Library Data and Student Success

Shane Nackerud
Krista Soria
Jan Fransen
David Peterson
Kristen Mastel
Kate Peterson

Association for Institutional Research
Monday, May 20, 2013
Existing Measures

- Long history of measuring input, output, external perceptions of quality and satisfaction with library services
- Expenditures, staffing effects on retention
- Information literacy instruction
- Collections, facilities on enrollment decisions

...useful for management of library services, collections and resources but...
UK Library Impact Data Project

• 2010, University of Huddersfield
  – 700 courses (2005-2009)
  – 3 indicators of library usage (access to e-resources, book loans, access to the library)

• 2011, 8 UK institutions joined
  – 33,000 students, JISC funding
  – Grade, loans, e-resources accessed, times entered the library, school

• Focusing on non/low use and achievement
Call to Action

• Value of Academic Libraries:
A Comprehensive Research Review and Report (ACRL)
  - Assessment management systems
  - Develop systems to collect data on individual library user behavior
  - Record and increase library impact on student enrollment
  - Link libraries to improved student retention and graduation rates
  - Track library influences on increased student achievement
  - Demonstrate and develop library impact on student learning
Gym Bags and Mortarboards

- Student success measures
  - First Year Retention and 5 year graduation
- 5211 students in sample (2001)
- Tinto’s 1975 model of social and academic integration
- "able to demonstrate that actual usage of CRFs (campus recreational facilities) does have a positive association with academic success, even while controlling for other important academic, financial, and social fit factors."
Layers of Data

**Office of Institutional Research Performance Data**
Term and Cum GPA, Retention

**Office of Institutional Research Demographics Data**
College, Level, Major, Gender, Ethnicity, Age

**Libraries Data (13 Access Points)**
Circulation, Digital, Instruction, Reference, and Workstation
Layers of Data

Libraries Data (13 Access Points)
Circulation, Digital, Instruction, Reference, and Workstation
A Word about Privacy

• In order to use OIR data, we must retain Internet ID
• For now, not aggregating anything about the library interaction other than count

<table>
<thead>
<tr>
<th>This</th>
<th>But not this</th>
</tr>
</thead>
<tbody>
<tr>
<td>Checked out X books</td>
<td>Titles</td>
</tr>
<tr>
<td>Attended X workshops</td>
<td>Which workshops</td>
</tr>
<tr>
<td>Reference interaction</td>
<td>Substance of interaction</td>
</tr>
<tr>
<td>Logged into library workstation</td>
<td>Date, location, duration</td>
</tr>
<tr>
<td>Used X digital resources of Y type</td>
<td>Which ones</td>
</tr>
</tbody>
</table>
Circulation

• Loans
  – Both new check-outs and renewals
  – Gathered by extracting data from Aleph transaction records
  – Internet ID and date of transaction
  – About 45% = Renewal data

• ILL Requests
  – Gathered by extracting data from ILLiad
  – ILLiad ID and date of transaction
  – Not all IDs were U of M Internet IDs
Digital

• Anytime someone logged into our digital resources with a U of M Internet ID
  – Database logins
  – E-Journal logins
  – E-Book logins
  – Website logins

• Due to IP based authentication, we did not track on campus usage of databases, e-journals, and e-books
  – Estimate - Missing 10-20% of our traffic

• This is only initial point of access, not actual usage
Reference

• Online reference transactions
  – Captured from QuestionPoint data
  – Some of the more difficult data to capture
  – *We did not capture ref desk traffic or research consultations*

• Peer Research consulting data
  – One-on-one assistance to develop research strategies
  – U of M student consultants
Instruction

• Workshop registrations
  – Captured by Drupal-based registration module
  – *Registration does not mean attendance*
• Intro to Libraries I workshop
• Intro to Libraries II workshop
• Course-integrated librarian instruction
  – Everyone registered for the course/section
  – *All students may not have been present*
Workstation

• U of M library workstation logins
  – Captured by Cybrarian application used to authenticate library users
  – *Does not include complete data from SMART Learning Commons*

• Reveals a flaw with regard to capturing “library as place”
  – Difficult to gather Internet IDs if students don’t give them to us
Library Data Layer

- 1,548,209 total transactions in all 5 categories
- 61,195 unique Internet IDs interacted with the Libraries in some identifiable way
- 37,674 people did something in only one of the five categories we measured
- 87 people did something in all five categories
- 9,324 people did only one of the 13 things we measured and did it only once
Questions we can’t answer alone

• How many undergraduates used the library?
• How many graduate students?
• Do some colleges use the libraries more than others?
• How many potential users are there?
• Are students who use the libraries more successful?
Layers of Data

Office of Institutional Research Demographics Data
College, Level, Major, Gender, Ethnicity, Age

Libraries Data (13 Access Points)
Circulation, Digital, Instruction, Reference, and Workstation
OIR Demographics Layer

- Office of Institutional Research
  - OIR collects and analyzes data to provide information for institutional planning, policy formation, and decision-making

- Key library data numbers:
  - 1,548,209 total transactions in 5 categories
  - 61,195 unique Internet IDs
77% of Undergrads made use of the Libraries during the Fall Semester 2011

85% of Grad Students made use of the Libraries during the Fall Semester 2011 (including professional schools)
Carlson School of Business
Higher undergrad usage than professional/grad student

Pharmacy Professional Students: 100%!
(411 students)
Percent of Grad Students Using Library

Academic Health Center
College of Design Graduate Students: 90% (279 students)
Percent of Undergrads Using Library

Big Seven
Colleges at the U of M - TC

- The Big Seven
  - CBS: Biological Sciences
  - CFANS: Food, Agricultural, Natural Resource Sciences
  - CEHD: Education and Human Development
  - CLA: Liberal Arts
  - CDES: Design
  - CSOM: Management
  - CSE: Science and Engineering
Undergrad Digital Usage

College of Education and Human Development

College of Science and Engineering

<table>
<thead>
<tr>
<th>College</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>CBS</td>
<td>71.61</td>
</tr>
<tr>
<td>CFANS</td>
<td>69.38</td>
</tr>
<tr>
<td>CEHD</td>
<td>74.12</td>
</tr>
<tr>
<td>CLA</td>
<td>66.07</td>
</tr>
<tr>
<td>CDES</td>
<td>65.02</td>
</tr>
<tr>
<td>CSOM</td>
<td>66.07</td>
</tr>
<tr>
<td>CSE</td>
<td>47.35</td>
</tr>
</tbody>
</table>
Layers of Data

Office of Institutional Research Performance Data
Term and Cum GPA, Retention

Office of Institutional Research Demographics Data
College, Level, Major, Gender, Ethnicity, Age

Libraries Data (13 Access Points)
Circulation, Digital, Instruction, Reference, and Workstation
Undergrad Cumulative GPA as of Fall 2011

<table>
<thead>
<tr>
<th>College/Department</th>
<th>No Library Use</th>
<th>Library Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carlson School of Management</td>
<td>3.24</td>
<td>3.36</td>
</tr>
<tr>
<td>Col of Educ/Human Development</td>
<td>3.04</td>
<td>3.16</td>
</tr>
<tr>
<td>Col of Food, Agr &amp; Nat Res Sci</td>
<td>2.98</td>
<td>3.13</td>
</tr>
<tr>
<td>College of Biological Sciences</td>
<td>3.20</td>
<td>3.36</td>
</tr>
<tr>
<td>College of Design</td>
<td>2.99</td>
<td>3.23</td>
</tr>
<tr>
<td>College of Liberal Arts</td>
<td>2.95</td>
<td>3.14</td>
</tr>
<tr>
<td>College of Sci &amp; Engineering</td>
<td>3.07</td>
<td>3.19</td>
</tr>
</tbody>
</table>
Inferential Analyses

• First-year students (non-transfer, $n = 5,368$)

• Many ways to slice the data:
  – Any use of the library
  – Type of library use
  – Frequency within type of library use
  – Frequency of total use
ACT, Library Use, and GPA
Library use vs. Non-library use

- Below 19: 2.755
- 19-22: 2.784
- 23-24: 2.628
- 25-27: 2.854
- 28-30: 2.926
- 31-36: 3.016
- 31-36: 3.224
- 31-36: 3.141
- 31-36: 3.079
- 31-36: 3.079
- 31-36: 3.258
- 31-36: 3.503

Legend:
- Red line: Library use
- Blue line: Non-library use
Methods: Measures

Use of library (71.3%)

- Database
- Ebooks
- Book loans
- E-journals
- Inter-library loans
- Intro to Libraries (part 1 & part 2)
- Peer references

- Reference librarians
- Websites
- Workshops
- Workstations
- Course-integrated instruction
## Different Types of Library Use (2011-2012)

<table>
<thead>
<tr>
<th>Service</th>
<th>Total (m)</th>
<th>Used at least once (n)</th>
<th>m</th>
<th>sd</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Database</td>
<td>9.03</td>
<td>3859</td>
<td>12.63</td>
<td>72.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electronic Journal</td>
<td>4.62</td>
<td>2617</td>
<td>9.70</td>
<td>49.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Workstation</td>
<td>3.49</td>
<td>2054</td>
<td>12.12</td>
<td>38.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Website</td>
<td>.96</td>
<td>1717</td>
<td>2.82</td>
<td>32.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loan</td>
<td>1.90</td>
<td>1708</td>
<td>5.97</td>
<td>32.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Libraries Part 1</td>
<td>.22</td>
<td>1153</td>
<td>.41</td>
<td>21.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electronic Book</td>
<td>.54</td>
<td>832</td>
<td>2.12</td>
<td>15.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Course-integrated Instruction</td>
<td>.12</td>
<td>616</td>
<td>.33</td>
<td>11.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Libraries Part 2</td>
<td>.09</td>
<td>456</td>
<td>.28</td>
<td>8.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reference</td>
<td>.06</td>
<td>234</td>
<td>.32</td>
<td>4.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Workshop</td>
<td>.03</td>
<td>168</td>
<td>.19</td>
<td>3.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inter-library Loan</td>
<td>.04</td>
<td>95</td>
<td>.35</td>
<td>1.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peer</td>
<td>.02</td>
<td>70</td>
<td>.21</td>
<td>1.3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Methods: Measures

– Demographics:
  • Gender (M = 47.8%)
  • Race/ethnicity (SOC = 18.4%)
  • Pell grant (22.3%)
  • Veteran status (.6%)
  • First-generation (25.9%)

– College environment:
  • Freshmen seminar (27.8%)
  • Access to Success program (8.8%)
  • Dorm (85.2%)

– Prior academics
  • ACT/SAT scores (M = 27.49)
  • AP credits (n = 3137, M = 8.73)
Analyses

• Ordinary least squares regressions
  – Fall cumulative grade point average
  – Spring cumulative grade point average
  – Academic engagement (SERU survey)
  – Scholarship (SERU survey)

• Logistic regressions
  – Retention from fall to spring semesters
  – Retention from first year to second year
Fall GPA Results

- Controlling for demographics, college environment, and academic variables:
  - Using the library one time was associated with a **.23 increase in students’ gpa** holding other factors constant
  - A one-unit increase in *types of use* was associated with a **.07 increase in gpa**
Additional Fall GPA Results

• Controlling for the same variables, we examined using different types of sources at least once (dummy-coded):
  – Course integrated instruction: -.11
  – Database .14
  – Ejournal .10
  – Loan .11
Additional Fall GPA Results

• Controlling for the same variables, we examined using different types of sources by frequency (a one-unit increase is associated with...):
  – Course integrated instruction: -.08
  – Database: .01
  – E-Journal: .004
  – Workstation: .006
  – Reference: .08

*note: 12 outliers removed
Additional GPA Results – E-Journals

• Controlling for the same variables, we binned e-journal frequency for variables:
  – E-Journal 1-5: .17
  – E-Journal 6-10: .21
  – E-Journal 11-15: .23
  – E-Journal 16-20: .30
  – E-Journal 21-25: .31
  – E-journal over 25: .32

Sweet spot?
Spring GPA Results

• Controlling for demographics, college environment, and academic variables (including college of enrollment):
  – Using the library one time was associated with a .17 increase in students’ gpa holding other factors constant
Additional Spring GPA Results

• Controlling for the same variables, we examined using different types of sources by frequency (a one-unit increase is associated with...):
  – Course integrated instruction: -.08
  – Intro to Libraries part one (-.076) and part two (.098)
  – Database: .005
  – E-Journal: .005
  – Workstation: .004
  – Book loans: .006
*note: 12 outliers removed
Fall Retention Results

- Controlling for the same variables, we examined retention:
  - Students who used the library at least once were 1.54 times more likely to re-enroll
  - For every one-unit increase in the types of library use, students were 1.1 times more likely to re-enroll
Additional Fall Retention Results

• Controlling for the same variables, we examined retention:
  – Students who had “Intro to Libraries 2” library instruction were 7.58 times more likely to re-enroll
  – A one-unit increase in database uses was associated with students being 1.03 times more likely to enroll
Spring Retention Results

• Controlling for the same variables, we examined retention from first year to second year:
  – Students who used the library at least once (increased to 82.2% of students) were 2.08 times more likely to re-enroll the following year
Benefits to OIR

• Help other departments and units find out how helpful they are
  – Find out worth to students
• We are a research institution
• Good use of data we already collect
• Potential model to other departments at the university
  – Surveys vs actual usage
Academic Engagement (SERU survey)

• Contributed to a class discussion
• Talked with an instructor outside of class about issues/concepts from course
• Had a class in which the instructor knew or learned name
• Asked insightful questions in class
• Brought up different ideas from different courses during class discussions
• Interacted with faculty during lectures

(α = .80)
Academic Engagement

• Controls: demographics, college experience (same as above for GPA/retention), in addition to classmate interactions, library research skills, and critical thinking skills (three factors)
• $n = 1,322$ FY students
• Using the library at least once is significantly and positively associated with students’ academic engagement ($p < .05$)
Scholarship (SERU survey)

- Examined how others gathered/interpreted data and assessed soundness of conclusions
- Reconsidered your own position on a topic after assessing the arguments of others
- Incorporated ideas/concepts from different courses when completing assignments
- Used facts/examples to support your viewpoint
  \( (\alpha = .85) \)
Scholarship

• Controls: demographics, college experience (same as above for GPA/retention), in addition to classmate interactions, library research skills, and critical thinking skills (three factors)
• $n = 1,322$ FY students
• Using the library at least once is significantly and positively associated with students’ scholarship ($p < .01$)
Benefits to Libraries

• Find out who uses what
• Demonstrate our worth to institution
• Use the data and analysis to make decisions
  – Collections
  – Services
• Be a trailblazer
Next steps

• More analysis by Libraries and OIR
  • Considering the impact of when students used the library
  • Slicing & dicing
  • More SERU survey analyses

• Moving forward
  – Do we need more data and analysis going forward?
  – Do we collect the same data? Do we need to make an attempt to gather things we aren’t gathering now?
Questions?
Contact information

• Krista Soria (ksoria@umn.edu)
• Shane Nackerud (snackeru@umn.edu)

http://blog.lib.umn.edu/ldss/
Resources