Library value through the lens of student success, research outcomes and collection impact

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Galter Health Sciences Library and Learning Center

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Empower Collection Assessment Programs with Value on Investment Strategies

Melissa Goertzen, Consultant & Information Manager
July 12, 2018
• Collection development initiatives rest on a balance between traditional library practices and the demands of a dynamic virtual world.

• Academic librarians hold a unique position in this information landscape; they possess the skills sets required to evaluate information and build collections of authoritative knowledge products.
Librarians face increasing pressure to demonstrate evidence of collection impact.

Library value is viewed as a demonstrated contribution to research & learning initiatives.

Traditional measures of library success fail to demonstrate the full impact and value of collections.

*Image source: blog.twosense-labs.com*
RETURN ON INVESTMENT (ROI)
Value on Investment (VOI) considers the following questions:

- What did library users accomplish because of interactions with library collections?
- What is the library aiming to achieve?
- How do librarians measure the impact collections have on research, teaching, and learning activities?

Key Features of VOI Assessment

- Accounts for the indirect value of the collection
- Concerned with how and why information funnels through the research cycle over time
- Examines the long-term impact of scholarly activities
- Captures benefits of library collections to the institution
Combining ROI & VOI

budget allocations Usage Reports devices file formats back-files BorrowDirect standardization publishers usage trends technology vendors What are the issues? discovery Subscription bundles collection PDA/DDA purchases download electronic Where are we going? Access copyright DRM E-book management copyright MARC delivery methods interlibrary loans reserves Collection impact Peer Review Citation
Benefits and Limitations of ROI & VOI

Collection Assessment Outcomes

Collection Development Goals

Resource Management

Collection Value & Impact

Collection Development & Strategic Objectives
<table>
<thead>
<tr>
<th>ROI</th>
<th>VOI</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pros</strong></td>
<td><strong>Pros</strong></td>
</tr>
<tr>
<td>• Direct value calculation</td>
<td>• Indirect value calculation</td>
</tr>
<tr>
<td>• Examines the present value of collections</td>
<td>• Supports long-term collection strategies</td>
</tr>
<tr>
<td>• Identifies recurring &amp; non-recurring costs</td>
<td>• Holistic collection view promotes strategic management</td>
</tr>
<tr>
<td>• Answers questions like: What materials are used today? What collections are of value to users today?</td>
<td>• Answers questions like: How and why do materials support scholarly activities?</td>
</tr>
<tr>
<td><strong>Cons</strong></td>
<td><strong>Cons</strong></td>
</tr>
<tr>
<td>• Does not capture how or why library collections are used</td>
<td>• Does not provide insight into present usage trends</td>
</tr>
<tr>
<td>• Does not provide insight into up-and-coming research needs or trends</td>
<td>• Does not identify the collection materials that are used today</td>
</tr>
<tr>
<td>• Does not measure what users do with information once it has been discovered</td>
<td>• Does not provide evidence to support immediate budget management activities</td>
</tr>
</tbody>
</table>
Think Globally, Act Locally

- Align assessment activities with strategic plans
- Reflect the values and goals of your institution
- Understand the characteristics of clients you serve
- Talk to your users, don’t rely on assumptions
Define the parameters of a VOI assessment plan

- Define what the terms “impact” and “value” mean to your host institution
- Identify the quantitative and qualitative data sources that support VOI activities
- List all resources that support collection development activities
- Calculate ROI and push beyond its limitations
PRESENT VOI ASSESSMENT RESULTS
Summary

• Librarians know that collection value isn’t measured in nickels and dimes.

• Return on investment (ROI) demonstrates smart financial decisions, but it doesn’t capture the impact of purchases.

• With value on investment (VOI), librarians showcase how collections support research workflows and learning activities over time.
Thank You

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Website: melissagoertzen.wordpress.com
Evaluating Research Impact:
Tools, resources, and ideas for getting involved

Karen E Gutzman
Galter Health Sciences Library & Learning Center
Northwestern University Feinberg School of Medicine

Library Connect Webinar Series
Thursday, July 12, 2018
Overview

Part 1.
What is research evaluation?

Part 2.
Tools and resources for evaluation

Part 3.
Options for library involvement

![Relative Citation Ratio for Fictional Group](image-url)
Why do we evaluate research?

Advocacy

Analysis

Accountability

Allocation

Why do we evaluate research?

Advocacy

Analysis

Making the case for research

Accountability

Allocation

Why do we evaluate research?

Advocacy

Making the case for research

Analysis

Accountability

...to taxpayers and donors

Allocation

Why do we evaluate research?

Advocacy

Making the case for research

Analysis

Understanding what works

Accountability

...to taxpayers and donors

Allocation
Why do we evaluate research?

Advocacy

Making the case for research

Analysis

Understanding what works

Accountability

...to taxpayers and donors

Allocation

Rewarding impact

Why do we evaluate research?

Advocacy

Making the case for research

Analysis

Understanding what works

Understand the objective of the research evaluation

Accountability

...to taxpayers and donors

Allocation

Rewarding impact

How do we evaluate research?

Basic tool of an evaluation: the Logic Model
Basic organizational diagram of a program.

What RESOURCES are used?
What ACTIVITIES do we do with those resources?
What OUTPUTS are produced?
What OUTCOMES do they create?

Environmental factors: external influences on the process or program
Evaluating a Pre-doctoral Training Program

Environmental factors: external influences on the process or program

- **What RESOURCES are used?**
  - Program Manager
  - Researchers
  - Conference Room
  - Funding

- **What ACTIVITIES do we do with those resources?**
  - Mentorship sessions
  - Training sessions

- **What OUTPUTS are produced?**
  - Certificate of completion
  - Joint publications between mentees and mentors

- **What OUTCOMES do they create?**
  - Increased career prospects of mentees
What amount of time and money was used?

How many mentorship sessions?

How many attended or did not attend?

How many trainees completed the program?

How many documents were published in scholarly literature?

Did mentees have improved career prospects?

To what extent has the program developed the careers of mentees?
Evaluating a Pre-doctoral Training Program

**Indicators**
- # of Staff
- Costs

**What RESOURCES are used?**
- # of sessions held
- Quality criteria of sessions
- # of mentees

**What ACTIVITIES do we do with those resources?**
- # and types of mentees reached
- # of publications

**What OUTPUTS are produced?**
- % employed
- % remain in research over time

**What OUTCOMES do they create?**
# Evaluating a Pre-doctoral Training Program

<table>
<thead>
<tr>
<th>Indicators</th>
<th>What RESOURCES are used?</th>
<th>What ACTIVITIES do we do with those resources?</th>
<th>What OUTPUTS are produced?</th>
<th>What OUTCOMES do they create?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Process Indicators</strong></td>
<td># of Staff Costs</td>
<td># of sessions held</td>
<td># and types of mentees reached</td>
<td>% employed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Quality criteria of sessions</td>
<td></td>
<td>% remain in research over time</td>
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</table>

**Northwestern Medicine**
Evaluating a Pre-doctoral Training Program

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<tr>
<th>Indicators</th>
<th>Process Indicators</th>
<th>Impact Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What RESOURCES are used?</strong></td>
<td># of Staff</td>
<td>% employed</td>
</tr>
<tr>
<td></td>
<td>Costs</td>
<td>% remain in research over time</td>
</tr>
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Overview

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Tools and resources for evaluation

Part 3.
Options for library involvement

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The Relative Citation Ratio (RCR) shows how well-cited an article is when benchmarked against publications resulting from NIH-funded papers in the same field and year of publication. An RCR greater than 1.00 means the article is more cited than expected according to the average.

Sources: Publication counts from Scopus, Relative Citation Ratio from Citeseer (https://citeseer.ist.psu.edu). Visualization created in Excel.
Building a library of indicators

above: http://www.metrics-toolkit.org/

above: https://becker.wustl.edu/impact-assessment

above: https://arxiv.org/abs/1408.5700

above: http://www.rand.org/pubs/research_reports/RR1606.html
100 Metrics to Assess and Communicate the Value of Biomedical Research

Research Impacts

<table>
<thead>
<tr>
<th>Metric</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of journal articles published</td>
<td>The number of peer-reviewed journal articles published over a particular timeframe is a quantitative metric of the volume of research produced by an individual or institution.</td>
</tr>
<tr>
<td>Number of citations</td>
<td>Measures of citations to published articles are used as a proxy for article quality. Can include Highly Cited Papers, Normalized Citation Score, etc.</td>
</tr>
<tr>
<td>Number of research output downloads</td>
<td>The number of times a research output has been downloaded gives an indication of how much it is being of use and the level of interest in it.</td>
</tr>
<tr>
<td>Mentions in Social Media</td>
<td>Information on who is citing the institution in social media can help identify where the influence of the medical school or teaching hospital is being felt across the sector, noting that this may be within academia.</td>
</tr>
</tbody>
</table>

http://www.rand.org/pubs/research_reports/RR1606.html
Advancement of Knowledge

<table>
<thead>
<tr>
<th>Books or Book Chapters</th>
<th>Book or book chapters generated by the research study is noted in a bibliography. Book is used as a textbook for higher education. Translations of the book. Book or book chapter cited in subsequent publications.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change in Understanding and Awareness</td>
<td>Research study findings represent a paradigm shift in a field. Research study findings lead to change in understanding a problem.</td>
</tr>
<tr>
<td>Citations to Publications</td>
<td>Number of first generation citations. Number of second generation citations. Countries represented by citations. Institutions represented by citations. Languages represented by citations.</td>
</tr>
</tbody>
</table>
A review of the characteristics of 108 author-level bibliometric indicators

Indicators of publication count

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>P (total publications)</td>
<td>Count of production used in formal communications</td>
</tr>
<tr>
<td>FA (first author counting)</td>
<td>Credit given to first author only</td>
</tr>
<tr>
<td>Co-authors</td>
<td>Indicates cooperation and growth of cooperation at inter- and national level</td>
</tr>
<tr>
<td>Noblesse Oblige (last author counting)</td>
<td>Indicates importance of the last author for the project behind the paper</td>
</tr>
</tbody>
</table>
Building a library of indicators

Metrics Toolkit

<table>
<thead>
<tr>
<th>Indicators of Attention, Research, or Diffusion</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blog Mentions</td>
<td>The number of times a scholarly output has been linked to from a blog.</td>
</tr>
<tr>
<td>Software Citations</td>
<td>The number of times a piece of software or code (or a paper that describes software or code) has been cited as a resource in a journal article or book.</td>
</tr>
<tr>
<td>Software Downloads</td>
<td>File downloads over a period of time.</td>
</tr>
<tr>
<td>Github: Forks, Collaborators, Watchers</td>
<td>Github “Forks” are created when a user makes a copy of a repository (i.e., a group of files). A “collaborator” is another Github user who is able to perform many actions on the files within the repository, including edits. “Watchers” are Github users who have asked to be notified of activity in a repository, but have not become collaborators. Watching a repository is similar to following an RSS feed to see changes.</td>
</tr>
</tbody>
</table>

http://www.metrics-toolkit.org/
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Enhancing the Impact of Your Research

Want to make your research more discoverable? Wonder how to discuss your research impact? Join us for this practical class in learning how to enhance your research impact. The class briefly covers the concept of research impact, including definitions and a discussion on why thinking about research impact is important, and is offered to faculty, students or staff.

Participants will learn practical strategies on:
- establishing an online presence
- enhancing the discovery of scholarly outputs
- increasing the dissemination of scholarly outputs
- communicating the impact of your research
• We write content for **Breakthroughs**
  (FSM Office of Research monthly newsletter) and Galter News
  - Recent news items include:
    - Writing About Your Impact on the New NIH Biosketch
    - Sharing, Publishing, and Archiving Your Work
    - Visualizing Science at Feinberg School of Medicine
    - Matchmaker, Make Me a Match: Choosing a Journal

---

**above: screenshot of Breakthroughs article :**

*Dissemination of Research in the Wild World Wide Web*
Create an impact report template for groups

Productivity: how much research was produced and who produced it
- # of researchers in department
- # of articles published by faculty
- Average articles per year
- # of unique source (journal) titles

Collaboration: who worked together to make the research happen
- # of country affiliations of co-authors
- # of top institutional affiliations of co-authors
- Listing of funding organizations from 2014 to present

Research Topics: what the research was about
- Document types for published articles
- Top key words used in articles
- Top subject areas of source (journal) titles

Requestor: Office of Finance and Administration or departmental administrators, NU FSM

above: screenshot of title page of group publication summary

Please note: this is not an exhaustive list of indicators. Indicator categories by Chris Belter, NIH Library
Create an impact report template for groups

Citation Impact for Department: the impact it had on subsequent scientific research

- Total citations
- Average citations per year
- Average citations per publication
- Citations by year of publication
- Citations cumulative
- Citations by year of publication per publication
- Most highly cited publication
- # of country affiliations of citing authors
- # of languages of citing articles
- # of unique source (journal titles) from citing articles
- # of unique country affiliations of citing authors
- # of unique institutional affiliations of citing authors
- h-index of departmental documents
- # of documents with no citations
- Hot or Highly Cited publications

Citation Impact for Individuals: the impact he/she had on subsequent scientific research

- Total published articles (career span and report timespan)
- Total citations (career span and report timespan)
- h-index
- m-index
- # of co-authors

Data Tables for Publication Summary

- Sheet name: Description: Used in report
  - Faculty Information: list of faculty with individual metrics: used throughout
  - Documents: list of all documents authored by faculty from 2011-2015: used for Table 6
  - Citing Document Metadata: provides information on documents citing faculty's documents: used for Tables 6 & 7
  - Citation Overview: detailed citation information by year using Elsevier's Scopus: used for Chart 5
  - Chart 1: chart of documents and citations by year: used for Charts 1 & 5
  - Chart 2: h-index, documents and citations by faculty for career span: used for Chart 5
  - Chart 3: h-index, documents and citations by faculty from 2011-2015: not in report
  - Chart 4: documents with no citations from 2011-2015: not in report
  - Scopus Search Strategy: search strategy for online department using Elsevier's Scopus: used throughout
  - Faculty Index (new): original source information: not in report

Please note: this is not an exhaustive list of indicators. Indicator categories by Chris Belter, NIH Library

above: screenshot of excel data tables file for group publication summary
Create an impact report template for individuals

**Productivity**: how much research was produced and who produced it
- # of articles published by faculty
- Average articles per year
- # of unique source (journal) titles

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- Most highly cited publication
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- # of languages of citing articles
- # of unique institutional affiliations of citing authors
- Hot or Highly Cited publications
  - h-index
  - m-index

---

*above: screenshot of excel data tables file for individual publication summary*

*Please note: this is not an exhaustive list of indicators. Indicator categories by Chris Belter, NIH Library*

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**Requestor**: Researchers, NU FSM
Assist with finding citations in policy documents

International Policies and Guidelines: 41
US Clinical Guidelines/Scientific Statements: 59
US Governmental Policies and Guidelines: 16
US State Policies and Guidelines: 2

Numbers reflect citations in documents. Word clouds of document titles by tagxedo.com
Write simple statements of impact

Text for a group of researchers’ publications

55% of the group’s documents have a citation impact at or above global average
(391 of 710 articles, reviews, conference proceedings indexed in Scopus from 1987-2017 have a Field Weighted Citation Impact of $\geq 1.0$)

15% of the group’s documents have a citation impact significantly exceeding the global average
(136 of 710 articles, reviews, conference proceedings indexed in Scopus from 1987-2017 have a Field Weighted Citation Impact of $\geq 3.0$)

Chart for a group of researchers’ publications

Field Weighted Citation Impact by Year
Group: Department of Name Here
Timespan: 2013-2017
Source: Scopus
Create a visual timeline of impact


2014 cited in Andrew Sullivan’s “The Dish” article on The Mirage of Food Deserts
http://dish.andrewsullivan.com/2014/02/food-deserts-are-a-mirage/

2014 cited in Slate.com article Food Deserts Aren’t the Problem
http://www.slate.com/articles/life/food/2014/02/food_deserts_and_fresh_food_access_aren_t_the_problem_poverty_not_obesity.html

2015 cited in report on 2015 Dietary Guidelines
Create visualizations for exhibits or other reports

above: screenshot of visualization for library exhibit on the Places and Spaces of science at NU Feinberg School of Medicine

above: screenshot of visualization for library exhibit celebrating the digitization of the NU Quarterly Bulletin in PubMed Central
Overview

Part 1.
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Acknowledgements

The following people are instrumental in developing research impact and dissemination materials and training, and from whose guidance I have greatly benefited.

**Cathy Sarli**  
Becker Medical Library, Washington University in St. Louis

**Amy Suiter**  
Becker Medical Library, Washington University in St. Louis

**Kristi Holmes**  
Galter Health Sciences Library & Learning Center, Northwestern University

**Chris Belter**  
NIH Library, US National Institutes of Health

**Ya-Ling Lu**  
NIH Library, US National Institutes of Health

If you’re interested in bibliometrics, I highly recommend attending the upcoming *(free!!)* Bibliometrics & Research Assessment Symposium (see details below)
Thank You

*image: Northwestern University stained glass window*
The impact of library instruction interactions on student success:
Highlights from GWLA multi-institutional study

Melissa Bowles-Terry, Head of Educational Initiatives
University of Nevada, Las Vegas Libraries
Background

- Origins of the project
- Objectives
- Motivation
- Participation
Participating Institutions: 2014-15

Arizona State University
Baylor University
Brigham Young University
Kansas State University
University of Missouri
SMU
University of Nevada, Las Vegas
The University of New Mexico
University of Southern California
Utah State University
Washington State University
Scope of project

- 47,012 total first-year students at 12 institutions
  - 25,327 students had library instruction
  - Includes all students instead of looking at only students who had library instruction
- Largest study of its kind to date
  - Diverse institutions across the west
  - Diverse student population
- Longitudinal -- planned for 2014-2020
Project Design

Research questions guided design:

1. What effect does library instruction have on the retention of college students?
2. What effect does library instruction have on the academic success of college students?
3. What is the impact of specific library instruction methods on the retention and academic success of college students?
Challenges & complexity

- Data collection process at each institution
- Data acquisition process
  - Data cleaning and coding
  - Merging datasets
- Data sharing agreement
- Planning first year data vs. longitudinal data
- IRB approval at each institution
  - Security
  - De-identifying data
  - Data storage
Course-level variables

- **Pedagogy**
  - Active Learning
  - Directed Practice
  - Flipped Instruction
  - Lecture
  - Other
- **Session level**
  - Co-designed Assignment
  - Library Tour
  - Time/Frequency Library Instruction
  - Online Tutorial or Digital Learning Object
  - Research Guide Used

Student-level variables

- **Grades**
- **Credit Hours Earned**
- **Retention**
  - Semester
  - Year
  - Graduation
- **Demographics**
  - Gender
  - Ethnicity
  - ESL
  - Admissions Data
Results for 2014-15 Cohort
Summary of Results from 2014-15
Question #1: Impact on Retention

Compared with the control group of students who did not have a library instruction interaction, significant results were found in three areas. First:

- **Library instruction is highly associated with student retention from fall to fall for first-year students.**
- Fisher’s Exact Tests and Spearman Correlations
- Results were highly significant for eight of the 12 institutions (p<.05)

Summary of Results from 2014-15

Question #2: Impact on Student Success

Compared with the control group of students who did not have a library instruction interaction, significant results were found in three areas. Second:

- First-year GPA for students who had library instruction was 0.02 points higher than students who did not (p=0.009).
- Fisher’s Exact Tests and Spearman Correlations
- Mean first-year GPA was significantly different and positively correlated for five of the 12 schools

Summary of Results from 2014-15

Question #2: Impact on Student Success

Compared with the control group of students who did not have a library instruction interaction, significant results were found in three areas. Third:

- These students can be expected to complete 1.8 more credit hours than those who did not have library instruction \( (p = <.001) \).
- Fisher’s Exact Tests and Spearman Correlations
- Mean first-year hours completed was significantly different and positively correlated for ten of the 12 schools

Institutional implications

- Library instruction has a positive impact on student academic success and speaks to the institution’s mission and goals
- Information literacy program improvements
- Accreditation
- Collaborations

Professional implications

- Evidence based instruction program improvements
- Contributing to institutional value statements (accreditation)
- Model for research reproduction
Study future directions

- Continue data collection and follow year one students through 2020
- Midpoint analysis and six year analysis
- Continue to add new institutions
- Disseminate process and results to inform practice

Professional directions

- Evidence based research for programmatic planning
- Accreditation bodies include information literacy evidence in their standards
- Model for reproduction of multi-institutional research
- Potential for public national dataset
Questions?

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Thank You & Questions

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Consultant and Information Manager

Karen Gutzman
Impact and Evaluation Librarian, Northwestern University
Galter Health Sciences Library and Learning Center

Melissa Bowles-Terry
Head of Educational Initiatives, University of Nevada, Las Vegas Libraries