What's your story?

Introduction to Research design for Libraries and Information Services

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Good research informs our beliefs

“I embrace as a librarian being thought of as part of a profession that has strong beliefs and is willing to stand up for those beliefs.”

– Carla Hayden, Librarian of Congress, Sept 14, 2016, USA Today
Library Value May Be Proven, if Not Self-Evident

We hold these truths to be self-evident: libraries are valuable to humankind; libraries preserve knowledge; libraries enable access to information; libraries serve the information needs of their users. To the believer the truth is evident. But libraries are not natural phenomena like the sun rising and setting every day. Libraries are institutions created and supported by those individuals who hold that these statements are true even if not self-evident to everyone.

- Martha Kyrillidou, RLI 271, August 2010
What is research?

Research is systematic inquiry about the nature of reality

• What is a library, what is an academic library, a public library, a school library, etc.
• What is a book, a journal, a computer, wifi, data plan, apps, etc.
• What is literacy and who is literate
• How are books, libraries and literacy relate to one another
• What is the relationship between socioeconomic status, the use of libraries and level of literacy and achievement
• How do libraries contribute to the economic development of a community
• Why and how developed economies engage with library services and advanced information technology systems
• How can developing economies benefit from the positive benefits of library and information systems
Once upon a time information was scarce.

We made decisions on advice from experts using them as north stars for insights.
The library is the center for learning
- John Seely Brown
Seesaw of discovery

Research

Learning
Research Design And Methods
• Connaway and Powell
• Wildemuth
• Matthews
• Markless and Steadfield
• Ben Showers

• Creswell
• Better evaluation: www.betterevaluation.org

• Anthropology, Sociology, Economics, Education
The Three Approaches to Research

- Qualitative
- Quantitative
- Mixed Methods
The Three Approaches to Research

**Qualitative research:**
- Focuses on individual meanings.
- Uses open ended questions.
- Collects data in participant’s setting.
- Uses the an inductive approach to research that moves from particulars to general themes.
- Written report tends to be flexible in structure.

**Quantitative research:**
- Tests the relationships among measurable variables.
- Uses closed ended questions.
- Uses survey instruments that produce numbered data.
- Uses statistical analysis of data generated.
- Tests theories deductively, final report is structured.

**Mixed methods research:**
- Collects and integrates both quantitative and qualitative data.
- Provides a more complete comprehension of given research problem.
Three Components of a Research Approach

Figure 1.1: A Framework for Research—The Interconnection of Worldviews, Design, and Research Methods

- Philosophical Worldviews
  - Postpositivist
  - Constructivist
  - Transformative
  - Pragmatic

- RESEARCH APPROACHES
  - Qualitative
  - Quantitative
  - Mixed Methods

- Designs
  - Quantitative (e.g., Experiments)
  - Qualitative (e.g., Ethnographies)
  - Mixed Methods (e.g., Explanatory Sequential)

- Research Methods
  - Questions
  - Data Collection
  - Data Analysis
  - Interpretation
  - Validation
Component #1: Philosophical Worldview

• This is the set of beliefs that guides the Researcher’s actions as they conduct the research.
• A Researcher’s philosophical world view may be:
  Postpositivism
  Constructivism
  Transformative
  Pragmatism
## Four Worldviews for Research

<table>
<thead>
<tr>
<th>Postpositivism</th>
<th>Constructivism</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Determination</td>
<td>• Understanding</td>
</tr>
<tr>
<td>• Reductionism</td>
<td>• Multiple participant meanings</td>
</tr>
<tr>
<td>• Empirical observation and measurement</td>
<td>• Social and historical construction</td>
</tr>
<tr>
<td>• Theory verification</td>
<td>• Theory generation</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Transformative</th>
<th>Pragmatism</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Political</td>
<td>• Consequences of actions</td>
</tr>
<tr>
<td>• Power and justice oriented</td>
<td>• Problem-centered</td>
</tr>
<tr>
<td>• Collaborative</td>
<td>• Pluralistic</td>
</tr>
<tr>
<td>• Change-oriented</td>
<td>• Real-world practice oriented</td>
</tr>
</tbody>
</table>

Table 1.1 Four Worldviews
Strategies of Inquiry: Quantitative

There are several research designs that are quantitative, these include:

- Causal-comparative research
- Correlational design
- Survey research
- Experimental research
In this type of research several approaches may be used, these include:

- Narrative research
- Phenomenological research
- Grounded theory
- Ethnography
- Case studies
Strategies of Inquiry: Mixed Methods

This is an integration of quantitative and qualitative research, data and analyses. It assumes that one type of database or method of analysis may be used to inform and explain another. Some mixed methods include:

- Convergent parallel mixed methods
- Explanatory sequential mixed methods
- Exploratory sequential mixed methods
- Transformative mixed methods
### Component #3: Research Methods

#### Table 1.3: Quantitative, Mixed, and Qualitative Methods

<table>
<thead>
<tr>
<th>Quantitative Methods</th>
<th>Mixed Methods</th>
<th>Qualitative Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-determined</td>
<td>Both predetermined and emerging methods</td>
<td>Emerging methods</td>
</tr>
<tr>
<td>Instrument based questions</td>
<td>Both open- and closed-ended questions</td>
<td>Open-ended questions</td>
</tr>
<tr>
<td>Performance data, attitude data, observational data, and census data</td>
<td>Multiple forms of data drawing on all possibilities</td>
<td>Interview data, observation data, document data, and audiovisual data</td>
</tr>
<tr>
<td>Statistical analysis</td>
<td>Statistical and text analysis</td>
<td>Text and image analysis</td>
</tr>
<tr>
<td>Statistical interpretation</td>
<td>Across databases interpretation</td>
<td>Themes, patterns interpretation</td>
</tr>
</tbody>
</table>
## Research Approaches as Worldviews, Design, and Methods

<table>
<thead>
<tr>
<th>Tend to or Typically . . .</th>
<th>Qualitative Approaches</th>
<th>Quantitative Approaches</th>
<th>Mixed Methods Approaches</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use these philosophical assumptions</td>
<td>• Constructivist/ transformative knowledge claims</td>
<td>• Postpositivist knowledge claims</td>
<td>• Pragmatic knowledge claims</td>
</tr>
<tr>
<td>Employ these strategies of inquiry</td>
<td>• Phenomenology, grounded theory, ethnography, case study, and narrative</td>
<td>• Surveys and experiments</td>
<td>• Sequential, concurrent, and transformative</td>
</tr>
<tr>
<td>Employ these methods</td>
<td>• Open-ended questions, emerging approaches, text or image data</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use these practices of research as the researcher</td>
<td>• Positions him- or herself</td>
<td>• Closed-ended questions, predetermined approaches, numeric data</td>
<td>• Both open- and closed-ended questions, both emerging and predetermined approaches, and both quantitative and qualitative data and analysis</td>
</tr>
<tr>
<td></td>
<td>• Collects participant meanings</td>
<td></td>
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<tr>
<td></td>
<td>• Focuses on a single concept or phenomenon</td>
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<tr>
<td></td>
<td>• Brings personal values into the study</td>
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<tr>
<td></td>
<td>• Studies the context or setting of participants</td>
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<tr>
<td></td>
<td>• Validates the accuracy of findings</td>
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<tr>
<td></td>
<td>• Makes interpretations of the data</td>
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<td></td>
<td>• Creates an agenda for change or reform</td>
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<td></td>
<td>• Collaborates with the participants</td>
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<td></td>
<td>• Tests or verifies theories or explanations</td>
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<td></td>
<td>• Identifies variables to study</td>
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<tr>
<td></td>
<td>• Relates variables in questions or hypotheses</td>
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<tr>
<td></td>
<td>• Uses standards of validity and reliability</td>
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<tr>
<td></td>
<td>• Observes and measures information numerically</td>
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<tr>
<td></td>
<td>• Uses unbiased approaches</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Employs statistical procedures</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Collects both quantitative and qualitative data</td>
<td></td>
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<tr>
<td></td>
<td>• Develops a rationale for mixing</td>
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<td></td>
<td>• Integrates the data at different stages of inquiry</td>
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<tr>
<td></td>
<td>• Presents visual pictures of the procedures in the study</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>• Employs the practices of both qualitative and quantitative research</td>
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</tbody>
</table>
Methods Dependent on Information Needed

• What do you want to know?
• When do you need it?
• How will you get it?
• Who else might you collaborate with
• How will you analyze data and communicate it
• How will you use the information?

No one best method . . .
Methods must be appropriate to the information needed!
Criteria for Selecting a Research Approach

Chapter 5 power point provides more details on this topic

• Research Problem and Questions:

  Quantitative approach is best when:
  • Testing causal relationships (factor/s that influence a particular outcome).
  • Evaluating the usefulness or successes of an intervention.
  • Establishing which factors best predict an outcome.
  • Testing theories or explanations.

  Qualitative approach is best when:
  • The Researcher is uncertain about which are the most important variables to be examined.
  • If the topic is new, sample population is unexplored by the topic or the dominant explanations may not apply to a given sample population.
Criteria for Selecting a Research Approach (Cont.)

- **Research Problem and Questions Cont.**
  
  Mixed Methods approach is best when:
  - Neither quantitative nor qualitative approaches will adequately examine the variables being researched.
  - The Researcher wants to capitalize on the strengths of both qualitative and quantitative approaches.

- **Personal Experiences**
  - Training
  - Preferences
  - Time
  - Resources
  - Experiences

- **Audience**
  - Advisors
  - Journal editors
  - Graduate committees
  - Colleagues in the field
More than Big Data Analysis

• Big data in the form of behaviors and small data in the form of surveys complement each other and produce insights rather than simple metrics

• Small data requires more qualitative approaches – use of social psychologists, anthropologists, and sociologists to find what simple measures miss

• Small data can find holes in big data

• "How Not to Drown in Numbers", 2015
Five laws of library science – S.R. Ranganathan (1931)

1. Books are for use.
2. Every reader his / her book.
4. Save the time of the reader.
5. The library is a growing organism.

Research Methods

Exploratory
Exploratory
Exploratory

Input
Output
Outcome
Impact

What is evidence?
Explanatory

Tell a story

Why am I collecting these data?

What’s the story?
Persuasion and the Power of Story: Jennifer Aaker (Future of StoryTelling 2013)

DATA – intellectual

+ STORIES- emotional
http://www.storytellingwithdata.com/
Assessment Methods and Tools/Protocols

• Customer Surveys
• Interviews/Focus Groups
• Observational/Ethnographic Studies
• User-Centered Design/Usability...
• Usage Data/Data Mining

For each method...

✧ Simple and complex
Customer Surveys – What They Do

• Acquire both quantitative and qualitative information
• Can generalize from sample population & respondents
• Analyze data for entire group, within group, between groups and over time
• Customize questions, length, format and timing
• Ask about importance, satisfaction, behavior, use
• Can analyze “gaps”
  • Importance/satisfaction, perceived/actual, “visibility”
# When to Use Surveys

<table>
<thead>
<tr>
<th>When to use surveys</th>
<th>When not to use surveys</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Generalizable</td>
<td>• Complex questions</td>
</tr>
<tr>
<td>• Trend Data</td>
<td>• Inappropriate to topic</td>
</tr>
<tr>
<td>• Compare with others</td>
<td>• Unsure how to analyze and report and apply results</td>
</tr>
<tr>
<td>• Quantitative Analysis</td>
<td>• Cost</td>
</tr>
<tr>
<td>• Comments</td>
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</table>
Interviews – What They Do

• Can get to the “whys” of user needs, work, behavior and outcomes
• Used as one-off, prelude to other methods, or after to gain understanding and context
• Purpose defined; questions should be well-thought out, consistent among interviewers
• Structured but flexibility to follow-up within the interview
• Done in-person or remotely (phone, “chat”)
Focus Groups – What They Do

• Planned discussion to obtain user perceptions and observations on a topic
• Each session composed of 6-10 participants
  • Participants often share a common characteristic
  • Sessions generally run 1 to 1.5 hours
• Several sessions (different groups) recommended
• Facilitator/moderator guides discussion, doesn’t lead
• Participants encouraged to share perspectives and learn from each other
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Observational Studies – What They Do

• Describe user activities
• Can be obtrusive or unobtrusive
• Can be tied in with interviews, usability, ethnography
• Well-developed data collection method essential
• Facilities use is traditionally most common application
Ethnographic Methods – What They Do

• Multiple qualitative methods of observation and engagement
• Views the library as part of a community rather than separate element
• Identifies likes, dislikes, narratives and stories
• Uses participants own words and actions
• Needs expertise, set-up and time to conduct and analyze
Usability & User-Centered Design – What They Do

• Apply both to virtual (Web) and physical space (wayfinding)

• Asks users to demonstrate:
  • How easy is it to navigate, understand, find, perform
  • User-centered design process involves users’ in space, furniture and equipment design

• Iterative process
Usability 101 by Jakob Nielsen

• Definition:
  • Utility = whether it provides the **features you need**.

• Definition:
  • Usability = how **easy & pleasant** these features are to use.

• Definition: **Useful** = **usability** + **utility**.

Critical Data Areas regarding library contributions

• Literacy
• Economic development
• Special populations
• Access to electronic resources
• Access to network services
• Student learning, engagement and success
• Faculty research and scholarship productivity
• Peer comparisons (benchmarking)
Examples to consult ...

• Qualitative (example ERIAL, Rochester study, Participatory Design efforts by N.Foster)

• Quantitative (experiments, national descriptive statistics, MN study on student success)

• Mixed methods (examples may include Project Outcomes, LibQUAL+, ClimateQUAL, MINES for Libraries)

• Design thinking (Edge, Space assessment by Bob Fox, Joan Lippincott, ARL Strategic Thinking and Design, Future of LIS education, etc.)
So Many Methods . . . . So Little Time, Resources Etc.
It’s All About Reducing Uncertainty and Risk

- How much do you already know?
- If you have a lot of uncertainty you don’t need much new data to tell you something useful
- If you have a lot of certainty already, then you need a lot of data to reduce uncertainty significantly. . .
- But how important is it to do this? It isn’t brain surgery. Is 90% confidence sufficient for most library decisions? Is it “good enough”? 
Four Useful Assessment Assumptions

1. Your problem/issue is not as unique as you think – Library worldviews
2. You have more data/information than you think – research design/methods
3. You need less data/information than you think – mixed methods
4. There are useful methods that are much simpler than you think

Adapted from Douglas Hubbard, “How to Measure Anything” (2014)
Resources

- Better Evaluation: http://betterevaluation.org/
- Against All Odds: Inside Statistics: https://www.learner.org/courses/againstallodds/
- What is a survey: https://www.whatisasurvey.info/
- Basics of designing a survey: https://www.youtube.com/watch?v=36s6wBSJW8U&feature=youtu.be
Questions?

Thank you

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