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# All Your Data Displayed in One Place: Preliminary Research and Planning for a Library Assessment Dashboard and Toolkit

Megan Hurst and Christine Madsen  
Athenaeum21, UK and USA

Frankie Wilson  
University of Oxford, UK

MacKenzie Smith and William F. Garrity  
University of California, Davis, USA

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## Abstract

The article presents the results of a 2016 multi-institutional, international research and scoping study to define the nature and feasibility of a library assessment executive dashboard and toolkit to enable libraries to centralize diverse collection, usage, administrative, and financial data, and to more easily visualize, analyze, and utilize the data. The study investigated the need and high-level requirements for a toolkit to enable library administrators to utilize commonly shared performance indicators and formulas to create their own dashboards, and the ability to customize indicators and formulas as needed. The article discusses research methodology and library management questions that might be more easily answered with a shared framework for key library performance indicators and library data sources, and an analysis of the current technology landscape and commercial and open source tools to support such a dashboard. Study findings and recommendations for next steps to develop a library assessment dashboard and toolkit are contextualized within the current library assessment and technology landscapes.

From January to June 2016, University of California, Davis and Athenaeum21 Consulting, with collaborators at University of Oxford in the UK and Göttingen State and University Library in Germany, engaged in scoping research to determine the nature and feasibility of a “library assessment dashboard toolkit.” Funded by the Andrew W. Mellon Foundation, the purpose of the project was to validate the need, to identify user requirements, and to scope resources needed to design and build the toolkit and dashboard. There have been many important, specialized efforts over the years to collect and standardize library data (including the Association of Research Libraries’ (ARL’s) Annual Statistics,<sup>1</sup> LibQUAL,<sup>2</sup> and Measuring the Impact of Networked Electronic Services (MINES);<sup>3</sup> California Digital Library’s Journal Value Metrics;<sup>4</sup> Project COUNTER;<sup>5</sup> International Standard Organization’s standard 11620:2014 of Library Performance Indicators;<sup>6</sup> Ithaka S&R;<sup>7</sup> the UK’s Library Analytics and Metrics Project (LAMP);<sup>8</sup> Germany’s Library Index (BIX);<sup>9</sup> the Public Library Association’s

Project Outcome;<sup>10</sup> Society of College, National and University Libraries (SCONUL) Statistics Reports;<sup>11</sup> the National Information Standards Organization’s Standardized Usage Statistics Harvesting Initiative (SUSHI);<sup>12</sup> Australia’s Wollongong Library Cube;<sup>13</sup> as well as proprietary library collections data analytics tools, such as SpringShare’s LibAnalytics;<sup>14</sup> OCLC’s GreenGlass;<sup>15</sup> and OrangeBoy’s demographic data dashboard, Savannah<sup>16</sup>). Our research builds upon these efforts by investigating the appetite and need for a toolkit to enable libraries to centralize these and other data sources, and a dashboard to more easily visualize, analyze, and utilize the data. Standardizing and collocating such data would give library leaders views of data, patterns, and trends for their libraries that were previously unavailable (or, at best scattered), and so help them better plan for the future in an increasingly complex landscape.

## Methodology

The research team started by compiling their own institutions’ assessment needs and performance

indicators, followed by compiling an inventory of recent and current projects and initiatives at research libraries worldwide that are addressing the problem of library data and assessment. These efforts were followed by survey questions circulated to the ARL-ASSESS and LIBER listserv communities and by interviews with individuals deeply engaged with assessment at the following institutions:

- Charlotte-Mecklenberg Public Library, North Carolina (US)
- Duke University (US)
- Harvey Mudd College (US)
- Jisc (UK)
- Syracuse University (US)
- University of Pennsylvania (US)
- Wollongong University (Australia)
- Yale University (US)

Participants were interviewed about the current status of, or plans for, assessment in their organizations, as well as key management and strategic questions to which library managers and executives want answers.

### Deliverables

Outcomes of this scoping research included:

- A **draft framework** for mapping relationships among data sources, metrics, strategic and managerial questions, and service areas in libraries
- A detailed **data inventory** elaborating the common data sources available to libraries and the disparities among data sources across institutions
- A **tools inventory** summarizing the most commonly available tools for business intelligence, data warehousing, library assessment, and data visualization in academic research libraries
- A **requirements document**, outlining user needs for a library data warehouse and dashboard toolkit
- **User needs interviews**, investigating potential typical users and their immediate and future needs
- A preliminary concept for the **user interface of the dashboard** based on the draft framework
- A detailed **project implementation plan** including timeline and resource estimates for implementation of a dashboard and toolkit

### Findings

Our literature reviews, research and interviews suggest that the majority of library managers approach assessment and evaluation in an ad hoc and reactive manner as pressing questions arise. Managers spend their valuable time manually collecting, cleaning, and normalizing data from diverse systems, and then perform one-time or static interpretations. The library managers that we interviewed felt that a toolkit and dashboard could free them to probe and interpret more data, think more strategically, and develop more meaningful questions about measuring and evaluating library performance.

The research team found that not only is there a need for the development of a toolkit and dashboard, the general approach represented by a toolkit and dashboard resonated with the community. Notably, it was clear from both the interviews and queries to relevant listservs that:

- Library managers and leaders agree on the need for a set of assessment tools and standards, ideally including capability to share and compare data across institutions.
- In some cases, current needs are partially met by an ad hoc set of existing tools, sometimes via the library itself and at other times via access to institution-wide business intelligence (BI) tools.
- Access to tools and standards is inconsistent among libraries, with some libraries having access to Tableau<sup>17</sup> for visualizing data, but few having access to the technical infrastructure to support a dashboard and even fewer having the technical and staff resources to assemble the necessary components that would allow them to make use of their data effectively and consistently.
- Even in cases where libraries have access to institution-wide BI solutions, these solutions may not be appropriate for their specific needs and often need to be customized.
- The majority of assessment librarians' time is currently spent reacting to ad hoc, often unanticipated requests, and manually normalizing and transforming the needed data. It was apparent from the interviews that libraries are striving for a systematic and regular approach to assessment data, but such an approach is not on the discernible horizon for the vast majority. As one interviewee said, "The holy grail for me is: 1) Present plan, 2) report on cost, 3) identify outcomes." The reality, however, is that most assessment activities are

reactionary: “Everything we’re doing now is done on a question/answer basis.”

- Many groups (including LAMP in the UK,<sup>18</sup> ISO standards for Library Performance Indicators,<sup>19</sup> and the University of Pennsylvania’s MetriDoc data warehousing solution<sup>20</sup>) have made significant efforts addressing aspects of end-to-end library assessment solutions or frameworks, but these solutions have not seen widespread adoption within the library community, and each solution offers just one facet of what could be a comprehensive, systematic solution for libraries.
- The most sophisticated efforts that we encountered in the domain of aggregating and presenting data to assess library performance emerged out of funding and budget crises requiring justification of return on investment to restore funding (namely, the Charlotte-Mecklenberg Public Library in North Carolina), or from reporting mandates tied to government legislation (to which Jisc and the Higher Education Statistical Association’s (HESA’s) HEIDI plus initiative<sup>21</sup> respond in the UK).

The current state of the use of assessment tools at the libraries we interviewed, and those in our literature review, is inconsistent; our findings indicated that the need and desire for a standard toolkit is both common and urgent. As one interviewee said, “I think we will always have more complex, deep questions than a dashboard like this would answer, but having the dashboard would enable us to spend less time on getting answers to basic questions, and spend more time on the complex, deep questions.”

Our research and interviews also suggested that library leaders are looking for answers to many of the same questions. The most common questions were the following (in the words of the interview respondents):

- Usage/Impact
  - Who is not using the Library—is there a pattern in time or across demographics?
  - Conversely, who is using the library, and what are the usage patterns?
  - How effective are our promotional activities?
  - Are the right demographic groups using the right resources?
  - How does library usage benefit clients?
- Collections
  - Are we buying the right resources?

- Are the items we are buying being used?
- What is the overall cost per use of electronic versus print materials?
- How many reproduction requests are we getting?
- Are we getting ILL requests for items we already own? Is it because items are not being found via our systems, or because they are not available? If they are not available, are there ways we can make items more quickly available?
- Does it make sense to lease or borrow, versus purchase?
- How does time-sensitivity of fulfillment of requested item factor into the equation?
- Work Rate and Project Management
  - How quickly is our backlog growing?
  - How long did a specific project take and what was the breakdown of resources: costs for hardware, software, staff resources?
  - What is work volume by time of day, day of the week, and time of semester across multiple work areas/functions (e.g., circulation, technical services, reference desk, research consultations, and instructional sessions)?
  - What is the staff time and cost per project?
- Physical Space
  - How is our physical space being used, by whom and when?
  - How many people are in our reading room(s) on average?
  - How frequently are our on-site print collections being used?
  - Does frequency of use justify in-library location, or should certain print items be stored off-site?
- Financial
  - How are we spending our budget? What is the allocation, for example, between application developers and purchased discovery services?

The commonality of the questions, in conjunction with the desire to compare data across institutions, indicate that some effort may profitably be put to utilizing, and potentially expanding upon existing library key performance indicators (KPIs)<sup>22</sup> and defined data sources in an integrated framework that “maps” those KPIs to the library data sources required to calculate performance. With the right set of questions, identified and agreed to by a community of users, the framework could provide an overall picture of activities in a library sufficient to

make many decisions about resource allocation. In the longer term, providing such a foundation would also enable libraries to more effectively demonstrate their contribution towards their parent institutions' teaching, learning, and research missions.

Other important findings of this scoping research include an understanding of how to prioritize access to "live data." That is, how important is it to update data on a live basis—say, hourly or daily? What is the preferred frequency to update data? The research team found that for the interviewed library managers and executives, real-time live data is not currently a high priority. While BI dashboards classically focus on live operational data, it was clear that in most cases quarterly updates would be fine and, in some cases, annual updates are sufficient. This preference would have the effect of lowering the costs of building and maintaining the toolkit as it will not need to account for live connections to all data sources. We anticipate, however, based on the responses of the more sophisticated assessment efforts (chiefly Charlotte-Mecklenberg Public Library), that as quarterly and monthly data are normalized and utilized in a dashboard, the demand will likely increase for live data as new questions emerge.

Based on our research and interviews, the proposed toolkit would require the following elements:

- Key library performance indicators and supporting data formulas
- Library data inventory
- Library data dictionary
- Data normalization script library
- Customizable web browser-based dashboard with data visualization modules of key library performance indicators
- Recommendations and case studies for open data warehousing solutions
- Establishment of a membership consortium and online community to enable the adoption and support long-term sustainability of the toolkit and dashboard

### **Proposed Approach and Path Forward for the Development of a Library Assessment Dashboard and Toolkit**

The final output of this scoping research is a detailed, proposed model plan, with costs, to develop the dashboard and toolkit and deploy them across the academic library community. We estimate that a full toolkit and dashboard could be

accomplished over three years. The proposed project plan incorporates recommendations and tools for the technical support of data aggregation and normalization, efforts that are currently significant obstacles to libraries' assessment efforts.

Additionally, based on the research team's experience and observation of particularly robust, successful cross-institutional initiatives that have achieved sustainability and widespread adoption by the academic and research library community, the plan includes the establishment of an open online community and membership consortium.

We preliminarily estimate that such an approach to the effort would take approximately three years, with the work comprising the following elements:

1. Framework, Data Model, and UI Dashboard
2. Technical Infrastructure
3. Project Management/Collaboration/Communications
4. Community Engagement/Sustainability

Our research has uncovered that the possible technical approaches to collecting, hosting, and managing data sources are varied and divergent, particularly in light of cloud-based solutions for managing data that provide alternatives to more traditional data warehousing approaches. Broader institutional learning assessment initiatives in institutions of higher education in the US and Europe that are in early stages of development may reveal advantages and disadvantages of various potential technical approaches within the next six to eighteen months.

An immediate first step towards the development of the toolkit and dashboard would be technical assessment of the feasibility and costs associated with open data warehousing solutions. Deeper research into the emerging technical approaches is needed before more precise development time and cost estimates can be made for the technical infrastructural components of the dashboard. However, work towards fully developing the framework and data dictionary, with real library data sources, can be undertaken in the near-term with potentially great benefit to participating libraries.

Additionally, our conclusion from our investigations and interviews is that while there is need for such a conceptual framework and supporting technical infrastructure, there is limited capacity and expertise

to develop them at the individual institutional level. Since one long-term goal identified is for institutions to share and benchmark data with one another, we foresee that an established, credible organization (or organizations) that can or already do manage the collection and sharing of data across individual institutions would be ideally situated to sponsor the development of the toolkit, dashboard, supporting technical infrastructure, and user community. Ideal entities would include mission-based, not-for-profit organizations with established credibility in the library assessment community, a focus on the success of libraries, and capability of innovating, taking risks, and leveraging technology. While the scoping research focused mainly on the performance of research libraries, the proposed toolkit and dashboard framework could be adopted and customized by any type of library, including smaller college and university libraries, community college libraries, and public libraries. Institutionalizing the project through sponsorship by an appropriate body or syndicate of libraries would help assure its extensibility nationally and internationally.

### Conclusion

The research and scoping study confirmed the appetite and need for a library assessment dashboard and toolkit enabling libraries to better visualize their performance and manage their resources. The proposed toolkit and dashboard would build upon the aforementioned preceding library assessment efforts internationally. The proposed project diverges from these important efforts and tools, however, in that it would provide an “end-to-end,” comprehensive framework that connects library key performance indicators with the full range of library data sources—from operational and financial data to collection management and usage data.

Ultimately, this type of infrastructure would allow library leaders to more easily and quickly understand the most important information they need, including efficiency of provision of goods and services, value for money, customer satisfaction, and the real costs of goods and services in their libraries. We envision a basic, ideally open source software-based “dashboard” with modules for standard data sources. By standardizing approaches to existing data sources with a toolkit, data can more easily be compared among institutions. While focused on research libraries, we anticipate that the dashboard and toolkit would be of interest and benefit to libraries of all types.

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