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# Business Intelligence and Data Visualization with Tableau in Research Libraries

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Research libraries engage in understanding their environment by asking questions, observing and collecting data, and analyzing and reporting what they learn. The aims are to improve library services as well as to get the word out about the value libraries deliver to their end users in a strategic, visually appealing dashboard that delivers needed information in a timely manner. This issue of *RLI* reports on the latest applications in research libraries of Tableau, a business intelligence and data visualization tool. The two articles published here were originally presented at the Library Assessment Conference in Seattle, Washington, in August 2014 and are also included in the conference proceedings.[1]

Among the most expensive and rapidly growing services libraries provide is the licensing of electronic resources, as Lewellen and Plum report in "Assessment of E-Resource Usage at the University of Massachusetts Amherst: a MINES for Libraries® Study Using Tableau for Visualization and Analysis."[2] Even though research libraries are more actively engaged in publishing, a large and disproportionately increasing part of the library budget is devoted to purchasing electronic journals from a handful of publishers.[3] In 2003, the Association of Research Libraries (ARL) identified the need to track and evaluate the usage of electronic resources as a key priority. ARL adopted and deployed the Measuring the Impact of Networked Electronic Services (MINES) for Libraries® service[4] and implemented it in a number of institutions. MINES for Libraries goes deeper than usage statistics as it asks users to identify how the resource they are using is linked to their learning, research, and teaching. Lewellen and Plum report on two implementations of the MINES for Libraries protocol at the University of Massachusetts Amherst. They summarize the overall goals of the protocol in addition to an evolution of implementation options coupled with a pragmatic goal of demonstrating value. The University of Massachusetts Amherst uses Tableau to analyze and report MINES for Libraries data in the library's most recent implementation of MINES.

## In This Issue



Lewellen and Plum discuss the pros and cons of different MINES implementation options and demonstrate convincingly how tracking usage of electronic resources at a slightly deeper level than COUNTER-compliant usage statistics is a realistic and achievable approach for research libraries that invest large amounts of money in purchasing electronic resources. The authors expect that they "will

continue to collect valuable, actionable data to present a comprehensive picture of e-resource use to library and campus stakeholders, specifically informing collection development, instruction, support for research, marketing, and liaison work."[5] In their article, Lewellen and Plum show how far libraries can drill down into usage statistics without threatening user privacy. They also raise questions about how to assess the new roles and services libraries develop. For example, their approach surfaces the critical issue of how open access and library publishing efforts need to be configured so that their usage and value can be captured as the usage and value of licensed resources is captured.

Buhler, Lewellen, and Murphy reported on a variety of library Tableau applications at the Library Assessment Conference in 2014.[6] They followed up their conference presentation with a series of four webcasts that ARL organized and distributed through the ARL YouTube channel.[7] In each of the first three webcasts, one of the authors presented the variety of Tableau implementations at their library, and the fourth webcast provided an opportunity for more in-depth discussion of the issues across these three research library settings: the University of British Columbia (UBC), the University of Massachusetts (UMass) Amherst, and The Ohio State University (OSU).

These three authors approach their *RLI* piece, "Tableau Unleashed: Visualizing Library Data," by answering the following questions:

- How has the library incorporated Tableau into its assessment program?
- What impact has Tableau had on making sense of large data sets, making data accessible, and improving stakeholder communications?
- Where does Tableau fit in the library's data strategy?

Murphy and Lewellen present examples of data publishing and data sharing and Buhler emphasizes data exploration. Hopefully the example of these libraries will inspire more widespread mining of business intelligence in libraries.

Murphy summarizes the Tableau dashboards regarding research services trends, gate counts, and ILLiad borrowing at OSU. The data are accessible to key stakeholders in the library and have enabled them to communicate the value of their services to internal and external constituencies. Tableau is a strategic asset in the library's assessment program.

Lewellen showcases a range of visualizations and applications at UMass by highlighting monograph purchasing, circulation and duplication at both aggregate and title-level detail, and the e-book library (EBL) pilot program across the Five College Consortium libraries. In the case of UMass, using Tableau enables the library to mine business intelligence without a comprehensive data warehouse implementation solution.

Buhler discusses data exploration based on the principles summarized by Stephen Few[8] and he uses circulation data and LibQUAL+ examples from UBC. The ability to mine the LibQUAL+ data

longitudinally by discipline and school provide new perspectives. As Buhler asserts, "None of the LibQUAL+ visualizations presented…are based on data that is new to UBC Library, but Tableau helped to breathe new life into relatively commonplace data sets, making them more relevant to certain audiences."[9] For UBC, Tableau offered strategic communication advantages for the library's assessment program.

As the authors state, "Using Tableau, a library may produce flexible, in-depth, online dashboards, complete with filters and annotations to both customize visualizations and provide context. A library may also blend data from disparate sources to create dynamic, interactive graphics and reports."[10] The art of visually communicating library usage has come a long way from the initial ARL Statistics Interactive Edition that was developed in 1995 through a collaboration of Kyrillidou at ARL and Stubbs at the University of Virginia in the early days of the World Wide Web.[11]

The future of business intelligence through research library data is to be realized by mining the dynamic, real-time, and scalable visualizations that tools like Tableau afford us. For example, a scalable application of MINES for Libraries with Tableau **across libraries** is within reach.[12] Furthermore, coupling MINES for Libraries with SHARE notifications[13] could realize the potential of demonstrating the value of open access content as well as purchased content. Notifications that alert users when content from a wide variety of sources is first published, along with embedded, real-time, usage reports, for example, could identify how useful those publications are at a point in time, and how they further user goals such as learning, research, and teaching as captured by MINES data. Identifying influential knowledge resources—publications and authors among them—in this way could bring libraries a step closer to understanding what individuals need to read or write about next. As a result, continuously mining and acting upon data about knowledge resources and their use may contribute to exponential rates of growth in learning, research, and teaching.

## Endnotes

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2. Rachel Lewellen and Terry Plum, "Assessment of E-Resource Usage at University of Massachusetts Amherst: A MINES for Libraries® Study Using Tableau for Visualization and Analysis," *Research Library Issues: A Report from ARL, CNI, and SPARC*, no. 288 (2016): 5–20, http://publications.arl.org/rli288/.

3. Karla L. Strieb and Julia C. Blixrud, "Unwrapping the Bundle: An Examination of Research Libraries and the 'Big Deal'," *portal: Libraries and the Academy* 14, no. 4 (Oct. 2014): 587–615.

4. MINES for Libraries, accessed March 29, 2016, http://minesforlibraries.org/home/.

5. Lewellen and Plum, "Assessment of E-Resource Usage at University of Massachusetts Amherst," 18.

6. Jeremy Buhler, Rachel Lewellen, and Sarah Anne Murphy, "Tableau Unleashed: Visualizing Library Data," *Research Library Issues: A Report from ARL, CNI, and SPARC*, no. 288 (2016): 21–36, http://publications.arl.org/rli288/.

7. Association of Research Libraries, "Data Visualization Webcast Videos Now Online," news release, May 11, 2015, http://www.arl.org/news/arl-news/3587.

8. Stephen Few, *Information Dashboard Design: The Effective Visual Communication of Data* (Sebastopol, California: O'Reilly Media, 2006).

9. Buhler, Lewellen, and Murphy, "Tableau Unleashed," 35.

10. Ibid., 21.

11. Martha Kyrillidou and Kendon Stubbs, "Interactive Statistical Analysis on the WWW," presented at the National Center for Educational Statistics Summer Data Conference, Washington, DC, June 1995; Martha Kyrillidou, "To Describe and Measure the Performance of North American Research Libraries," *IFLA Journal* (2001): 257–263; also, see ARL Statistics Analytics, accessed March 29, 2016, http://www.arlstatistics.org/analytics/.

12. Dana Thomas, Catherine Davidson, Martha Kyrillidou, and Terry Plum, "Measuring Use of Licensed Electronic Resources: A Second Iteration of the MINES for Libraries® Survey on Scholars Portal and Other Resources for the Ontario Council of University Libraries," *Library Management* 33, no. 6/7 (2012): 374–388, http://www.emeraldinsight.com/doi/abs/10.1108/01435121211266195.

13. A SHARE notification captures when a new resource becomes available, either through licensed proprietary databases or through open access repositories and digital collections. For more information, see the SHARE website http://www.share-research.org/.



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