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Research Methods & Applications

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Research Methods & Applications
Nancy J. Busch & Joan R. Giesecke

McMaster University Library
June 9, 2009
Agenda

8:30 – 9:00 registration and networking
9:00 – 9:15 introductions, expectations and outcomes
9:15 – 10:15 overview of research process
10:15 – 10:30 break
10:30 – 12:00 small group work and discussion
12:00 – 1:00 lunch
1:00 – 2:30 methods and options
2:30 – 2:45 break
2:45 – 3:15 small group work and discussion
3:15 – 4:00 reporting results and ethical issues
4:00 – 4:30 wrap-up and evaluation
Expectations and outcomes

Purpose: This workshop is an introductory / intermediate look at research methods, practices and strategies. Participants will learn tools and techniques for turning interesting questions into researchable topics.

Learning Objectives: 1) To build knowledge and skills in identifying a good research project. 2) To conceptualize a realistic research project that is likely to be completed and published.
To help us focus and evaluate

On the index card write 3 things you want to learn today

1
2
3
Topics we will explore today include

- what you know about research
- what you need to know about research
- research trade-offs
- collaboration
- psychology of writing research & publishing
- keeping your momentum
- how and when to let go
- researching moving targets
- evaluation verses research
Overview of the research process

*Nothing is interesting if you’re not interested.* - Anonymous
“Research is formalized curiosity. It is poking and prying with a purpose.”

- Zora Neale Hurston

“If we knew what it was we were doing, it would not be called research, would it?”

“We can't solve problems by using the same kind of thinking we used when we created them.”

- Albert Einstein
“… a properly framed question contains the answer.”

- Earl Babbie, The Practice of Social Research

What sets good research apart is usually not one’s cleverness in finding the answer but one’s skill in asking the question and phasing it carefully and well.

- paraphrase attributed to E.O. Wilson
Purposes of research

- exploratory
- descriptive
- analytical
- predictive
Units of analysis

- individuals
- groups
- organizations
- social artifacts
Time dimension

- cross-sectional studies
- longitudinal studies
  - trend studies
  - cohort studies
  - panel studies
Research

- originates with a question or problem
- requires a clear articulation of a goal
- follows a specific plan or procedure
- usually divides the principal problem into more manageable sub problems
- is guided by a specific research problem, question, or hypothesis
Research …

- accepts certain critical assumptions
- requires the collection and interpretation of data in attempting to resolve the problem that initiated the research
- is, by nature, cyclical; or more exactly, helical

Foundations for good research

- clear purpose
- relevant
- manageable
- original
- accurate
- credible
- applicable
- objective
- ethical
- cautious
Research elements

- problem or objective: what are you studying and why?
- review of past studies: what, if anything, has been done on this topic before?
- subject of study: from whom or what will you collect data?
- measurement: what are the key variables and how will you define and measure them?
Research elements ...

• data-collection: how will you actually collect the data for your study?
• analysis: how will you make sense of and report your findings?
• schedule: what is the timeline for your study?
• budget: what are the estimated direct and indirect costs of your study?
Research productivity among librarians – factors leading to publications

- motivation
- mandate
- mentoring
- research agenda
- education
- skills
- support
- time
- culture

From Fennewald’s Penn State Library Study
Scholarship of Canadian Research Library Librarians

• more than 50% required or encouraged to participate in scholarly activities
• formal publications most important means for obtaining tenure and promotion
• librarians pursue a rich array of scholarly interests
• support for scholarship is extremely variable
• most scholarly activity generated with benefit of leave
• article includes additional areas/topics for research
The most difficult thing in science, as in other fields, is to shake off accepted views. - George Sarton
Small group work –
Research proposal
brainstorm

- form small groups of 7 or 8
- select a facilitator and a recorder
- work through questions 1-5 (handout)
- ask clarifying questions
- everyone participates
Touch base

- issues and questions relating to content?
- small group work observations?
- other questions?
The whole of science is nothing more than a refinement of everyday thinking.  

-- Albert Einstein
Methods and Options

- planning the research study
- literature review
- concept and literature mapping
- research dilemmas
- quantitative, qualitative and mixed methods
- mixed method example
- reporting results
- ethical issues
## Research Methods by Discipline

<table>
<thead>
<tr>
<th>Discipline</th>
<th>Humanities</th>
<th>Social Sciences</th>
<th>Sciences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Areas of study</td>
<td>Literature, Art, Philosophy, Dance, Film Music, Religious Studies</td>
<td>Anthropology, Political Science, Psych, Sociology, Criminal Justice, Economics, Linguists</td>
<td>Geography, Geology, Biology, Chemistry, Engineering, Physics, Computer Science, Nursing</td>
</tr>
<tr>
<td>Areas of Inquiry</td>
<td>Text, artifacts, People create, Meaning and values</td>
<td>Meaning and values, Interaction</td>
<td>Physical World</td>
</tr>
<tr>
<td>Role of Investigator</td>
<td>Interpret and Make meaning</td>
<td>Develop theories, Identify patterns</td>
<td>Investigate and report</td>
</tr>
<tr>
<td>Methodology</td>
<td>Study of manuscripts, Primary materials, Literary works, editions, Word analysis, patterns, Data mining of large text, Databases</td>
<td>Qualitative methods, Quantitative methods</td>
<td>Scientific method</td>
</tr>
</tbody>
</table>
Literature review

• share results of other relevant studies
• extend prior studies, “fill in gaps”
• provide framework for your study
• provide benchmark for comparison with other findings
• establish theoretical framework
A theory is a statement of relations among concepts within a set of boundary assumptions and constraints. It is no more than a linguistic device used to organize a complex empirical world. - Samuel B. Bacharach
## Theory and research methods

<table>
<thead>
<tr>
<th>Theory</th>
<th>New</th>
<th>Intermediate</th>
<th>Mature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research questions</td>
<td>Open-ended inquiry about an area of interest</td>
<td>Propose relationships between new and established concepts</td>
<td>Questions or hypotheses relating to established constructs</td>
</tr>
<tr>
<td>Types of data</td>
<td>Qualitative</td>
<td>Qualitative and quantitative</td>
<td>Quantitative</td>
</tr>
<tr>
<td>Objective</td>
<td>Identifying patterns</td>
<td>Exploratory testing</td>
<td>Formal hypotheses testing</td>
</tr>
</tbody>
</table>

Adapted from Zammuto 2008 and Edmonson & MacManus 2007
A Three-Horned Dilemma --
Why no method is perfect

• Different methods have different strengths:
  • rigor
  • relevance
  • generalizability

All research strategies are seriously flawed. McGrath (1982)
Choices on strategies

- Obtrusive to unobtrusive
- Universal behavior to specific behavior systems
Conflicting efforts

- you can not maximize all of the following:

  ✓ generalizability – with respect to populations
  ✓ precision – in control and measurement of variables
  ✓ context – real verses no context
<table>
<thead>
<tr>
<th>Research Methods</th>
<th>Research Question</th>
<th>Research Dilemma</th>
</tr>
</thead>
<tbody>
<tr>
<td>Historical Methods</td>
<td>What was the role in society of circulation music libraries in 19th century France?</td>
<td>High in relevance</td>
</tr>
<tr>
<td>Case Study</td>
<td>What is the impact of changing promotion and tenure requirements on the retention of faculty in library X?</td>
<td>High in relevance</td>
</tr>
<tr>
<td>Participant/Observation</td>
<td>How well do reference librarians in library X respond to patron inquiries compared to the ACRL Behavioral standards for reference librarians?</td>
<td>High in relevance</td>
</tr>
<tr>
<td>Field Studies (anthropology)</td>
<td>How accurate are the answers given by reference librarians in 3 similar libraries?</td>
<td>High in relevance</td>
</tr>
<tr>
<td>Focus Group and/or Key Informant Interviews</td>
<td>What services should a 21st century Engineering library provide to University students and Faculty?</td>
<td>High in relevance</td>
</tr>
<tr>
<td>Surveys</td>
<td>How well does the libraries organizational climate promote productivity?</td>
<td>High in generalizability</td>
</tr>
<tr>
<td>Bibliometric Studies</td>
<td>How well does Communication Abstracts index and journal needed and used by Communication Studies faculty?</td>
<td>High in generalizability</td>
</tr>
<tr>
<td>Grounded Theory</td>
<td>How do decision-making models differ?</td>
<td>High in generalizability</td>
</tr>
<tr>
<td>Lab Experiments</td>
<td>How well do the new search engines for the catalog aid discovery by students?</td>
<td>High in rigor</td>
</tr>
<tr>
<td>Content Analysis</td>
<td>How have librarians been portrayed over time in film</td>
<td>High in rigor</td>
</tr>
</tbody>
</table>
Rochester undergraduate research project

- Research begun Fall 2004
- Led by Anthropologist Nancy Fried Foster
- Used ethnographic research techniques
- Pre-study: faculty interviews
- Objectives broadened to gain broad insight into student lives
- More than 100 students participated
- More than 1/3 of library staff involved
Design Charrette - Foster & Gibbons
Web site usability – Foster & Gibbons
Informing Innovation: Tracking Student Interest in Emerging Library Technologies at Ohio University – Char Booth


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Informing Innovation - Booth

- The modern library can develop a range of personalizable, practical tools adaptable to diverse student learning environments, but will only succeed if it does so based on insight and direct user feedback. Library 2.0’s prescriptive utopianism has given way to an emphasis on technology as a means rather than an end. Social, mobile, and dynamic tools can be as capricious as they are beneficial, and it is not advisable to assume that the range of products commonly described as ‘2.0’ are innately needed, anticipated, supportable, or effective. [Booth, p.102]
A person who can identify the inevitable tradeoffs in inquiry and relax gracefully having done so is a seasoned inquirer.

-- Karl E. Weick
Small group work – Research proposal

- same small groups of 7 or 8
- select a facilitator and a recorder
- work through question 6 (handout)
- ask clarifying questions
- everyone participates
Reporting results

- audience
- finding the ‘story’ – making sense
- formatting considerations
- methods used
- limitations
- copy of instrument
Reporting cautions

- don’t assume facts speak for themselves
- don’t make unwarranted claims or conclusions from the evidence
- acknowledge findings that are debatable and controversial
- consider alternative explanations
- recognize limitations of your research

All animals are able to think, and many can use tools. What sets humans apart is our ability to deceive ourselves.” Anonymous
Ethical and other issues

- confidentiality and anonymity
- reporting and interpretation
- voluntary participation
- informed consent
- risk of harm
- right to service
- IRBs
- web-related issues
IRBS -- Belmont Report

- [http://www.youtube.com/watch?v=W7sfIA1dIGQ](http://www.youtube.com/watch?v=W7sfIA1dIGQ)
- [http://videocast.nih.gov/ram/belmont_tribute.ram](http://videocast.nih.gov/ram/belmont_tribute.ram)
Wrap-up

- Questions and comments?

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My research to-do list

1 __________________________________________
2 __________________________________________
3 __________________________________________
4 __________________________________________
5 __________________________________________
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7 __________________________________________
8 __________________________________________
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10__________________________________________
My research collaborators

1 __________________________________________
2 __________________________________________
3 __________________________________________
4 __________________________________________
5 __________________________________________