



## Academic libraries & institutional learning analytics: One path to integration



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### Introduction

For years, higher education institutions have been called upon to demonstrate that their students are learning and achieving success in the form of outcomes attainment, retention to completion or graduation, and post-graduation career placement and earnings. Likewise, academic libraries have recognized the importance of demonstrating their contribution to learning and success markers. Since the 2010 publication of ACRL's *Value of Academic Libraries* report, many librarians have embraced the use of assessment and research to explore links between student library interactions and student learning and success measures (Ackermann, 2015; Association of College and Research Libraries, 2010; Association of College and Research Libraries, 2015; Association of College and Research Libraries, 2016; Catalano & Phillips, 2016; Jantti & Cox, 2013; Jantti & Heath, 2016; Murray, Ireland, & Hackathorn, 2016; Soria, Fransen, & Nackerud, 2013, 2014, 2017; Stone & Ramsden, 2013). In general, the research linking libraries with student learning and success has pursued a correlation approach in which librarians use correlation methodologies to explore connections between library services and resources and the needs, goals, and outcomes of their institutions.

In an effort to investigate the linkages between libraries and institutional goals, typical correlation research questions follow a three-step formula found in Fig. 1 (Oakleaf, *in press*; Oakleaf et al., 2017; Oakleaf, Walter, & Brown, 2017). Essentially, librarians select 1) library service or resource engagement or use data and 2) data that serves as a surrogate for student learning or success; then they hypothesize a link between these two elements using a verb expressing a potential relationship. Example research questions that follow this format are found in Fig. 2 (Oakleaf, *in press*; Oakleaf & Kyrrilidou, 2016). In recent years, this research stream has successfully produced results that connect students' library engagement with grade attainment, completion of courses, persistence through programs, and timely graduation. While this research represents a significant step forward in the quest to link libraries with student learning and success, the limitations of this approach are beginning to surface. Key among these limitations is a pattern of difficulties evolving from the limited data available to conduct

this research.

### The problem: data unavailability, inaccessibility, & imprecision

Research correlating libraries with student learning and success requires library data, such as student use of reference or instruction services, circulation data, digital downloads, or library space usage. It also requires data that serves as a surrogate for student learning and success, such as student course grades, retention rates, graduation numbers, or initial workplace earnings. Unfortunately, these pools of data can be problematic in three main ways: data can be 1) too imprecise, 2) completely unavailable, or 3) inaccessible due to institutional silos (Oakleaf et al., 2017; Oakleaf, Walter, et al., 2017). Sometimes, researchers find that data available to them is too imprecise and lacks the finer levels of granularity required for useful analysis; one example is the use of GPA as a surrogate for learning attainment (Oakleaf et al., 2017; Oakleaf, Walter, et al., 2017). Other times, the data necessary for research is unavailable because it has not been recorded or maintained by libraries or their institutions, either by choice (to protect privacy, in accordance with policies, or because the data was deemed unimportant), by accident, or by circumstance (prior to the advent of recent technological advancements, many data points were not easily recorded). Oftentimes, researchers discover that the required data is inaccessible due to data "siloeing." That is, the data may be owned by the institution (and not shared with the library), buried in vendor-owned data systems, or stored in formats that are not easily translatable, preventing the research from being conducted at all (Oakleaf, *in press*). These data problems represent a significant challenge to researchers seeking to take the correlation of libraries with student learning and success to the logical next step (Oakleaf et al., 2017; Oakleaf, Walter, et al., 2017).

### The challenge: data availability, accessibility, & detail

To advance research investigating the academic library's contribution to institutional student learning and success outcomes, librarians can expand and improve the data included in their research efforts. The

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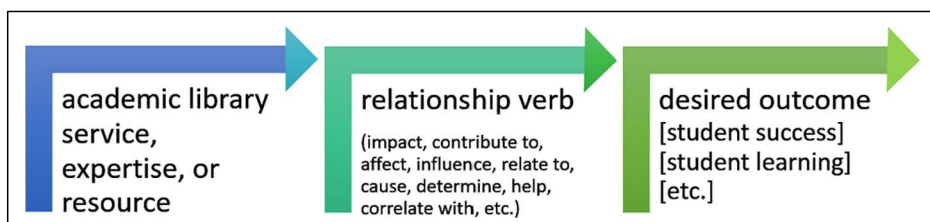


Fig. 1. Correlation research question formula.

data required for future library impact investigations needs to be granular, accessible, and translatable across library and institutional systems. To gain this data, librarians can seek access to more detailed data about student library interactions, student learning outcomes, and student success indicators currently found in a variety of data silos, including library vendor systems, learning management systems, student engagement information systems, learner relationship management systems, student advising systems, co-curricular/extracurricular involvement systems, and any existing institutional data warehouses. In short, librarians can prepare to engage in the broader Next Generation Digital Learning Environment (NGDLE) initiative generally and participate in institutional and cross-institutional “learning analytics” specifically (Oakleaf, 2016, in press; Oakleaf et al., 2017; Oakleaf, Walter, et al., 2017).

**The evolving learning landscape: the NGDLE and learning analytics**

The NGDLE seeks to replace the current LMS-focused digital learning environment. Higher education experts predict that in the near future, higher education learning environments will shift from an over-dependence on the LMS to a new vision of learning environment architecture, one made up of a variety of pedagogical applications, tools, and services, all connected by means of open standards (7 Things You Should Know About NGDLE, 2015; Oakleaf, Walter, et al., 2017). By leveraging interoperability standards, all applications associated with an institution's teaching and learning mission can contribute learning data to a central repository. The institutional data repository can then serve as a resource for learning analytics initiatives.

Learning analytics is the “measurement, collection, analysis, and reporting of data about learners and their contexts, for the purposes of understanding and optimizing learning and the environments in which it occurs” (Conole, Gasevic, Long, & Siemens, 2011). Essentially, learning analytics employs data to improve learning contexts and help learners succeed. To accomplish these goals, learning analytics systems input data from a variety of sources and output descriptive information about student populations and cohorts; this information is employed to discover behaviors, characteristics, or other attributes that appear to lead to student difficulties or successes. Learning analytics systems attempt to predict, based on known attributes, which students are “at risk” so that educators can intervene quickly. Interventions emanating from learning analytics systems include notifications to students, advisors, or faculty; requirements for students to meet with support services, changes to institutional processes or policies; or other actions intended to support improved student outcomes (Alhadad et al., 2015).

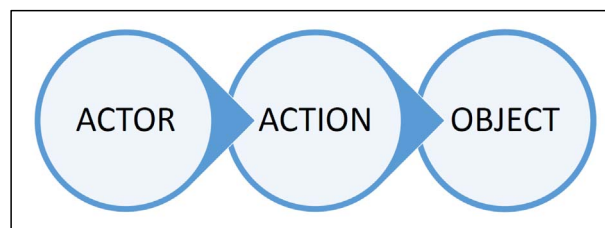


Fig. 3. Caliper structure.

Learning analytics systems come in a variety of forms and draw from a wide range of data sources. Many are “home grown” by individual higher education institutions, and even more are offered by vendors either as single offerings or suites of learning analytics “solutions.” The learning analytics landscape is growing and fast changing; it is difficult to obtain a census of all the options. In general, learning analytics tools tend to be clustered into or across the following system categories: enrollment management, relationship management, business intelligence/reporting, learning management system activity/achievement monitoring, integrated planning and advising, early-alert warning, and degree mapping. Typically, the data used by learning analytics systems comes from student information systems, learning management systems, clickers, publishers, video-streaming and web-conference tools, surveys, and co-curricular and extracurricular involvement systems (Alhadad et al., 2015).

Currently, library data is generally omitted from learning analytics efforts; however, the development of more detailed, insightful, and useful research correlating academic libraries and institutional goals like student learning and success may require the integration of library data into learning analytics systems in the near future. Moving from existing library correlation research—or “library analytics”—to participation in broader institutional learning analytics efforts would represent a sea change in the effort to demonstrate the library's existing impact on student learning and success outcomes. Beyond the implications of such a move on existing correlation research streams, the inclusion of library data in institutional learning analytics initiatives offers a new hope: that librarians will discover new connections—and perhaps uncover missed connections—that can inform, enable, and empower librarians to make decisions and take actions to reinvigorate or even revolutionize the ways in which libraries can support and generate student learning and success. The potential benefits of linking libraries and institutional learning data are numerous, yet so too are the challenges of such an approach. One significant challenge is the need to develop and deploy library-specific interoperability standards to serve

Academic Library Service, Expertise, or Resource	Relationship Verb	Desired Outcome
Are students who attend reference consultations	more likely to	earn higher course grades?
To what extent does information literacy instruction	impact	achievement of learning outcomes sought by employers?
Is increased use of library resources	correlated with	student employment at 6 months post-graduation?

Fig. 2. Example correlation research questions.

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