student Inquiry Process**



# PPDAC Model

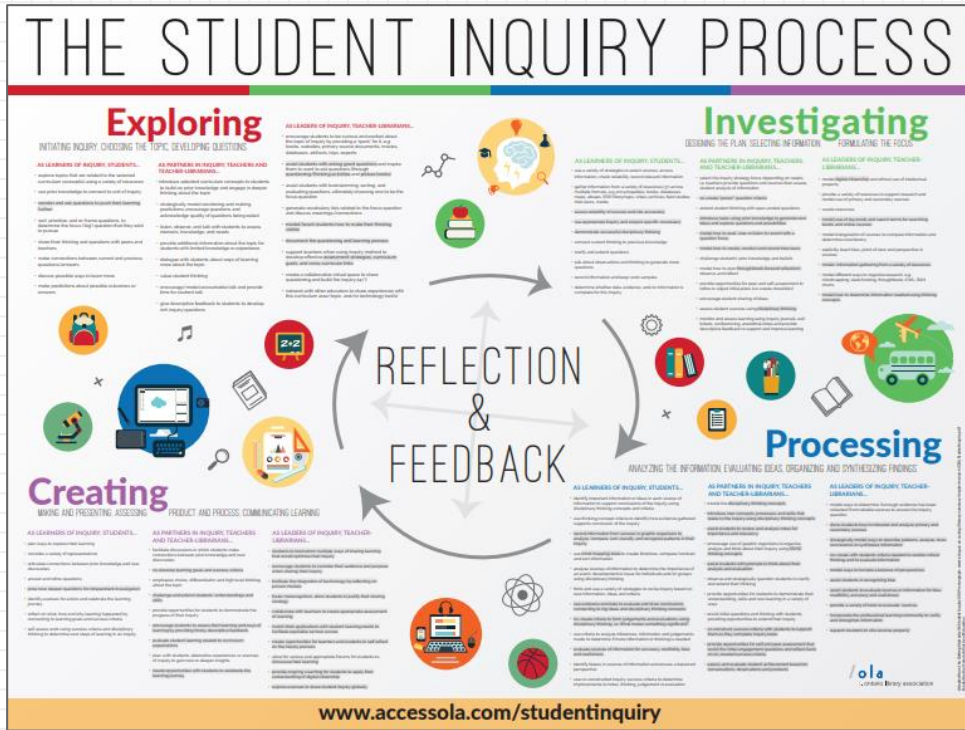


“beneficial to **examine the process in the reverse direction**, starting with Problem definition and then examining expectations as to the format and structure of the Conclusions”  
 (de Smith, Goodchild, & Longley, 2018, n.p.)

**Understand and address issues in each stage**  
 (Mackay & Oldford, 2000, p. 263-4)



# OLA's Student Inquiry Model



Created by OSLA and The Association of Library Coordinators of Ontario

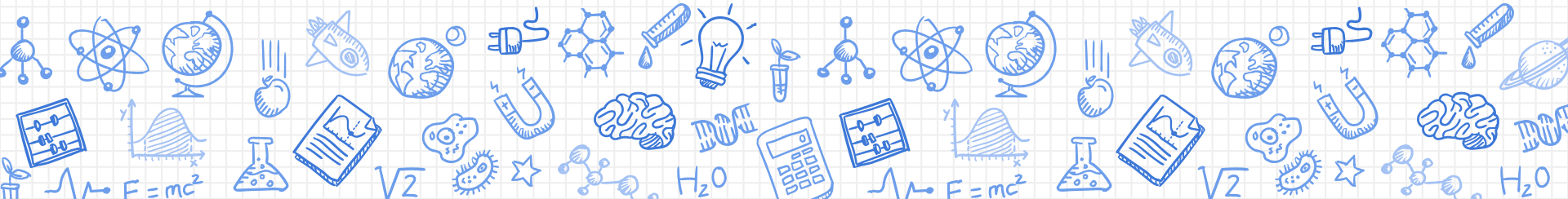
Designed for grades 1-8

“supporting the student and classroom educator in the curriculum-based student inquiry process” (OLA website)

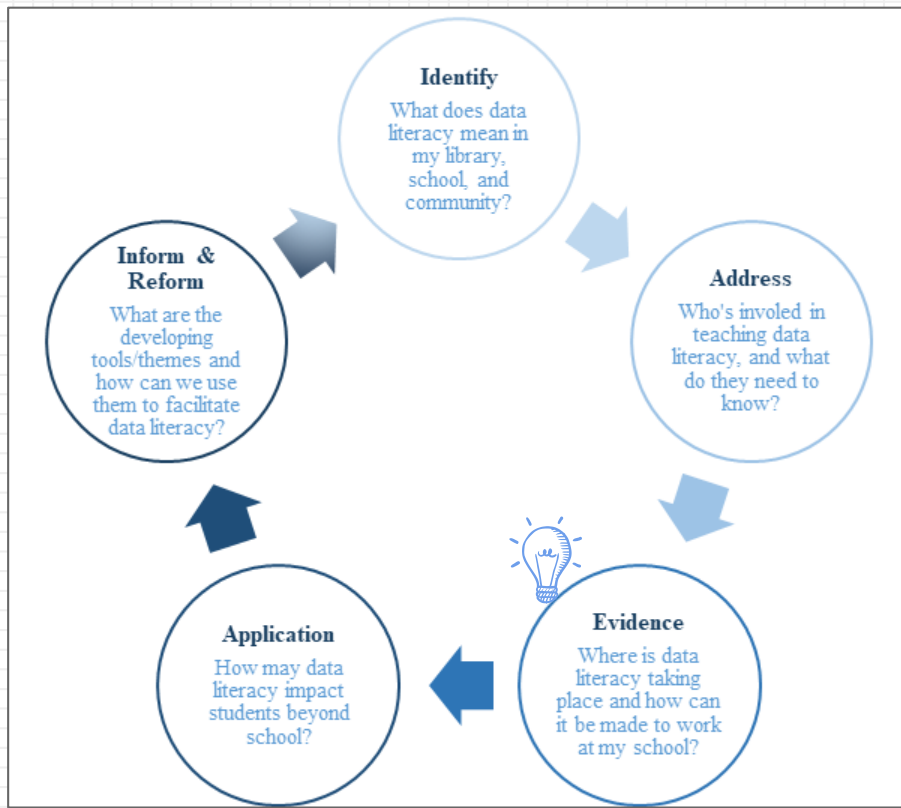


# Library-Led Data Literacy Programs in Schools

A Practical Framework







## 5 iterative stages:

Identify

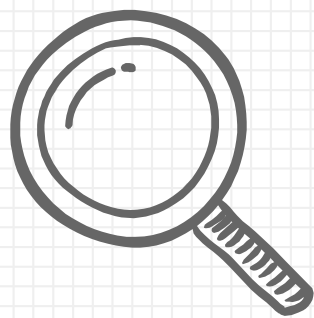
Address

Evidence

Apply/Application

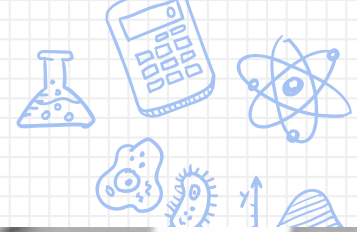
Inform & Reform

# Library-led data literacy model



# Identify

What does data literacy mean in my library,  
school, and community?



# Identify

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## How do we define data literacy?

- Difficult but necessary
- Look to leaders & research
- Precision is key
- Industry & individual



# Identify

## Strategies and Best Practices for Data Literacy Education

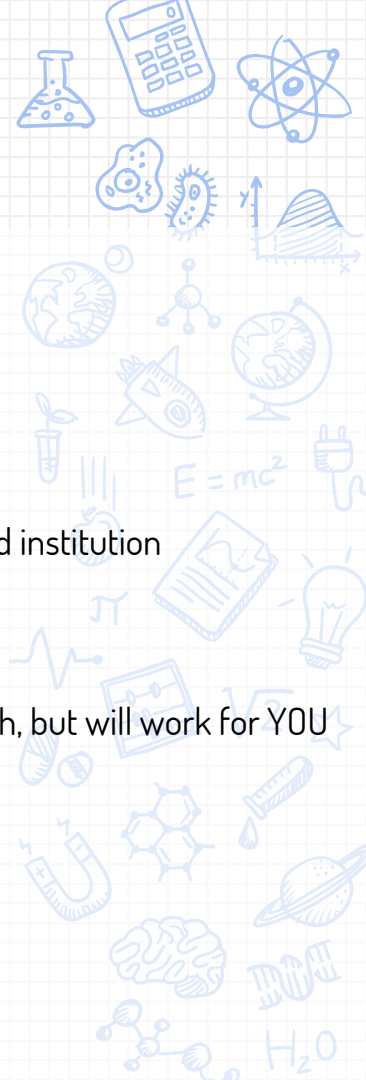
Knowledge Synthesis Report

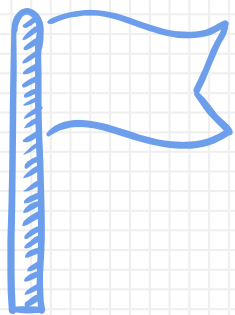
Chantel Ridsdale, James Rothwell, Mike Smit,  
Hossam Alt-Hassan, Michael Blitemel, Dean Irvine,  
Daniel Kelley, Stan Matwin, and Brad Wuetherick



## How do YOU define data literacy?

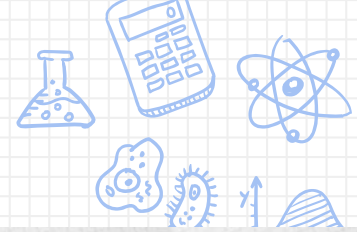
- Start broad, but shape a path for your library and institution
- Don't proscribe program, define parameters
- Formulate a definition that respects the research, but will work for YOU
- Be reflective
- Ask! Discuss! Iterate!





# Address

Who's involved in teaching data literacy, and what do they need?



# Address

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## Who's teaching data literacy? What do they need?

- Where data literacy is happening
- Identify & address gaps
- Involves the entire Institution
- To support students, programs need to support staff



# Address



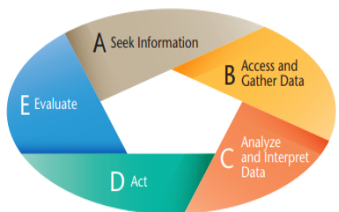
## Research Reports

WWW.KDP.ORG

Kappa Delta Pi Record, 53, 131-133, 2017  
Copyright © Kappa Delta Pi  
ISSN: 0022-8958 print/2163-1611 online  
DOI: 10.1080/00228958.2017.1334479

### Making a Case for Case-Based Teaching in Data Literacy

by Derek R. Riddle, Jori S. Beck, Joseph John Morgan, Nancy Brown, and Heather Whitesides



#### Abstract

*Building on a study conducted by the authors, this article provides strategies for teaching data literacy and outlines the case-based teaching method as an effective way of developing data-literate teachers.*

**Key words:** case-based teaching, data literacy, teacher education

Teachers should master many forms of knowledge and skills to effectively execute their jobs. These include two key skills that can improve both teacher practice and student achievement: (a) the use of data to inform instruction; and (b) the ability to develop actionable, differentiated instruction through data-based decision-making processes (DBDM). These two skills are referred to as *data literacy* (Gummer & Mandinach, 2015) and are becoming a necessity for teachers.

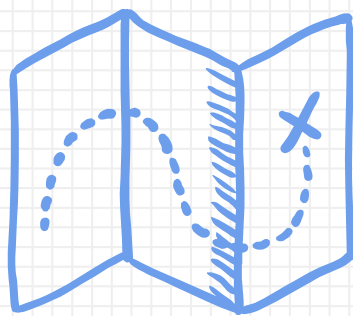
For instance, the National Council for Accreditation of Teacher Education (NCATE, 2008) requires that teacher educators assess teacher candidates' ability to "analyze student, classroom, and school performance data and make data-driven decisions about strategies for teaching and learning so that all students learn" (p. 19). In Nevada, teachers are evaluated on their ability to "plan on-going [sic] learning opportunities based on evidence of all students' current learning status" and "adapt actions based on evidence generated in the les-

son for all students" (original emphasis; Nevada Department of Education, 2014, p. 1). Moreover, professional learning communities (PLCs) are becoming commonplace in K-12 schools and, within these meetings, teams are often required to discuss student achievement data. In addition, the Every Student Succeeds Act (ESSA, 2015) directs state and local educational agency leaders to provide professional development that enhances teachers' data-literacy skills (e.g., pp. 64, 129). Thus, data proficiency is required by all levels of policy.

A growing body of literature supports the role of data literacy in improving teacher quality and, ultimately, student achievement. For example, Schildkamp, Lai, and Earl (2013) cited studies indicating that school leaders

## How will we address our data literacy needs?

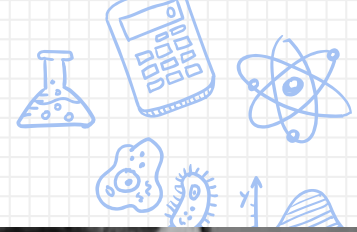
- Discover leaders and users and define supports
- Workshops, programs directed at leaders
- Engage, collaborate, and embed
- Students and staff as learners together
- Continue and support education of educators
- Use models!



# Evidence

Where is data literacy taking place, and how can it work for my library or school?





# Evidence

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## What does successful data literacy look like?

- Hands-on, project-based, real world
- Inclusive & relevant
- Innovative or new
- For learners and leaders



# Evidence

The Journal of Community Informatics

ISSN: 1721-4441

## Painting the Mural

With a draft design in hand, we iterated on shape and color to finalize the design. The painting process was an opportunity to focus in on the goals of bringing the Nucleos together, involving the community, and making data fun. School staff invited students across all the Nucleos to join the painting process the next day. A car with an amplifier its roof was sent around the neighborhood to play a recorded announcement that everyone was invited to join

The Journal of Community Informatics

ISSN: 1721-4441

## Special Issue on Data Literacy: Case Studies

### Data Murals: Using the Arts to Build Data Literacy

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Image 8: Students and staff working on the mural

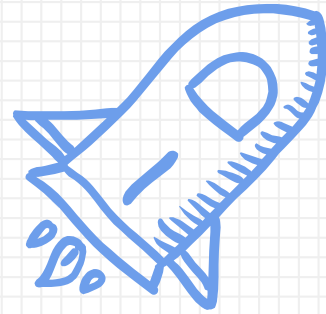
To accommodate the large number of people that came over the course of the day to help, we used a large secondary canvas to prompt people to write about the neighborhood (Image 9). This was a deliberate attempt to bring in the residents and have the students think outside the school's walls. This canvas was put on display in the small art gallery in front of the school after the mural was completed.

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## What can we learn from other data literacy successes?

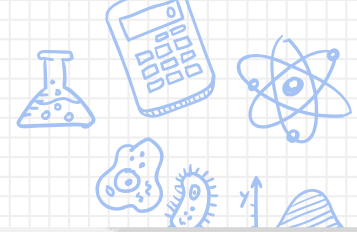
- High tech, low tech, no tech
- Leverage the decentralized nature of libraries
- Integrate meaning-making
- Empower students, staff, and library workers
- Support and connect bottom-up and top-down methodologies





# Apply

How can data literacy impact students  
beyond the library and school?

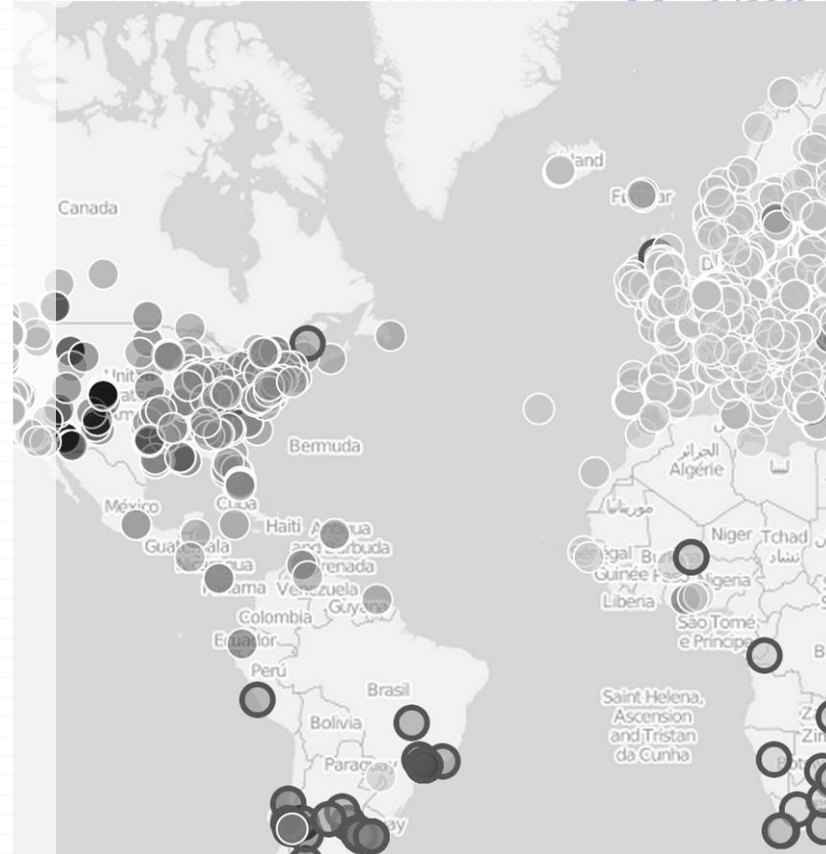


# Apply

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## When do data literacy programs have an impact?

- Beyond the classroom
- Real-world context and discussions
- Comfort in a data-rich environment
- Part of digital and information literacy



# Apply

## FACING THE CHALLENGE OF DATA-INTENSIVE RESEARCH: RESEARCH DATA SERVICES AND DATA LITERACY IN ACADEMIC LIBRARIES

Tibor Koltay

### ABSTRACT

*Purpose – This chapter describes challenges that academic libraries face in the era of data-intensive research.*

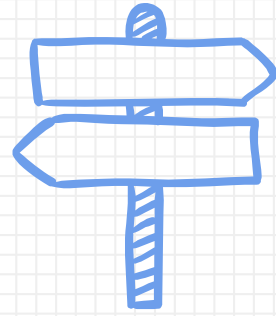
*Methodology/approach – A review of current literature about the topic was performed. The main features of the data-intensive paradigm of research are outlined and new tasks to be performed by academic libraries are explored.*

*Findings – To fulfil their mission in this environment, academic libraries have to be equipped with tools that can be epitomised as research data services and include research data-management and digital data curation. Issues of data quality, data citation and data literacy are also of prime importance for related academic library services that also need to employ*

Innovation in Libraries and Information Services  
Advances in Library Administration and Organization, Volume 35, 45–61  
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ISSN: 0732-0671/doi:10.1108/S0732-067120160000035008

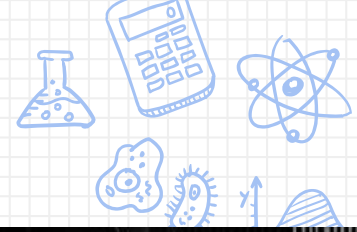
## How can data literacy be applied beyond our walls?

- After graduation - in the real world
- Interdisciplinary increases application
- Part of a critical thinking process
- Imperative for post-grad students, but applies to all students
- Conversations and communication in the workforce
- For leaders, teachers, librarians, students



# Inform & Reform

What are the developing tools and themes, and how can we use them to support data literacy?



# Inform & Reform

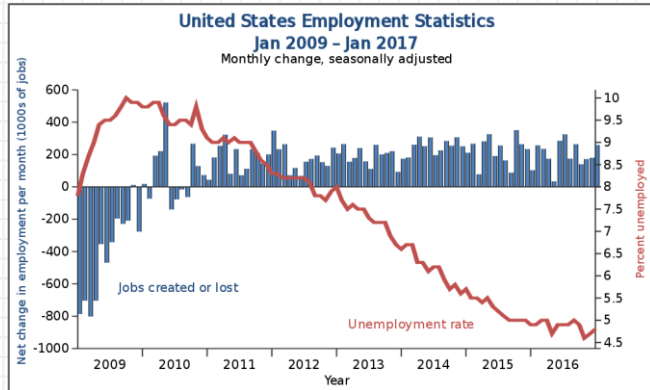
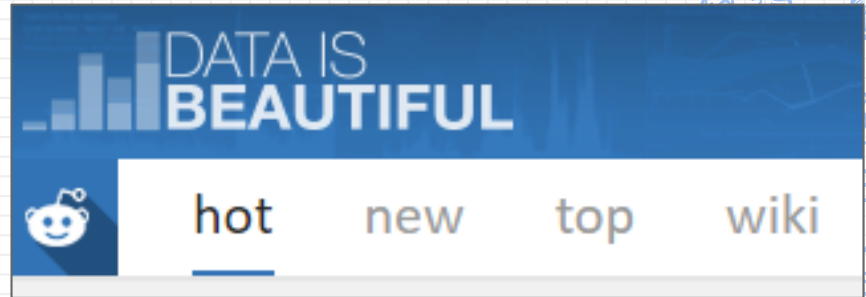
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## What tools do I need for data literacy?

- Inform and reform data literacy landscape
- Combine and apply knowledge
- Focused, supportive, engaging, allows for growth
- Actionable and accessible
- Part of digital and information literacy

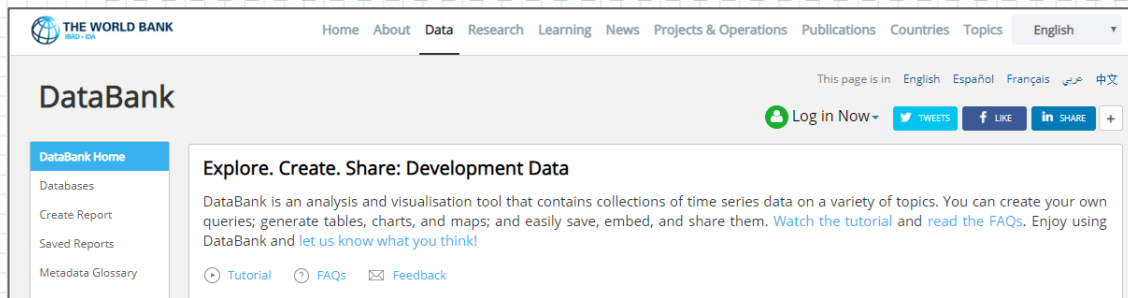


# Inform & Reform





# Inform & Reform



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- Create Report
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- Metadata Glossary

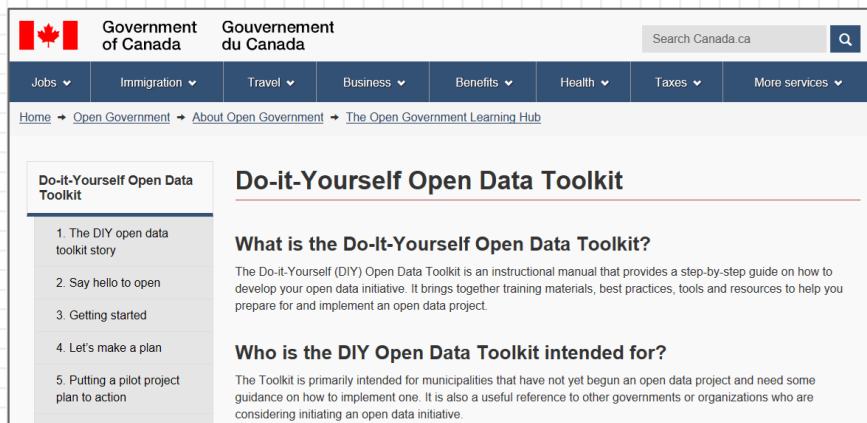
### Explore. Create. Share: Development Data

DataBank is an analysis and visualisation tool that contains collections of time series data on a variety of topics. You can create your own queries; generate tables, charts, and maps; and easily save, embed, and share them. [Watch the tutorial](#) and [read the FAQs](#). Enjoy using DataBank and [let us know what you think!](#)

Tutorial FAQs Feedback



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## Do-it-Yourself Open Data Toolkit

### Do-it-Yourself Open Data Toolkit

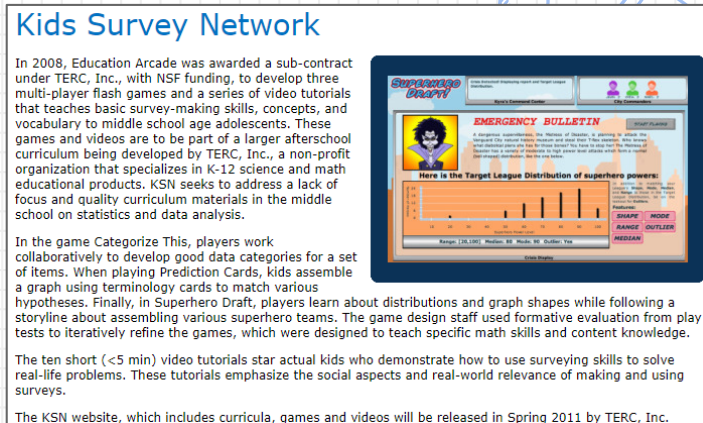
- The DIY open data toolkit story
- Say hello to open
- Getting started
- Let's make a plan
- Putting a pilot project plan to action

### What is the Do-it-Yourself Open Data Toolkit?

The Do-it-Yourself (DIY) Open Data Toolkit is an instructional manual that provides a step-by-step guide on how to develop your open data initiative. It brings together training materials, best practices, tools and resources to help you prepare for and implement an open data project.

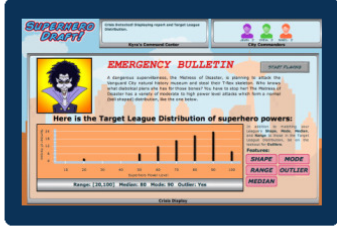
### Who is the DIY Open Data Toolkit intended for?

The Toolkit is primarily intended for municipalities that have not yet begun an open data project and need some guidance on how to implement one. It is also a useful reference to other governments or organizations who are considering initiating an open data initiative.



## Kids Survey Network

In 2008, Education Arcade was awarded a sub-contract under TERC, Inc., with NSF funding, to develop three multi-player flash games and a series of video tutorials that teaches basic survey-making skills, concepts, and vocabulary to middle school age adolescents. These games and videos are to be part of a larger afterschool curriculum being developed by TERC, Inc., a non-profit organization that specializes in K-12 science and math educational products. KSN seeks to address a lack of focus and quality curriculum materials in the middle school on statistics and data analysis.



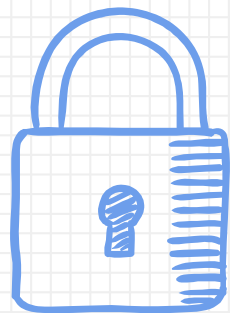
In the game Categorize This, players work collaboratively to develop good data categories for a set of items. When playing Prediction Cards, kids assemble a graph using terminology cards to match various hypotheses. Finally, in Superhero Draft, players learn about distributions and graph shapes while following a storyline about assembling various superhero teams. The game design staff used formative evaluation from play tests to iteratively refine the games, which were designed to teach specific math skills and content knowledge.

The ten short (<5 min) video tutorials star actual kids who demonstrate how to use surveying skills to solve real-life problems. These tutorials emphasize the social aspects and real-world relevance of making and using surveys.

The KSN website, which includes curricula, games and videos will be released in Spring 2011 by TERC, Inc.

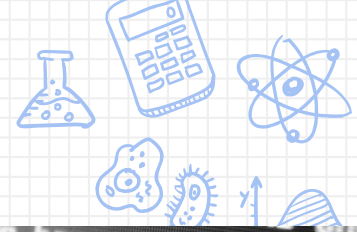


encourage the use of many tools and applications that engage and reflect student needs



# Security & Privacy

How do data literacy, security, and privacy intersect?



# Security & Privacy

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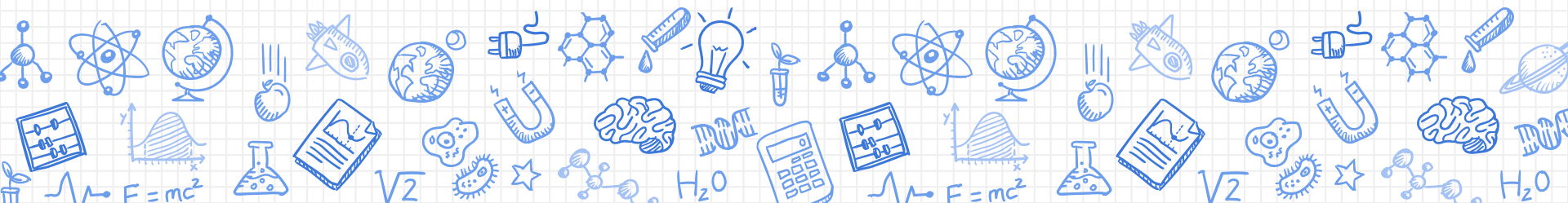
## Why do we talk about security & privacy?

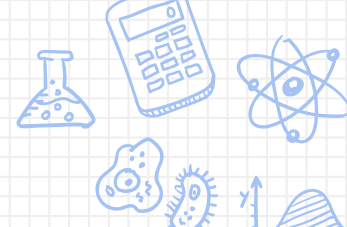
- Part of data literacy
- Students may collect sensitive or original data
- Understand data culture in your school
- Leads to bigger discussions about data management



# Case Study: Data Keychains

Library-Led Data Literacy Programs in Schools

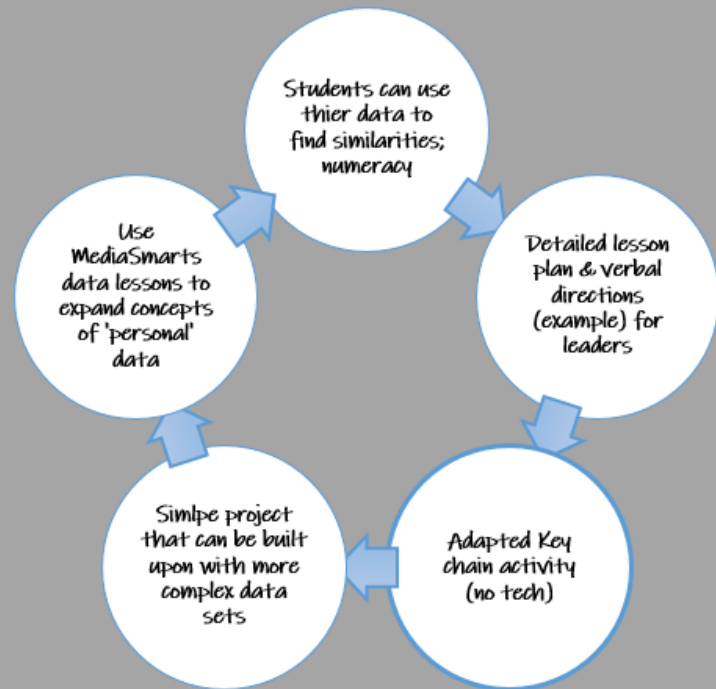


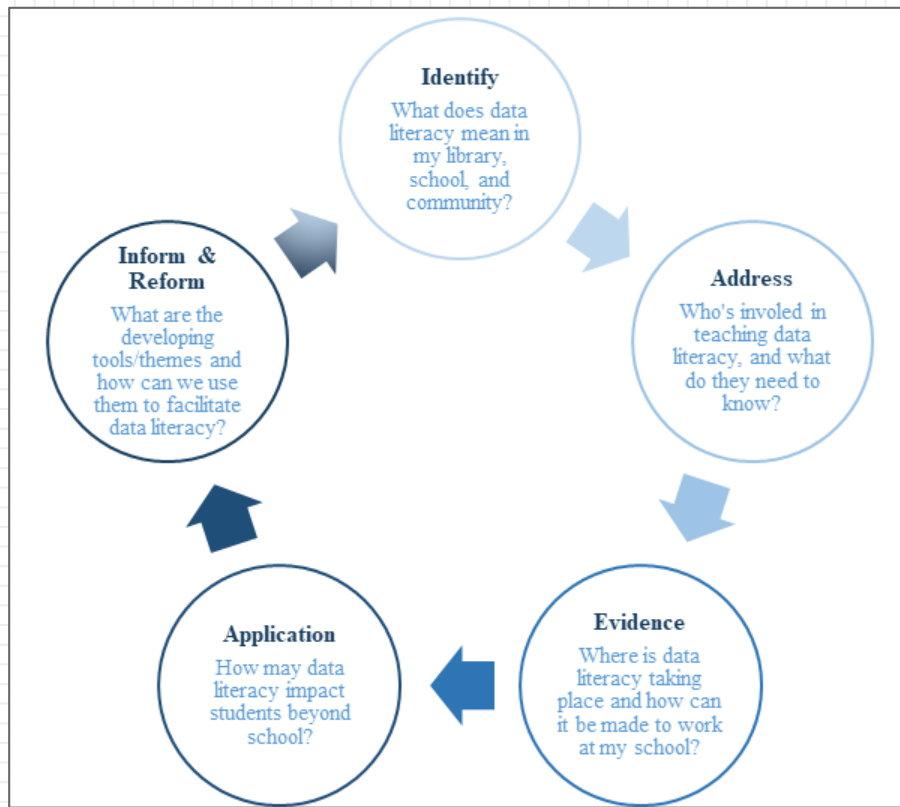


# Case Study: Data Keychain (revised)

## The data keychain and how it helps data literacy

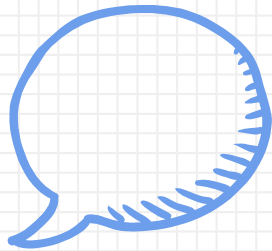
- Adapted from keychains to paper
- Grade 9 students entering high school
- General questions
- Blind vote to share
- Discussions around collection, display, and meaning-making





# Library-led data literacy model

# Thank you!



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**[linkedin.com/in/kaseywhalley](https://www.linkedin.com/in/kaseywhalley)**

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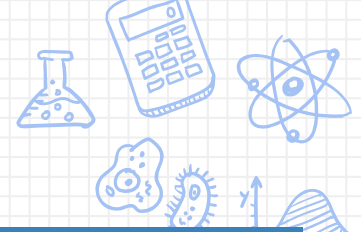


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- World Bank. (2017). "Open Government Data Toolkit." Retrieved from <http://opendatatoolkit.worldbank.org/en/>



# Q&A



# Data Activity: Data Keychain

## How to make a data keychain

- Tie your string in a loop around your keychain (you should have two threads hanging down)
- Assign a coloured bead to YES and another to NO
- Answer each question in order:
  - if you answer YES, thread a YES coloured bead
  - if you answer NO, thread a NO coloured bead
- Tie off the final bead
  - tie a knot around the outside of your final bead (thread a string through each side), so that your final bead can not fall off

1. Do you currently work in a school or academic library?
2. Do you work in the City of Toronto?
3. Is this your first time attending Super Conference?
4. Is this your first session today?
5. Have you registered for more than one day at the Super Conference?
6. Did you drive here today?
7. Did you have breakfast this morning?
8. Was it snowing when you arrived?
9. Did you use the coat check?
10. Did you learn something useful at this session?