

Academic Library Impact:

Improving Practice and Essential Areas to Research

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Association of College & Research Libraries
A division of the American Library Association



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Foreword

ACRL has long been interested in assessment, accountability, and determining the impact of academic library programs and services. In the early 1980s, ACRL created an Ad Hoc Committee on Performance Measures that issued an RFP and selected Dr. Nancy Van House to develop a manual on assessment.

More recently, in early 2009, the ACRL Board of Directors identified a rapidly growing need to document the contributions academic libraries make to the missions of their institutions and made a commitment to help librarians demonstrate these contributions. This was both in response to the general environment and because ACRL members told us, in membership surveys and focus groups, that demonstrating and communicating the value of academic libraries was and remains a top issue facing the profession. ACRL determined it had a vital role in developing research to support libraries in communicating with campus decision-makers and funders in higher education. In fall 2009, ACRL issued a request for proposal for a comprehensive review of the quantitative and qualitative literature, methodologies, and best practices currently in place for demonstrating the value of academic libraries. We selected Dr. Megan Oakleaf to carry out this work. The subsequent 2010 report, *The Value of Academic Libraries: A Comprehensive Research Review and Report (the “VAL Report”)*, represents a seminal work on the subject and has spurred ACRL along with countless libraries to take action to improve their programs and communicate clearly about library contributions to campus communities.

After the report was issued, in April 2011, ACRL adopted a new strategic plan, the Plan for Excellence, with one of three goal areas concentrated on the value of academic libraries. The following month the Board of Directors established and charged a new standing committee to oversee and coordinate ACRL’s Value of Academic Libraries Initiative as described in the strategic plan.

The “VAL report” recommended that ACRL:

create a professional development program to build the profession’s capacity to document, demonstrate, and communicate library value in alignment with the mission and goals of their colleges and universities.

To determine how to shape that program we sought advice from a broad range of stakeholders, and convened a summit in 2011 with an IMLS Collaborative Planning Grant (read more in the report *Connect, Collaborate, and Communicate: A Report from the Value of Academic Libraries Summits*).

We took what we learned and, within weeks, we applied for a follow-on IMLS National Leadership Demonstration Grant. In September 2012 ACRL was awarded nearly \$250,000 for the project *Assessment in Action: Academic Libraries and Student Success*, which ran for three years and provided an intensive 14-month, team-based format to more than 200 academic institutions. This training continues today as a one-day travelling workshop. Reports on each of the three years of the *Assessment in Action* project, as well as best practices and lessons learned from participants and instructors, will be published by ACRL in late 2017 as *Shaping the Campus Conversation on Student Learning and Experience: Activating the Results of Assessment in Action*. That book will feature an occasional paper which synthesizes the results of the Assessment in Action program, *Creating Sustainable Assessment through Collaboration: A National Program Reveals Effective Practices*, first published by the National Institute of Learning Outcomes Assessment (NILOA) in November 2017.

ACRL's Purpose in Issuing this Report

Leaders of ACRL's VAL committee studied the progress of the association's strategic objectives for their area and identified outstanding gaps where effort should be focused. Knowing that the "VAL report" had stimulated much inquiry into practice and scholarly research, and that the landscape had changed, they recommended that ACRL issue an open and competitive request for proposals to investigate and write a research agenda that provides an update on progress since the 2010 publication of the "VAL report." In April 2016, ACRL issued a call for proposals, asking for an "action-oriented research agenda" that would both examine important questions where more research is needed in areas critical to the higher education sector, and also identify actions academic libraries can take now based on both existing scholarship and practice-based reports. In August 2016, we selected a team from OCLC Research, who has shared many updates on their work through virtual and in-person sessions over the past year. Now we are pleased to be releasing this report, *Academic Library Impact: Improving Practice and Essential Areas to Research*, and the accompanying Literature Analysis Dashboard.

Next Steps for ACRL

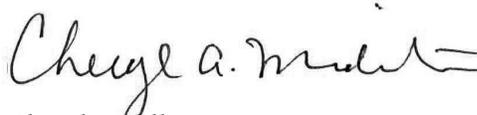
This new report is a significant milestone for ACRL's value of academic libraries initiative and for the profession. It clearly identifies priority areas and suggests specific actions for academic librarians and administrators to take in developing programs, collections, and spaces focused on student learning and success. It includes effective practices, calls out exemplary studies, and indicates where more inquiry is needed, with proposed research designs.

ACRL hopes this report will be used as a springboard for action. The Board of Directors has allocated funds for travel scholarships so that librarians can make presentations about the contributions of libraries to their parent institutions at higher education conferences. ACRL has also allocated funds for small research grants so that scholars and practitioners can undertake research in the areas where this report indicates it is most needed. In 2017, ACRL was chosen as a host organization for the American Council of Learned Societies (ACLS) Mellon/ACLS Public Fellows Program, a career-building fellowship initiative designed to expand the reach of doctoral education in the humanities. The Public Fellow placed at ACRL in a two-year staff position will advance research focused on student learning and success and promote findings from this report to resonate across the network of higher education stakeholders. Our fellow is working closely with the VAL Committee to develop the travel scholarship and research grant programs. They will be available through an open, competitive process and we'll be announcing full details in the months ahead.

Academic Library Impact: Improving Practice and Essential Areas to Research summarizes the incredible strides made and best practices developed by the profession in capturing and emphasizing academic libraries' contributions to student learning, success, and experience. ACRL looks forward to an exciting future, including this next generation of research that builds on our extensive assessment knowledge base.



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Introduction: Demonstrate the Library's Value

How well can academic library administrators and staff demonstrate that the academic library is useful to students? Do these administrators and staff have metrics that show how their programs, collections, and spaces impact student learning outcomes and institutional goals? Can they illustrate to provosts* the library's value to support increased spending?

Now more than ever, academic libraries are being asked to demonstrate value to their institutional stakeholders, funders, and governance boards.¹ But because there is a lack of consensus on how to measure library value for student learning and success, these measures often are left to individual campus units to determine.² This absence of consensus poses a difficulty for librarians, as they may need to serve several constituencies with very different goals, even at one institution. Across the entire educational landscape, there is even less agreement on how libraries might show substantial contributions to measures such as accreditation, student retention, and academic achievement.³

This situation has led the Association of College and Research Libraries (ACRL) to commission an “action-oriented” research agenda. The goal is to investigate how libraries can increase student learning and success while communicating their value to higher education stakeholders. This document consists of the following components:

- a report on all project phases and findings;
- a detailed research agenda based on those findings;
- a visualization component (<http://experimental.worldcat.org/valresearch>) that filters relevant literature and creates graphics that can communicate library value to stakeholders;
- a bibliography of the literature analyzed;
- and a full bibliography of the works cited and reviewed, which can be found at <http://www.oclc.org/content/dam/research/themes/works-cited.pdf>.

All components were produced in partnership with OCLC Research and include the analyses of library and information science (LIS) and higher education literature, a focus group interview and brainstorming sessions with academic library administrators at different institution types within the United States, and individual interviews with provosts.

Based on findings from these analyses and feedback from ACRL members, this agenda identifies six priority areas for academic librarians and administrators to use as a guide and facilitator for developing academic services, collections, and spaces focused on student learning and success:

- 1. Communicate the library's contributions.**
- 2. Match library assessment to institution's mission.**
- 3. Include library data in institutional data collection.**
- 4. Quantify the library's impact on student success.**
- 5. Enhance teaching and learning.**
- 6. Collaborate with educational stakeholders.**

*Throughout this report, the term “provost” is used as a catch-all to indicate all senior academic officers. See Appendix C for more details.

Academic librarians, administrators, LIS researchers, and library school students can use research questions developed for each of the six priority areas as a catalyst for the study of college and university student learning and success. These priority areas, suggested actions, and accompanying future-focused research questions are included in the section below and with more detail in the agenda. The agenda also includes effective practices, exemplary studies, and proposed research designs. The suggested actions described in this section are broader than the effective practices in the agenda, which were derived using specific examples from this report.

Communicate the Library's Contributions

As academic libraries strategically evolve to support student learning and success, they must effectively communicate the library's value to those high in their institution's hierarchy. This communication is a vital step when competing for resources within funding and governance structures both in and outside the academic institution.

Communication was the most commonly identified theme in the selected literature and interview data analyzed, and the other five areas support this priority area. If the library matches its assessment to its institution's mission, enhances teaching, quantifies its impact, is included in data collection activities, and collaborates with the principal stakeholders, good communication can happen much more naturally and efficiently.

There is more emphasis on service in the LIS literature and the focus group interviews with library administrators than in the higher education literature and provost interviews.

The increasing importance of communication is a theme in the selected literature, but with more research, come more questions. A significant difficulty in suggesting best practices is the number of factors that can affect with whom to communicate and how. In other words, communication is highly contextual. However, such context must be addressed by librarians, as findings from a recent survey comparing faculty and librarian views of the library suggest that librarians are not effectively communicating their value to entities responsible for funding and governance.⁴ There is more emphasis on service in the LIS literature and the focus group interviews with library administrators than in the higher education literature and provost interviews. This lack of focus on service does not mean that provosts perceive library services as redundant and not proactive but indicates that library administrators and staff may not be communicating the breadth of their offerings and their value in the same language used by others in the academic community. While this report uses the word *service* to describe the activities performed by library administrators and staff, they should consider using more direct terminology, such as *programs* or *events*, to describe their activities.

While this report uses the word *service* to describe the activities performed by library administrators and staff, they should consider using more direct terminology, such as *programs* or *events*, to describe their activities.

Suggested Actions

1. Explore ways to effectively communicate both up (to institutional leaders) and out (to other departments and peers).
2. Experiment with both messages and methods.
3. Confer with provosts, who can offer a bird's-eye view of what the library should be doing and how well it is succeeding.⁵
4. Communicate regularly with other stakeholders in the hope of making them feel invested in the library and become library advocates and supporters.

Research Questions Requiring Further Study

1. How can library administrators and staff more effectively communicate their contributions to student outcomes to institutional stakeholders (e.g., administrators)?
2. What types of library services, collections, and spaces matter to institutional stakeholders?
3. To what extent do institutional stakeholders recognize library administrators' and staff's contributions to teaching and learning? What factors affect levels of recognition?
4. How do faculty envision the integration of library services, collections, and spaces for teaching and learning?
5. How can libraries support the information needs of stakeholders related to teaching activities?
6. How are other units effectively communicating with stakeholders?
7. What factors influence librarian communication with academic library users and potential users?
8. How can library administrators and staff leverage social media to increase student engagement?
9. What are the main barriers to communication between library administrators and staff and educational stakeholders (e.g., students, faculty, administrators)?

Match Library Assessment to Institution's Mission

There is a growing trend toward institutional similarity in education as the pressure of rankings causes colleges and universities to emulate their more prestigious counterparts.⁶ As institutions gradually come to resemble each other across academic offerings, they also must conversely strive to address the unique needs of specific stakeholders and surrounding communities.⁷

Academic administrators must balance these competing pressures. Striking this balance means that campus units must perform based on both common indicators of quality (such as accreditation) and unique objectives that align with the institutional mission and goals. Stakeholders judge libraries based on how well their services, collections, and spaces align across both these areas.

Although provosts and other academic administrators develop institutional plans, supervise libraries and other institutional units, and allocate funds, few studies published since 2000 have investigated their perceptions of library services, collections, and spaces. In fact, the number of research studies from LIS and higher education journals addressing institutional mission and goals and alignment, which includes accreditation, has decreased from 2010 to 2016. At the same time, practitioners work to align their libraries' services, collections, and spaces with the institutional mission and goals, but findings from interviews with provosts indicate that this alignment must be better communicated. Interviews with academic library administrators and provosts

show that accreditation is important to the institution. However, some stakeholders may perceive accreditation as a necessary task accomplished with or without libraries. For this reason, libraries must communicate how they contribute to accreditation and their importance in meeting these standards.

One reason for a discrepancy between library administrators' and provosts' views of the library's importance to achieving institutional goals could be that they have differing views on the library's role within the institution. While interviews with provosts from around the United States show that they are concerned about alignment, a recent study of 722 library directors indicates that they feel less aligned strategically with their supervisors and less valued by their administration than the respondents reported in the 2013 survey.⁸ Further, analysis of the LIS literature and information from a focus group interview with academic library administrators indicates that librarians and LIS researchers mention service more frequently than provosts. This finding suggests that librarians and administrators see the library's role in student learning and success outcomes differently.

Suggested Actions

1. Support student success by aligning services, collections, and spaces to support institutional objectives.
2. Include “nontraditional” metrics that show how libraries support goals such as student recruitment and alumni engagement.⁹
3. Go outside of the library to collect data and suggest collaborations with other campus units around common issues.
4. Use terminology similar to that used by others within the academic institution.
5. Work with faculty and staff from teaching and learning support services to build a culture of assessment that effectively demonstrates library alignment with the institutional mission, goals, and priorities.

Research Questions Requiring Further Study

1. In what ways have the support by library administrators and staff of the institution's mission and goals affected student learning and success outcomes?
2. How do libraries fit into the broader array of institutional resources and programs (e.g., writing centers, tutoring)?
3. How do libraries compare to other support units in demonstrating their impact on the institutional mission and goals?
4. How are budget constraints affecting the support by library administrators and staff of the institution's mission and goals related to student learning and success?
5. How do library administrators and staff support accreditation efforts, and are these efforts recognized by the institution?

Include Library Data in Institutional Data Collection

Learning analytics involves “data about learners and their contexts for... understanding and optimising learning and the environments in which it occurs.”¹⁰ While research in this area is relatively new, three of the fourteen

provosts interviewed for this report described data components that could track student progress at a variety of institutional, programmatic, and course levels. The range of data being tracked by these components offers librarians the opportunity to triangulate their data with those from other departments, improving their visibility to other departments, administrators, and provosts.

Research in this area mirrors that on analytics and privacy and confidentiality in other areas.¹¹ For instance, one study assesses what analytics related to reading behaviors researchers can collect from individuals reading mass-market e-books versus scholarly journals.¹²

Suggested Actions

1. Know how other academic stakeholders are using learning analytics.
2. Research the safeguards needed to ensure student privacy or confidentiality.
3. Strategically collect data that can be integrated into learning analytics software.
4. Advocate for the inclusion of library data in the volumes of information collected from multiple systems within the academic institution.
5. Integrate library data into campus analytics components.
6. Work with stakeholders to statistically analyze and predict student learning and success based on shared analytics.

Research Questions Requiring Further Study

1. How can library administrators and staff connect their data with student outcomes? To do this effectively, will library administrators and staff need to begin collecting different and additional data?
2. How are other stakeholders in higher education using analytics to affect the areas of teaching and learning and student success, and how can library administrators and staff contribute to these efforts?
3. What types of data do faculty and staff in institutional research units collect that would supplement the data assembled by library administrators and stakeholders to measure the impact of courses, events, and other library services on student learning and success?
4. How can library administrators and staff use triangulated data to demonstrate the impact of library resources and programs on student learning and success?
5. How can library administrators and staff employ mixed methods or multiple methods to demonstrate how student usage of library collections affects retention?
6. How can library administrators and staff balance concerns about maintaining user privacy with the use of individual student data to measure learning and success outcomes?
7. What factors affect librarian decisions regarding the level of confidentiality or privacy of student data?

Quantify the Library's Impact on Student Success

Contributing to student success has become the most significant way that institutions and their constituent units demonstrate value to funding and governance boards. These outcomes often relate to objective indicators of learning, which include assignment completion, semester grades, and graduation rates.

In this agenda's analysis, LIS and higher education literature related to student success peaked in 2013. By 2016, this theme was present in only about half of the documents analyzed. A lack of effective practices and standards regarding student privacy constitutes a significant factor in causing this decline.¹³ However, research from the University of Minnesota and the University of Wollongong has employed data collection and analysis methods that facilitate user confidentiality.¹⁴ These methods can be used to re-engage with data-driven research that quantifies student success.

Suggested Actions

1. Identify quantifiable student success indicators at the individual and aggregate levels. These indicators should include enrollment in postsecondary education, grades, persistence to the sophomore year and beyond, length of time to degree, and the student's career after graduation.
2. Partner with other educational stakeholders, including those from other institutions, to identify factors that affect student success before students begin their education at a college or university.
3. Partner with outside stakeholders, such as businesses, to identify factors that influence student success following their undergraduate education.

Research Questions Requiring Further Study

1. How do library resources and programs (e.g., courses, events, etc.) impact indicators of student success?
2. Does access to library collections impact student retention? If so, how?
3. How do library spaces support student enrollment?
4. How does library instruction affect job placement and salary the first year after graduation? Five years after graduation?
5. What effects do libraries have on success outcomes for different types of students?
6. What are the effects of library instruction on success outcomes for diverse student populations (e.g., military students, non-US students, English language learners, nonresidential students, online-only students, etc.)?
7. How are library administrators and staff implementing continuous assessment to facilitate equal access to information for diverse student populations?
8. How can library administrators and staff supplement the data collected by other university departments (e.g., tutoring and writing centers) to document student learning and success?
9. How does library instruction at the secondary or earlier level affect information competencies at the postsecondary level?
10. How have library administrators and staff updated instruction based on the ACRL *Framework for Information Literacy*?¹⁵
11. What factors affect library contributions to positive student learning outcomes?
12. How can academic, public, and school libraries work together to develop connected informal and formal learning opportunities that lead to measurable student success outcomes (e.g., retention, grades, time to graduation) for community college, four-year college, and university students?

Enhance Teaching and Learning

Librarians frequently have collaborated with course instructors to help improve the course instructors' teaching. At the most basic level, librarians introduce students to the services, collections, and spaces that the library offers. At the highest level, librarians can function as co-instructors.

Learning activities can cover a wider range of activities than simply teaching, however. For instance, librarians often include textbooks and other learning materials in the collections, incorporating teaching faculty in the selection decisions so that the faculty members will use the materials in their courses.¹⁶ This inclusion and selection require librarians to engage and communicate with teaching faculty across various disciplines to coordinate and collaborate on the collection of these resources. Librarians also can align with the institutional mission and goals by developing affordable resources for students of lower socioeconomic backgrounds and electronic resources for distance learning students.

Like other learning outcomes, the use of library materials may not impact specific success measures, but it can enhance more subjective learning goals, such as critical thinking. Due to the less tangible effects of learning resources, higher education stakeholders are determining how best to identify and measure these relationships.¹⁷

Another, more established outcome related to student learning is engagement. In the last few years, faculty and staff have worked to increase students' engagement both during their time in school and after graduation.¹⁸ Given their experience in providing information literacy instruction, librarians have an opportunity to lead the effort in creating more informed citizens. While LIS research in this area has increased over the last six years, interviews from around the United States indicate that provosts are more likely to associate libraries with student learning outcomes related to services, collections, and spaces than instruction and teaching support. Activities that support these outcomes include training in research skills and how to identify credible information.¹⁹

Suggested Actions

1. Work with peers and students to identify effective points at which the library can be involved in teaching and learning.
2. Determine the metrics to measure the impact of those changes.
3. Integrate library resources and instruction into academic workflows.
4. Engage with faculty and students to develop everyday support services (such as research and writing workshops) for students. That might involve extending library hours, having services and collections available in nontraditional areas, providing stress-relief services during final exam periods, and so on.
5. Plan to articulate and communicate the ways in which these new activities support teaching and learning outcomes.

Research Questions Requiring Further Study

1. What is the role of library administrators and staff in evaluating teaching and student learning outcomes?
2. What are the most common difficulties faced by library administrators and staff in measuring teaching and learning outcomes?
3. How do library administrators and staff measure the impact of library instruction on student learning outcomes?

4. How can library administrators and staff increase engagement among students?
5. How are library spaces (online or physical) affecting engagement among students?
6. In what ways have library administrators and staff implemented a continuous improvement process to support engaged student learning?
7. How are library administrators and staff implementing new models of outcomes-based measurement to assess the effectiveness of informal (e.g., Greek life, intramural sports) and formal learning opportunities?
8. Where do students go to discover information (e.g., answers to questions, resources for their needs)? If they do not use library websites or online catalogs, what can library administrators and staff do to integrate library discovery systems into academic users' workflows?

Collaborate with Educational Stakeholders

The primary mission of the academic library is to support an institution's research and teaching.²⁰ This mission obviously necessitates collaboration with other educational stakeholders. Such collaboration includes all librarian efforts to work with those inside and outside their institution to influence student learning and success outcomes.

Findings from this agenda indicate that librarians and others in higher education are collaborating at an increasing rate. Provosts discussed collaboration numerous times in their individual interviews, underscoring the importance of these types of activities across all types of academic institutions. The library administrators in the advisory group also identified several collaborative efforts at both inter- and intra-institutional levels that served to communicate library value.

In Assessment in Action (AiA) projects supported by ACRL and the Institute of Museum and Library Services (IMLS), nearly 200 research teams collaborated with a variety of university units that also support research and teaching. This report also summarizes how these units (e.g., offices of assessment, institutional research, student affairs, information or academic technology, etc.) collaborate to support each other and students, as well as relevant services that bolster student learning and success, such as study abroad.

Suggested Actions

1. Collaborate beyond the academy with other public institutions such as museums, libraries, and archives. A recent study found that public library staff support students in their learning because students will use public libraries if they know the staff or otherwise feel comfortable going there.²¹
2. Study how other librarians have modified services and collections to better support other departments, including joint publications in other fields.²²
3. Understand that there are different types and levels of collaboration and consider looking at literature from related fields to see what is said about libraries and information-related topics.
4. Work with academic and regional stakeholders, who include administrators, academic services staff, faculty, students, alumni, and other members of local communities, to identify mutual areas of research interest and to initiate collaborative research projects.

Research Questions Requiring Further Study

1. How can library administrators and staff collaborate with staff and faculty members from other academic institutions to increase student learning and success?
2. How can library administrators and staff collaborate with staff and faculty from other academic departments within the same academic institution to increase student learning and success?
3. What can library administrators and staff learn from institutional units that have increased student learning and success? How can library administrators and staff use this information to accomplish these increases and communicate their efforts?
4. What types of collaboration are the most effective in facilitating student learning and success outcomes?
5. How do collaborations between library administrators and staff and other libraries affect contributions to student success outcomes?
6. How can library administrators and staff contribute to areas that demonstrate the most promise for benefiting from library collaboration to increase positive student learning outcomes?

Using This Report

The priority areas, research questions, and other components of this research agenda provide a framework for discussion by key stakeholders. There have been several conference presentations outlining draft stages of the agenda, demonstrating the visualization component, and soliciting comments and suggestions. This agenda culminated in a public release and presentations of the agenda and visualization component.²³

At the same time, no one project, even one as comprehensive as this, can provide all the information needed to measure the ways in which one library impacts student learning and success. Therefore, academic librarians should use the priority areas and research questions above to guide their efforts. The report, bibliography, and visualization component all need to be customized to suit the individual needs every library has when demonstrating value in student learning and success to its institution.

The audience for this report consists of library administrators and staff, as well as researchers, practitioners, and students in the fields of LIS, higher education, and other allied areas. While this report pertains to academic libraries, library administrators and staff who are undertaking assessment initiatives in auxiliary contexts also can use it to develop services, collections, and spaces and to learn about the practices that have been effective for others. Given that one primary audience for the report is academic library staff, many of whom are practitioner-scholars, we provide guidance on investigating the identified priority areas throughout the report.

The remainder of the report is structured to guide the reader through the steps taken to derive the priority areas and research questions outlined. First, a brief literature review provides an overview of some of ACRL's work on the value of academic libraries and describes how this work informed the development of a codebook. This codebook was then used to identify emerging themes addressed in the three different data sources: 535 selected LIS and higher education documents, focus group interviews with library administrators comprising the advisory group, and semi-structured individual interviews with their provosts. The report outlines how we collected data from these three sources and how we analyzed these data using a codebook, as well as basic and inferential statistics. Next, we discuss findings from each data source, followed by a comparison between the three data sources. We then summarize what we learned by comparing these data sources and identify six priority areas. These priority areas are defined, and we provide an overview of exemplary studies, practices, and research designs for each. In addition, we provide future-focused research questions in each priority area.

Academic librarians, administrators, and LIS researchers, practitioners, and students can use the research questions as a catalyst for the study of college and university student learning and success. After introducing the agenda, the report provides an overview of the development of the visualization component and some examples of how it can be used to address the priority areas and research questions. The report concludes with a discussion of limitations of both the design and creation of the research report, agenda, and visualization component, followed by a conclusion.

Literature Review

This literature review outlines four types of value research conducted by library administrators, library staff, researchers, practitioners, and students. Each type varies by the library resource measured (collection, service, and space), how it is measured (library-centered outcome, student-centered outcome), and the intended audience (librarians, higher education administrators). It appears that over time, there has been a push toward studies intended for higher-level administrators that examine the effect of library resources on institutional-level goals, such as student-centered outcomes. Two of these outcomes, learning and success, are then discussed in detail, including how researchers outside the library study them.

Following this review, we outline key findings from relevant ACRL documents identified by the RFP, which is entitled *Academic Library Impact: Improving Practice and Essential Areas to Research*.²⁴ These documents were intended to inform the team of themes to look and code for when analyzing relevant literature and interviews. We kept a list of these themes, of which the section *Relevant ACRL Documents* below gives an overview. See *Appendix A: Glossary* for definitions of relevant terms.

Evaluation and Assessment Literature

Evaluation and assessment are two related concepts used to determine the value of academic library collections, spaces, and services. While exact definitions of each vary in LIS and other literature, evaluation tends to be more holistic,²⁵ occur on a larger scale, focus on more generalized end results, and be written for a wider audience. In other words, an evaluation perspective will take a big picture or helicopter view of a collection, space, or service in a larger (e.g., institutional) context. Assessment provides a more detailed or “on the ground” view of the same. Another way to describe the difference between the two terms is that the purpose of assessment is to facilitate the ongoing improvement of the collection, space, or service that librarians are assessing, and the purpose of evaluation is to measure the library’s resources and activities against a predetermined standard of value. To differentiate assessment from evaluation, take information literacy instruction as an example. An assessment would adopt a more focused examination of whether the students learned how to find and evaluate information. An evaluative approach might incorporate a test or survey instrument, such as the Standardized Assessment of Information Literacy Skills (SAILS).

One way to increase the scope of the assessment in this example would be to compare student learning outcomes to those of other sections, either by section average or individual student grades. Based on the performance of their students, librarians could modify their information literacy instruction for the next class. On the other hand, an evaluation of information literacy instruction would primarily be concerned with whether the students met a certain standard after receiving the instruction. A narrower evaluation might only compare assessments of students’ information literacy skills, perhaps using SAILS. A broader evaluation might link their results to

institutional goals for the attainment of a certain level of information literacy skills or link information literacy to the achievement of more extensive critical thinking skills. Because this report examines the influence of academic libraries on student learning and success, it is more concerned with evaluation, reflected in the report's data collection, data analysis, and priority areas. However, we did include ACRL AiA projects in our content analysis of 535 selected LIS and higher education documents (see *Relevant ACRL Documents* section).²⁶ Since the terms *evaluation* and *assessment* often are used interchangeably, and assessment can provide contextual details to aid in evaluation studies, the report uses the terms *evaluation* and *assessment* as employed by the authors of the cited work.

The past few decades of LIS literature on academic library value can be differentiated based on the use of evaluation and assessment activities and how departments or units report these activities. We have identified four types of value research conducted by library administrators, library staff, researchers, practitioners, and students. The first type includes library evaluations based on collection size or amount of other library resources. LIS research published before the 1980s tends to fall into this category, but this type of the investigation continues to present day. These evaluations often compare library collection size or composition to national standards, such as the *Standards for College Libraries* or, more recently, the *Standards for Libraries in Higher Education*.²⁷ They also can include how a library compares to its peers regarding resources, such as space, budgets, or collection size, an approach similar to the statistics compiled by the Association of Research Libraries (ARL).²⁸ The results of these evaluations usually are intended for other librarians or administrators rather than the staff, faculty, and students of an institution.²⁹

The second type of value research includes assessments and evaluations concerning how students, faculty, and staff in colleges and universities use library collections, spaces, and services. Findings from these activities often are framed regarding types of value that concern only libraries. For example, the number of items checked out can be tracked year to year and included in an evaluative report as one indicator of the library's value³⁰ based on the assumption that if the items are checked out, they support the mission and goals of the institution for teaching, learning, and research. Librarians also can attempt to increase the number of checkouts through better marketing or through buying materials that library users may be more interested in and then assess those efforts via checkout volumes over time.³¹ Librarians report these results to other stakeholders, either within or outside the library, and different metrics may appeal to different audiences. The emphasis on collections can be difficult because of shared collections and storage facilities, as well as the availability of online content. For instance, a library administrator or employee might feel that access to a book through interlibrary loan within forty-eight hours is acceptable, while graduate students care more about the number of books that they must request via interlibrary loan because the book they need is not available on campus.

The third type of value research includes assessments and evaluations of how those outside the library perceive and quantify the quality or value of library collections, spaces, and services.³² The most common types are user satisfaction and return on investment (ROI) studies. User satisfaction studies frequently use the LibQUAL+ survey instrument to collect responses on library quality in three areas: effect of service, information control, and library as place. These areas were found to have statistical validity and reliability over several iterations of the survey, which has been in development since the 1990s and used in thousands of libraries worldwide since 2000.³³ While there has been some criticism over what the LibQUAL+ survey measures and how to interpret the findings, the results of the surveys have been used to aid in library strategic planning, general comparisons of library service perceptions among different groups of users, and benchmarking.³⁴ Librarians can mix survey results with other data, such as funding and collection size data.³⁵ ROI studies quantify the economic costs of library collections, spaces, and services and are the most common examples of how the library can be evaluated based on an external standard, in this case the monetary value. These studies lend themselves to comparing libraries with other units in the institution and between institutions. While satisfaction, ROI, and other, similar

studies sometimes consider non-library perspectives, studies that examine student-, faculty-, or staff-centered goals and outcomes may be more interesting and useful to those outside of the library.

The fourth type of value research includes assessments and evaluations of how library collections, spaces, and services affect user-centered goals or outcomes.³⁶ For instance, the number of checkouts for each student may be tracked year to year and then compared to the grade-point average (GPA) of each student.³⁷ The results would frame the library's value regarding how its collections may have had an impact on the student's GPA rather than the number of checkouts alone. Libraries also engage in benchmarking activities, such as information literacy instruction, linking these activities to student-centered learning and success. In the past few years, an increasing amount of the literature has focused on the significance of the library to students, faculty, and staff.³⁸ This increase is based on the overall growth in studies and other literature focusing on the themes of collaboration, communication, teaching and learning, student success, and teaching support (see *Data Analysis* section).

Learning and Success

Learning and success are two student-centered outcomes prioritized by the ACRL RFP. Like evaluation and assessment, learning and success are two distinct, yet related terms. The *Oxford English Dictionary* definition of *learn* is “To acquire knowledge of a subject or matter; to receive instruction.”³⁹ One can categorize students' demonstration of learning based on the success of their performance. However, learning and success can be difficult to measure. As the *International Encyclopedia of the Social Sciences* explains:

The major preoccupation of students [and] learning has been with the experimental manipulation of a variety of variables to determine their lawful relationship to learned changes in behavior. As we shall see, it is easy to list variables that have powerful effects upon performance in the learning situation. What is not so easy is to determine with certainty whether the effect is upon learning or performance.⁴⁰

In other words, it is hard to tell if a university unit, such as the library, has affected the student's learning or the student's ability to perform well in a graded event or other indicator of success, such as eligibility to graduate.

Not only are learning and success difficult to measure, but differentiating the terms also can be problematic. Sometimes one encompasses aspects of the other. For instance, Kuh, Kinzie, Schuh, and Whitt state that student success is “broadly defined to include satisfaction, persistence, and high levels of learning and personal development of the increasingly diverse students enrolling.”⁴¹ Another conceptualization puts one in the service of the other. An advisory group member associated student learning with attaining learning goals and objectives and student success with programs to support attainment of those goals (Advisory Group Member LM13). In the AiA program, ACRL has defined projects that “consider any aspect of the library (e.g., collections, space, instruction, reference, etc.) but must ultimately be tied to student learning (e.g., course, program, degree) or success (e.g., retention, completion, persistence).”⁴² A fourth conceptualization looks at the qualitative or quantitative measurability of the terms. Under this conceptualization, one may define student success as “quantifiable student attainment indicators, such as enrollment in postsecondary education, grades, persistence to the sophomore year, the length of time to degree, and graduation.”⁴³ We used the fourth definition to connect *student success* to more objective, usually quantifiable outcomes and maintain the distinction between these terms when coding and analyzing the selected documents and interviews. *Teaching and learning* denotes less measurable outcomes.

Measuring Student Learning and Success outside the Library

Student learning and success also prove difficult to measure outside the library. While a literature review and analysis of these topics are outside the scope of this project, a recent study of actions taken by other units or departments in higher education to influence student learning and success outcomes suggests that others are investigating this topic.⁴⁴ Although this higher education document did not include the library, the findings indicate that all types of academic libraries (e.g., universities, community colleges) could immediately respond and contribute to the two most effective practices: supporting and collaborating with undergraduate research and creating or redistributing space to facilitate collaborative learning. Findings from the study indicated that actions that are taken to support and work with undergraduate research positively affected critical thinking, attitudes toward literacy, inclination to inquire and lifelong learning, and intercultural effectiveness. Creating or redistributing space to facilitate collaborative learning positively affected critical thinking, the desire for inquiry, lifelong learning, and intercultural effectiveness. In addition to giving more support or collaborating with the institutional departments or units that engage in these practices, library administrators and staff also can work together or learn from those that offer similar resources and services. Examples include the following:

1. *Writing centers or courses.* As indicated by the provost interviews, libraries have the potential to collaborate with other departments or units, such as writing centers, by sharing space (see *Provost Semi-structured Individual Interviews* section). A recent study on the influence of university writing centers on first-year students in a business seminar reported that there is relatively little research into the effectiveness of writing centers at universities.⁴⁵ This study used multiple quantitative methods and found that students who visited the writing center scored significantly higher than students who had not. Interestingly, this significant effect applied only to students who received higher grades. An earlier study used mixed methods to evaluate the effectiveness of a writing center course at a university.⁴⁶ While a survey of the students who took the course found it to be helpful, there was no significant difference in their grades, which the researchers concluded was an indicator that student evaluations were not appropriate measures of effectiveness. An earlier study using multiple qualitative methods compared the differences between remedial writing courses, a reportedly understudied service despite their widespread availability, at a community college and those offered at a research university.⁴⁷ The study findings suggested that various factors, such as the curriculum, pedagogy, and level of resources, such as access to tutors or full-time professors, affected student learning. These studies suggest that writing centers and courses are understudied and that more recent studies are more likely to focus on student success and use multiple or mixed methods. The implication for academic libraries is that writing centers and libraries can mutually benefit from collaborating on student success studies that test the effect of research and writing interventions.
2. *Advising or tutoring consultations.* A library's reference service can be like consulting services, which tutoring, advising, or career services provide. These departments connect students with resources and information. They also can contribute indirectly or directly to students' learning and success. However, the influence of activities, such as tutoring from one department, on learning and success can be difficult to isolate from similar support provided by other units.⁴⁸ A recent study of mathematics support at nine higher education institutes in Ireland found that students in a survey believed that mathematics supported their retention and other learning and success outcomes.⁴⁹ Qualitative analysis of open-ended survey questions also led to the development of themes related to this type of tutoring. As in many large-scale surveys, the individual respondents were anonymous. However, when looking at data in a single institution, it was common to link resources and activities to individual learning or success. A recent article describes ways to improve advising using technology

and data analytics.⁵⁰ The author reports that “the collegiate advising system... is highly inefficient, error-prone, expensive, and a source of ubiquitous student dissatisfaction” but that systems can be improved by utilizing data analytics, specifically by pulling individual student-level data from a variety of sources.⁵¹ This study and the other quantitative studies of departmental or unit influence on student learning and success also suggest that other departments besides the library are comfortable with collecting these sorts of data. The implication for library administrators and staff is that they should learn what data these departments are collecting and identify library data that can help provide a richer picture of the range of academic support services used by students and their effects.

3. *Study abroad.* Study abroad programs were related significantly to intercultural effectiveness⁵² and are a high-impact practice for libraries to demonstrate value.⁵³ Library and non-library administrators, faculty, and staff should work together to provide support for these programs because the students involved comprise a unique type of distance student. Another similarity between research on study abroad and libraries is that community colleges are often underrepresented, as noted in a recent study, which used mixed methods to show that studying abroad positively affects learning and academic success.⁵⁴ A difficulty addressed by a study in this topic of research is what to do when the researcher does not have a control group or a group that has not received the resources or services given to the group under study.⁵⁵ The researcher used participant age to create two different groups, and because he found that this variable did not have an effect on participants’ learning and other outcomes, he concluded that studying abroad did have an effect on student learning, which included better language fluency and an increased interest in world affairs. While one can debate the validity of these results, this study does indicate that others working in the higher education environment are facing challenges like those experienced by library administrators and staff. The implication for library administrators and staff is that while experimental designs may be unfeasible in most contexts, other educational stakeholders face the same issues, and some have implemented creative quasi-experimental designs.

To further investigate the topic of measuring student learning and success outcomes outside the library, questions were added to the provost interview protocol asking how all academic units or departments reporting to them measured and articulated their contributions to student learning and success outcomes (see *Appendix B: Provost Semi-structured Interview Protocol* and *Appendix C: Provosts’ Titles and Carnegie Class for Provosts’ Universities*).

Relevant ACRL Documents

In addition to the relevant literature areas outlined above, the ACRL RFP specified several of its publications as key documents for review.⁵⁶ The project team read these documents before responding to the RFP, which led to the suggested methods as noted in the RFP proposal.⁵⁷ A qualitative analysis of themes in the key documents from the RFP led to the formation of two codebooks (see *Appendix D: Codebook* for the codebooks). The definition of a codebook, as well as its purpose, is described in more detail in the *Data Collection* section below. Three of these publications are summarized below to exemplify how these codes emerged.

ACRL’s 2010 *VAL Report* provides an overview of how academic librarians articulate value to higher education stakeholders and identifies ten areas of library value. Areas informing the codebooks include student enrollment, retention, and graduation; success; achievement; learning; and support of faculty teaching. Based on these identified areas, the report concludes with a series of recommended next steps. The steps that have the most relevance to this project detail the importance of library administrators and staff not only establishing student outcome measures but also documenting and communicating outcome attainment to higher education

stakeholders, as well as engaging in higher education assessment initiatives.⁵⁸ While library administrators and staff must determine and establish outcome measures, there appears to be a significant need to link these outcomes to a broader higher education context beyond the library's walls.

Based on these recommendations, ACRL created an action-oriented project, AiA, which built a community of practice around assessment among more than two hundred higher education institutions.⁵⁹ Findings from the shared assessment methodologies and tools informing the codebooks show the effectiveness of library assessment when libraries collaborate with other campus units, assessment aligns with institutional goals, and mixed-methods approaches are employed. Codebook values also incorporate findings that emphasize the contribution of library instruction and spaces, as well as collaborative instructional activities, instructional games, and multiple instruction sessions, to student outcome measures.⁶⁰

To capture the broader higher education context of assessment, ACRL regularly completes an environmental scan in odd years⁶¹ and identifies trends in higher education in even years.⁶² The 2015 *Environmental Scan* indicates growth of interest among higher education stakeholders in linking the following areas to outcome measures: research data services, discovery services, and the library as a place for student success.⁶³ These areas are mirrored in “2016 Top Trends in Academic Libraries,” particularly the importance of the library in supporting digital scholarship.⁶⁴ The report also explains how information literacy assessment has changed to include contributions to student and institutional-level outcomes—the fourth type of value research outlined in the previous section, *Evaluation and Assessment Literature*.⁶⁵ As with the prior resources addressed in the literature review, these identified areas informed the development of the initial codebooks, and the *Methods* section discusses these codebooks in further detail.

As mentioned at the beginning of the *Literature Review*, the areas identified in this review informed the following data collection methods: (1) literature review of LIS and higher education literature from 2010 to present that addresses the impact of library resources on student learning and success; (2) the development of an advisory group of academic library administrators at diverse institutions in the United States to participate in focus group interviews and provide feedback on the project; and (3) semi-structured individual interviews with provosts at the same institutions as the advisory group academic library administrators.

Methods

Since a primary audience for this report is practitioner-scholars, we identify the steps, or methods, taken to conduct the research and offer pointers to primers for more detailed discussions of the methods. Defined as “any procedure employed to attain an absolute end,” a method is used to characterize a research-related goal or goals.⁶⁶ We used both qualitative and quantitative methods, or mixed methods, for data collection and analysis. The use of mixed methods provides a way of viewing and analyzing the data using different analytical lenses, rather than one lens alone, and can provide checks and balances of the data collection and analysis methods as well as the findings.⁶⁷ The following section is an overview of the mixed-methods data collection tools used for the three data sources: LIS and higher education literature, a focus group interview, and semi-structured individual interviews. While this overview is not comprehensive, several excellent primers describe qualitative and quantitative research methods.⁶⁸ A key component of the data analysis for this project is coding. Coding can be qualitative or quantitative and represents instances where researchers describe a defined unit of data, such as a sentence or paragraph, by assigning it a label, or code. In this report, codes are assigned based on themes identified in the 2010 *VAL Report*.⁶⁹

Data Collection

Selected LIS and Higher Education Literature

We performed a search in both LIS and higher education databases for literature that aligned with the project themes identified in the RFP. Selected LIS databases were Library and Information Science Abstracts (LISA), Library Literature and Information Science Full Text (H. W. Wilson), and Library, Information Science and Technology Abstracts (LISTA). Selected higher education databases were Academic Search Premier, Education Resources Information Center (ERIC), ProQuest Education Journals, and Teacher Reference Center. Papers included in the Association of Research Libraries (ARL) Library Assessment Conference (LAC), AiA projects, and reports published by Ithaka S+R also were included in the analysis. Search delimiters narrowed the results to studies published since 2010, containing themes identified in the 2010 *VAL Report*,⁷⁰ and published in the United States, except for studies outside the United States that we deemed relevant.

We reviewed the retrieved documents based on their alignment with the project research outcomes and questions and added and removed documents accordingly. Therefore, the literature review does not represent an exhaustive consideration of all assessment and evaluation research, but rather only literature about student outcomes, libraries, and higher education. We added a total of 535 documents to a bibliography (see *Appendix E: Literature Analyzed Bibliography*) and designated them as either theoretical (31%, $n=166$) or research (69%, $n=369$). Documents coded as theoretical include literature reviews, discussions of a theoretical model or framework, or thought pieces that identify a higher education trend or the way in which a library utilized its resources, which could include its collections, spaces, and services, or a combination of these, to respond to that trend. These theoretical pieces represented what LIS and higher education professionals addressed as emerging and important areas to examine. The documents coded as research involve some data collection and analysis for measuring outcomes or answering practical or empirical questions. These documents identify a higher education trend or the way in which a library utilized its resources, which could include its collections, spaces, and services, or a combination of these, to respond to that trend. The research category includes all AiA projects that have been completed and are accessible from the AiA project page website—a total of 178 studies.⁷¹

Focus Group Interviews

We created an advisory group to ensure that the findings from this report resonate with professional librarians and administrators in higher education. The members were academic library administrators from fourteen institutions that include community colleges ($n=2$), four-year colleges ($n=2$), and research universities ($n=10$); the members were from secular ($n=11$), nonsecular ($n=3$), public ($n=9$), and private ($n=5$) institutions representing the four geographical regions of the United States (see *Appendix F: Advisory Group Members' Titles and Carnegie Class for Advisory Group Members' Universities* for a full breakdown of Carnegie Classes). Eleven advisory group members addressed the questions we developed (see *Appendix G: Library Administrator Focus Group Interview Protocol* for an interview protocol) via an online focus group interview, which we conducted on Tuesday, October 11, 2016, from 1:00 p.m. to 2:30 p.m. EST. The other three members, who could not attend the focus group, provided written responses to the focus group protocol, which we folded into the analysis.

We conducted the online focus group interview using WebEx conference software, and we recorded audio from the meeting and had it transcribed by an external service. This conference software enabled both audio and visual, meaning that we could see nonverbal behaviors, such as facial expressions. The purpose of a focus

group interview is “to explore in depth the feelings and beliefs people hold and to learn how these feelings shape overt behavior,”⁷² by beginning with a broad discussion and gradually winnowing down to the core research focus.⁷³ Researchers can employ focus group interviews for multiple purposes; those most relevant to this project are to “examine known research questions from the participants’ perspective”⁷⁴ and obtain “participants’ interpretations of results from earlier studies,” namely from the literature review portion of the study.⁷⁵ To this end, we used findings from initial analysis of the literature review themes to structure focus group questions. Project lead Connaway moderated the focus group interview and ensured that participation was equitable, the participants addressed the desired themes, and the session ended on time. While we had developed a protocol for the focus group interview (see *Appendix G: Library Administrator Focus Group Interview Protocol*), Connaway used the protocol as a guide to engender a free flow of discussion around core themes identified in the ACRL documents and by the literature review.⁷⁶

One way to determine the validity of data collection and analysis methods is to ask participants to interpret the data collected and analyzed. This interpretation can inform writing up of findings by the research team. Researchers call this process *member checking*.⁷⁷ For this research, we employed member checking by conducting brainstorming sessions with advisory group members. Specifically, those who attended the American Library Association (ALA) 2017 Midwinter Conference in Atlanta, Georgia, in January participated in one of two brainstorming sessions. These sessions provided an opportunity for the advisory group members to review our initial findings, expand upon the identified priority areas, and suggest additional priority areas that we had not defined. We used the results of the brainstorming sessions to refine the research report and agenda further and to inform interpretations of findings.

Semi-structured Individual Interviews

Like focus group interviews, semi-structured individual interviews constitute another method intended to elicit in-depth information from individuals who are knowledgeable about a particular subject.⁷⁸ Three team members conducted semi-structured individual interviews with provosts from each of the advisory group members’ institutions. Unlike a focus group interview environment, where the intent is to engender conversation among participants conducive to group input and discussion, the provost interviews were conducted to identify the provosts’ ideas and thoughts on the academic library’s contribution to the institution and the future of higher education. We chose this data source given the lack of studies in the LIS literature concerning assessment that elicit interview data from provosts and other higher education administrators.⁷⁹ However, some recent examples of LIS literature employ provost interviews to inform assessment-related recommendations.⁸⁰ The interviews were semi-structured, meaning that the interviewer and the provost shared control of the interview. In this way, the provosts could redirect some of the interview topics as desired, and the interviewer could probe in areas of interest.⁸¹

Between Friday, November 4, and Friday, November 11, 2016, three team members conducted telephone interviews with fourteen provosts. Two team members each interviewed five provosts each, and one interviewed four. As with the focus group interviews, findings from the literature review informed the development of the provost semi-structured individual interview protocol (see *Appendix B: Provost Semi-structured Interview Protocol* and *Appendix C: Provosts’ Titles and Carnegie Class for Provosts’ Universities*). On average, interviews were forty-five minutes, with the shortest interview taking twenty minutes and the longest sixty minutes. The interviewers took notes during the interviews, and the interviews were audio recorded digitally and sent to an outside agency for transcription. The recording quality of five interviews was not sufficient for transcription, so notes taken during the interviews were used to code and analyze these interviews.

Data Analysis

Once we collected the three data sources (i.e., relevant literature, advisory group interview transcript, provost semi-structured individual interview transcripts), we needed to develop a system to describe the context of each data source, as well as to compare the data sources. To make this comparison, we used coding to develop a standard way to represent the data. Once we applied codes, we could search for and identify patterns among and between the data sources, referred to as “post hoc analysis.” This section reviews both phases of data analysis.

Coding

As stated by Connaway and Radford, “To organize and analyze the data collected for a study, it is necessary to place them in categories.”⁸² An initial identification of categories occurred before the data collection, when we reviewed relevant ACRL documents to identify important categories, or themes (see *Relevant ACRL Documents*).⁸³ Based on these documents, we developed a codebook to record the themes; we also included definitions and examples for each theme.⁸⁴

After we had identified and analyzed literature review documents, we divided the original codebook into two separate codebooks. The first codebook includes the theme coding scheme, informed by the categories identified within the ACRL documents specified in the ACRL RFP. The second codebook, which contains the research document characteristics, was applied to the LIS and higher education documents identified as research (see *Selected LIS and Higher Education Literature* section). These codes captured information found only in research documents, including information about the populations studied (type of institution, group studied) and methods used, which one can call the demographic characteristics of the documents. We collected these codes to make the studies more accessible and findable when using the visualization component.

As mentioned above, student *learning* and *success* are two distinct terms. When developing the coding scheme, we decided to code any library collection, space, or service objectively tied to a particular grade or outcome as *success*. In this case, “objectively” means that the variables are measurable and usually quantifiable. If the library collection, space, or service did not have a measured or measurable effect on the student or their success, we coded it as *teaching and learning*.

Table 1 depicts sample entries from the project theme codebook, which was applied to all three data sources, while Table 2 depicts sample entries from the research document characteristics codebook, which we applied only to the literature review research documents. Refer to *Appendix D: Codebook* for full versions of both codebooks and *Appendix H: Further Description of the Coding Process for Data Analysis* for a detailed description of the coding process.

Table 1. Excerpt from theme codebook

<i>Higher education trend</i>	<i>Trend defined</i>	<i>Example of library resources that addressed higher education trend</i>
Teaching and learning (and beyond)	This outcome represents the less objective concepts of learning, such as critical thinking. These encompass the outcomes not covered by the student success theme, which is “quantifiable student attainment indicators, such as enrollment in postsecondary education, grades, persistence to the sophomore year, the length of time to degree, and graduation.” ^a Usually not tied to a particular graded assignment or graduation. For more information, please see the discussion on Learning and Success in this report’s <i>Literature Review</i> section.	Service: Library instruction Space: Collaborative working space for students Collections: Repository of online tutorials not linked to a specific class
Student success (for multiple student groups)	This outcome represents the more objective, usually quantifiable indicators of learning, or “quantifiable student attainment indicators, such as enrollment in postsecondary education, grades, persistence to the sophomore year, length of time to degree, and graduation.” ^b These outcomes are related to a particular assignment or semester, such as grades or GPA. They could also be related to whether the student re-enrolled or graduated. For more information, please see the discussion on Learning and Success in this report’s <i>Literature Review</i> section.	Collections: Physical collections Collections: Digital collections Space: Study spaces Service: Library instruction Service: Collection discovery
<p>a. George D. Kuh, Jillian Kinzie, Jennifer A. Buckley, Brian K. Bridges, and John C. Hayek, What Matters to Student Success: A Review of the Literature, Commissioned Report for the National Symposium on Postsecondary Student Success: Spearheading a Dialog on Student Success (Washington, DC: National Postsecondary Education Cooperative, 2006), 5, https://nces.ed.gov/npec/pdf/kuh_team_report.pdf.</p> <p>b. Ibid.</p>		

Table 2. Excerpt from research document characteristics codebook

<i>Code name</i>	<i>Code definition</i>	<i>Values</i>
Analysis method—Qualitative	How the data were analyzed via qualitative methods.	Content analysis; Other
Analysis method—Quantitative	How the data were analyzed via quantitative methods.	ANOVA; Regression; X2; Descriptive statistics; Correlation; Other

Descriptive Statistics and Post Hoc Analysis

All three data sources (i.e., selected literature, advisory group interview, and provost semi-structured individual interviews) were coded, and we divided each data source according to its unit of analysis. The units of analysis describe the “what” or “who” being studied or quantified;⁸⁵ and we chose the document, the group interview transcript, and the provost interview transcript as the unit of analysis for the three data sources, respectively. For each selected document, we were concerned with whether a code was applied or not, not how many times we used the code. This decision allowed us to see what themes were being discussed frequently and less frequently across the literature. For provost and focus group interviews, we were concerned with how many times advisory group members and provosts discussed each theme, rather than whether they discussed a theme or not. We made this decision given the small sample number of participants in both the focus group and semi-structured interviews. Based on the selected units of analysis, we were, therefore, able to determine the number of documents that discussed each theme and the number of times focus group and semi-structured interview participants discussed each theme. We also wanted to compare how often each data source discussed the themes. To make this comparison, we took the total number of themes coded for each data source and divided them by the number of times each theme was coded, otherwise known as the proportion of themes assigned to each data source.

Within each data source, we also calculated basic descriptive statistics (i.e., mean, median, mode, and standard deviation). This process broadly summarized and described the data, giving us insight when obtaining the findings. We also used post hoc analysis techniques to search for trends and patterns within the three coded data sources. Such methods allowed for additional findings and discoveries beyond what could be uncovered using descriptive statistics.⁸⁶ For more details on the specific post hoc techniques used, please see *Appendix I: Description of Post Hoc Techniques Used in Report*. The *Findings* section below addresses the frequency of codes applied to each data source, then compares similarities and differences between the proportion of codes used.

Findings

This section examines key findings from analysis of the three data sources. These key findings include the following:

- *The selected literature focused on service, collaboration, and teaching and learning.* Mission alignment and strategy was discussed more in theoretical documents than in research documents, which signifies that librarians and researchers are not addressing this key theme in their work. Documents from the higher education literature examined service less than those within the LIS research, suggesting a disproportionate focus on this theme among librarians and LIS researchers. We compared the AiA projects to the non-AiA projects, finding that the former sampled from more varied populations and used mixed methods more frequently than non-AiA projects. AiA projects focused more on collaboration, communication, and instruction than non-AiA ones.
- *Focus group interview participants, who are library administrators, prioritized service, collaboration, and communication.* As in the AiA projects, participants also addressed collaboration and communication. However, participants contextualized the need to link both collaboration and communication to the institutional mission, goals, and strategy of the university, rather than isolate both themes within the library.

- *Provosts valued communication and mission alignment and strategy.* Provosts' evaluating communication aligns with the priorities of the AiA projects and advisory group participants. However, provosts discussed mission alignment and strategy to a greater degree than these other data sources. Specifically, provosts further emphasized the importance of librarians communicating how the library contributes to institutional goals by marketing, customer service, and sharing space with other groups, both on and off campus.

We discuss the empirical basis of these findings in more detail below.

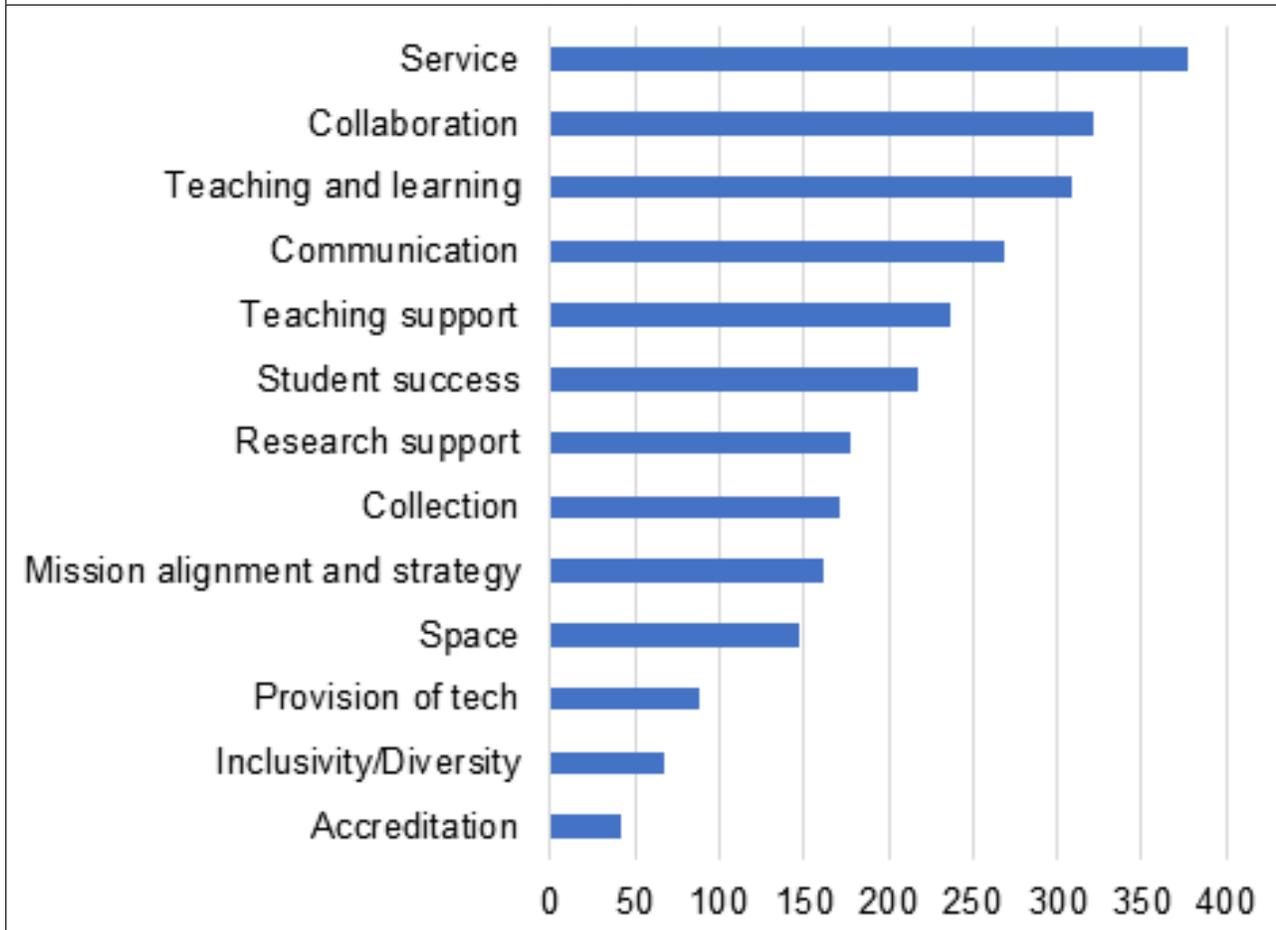
Selected LIS and Higher Education Literature

As stated above in the *Data Collection* section, we coded a total of 535 documents using the theme codebook (see *Appendix D: Codebook* for a list of all theme codes). Figure 1 and figure 2 depict the number of documents with each theme. On average, we applied a code to 37 percent of the documents ($n=199$). Themes that are more than one standard deviation ($\pm 19\%$, $n=102$) from the mean indicate some of the themes most and least frequently discussed by the literature. Themes most discussed are service ($n=377$, 70%), collaboration ($n=321$, 60%), and teaching and learning ($n=308$, 58%). Those least discussed are provision of technology ($n=88$, 16%), inclusivity/diversity ($n=67$, 13%), and accreditation ($n=41$, 8%).



Figure 2

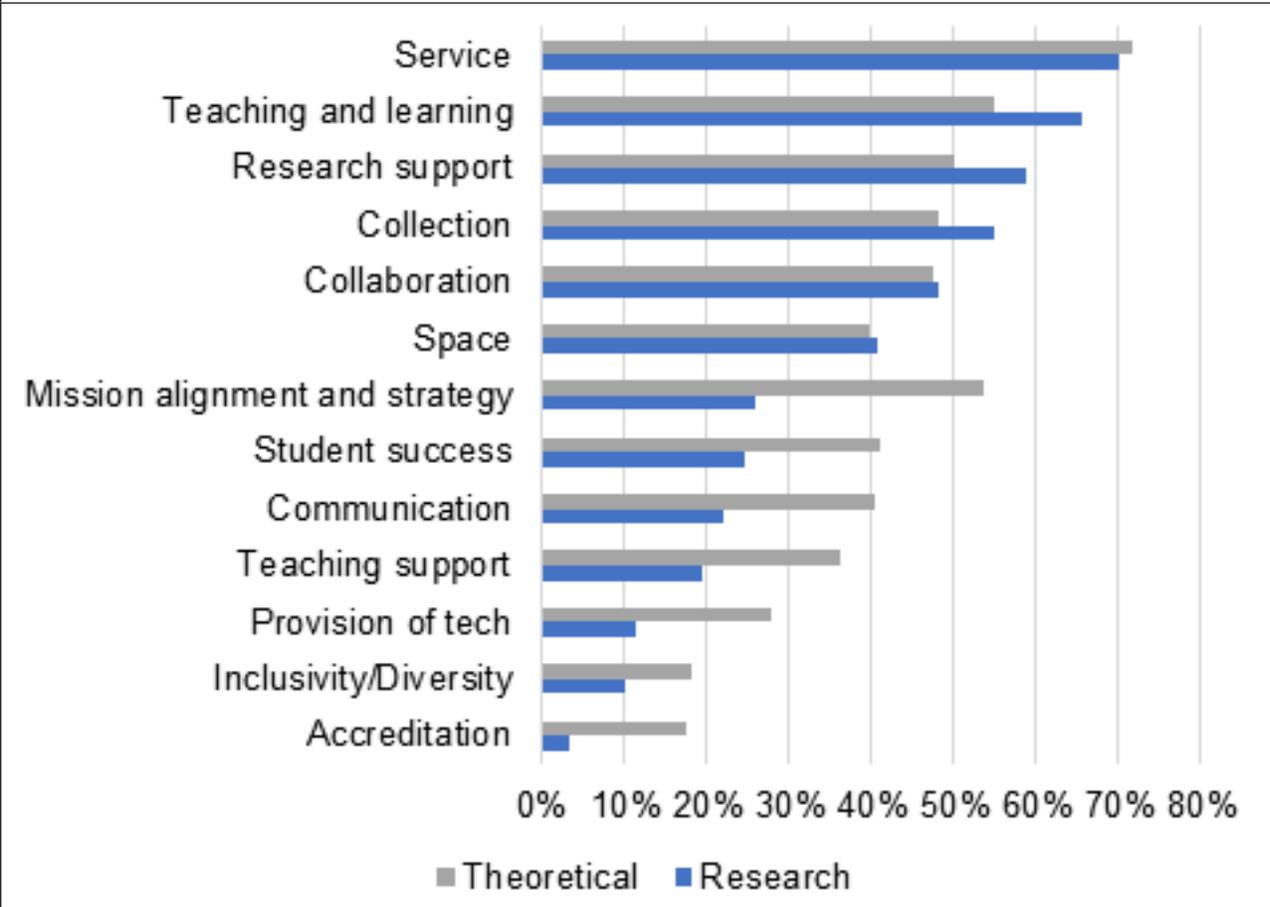
Number of documents within each theme ($n=535$)



Next, we compared the frequency of codes based on whether a document was coded as theoretical, representing an area or areas identified as important to focus on by library administrators, library staff, researchers, practitioners, and students and supported by prior research (e.g., literature reviews), or practical research, indicating both empirical and action. An overlap between the frequency of codes applied to theoretical and research documents means that library administrators, library staff, researchers, practitioners, and students are addressing significant themes within higher education and LIS, whereas little to no overlap indicates that what they are articulating should be done differs from what they have done, as reflected in the documents reviewed. Since research documents (68%, $n=369$) outnumber theoretical documents (32%, $n=166$), we compared their proportions. This comparison is depicted by figure 3.

Figure 3

Differences in proportion of codes between theoretical and research documents



On average, theoretical documents contain 7 percent more codes than research documents. One explanation for this observation is that theoretical documents include literature reviews and predictions of future trends. Therefore, discussing theoretical documents will include more themes as compared to research documents, which empirically investigate one or two themes. Mission alignment and strategy is discussed 28 percent more in theoretical documents than in research documents and is more than one standard deviation of difference from the mean (+/-12%).

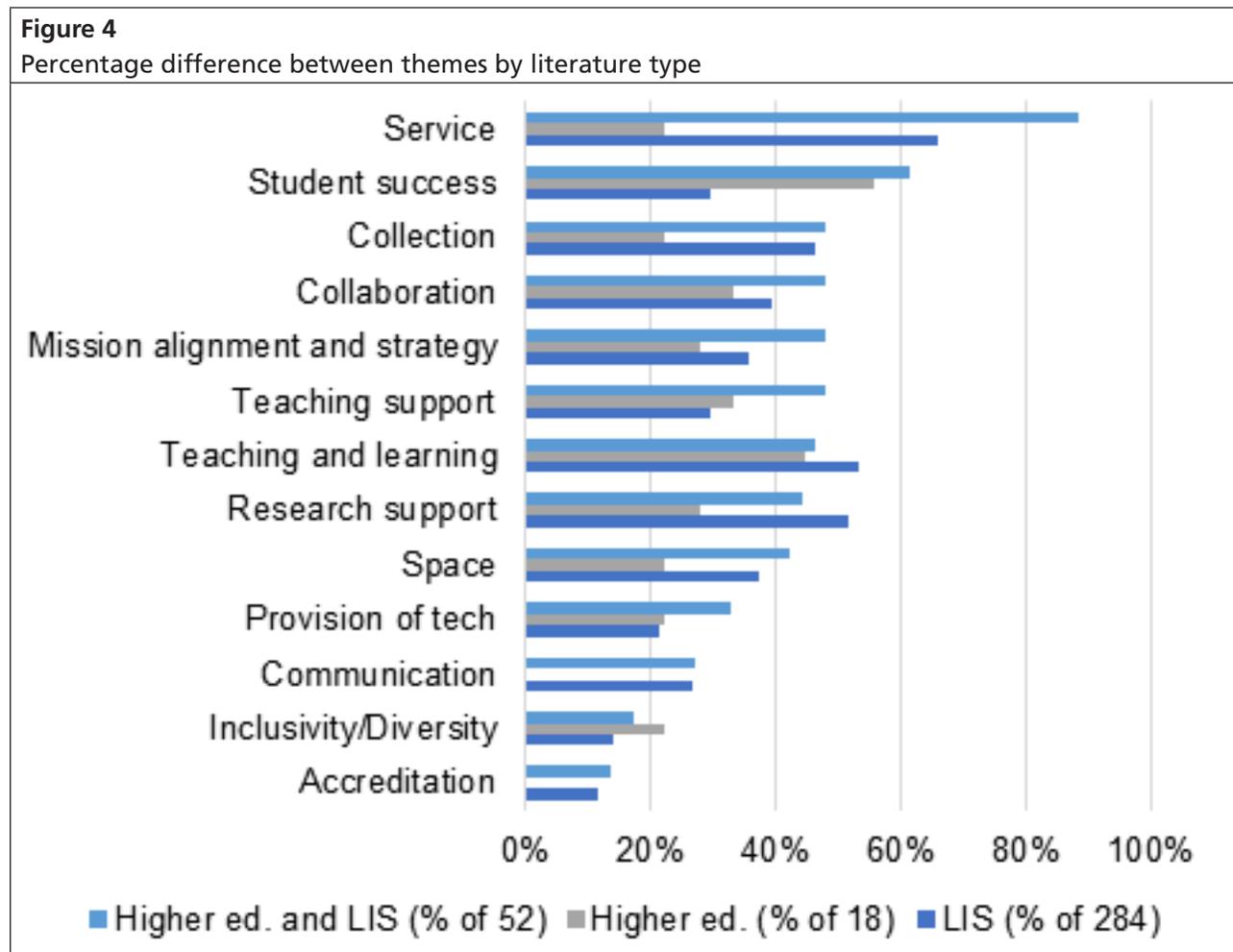
We also wanted to determine if the proportion of themes applied changed over time. Table 3 depicts the proportion of themes coded by year. Themes discussed more over time are collaboration, communication, and teaching support. A few themes experienced a decrease in the proportion of codes applied over time. However, the *p*-value determining their significance was higher than 0.05. This *p*-value indicates that while these themes were very likely to trend downward over time, there is less evidence for this observation as compared to those themes that increased over time. Themes that appeared to decrease over time are mission alignment and strategy, research support, and collection.

Table 3. Proportion of themes from codebook applied to documents by year

Themes by year	2010 % (of 63)	2011 % (of 20)	2012 % (of 77)	2013 % (of 29)	2014 % (of 109)	2015 % (of 40)	2016 % (of 18)
<i>Collaboration</i>	32%	25%	34%	34%	43%	63%	50%
<i>Communication</i>	25%	30%	16%	38%	24%	35%	33%
<i>Accreditation</i>	11%	20%	8%	17%	8%	18%	11%
<i>Mission alignment and strategy</i>	40%	50%	35%	45%	27%	50%	44%
<i>Inclusivity/Diversity</i>	17%	15%	6%	21%	9%	28%	44%
<i>Teaching and learning</i>	59%	50%	42%	41%	53%	60%	61%
<i>Provision of tech</i>	25%	25%	19%	34%	17%	30%	22%
<i>Research support</i>	54%	45%	56%	62%	44%	45%	28%
<i>Student success</i>	24%	30%	23%	66%	27%	73%	67%
<i>Teaching support</i>	30%	30%	26%	52%	26%	38%	61%
<i>Collection</i>	46%	50%	55%	62%	42%	28%	44%
<i>Service</i>	62%	80%	68%	83%	69%	55%	56%
<i>Space</i>	35%	15%	36%	48%	37%	48%	44%

Following this comparison of documents by type (theoretical or research) and year, we compared differences in the proportion of themes discussed in documents from the higher education literature versus the LIS literature. One should note that the search terms used for the database searches included the word *library* and its derivatives. For this reason, this comparison can inform only of differences in the proportion of themes between what the documents say about student learning outcomes as related to libraries within the higher education literature versus the LIS literature, not student learning outcomes in general.

Documents labeled as higher education literature were those retrieved from higher education databases that LIS databases did not index and reports from Ithaka S+R. For this reason, we reviewed 354 of the total 535 documents (66%) when making this comparison, given that we retrieved documents for review that were not indexed by databases (e.g., AiA projects). We designated 5 percent of documents as higher education literature ($n=18$). We also designated 15 percent ($n=52$) as both higher education and LIS literature since both databases indexed them. The remainder of the documents ($n=284$, 80%) were from LIS literature. Figure 4 illustrates the percentage difference between themes coded in the higher education literature, the LIS literature, or both the higher education and LIS literature.



Higher education literature has fewer documents coded for service (22%, $n=4$) as compared to LIS documents (66%, $n=187$) and higher education and LIS literature combined (88%, $n=46$). The LIS documents have fewer codes for student success (30%, $n=84$) as compared to higher education and LIS literature combined (62%, $n=32$).

Analysis of Studies within the Selected Literature Review

Along with the theme codes, we applied the research document characteristics codes to documents coded as research, about 68 percent ($n=369$) of all documents. These latter codes provide more insight into the study details.

Per the selection criteria for the literature review, the studies were conducted in the United States (79%, $n=290$) and distributed evenly throughout the four regions: South (22%, $n=83$), Midwest (22%, $n=80$), West (18%, $n=65$), and Northeast (17%, $n=62$). The majority examined universities (72%, $n=266$), followed by colleges (11%, $n=39$), and community colleges (7%, $n=27$). Fourteen percent ($n=51$) of studies spanned multiple institutions. Most institutions were in the public sector (67%, $n=227$). Populations studied were graduate students (41%, $n=151$), undergraduates (39%, $n=143$), and other groups, such as faculty (27%, $n=98$).

Because we defined *method* for this project as “Any procedure employed to attain a certain end,” methods are the specific actions and tools used during data collection and analysis.⁸⁷ The most popular data collection methods were quantitative (79%, $n=292$), specifically surveys (41%, $n=151$) and rubrics (28%, $n=102$). Qualitative methods were less used (28%, $n=102$), with interviews constituting the most popular method (18%, $n=65$). The most common data analysis methods also were quantitative (86%, $n=316$), most of which used correlations (52%, $n=191$) and descriptive statistics (37%, $n=136$). Qualitative analysis methods also were used (71%, $n=262$), with content analysis being overwhelmingly employed (69%, $n=254$).

Research approaches constitute the “plans and the procedures for research that span the steps from broad assumptions to detailed methods of data collection, analysis, and interpretation.”⁸⁸ These approaches fit into three categories: qualitative, quantitative, and mixed methods.⁸⁹ The research documents most often used quantitative approaches (92%, $n=338$), followed by qualitative (73%, $n=271$) and mixed methods (67%, $n=246$). Many studies also employed multiple methods (80%, $n=296$). See *Appendix A: Glossary* for definitions stating the difference between mixed and multiple methods.

Given that the data collection and analysis of this report have proceeded iteratively, we added literature for review based on comments by the ACRL board and other valued stakeholders. One significant addition from prior drafts was the addition of 178 AiA projects. We folded findings from analysis of these studies into all previous discussion of selected documents, except for the discussion of theoretical documents (we labeled all AiA projects as research documents) and when comparing documents retrieved from LIS databases to those from higher education ones. In examining the findings before and after this addition, we noted that some key themes and study demographics addressed by the AiA projects were not as prevalent in non-AiA projects.

Differences in AiA Projects versus Non-AiA Projects

A collaborative planning grant funded the AiA program, which involved “senior librarians, chief academic administrators, and institutional researchers.”⁹⁰ Participation in the program required librarians, administrators, and researchers to collaborate with at least two team members outside of the library. AiA participants were

asked by the project requirements to consider any aspect of the library related to assessment, and the requirements also provided examples of inquiry questions.⁹¹ AiA projects all are within the United States except for six in Canada and one in Australia, whereas 11% ($n=40$) of non-AiA projects collected are outside the United States. The team can attribute this finding to the selection criteria of literature reviewed for this project, which emphasized studies within the United States, with a few exceptions from Australia and the United Kingdom. AiA projects are more evenly dispersed throughout the four areas of the United States (Northeast, 25%, $n=43$; West, 20%, $n=34$; Midwest, 28%, $n=48$; South, 26%, $n=45$) as compared to non-AiA projects, which are less representative of the Northeast (9%, $n=19$).

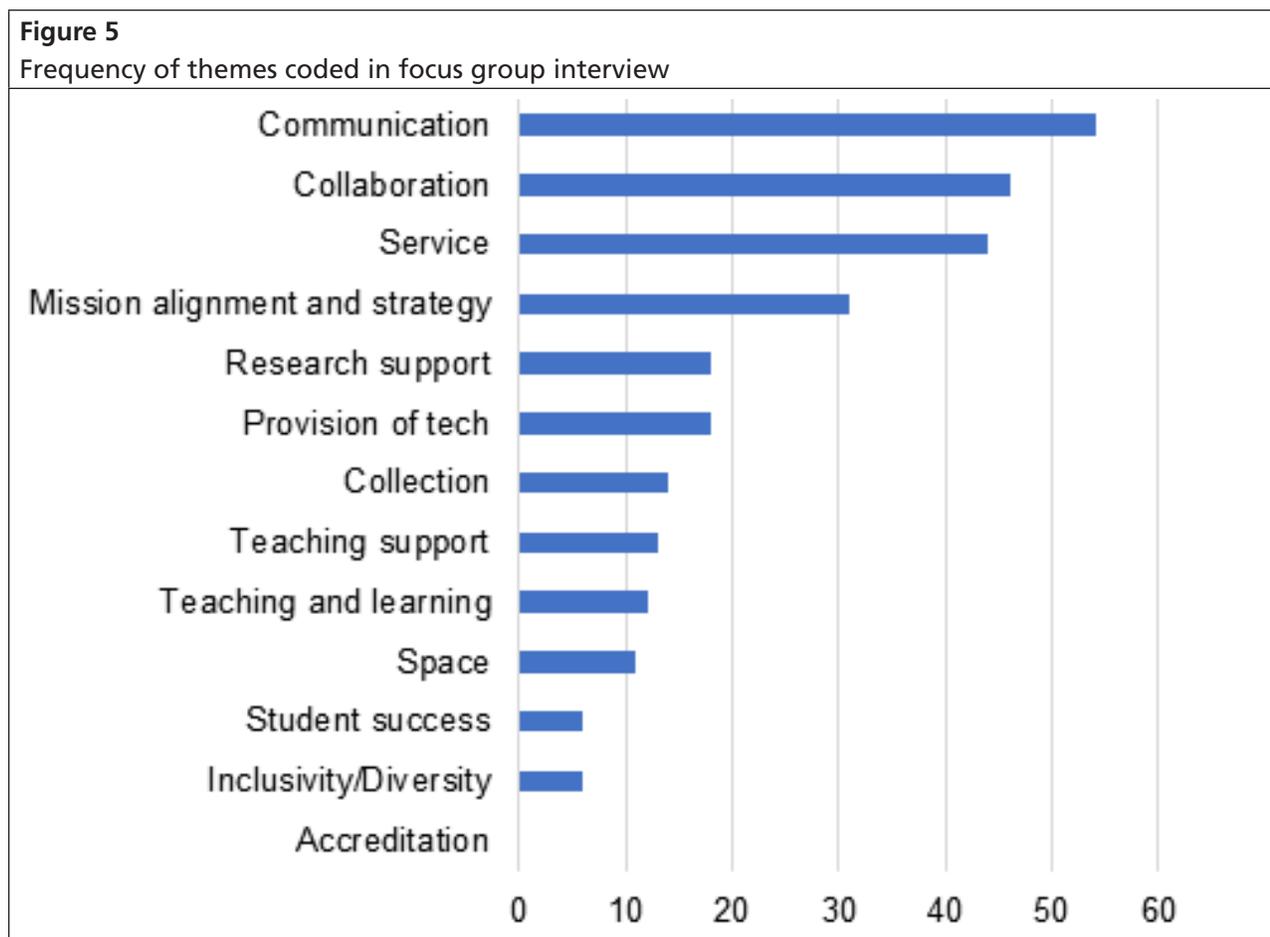
We examined these studies across three areas: institution type, communication and collaboration, and data collection and analysis methods:

- ***Institution type.*** AiA projects concentrate more on community colleges (6%, $n=22$) and colleges (8%, $n=31$) than non-AiA projects (1%, $n=5$; 2%, $n=8$, respectively). AiA projects also focus more on private institutions (18%, $n=67$) than non-AiA projects (8%, $n=30$). Both study types primarily examine universities (non-AiA, 38%, $n=141$; AiA, 34%, $n=125$). Regarding the groups studied, AiA projects focus less on undergraduates. Thirty-three percent ($n=120$) of non-AiA projects examine undergraduates, while 6 percent ($n=23$) of AiA projects do. Instead, AiA projects have a more evenly dispersed focus in the study of graduates, undergraduates, and other populations.
- ***Communication and collaboration.*** In the analysis of theme coding, AiA projects focus more on communication (48%, $n=178$) and collaboration (48%, $n=178$) than non-AiA projects (25%, $n=91$; 39%, $n=143$). On the other hand, AiA projects focus less on space (4%, $n=13$) and research support (1%, $n=2$) than non-AiA projects (36%, $n=134$; 48%, $n=176$). Since participants conducted all AiA projects between 2014 and 2016, AiA projects likely account for the observed increase in focus on communication and collaboration and for the decrease in focus on research support over time within the literature. Although AiA projects concentrate more on collaboration than non-AiA projects, the latter are more collaborative across institutions, with 24 percent ($n=50$) of non-AiA projects conducted at multiple institutions, as compared to only 1 percent ($n=1$) of AiA projects.
- ***Data collection and analysis methods.*** Regarding types of library resources studied, AiA projects focus much more on instruction as a library service (37%, $n=135$) than non-AiA projects (17%, $n=64$). This observation plays out when examining quantitative data collection methods used, with AiA projects more often employing rubrics (22%, $n=82$) to assess instructional effectiveness than non-AiA projects (5%, $n=20$). Regarding methods in general, AiA projects experience a heightened use of quantitative data collection methods (53%, $n=195$) versus non-AiA projects (26%, $n=97$), whereas non-AiA projects employ more qualitative data collection methods (20%, $n=74$) than AiA projects (8%, $n=28$). Both types of studies emphasize quantitative data analysis, but the kind of analysis employed varies. Specifically, 37 percent ($n=165$) of non-AiA projects apply descriptive statistics as a quantitative data analysis method, whereas no AiA projects coded use this analysis method. Instead, 45 percent ($n=166$) of AiA projects employ correlations, whereas 7 percent ($n=25$) of non-AiA projects do. AiA projects also demonstrate a heightened use of mixed methods (45%, $n=166$) as compared to non-AiA projects (22%, $n=80$). See *Appendix A: Glossary* for definitions stating the difference between mixed and multiple methods.

As previously discussed, the themes of collaboration and communication were addressed more frequently in the AiA projects than in the non-AiA projects. These themes also were reviewed by the focus group participants in this project.

Focus Group Interview

Figure 5 depicts the frequency of themes coded within the focus group interview transcript. On average, a theme was coded 21 times (8%) within the transcript. Themes more than one standard deviation away from the mean ($\pm 6\%$, $n=17$) are communication (20%, $n=54$), collaboration (17%, $n=46$), and service (16%, $n=44$), all frequently discussed, and accreditation (0%, $n=0$), which was not addressed.



All of us see our work as directly tied to the mission of the university. And it is what makes academic libraries unique in some ways, but also so successful, that academic libraries, in my opinion, are those that are directly connected to the mission of their unique institution.

— Advisory Group Member LM13

It may be surprising that the focus group interview participants did not discuss student learning (4%, $n=12$) and success (2%, $n=6$), considering how often the literature mentions these themes (learning, 58%, $n=308$; success, 41%, $n=218$). However, as explained by one participant:

I think probably each of us would have some example of our shared strategic initiatives around enhancing students' success. And promoting innovation and teaching and learning. I think those are probably common across all our institutions. I think what's underlying all of this is that all of us see our work as directly tied to the mission of the university. And it is what makes academic libraries unique in some ways, but also so successful, that academic libraries, in my opinion, are those that are directly connected to the mission of their unique institution. (Advisory Group Member LM13)*

As perceived by this participant, library administrators and staff should continue to position the library's role in enhancing student learning and success as inherent to the mission of the academic institution. This participant felt that being solely concerned with fulfilling library-oriented goals would detract from the effect they would be able to have at the university level. One reason for this observation may be that the participants are administrators in their academic libraries; therefore, their focus is to be strategic and targeted on high-level library goals. It also likely accounts for why themes that implied making connections and establishing relationships outside of the library—collaboration and communication—were among those most frequently discussed (communication, 20%, $n=54$; collaboration, 17%, $n=46$).⁹²

One thing I will say is I think it needs to be sort of multi-level communication from the provost to those relationships you have with other units like the centers for teaching and learning, to the academic units, to the individual relationships that librarians and staff have with faculty and students.

—Advisory Group Member LM03

However, making such connections is not as simple as having a conversation with one group or implementing the same strategies to make connections across various ones. Rather, library administrators and staff should continue to engage in outreach beyond the library by recognizing and adapting to the unique “ecosystem” of relationships within the institution (Advisory Group Member LM14). As stated by one participant:

A lot of what's come out is that we're not islands. Not that we ever were, but I think part of our success in reaching to students and faculty is the way we collaborate with others.... One thing I will say is I think it needs to be sort of multi-level communication from the provost to those relationships you have with other units like the centers for teaching and learning, to the academic units, to the individual relationships that librarians and staff have with faculty and students. You know, all those levels reinforce each other, and any alone doesn't quite work as well. (Advisory Group Member LM03)

As indicated by this participant, establishing multi-level communication requires collaboration. Specifically, library administrators and staff should continue to recognize how the multiple stakeholders within their specific university ecosystem interrelate and leverage their relationships to attain “shared goals,” rather than just library-oriented ones (Advisory Group Member LM07). Here are some examples of how focus group interview participants achieved successful collaborations that resulted in communicating value:

* All quotes were lightly edited and abbreviated for clarity.

- Partner with departments to support student research projects by offering instructional courses, publishing research in a student-run journal or institutional repository, and hosting relevant campus events, such as research competitions (Advisory Group Member LM06)⁹³
- Invite campus meetings and gatherings to take place in the library building, which increases visibility of the library's space and services among administrators (Advisory Group Member LM08)⁹⁴
- Work with the student government association to advocate to the administration on the library's behalf (Advisory Group Member LM01)⁹⁵
- Partner with faculty members to institute an embedded librarians program, which results in the former advocating on the latter's behalf (Advisory Group Member LM12)⁹⁶
- Establish a marketing communication program that considers the best approaches to engage different user groups, for example, using social media to market to students (Advisory Group Member LM09)⁹⁷
- Build use of special collections materials into course curriculum (Advisory Group Member LM01)⁹⁸
- Examine the learning goals and influential practices articulated by other departments to see where potential synergies are present (Advisory Group Member LM07)⁹⁹
- Collaborate with the career office to articulate library effects on student learning outcomes (Advisory Group Member LM07)¹⁰⁰

A common thread throughout these examples is that library administrators and staff should continue to denote how the library integrates into the larger university system when focusing on mission alignment and strategy and communicating value. By considering themselves as “university citizens” (Advisory Group Member LM13), library administrators and staff can more easily “capture the senior leadership attention, because what they see is the library as a partner in the academic enterprise, helping other units to achieve these goals that at the highest level have been identified” (Advisory Group Member LM07). It also should be noted that the library engendered collaboration and communication efforts using service-based (16%, $n=44$), rather than collection-based (5%, $n=14$) or space-based (4%, $n=11$) resources. This finding contrasts with provost interviews, which focused on space (9%, $n=105$) almost as much as service (10%, $n=112$). The provosts' increased focus on space as compared to library administrators' is also statistically significant. This finding demonstrates that library administrators and staff may not know how to talk about space and facilities, while provosts and other higher education administrators are interested in seeing a more efficient use of library space and facilities. Therefore, library administrators and staff should craft their terms carefully to align their language with the areas considered vital by provosts. Such alignment will improve communication among library administrators and staff and provosts.

Privacy was mentioned only once but is an important area of exploration. This topic is particularly fraught in the areas of assessment and academic libraries since there is a lack of established effective practices and standards addressing the methods and contexts that may threaten the privacy of students.¹⁰¹ For this reason, privacy, when broadly defined, can be viewed by library administrators and staff in some instances as less of an ethics issue and more of an impediment, as articulated by one participant:

I think that to truly be able to look at, and be able to tell those stories, and to come up with those snippets of information that will resonate with other leaders, we have to be willing to do types of data collection that libraries have shied away from in the past. And I think that involves tracking user behavior in a way that we've seen in a couple of the different studies that have looked at retention. But I think that there are ways of extrapolating and growing that out a little bit more so that we are dealing with large datasets.... We could still keep it anonymous when we look at it in aggregate, right? I think that we have to be able to be willing to have conversations on campus about tracking user behavior in ways that libraries just haven't done. (Advisory Group Member LM14)

The methods detailed in this account are in stark contrast to the level of detail that would be available with some of the data components mentioned by three of the provosts in the semi-structured individual interviews. As one provost explained:

We are creating components that [are on] institutional, programmatic and... course level[s], and having an intervention assigned to each.... Each department will have its own interventions to increase... numbers that are associated with completion. We'll keep track of those through [a] software program that is available to me as well as everybody... at different levels with different permissions. (Provost PP12)

We have to be willing to do types of data collection that libraries have shied away from in the past. And I think that involves tracking user behavior in a way that we've seen in a couple of the different studies that have looked at retention.

—Advisory Group Member LM14

Although arguments for using individual-level data have been made, and in some cases such usage has been put into practice, certain components can anonymize data or make it available only to specific levels.¹⁰² Library administrators and staff should continue to examine methods and tools, such as software programs, to collect new forms of individual-level data and connect these data to communicating the library's value, while preserving privacy and confidentiality. We have highlighted the University of Wollongong as having done an exemplary study in the *Priority Areas for Future Research and Effective Practices* section below because it has successfully navigated the line between privacy and confidentiality while using individual-level data. Library administrators and staff can use this study as a starting point from which to derive methods and tools that strike this balance. Since we did not ask provosts direct questions about privacy, future research may need to address how those involved in assessment outside the library handle this topic and what practices and norms they have established.

Some of the themes addressed in the focus group interviews also were discussed by provosts. However, provosts also emphasized the integration of these themes with the themes of mission alignment and strategy and space.

Provost Semi-structured Individual Interviews

Figure 6 depicts how frequently the provosts discussed the themes. On average, a theme was coded 88 times (8%) across all provost interview transcripts. Themes that have frequencies more than one standard deviation (+/-1%, $n=53$) from the mean indicate those considered most and least significant to provosts interviewed. Those considered important to provosts are communication (17%, $n=199$) and mission alignment and strategy (14%, $n=159$). Accreditation, on the other hand, was not discussed frequently by provosts (2%, $n=18$).

Provosts consider communication and mission alignment and strategy to be essential components of academic library value related to student learning and success. Regarding communication, provosts recognize that it is difficult for library administrators and staff to get the attention of potential stakeholders. One reason for this difficulty is the gap in perceptions between stakeholders, such as faculty, and library administrators and staff of what the library does and how it is a valuable member of the academic enterprise.¹⁰³ This gap may result in

a series of “myths” (Provost PP04) about the library, such as that it provides only collections or that there is no need for libraries since everything can be freely accessed online. As stated by one provost:

The big myth... is that, that many faculty don't engage with the library, because they feel that, “Well, the library is online.” Right? Students can access everything from a distance. (Provost PP04)

To address these gaps, library administrators and staff should continue to become better at communicating the value of their libraries. However, for this communication to be effective, it cannot rely on passive means such as e-mail newsletters. Rather, library administrators and staff must integrate their library's services, collections, and spaces into the lives of its principal stakeholders, such as faculty and students, to achieve this communication. This point is exemplified by the following anecdote from the same provost of a “not helpful” communication strategy:

A number of years ago, before I started... there was some agreement... to buy huge TV screens... and put them in our library as a means of sharing information for students... [such as] what resources are available to students and, and then it also advertises other things going on on-campus,... award winners and that sort of thing. Well, we have got them by the main entrance of these libraries and I have yet to see a single student interested in those things. These passive forms of communication are not helpful. I would say another e-mail is not helpful. Even a newsletter that is beautiful, by e-mail, [is] probably not helpful. (Provost PP04)

They have to be able to sell to the deans that this is something valuable that the deans want to be a part of, and the deans are going to be impacted by their faculty feeling like that this is a worthy thing because if we use money for one thing, we can't use it for something else. I think customer service... becomes really important in this kind of environment.

—Provost PP07

Instead of such passive communication, library administrators and staff need to become good at “customer service” (Provost PP07). It instills buy-in from other campus stakeholders, who can become the library's “champions,” “boosters,” and “prophets” (Provost PP02). As noted by one provost:

I think the key for units like the library, since they are dependent upon the deans, whether for special things or just in that general sort of central cost pool assessment, they have to be able to sell to the deans that this is something valuable that the deans want to be a part of, and the deans are going to be impacted by their faculty feeling like that this is a worthy thing because if we use money for one thing, we can't use it for something else. I think customer service... becomes really important in this kind of environment. (Provost PP07)

To fulfill this role, provosts suggest that library administrators and staff should continue to collaborate with faculty and students, for example, by introducing a liaison program. As conveyed by one provost, it is very important for library administrators and staff to “establish themselves as a critical link or a critical piece” early on by having “intentional interventions” (e.g., in orientations, by going to classes or convincing instructors to bring classes to the libraries, online or on campus; Provost PP05). The goal of library administrators and staff

should be to push the library beyond its role as “a service body” and instead integrate the library into the lives of its potential users (Provost PP13). As one provost stated:

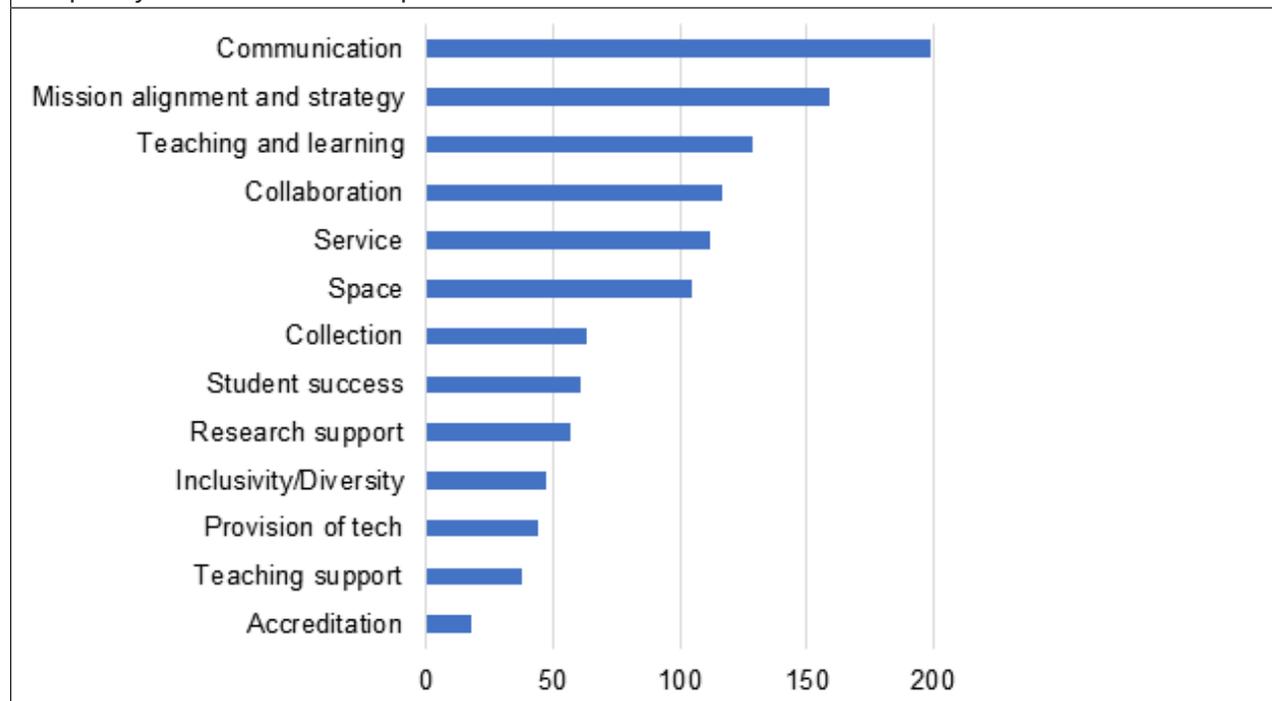
I think that for so long [libraries] have had sort of a role of support rather than integration into work, and I think with the new leadership and the new vision that it is much more of a partnership rather than just sort of a support as needed, so it’s much more proactive in its orientation rather than reactive. And I think that culture change is somewhat, it takes time. I think that not everyone recognizes because the way many of our faculty and students have done research now, it is less about going to a physical space but accessing information in their offices.... And so trying to imagine a new way in which it is not just a service model, but it is actually an integration and partnership model, I think that that is one of the challenges of... changing the paradigm. (Provost PP03)

And so trying to imagine a new way in which it is not just a service model, but it is actually an integration and partnership model, I think that that is one of the challenges of... changing the paradigm.

—Provost PP03

This account reiterates a key finding from the *Selected LIS and Higher Education Literature* and *Focus Group Interview* sections above. Library administrators and staff use *service* as an umbrella term to capture more distinct practices, such as teaching or customer service. However, provosts envision service as less explicit and therefore less “proactive” (Provost PP03). Instead, provosts want to see the specific ways that library administrators and staff have collaborated with the principal stakeholders in their institutions and enhanced the institutional mission and goals. For this reason, library administrators and staff should use more direct language that identifies how the library contributes the shared mission and goals throughout the institution.

Figure 6
Frequency of themes coded in provost interviews



Library administrators and staff should continue to collaborate with the main stakeholders in their institutions by sharing space with them. As indicated by figure 6, provosts discussed space often. For instance, the provost who previously shared a “not helpful” anecdote regarding how librarians should communicate went on to discuss the strongest ways for the library to communicate its value, noting: “A library has so many resources to help with the mission of the university... But you have to woo in faculty and students and staff... the space is important...” (Provost PP04). But space cannot be limited to supporting library collections or services, as stated by another provost:

If the library gets into turf protection, it is going to lose.... It is going to look and feel like the stereotypical, antiquated repository of knowledge with dusty books that nobody ever pulls off the shelves. (Provost PP01)

Instead, provosts want library administrators and staff to collaborate with others in using space. Library administrators and staff can achieve this collaboration in several ways, from offering space in the library to a writing center to hosting a museum with artifacts of interest to those within and outside the university. For provosts, being able to see individuals using the space leaves an impression of the library as “a hub of student learning” (Provost PP03). According to one provost:

I think [space] is one of the most effective ways to get the message out. That... might involve, as an example, making meeting rooms in the library more generally available for people to come and do projects. Creating... the library as this sort of center of intellectual activity. (Provost PP09)

Such communication also keys into mission strategy and alignment. If library administrators and staff are actively assessing services, systems, spaces, and so on, then they are naturally having to communicate and collaborate with the administrators and faculty on a regular basis.

I think [space] is one of the most effective ways to get the message out. That... might involve, as an example, making meeting rooms in the library more generally available for people to come and do projects. Creating... the library as this sort of center of intellectual activity.

—Provost PP09

Essential to provosts is the contribution libraries can make to the larger institutional mission and goals. Provosts indicate that communication and collaboration-based efforts on the part of library administrators and staff must be tied to the larger institutional mission and goals to sell the library to higher education administrators: “... if it can help a university-wide initiative, that’s going to be helpful. Find out what the provost is very interested in, and then try to find a way that the library can help support that initiative” (Provost PP04). Given that these missions vary, it is imperative that library administrators and staff communicate with the provost to identify critical issues and then use language recognized by the provost when explaining how the library can address these issues.

The outcomes of these issues remain unknown to provosts, especially considering the result of the 2016 US presidential election. Library administrators and staff can respond to this uncertainty by communicating some of the new approaches to library assessment and evaluation that address these issues. For instance, they can articulate the importance of systematically integrating information literacy courses beyond a one-time session

into the course curriculum and provide teaching and learning responses to address this integration, such as curriculum development and faculty training. Further, they can collaborate with the information technology (IT) department to devote resources to an increasing need for media and digital literacy.¹⁰⁴

One provost provided a rich, detailed anecdote concerning the importance of library administrators and staff linking communication and collaboration efforts to the institutional mission and goals:

We are a science and technology university. There is no way on God's green earth that our faculty are ever going leave the peer-review-journal conference-proceedings world. And yet we have got a couple of very bright, very interesting, very cool young library faculty, who when you talk to them, you can tell that they have no idea who their audience is here. They have very exciting ideas. But the kind of stuff they are interested in, and they're wondering why they don't get more response and that sort of thing, this is just not the kind of institution where they are going to get a lot of response. Then you get into this kind of weird situation where you've got these incredibly bright people who are out there talking to other librarians about ideas that are very important to librarians, and that librarians as a body agree are important. But the engineers do not think it is important and the biologists do not think it is important because they are all still very much grounded in the standard grants, peer-review publication, citation count. And so, for me, in that kind of a situation, what is compelling is not, "You should be interested in open-source because it's, A, a moral good, B, we get to stick it to the evil publication company." What is compelling is, "Did you know that on average, faculty members who post the early version of their papers in their university's repository see a 15 percent increase in their citations?" (Provost PP09)

In this example, the provost recognizes the value of practices in which library administrators and staff are engaged. However, she points out that the way library administrators and staff communicate these practices may exhibit disconnection from what provosts value. Library administrators and staff should continue to communicate with provosts to determine what provosts value and develop effective strategies for communicating how these practices contribute to this value. Further, this provost's account, especially her conclusion, should not be interpreted as provosts emphasizing direct outcomes as indicators of library value. Provosts recognized that the influence of the library often is indirect, which has been suggested in older literature supported by the provosts' discussion of teaching and learning (16%, $n=44$) and exemplified by the following quote:¹⁰⁵

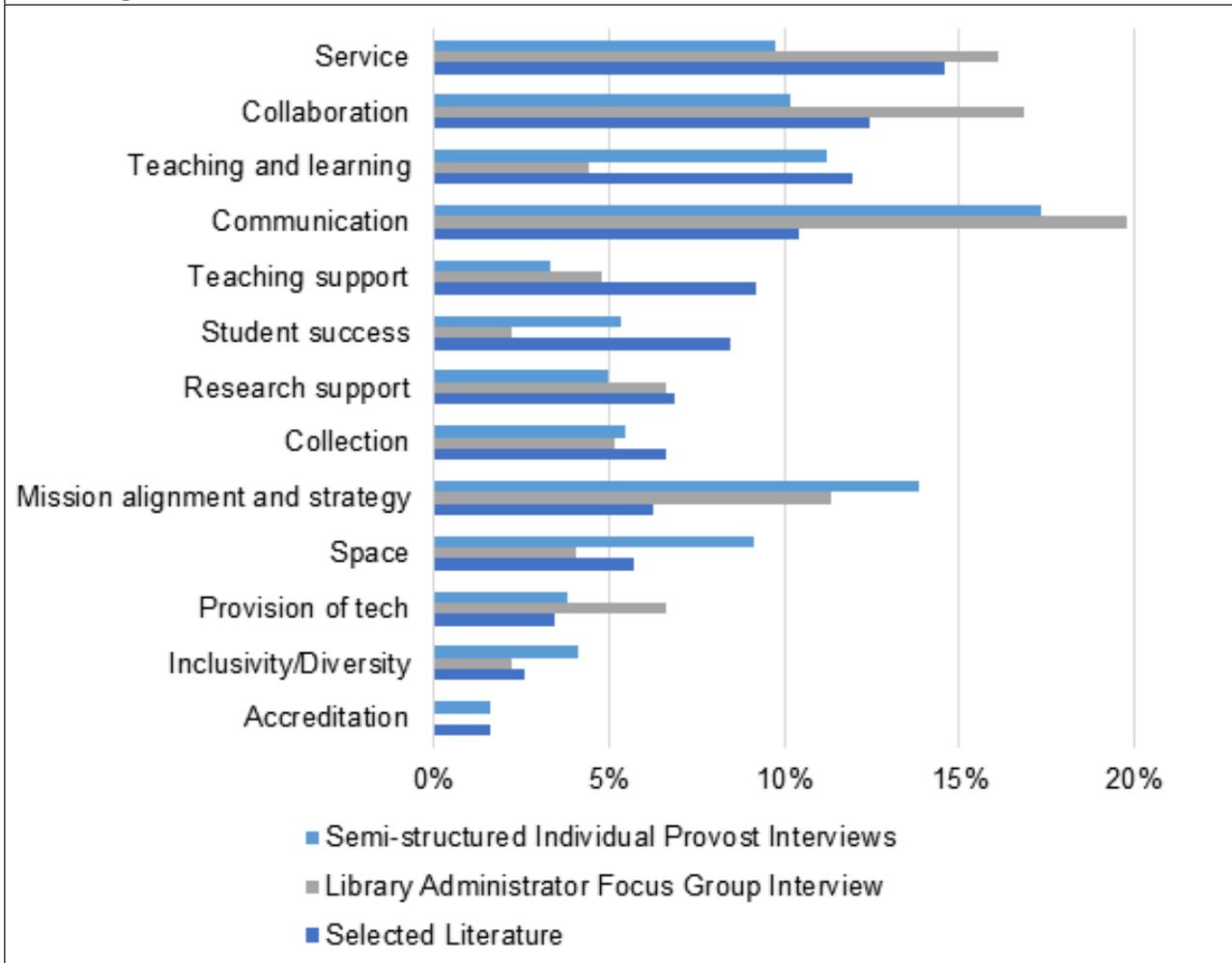
One thing librarians are great at is collecting metrics on what they are doing, and who is using this and that and so forth, and then trying to adjust their services to meet the development and demands and so forth. You know, the problem, of course, is that there are a lot of less tangible kinds of benefits that the library brings to a campus, in terms of being a place where people meet to exchange ideas, and to develop projects, and things like that.... And use the resources in less visible ways than can always be tracked by these kinds of use metrics. (Provost PP02)

Rather than library administrators and staff concerning themselves with whether an impact is direct or indirect, they should instead connect these effects strategically to the overarching institutional mission and goals (Provost PP14).

Comparing Three Data Sources

Figure 7 compares the percentage of themes across all three data sources: the literature review of selected higher education and LIS documents, focus group transcript, and provost semi-structured individual interview transcripts.

Figure 7
Percentage of themes coded for all three data sources



When comparing all three data sources, we can draw some differences among the themes prevalent in each. Literature review documents discussed student success more than the advisory group or provost interviews and communication less. Advisory group members discussed teaching and learning less than the selected literature documents and provost interviews. Provosts discussed space more than the participants of the focus group interview or in the selected literature and service less. Finally, documents from the selected literature examined mission alignment and strategy less than the provosts, whereas provosts focused less on teaching support than the selected literature.

Discussion

The *Findings* section above provided empirical evidence for the identification of themes critical in the selected literature to library administrators and to provosts, as well as for comparisons made between these data collection sources and within data sources (theoretical and research). This section summarizes the three data sources collected and analyzed.

One finding that might be surprising is that all three data sources mention accreditation either infrequently or not at all. In higher education, one cannot overstate the importance of accreditation because “almost every relationship a college has with an external party... is contingent on accreditation.”¹⁰⁶ In addition to regional accreditation, which usually applies to the entire institution, programs, departments, and individual schools may also receive more specialized accreditation.¹⁰⁷ Because of accreditation’s importance, we note discussion of the topic in literature and interview data, and the occasional appearance of accreditation in the three data sources does not signify its lack of importance. Instead, as conveyed by brainstorming sessions in which we disseminated initial report findings for discussion, advisory group members suggested that few mentions of accreditation may reflect its required, boilerplate nature. As one member stated, librarians at her institution consider accreditation the “least common denominator” when examining student-centered outcomes given that the library does not make or break accreditation decisions. “No institution will fail because of the library,” she explained (Advisory Group Member LM07). Another point that was brought up in the focus group was that accreditation currently falls back on collections, but by collaborating with faculty members, librarians might be able to demonstrate their support for these activities using other resources. However, it is also possible that while the library’s contribution to regional accreditation efforts is commonplace, the difference in the lack of literature on accreditation and increased discussion in the interviews about the library’s contribution to more specialized accreditation suggests that more work on the latter type of accreditation may be warranted.

[V]iewing the library concerning simply its services may not be an effective communicator of value. While it is likely that library administrators and staff address other issues besides service in their work environments, the fact that this excessive focus also was found in the focus group session suggests that they should consider focusing on other library resources outside of service, such as space, events, and other library offerings.

—Provost PP13

Another key finding is that librarians, as indicated both by the literature review and by the focus group interview, are concerned with service as an indicator of value. Funding for higher education has decreased overall since 2010, and it has affected academic library budgets.¹⁰⁸ The literature and advisory group members might have frequently mentioned service because of stagnant or reduced funding, since it can be cost-effective. Further, service data are easy to collect and analyze and constitute an everyday practice for library administrators and staff. However, as suggested by comparing the higher education literature to the LIS literature, and as discussed in the provost interviews, higher education stakeholders and administrators are not as concerned with service as library administrators and staff seem to be. Instead, as suggested by one provost’s comment (see Provost PP13 in the previous section), viewing the library concerning simply its services may not be an effective communicator of value. While it is likely that library administrators and staff address other issues besides service in their work environments, the fact that this excessive focus also was found in the focus group session suggests that they should consider focusing on other library resources outside of service, such as space, events, and other library offerings. Further, they should carefully consider language related to services. Do they mean *service*, or can they use a more directed term, such as *customer service* or *programs*? Library administrators and staff must continue to craft their terms carefully to align them with those used by provosts and considered as indicative of value by them.

As indicated by the frequency of themes coded in the provost interviews, higher education administrators consider space to be a significant library resource. The importance of space is reflective of a larger cultural perspective regarding the importance of libraries as community and technology centers. However, space is not as frequently discussed in the focus group interview when compared to the provost interviews and the analysis of the selected LIS literature. Space might not be addressed by library administrators and staff because they may associate space with costs, such as renovations and additions. However, it also could be that library administrators and staff do not want to call attention to the amount of space allocated to libraries, especially if they have dedicated the space to shelving for materials. They may be involved in—or wanting not to become involved in—turf wars and may be reticent to share their space with groups outside the library. The LIS literature has addressed space and provides an excellent resource for library administrators and staff considering space issues and changes within academic libraries.¹⁰⁹

Library administrators and staff must not be reticent to collaboratively share space with groups within and outside the institution (i.e., those within the institution but not part of the library; those outside the institution, such as the community). An effective way to communicate value to provosts is for them to see how the library is serving various groups, which is reflected by their use of space.¹¹⁰ For instance, library administrators and staff can invite provosts to use the library for meeting space so that they might see how students and faculty are using the space for activities beyond checking out books. This value also might be considered more significant with the increase of distance learning, as noted by one provost:

Well I think space could be fantastic [for] on-campus students who want to gather together. This is my biggest concern, is that the students are not coming together. The library can be that place, that nexus, the crossroads where students can come to study together. So, yes, everything is posted online and they can do this alone, but there is a hunger within our undergraduate student population at least to, to actually socialize. And I think the library can... has always been that crossroads for campuses. It could serve in this capacity, pulling students together. (Provost PP04)

While this provost was the only one to mention virtual space, this is an area that should be considered and addressed, particularly as online learning offerings increase. Library administrators and staff should continue to create virtual spaces that possess the collaborative and programmatic characteristics of physical places. Several examples exist of work from user experience (UX) librarians, who focus on virtual environments. Findings from their work may be used to inform the production, development, and maintenance of virtual space.¹¹¹ Further, there is a need for research that assesses these efforts.¹¹²

However, this provost's account should not be interpreted to mean that library administrators and staff can demonstrate value solely by sharing space—either physically or virtually. When we shared analysis of provost interviews with advisory group members during the brainstorming session at the ALA Midwinter Meeting, advisory group members cautioned that, while space constitutes an important area in which the library can demonstrate value, library administrators and staff must go beyond envisioning space in the physical sense. Instead, they must consider the potential for programmatic integration of library space with complementary value initiatives. According to one advisory group member: “Only sharing space, such as with a writing or computer lab, is low level. There needs to be cooperative programming and interaction” (Advisory Group Member LM06). For example, if the library shares space with a writing center, as is common, both the library and the writing center must increase their shared strategic planning, assessment, training, and communication.¹¹³ Therefore, library administrators and staff must envision space as intersecting with other facets of great contributions to student learning and success, including collaboration and communication.

Results from analysis of provost interviews show that provosts view the library as an essential component of the academic enterprise and recognize some of the larger challenges it faces in demonstrating value linked

to student learning and success. However, provosts also contend that library administrators and staff can do better in communicating this demonstration by systematically integrating resources beyond service, such as space, into the lives of its primary users and stakeholders. Further, provosts say that library administrators and staff must be mindful of university-wide initiatives of importance to provosts and align library resources with these initiatives. While these efforts will vary by context, library administrators and staff must keep abreast of larger national and international trends shaping higher education and devote appropriate resources to them, which can be communicated effectively to provosts.

Specifically, library administrators and staff need to connect collaboration, as well as communication, to mission alignment and strategy outcomes.¹¹⁴ Mission alignment and strategy is addressed more in theoretical pieces from the literature review and is important to provosts; it is less frequently discussed in studies from the literature review and by librarian administrators in the focus group interview. This observation supports the argument that in theory library administrators, library staff, researchers, practitioners, and students recognize the importance of mission alignment and strategy within higher education, but they do not address it in practice. This observation also is supported by a large-scale survey of provosts' perceptions of library value and how library administrators and staff should communicate it.¹¹⁵ In this survey, provosts stated the perception of library administrators and staff being somewhat involved in initiatives such as retention, student success, and faculty productivity, and less concerned with enrollment. Therefore, it is essential that library administrators and staff market and link their service offerings to the institutional mission and goals in a way that is visible to provosts and other key stakeholders.

Thinking of how these new learning environments work, and how the library would enhance students' and faculty's ability to access and process knowledge, data, [and] information in those particular kinds of environment[s]... that is what libraries need to do to be successful.

—Provost PP02

The way that library administrators and staff can make this link seems to be contextually bound because of their dependency on the mission and goals unique to their institution. The large-scale survey of provosts mentioned above also supports this finding, which indicates differing communication trends by institution type.¹¹⁶ The following provost account exemplifies the importance of context in shaping how librarians communicate value:

There is not one specific thing a library can do, because the environments are so different. Thinking of how these new learning environments work, and how the library would enhance students' and faculty's ability to access and process knowledge, data, [and] information in those particular kinds of environment[s]... that is what libraries need to do to be successful. (Provost PP02)

What library administrators and staff can take away from this account is that they must continue to pay close attention to the unique mission and goals of their institution and link these to broader, higher education trends to effectively communicate to provosts their library's value.

Aside from being abreast of context by linking library value to the mission and goals of one's institution, library administrators and staff also need to consider the contextual nature of their relationships with higher education administrators.¹¹⁷ As conveyed by one focus group participant:

I think one of the challenges of building relationships is, if you look at the average tenure of a provost or another chief academic officer, which is something, it's less than five years. So sometimes you're fostering relationships that—maybe key relationships—that you know are going to change over the time when you've established these relationships. We had a plan a year ago to build out a model for successful tutoring center that included peer tutoring. We have one in our science library and we're going to do a more cross-campus one, but those plans had to get set aside.... We had to put them to the side until things settled down at the upper level. So I think being able to work in an environment where you are going to be prepared to learn... to forge a relationship with new players, and to wait for those times when that idea that you had laid the groundwork for previously, you can start laying that groundwork again when you have new players in some of those positions. (Advisory Group Member LM06)

People [are] talking about the problems of educating people to be citizens more, with this election being indicative of that. This is a hard thing to confront right now because we are going to have an administration that doesn't think that's important at all.

—Provost PP02

Provosts, some of whom were interviewed before and some after the 2016 US Presidential election, discussed the need to impart critical literacy skills to students so they can differentiate between facts and fiction—skills that will reverberate outside of the academy.¹¹⁸ As stated by one provost:

People [are] talking about the problems of educating people to be citizens more, with this election being indicative of that. This is a hard thing to confront right now because we are going to have an administration that doesn't think that's important at all. (Provost PP02)

Critical literacy skills also have been identified as one of the top trends in higher education.¹¹⁹ Academic librarians and staff are experts in teaching information literacy and could lead this initiative on campuses, as exemplified by a collaboration between library administrators and staff, IT staff, instructional designers, and faculty at Purdue University.¹²⁰ Bringing visibility to such collaborations provides library administrators and staff with the ability to articulate the library's value by connecting the library with the university's story.¹²¹

If not already aware of the challenges associated with higher education funding, library administrators and staff should become more aware of and involved in its broader landscape.¹²² There's more uncertainty among those in higher education as to what the fate of funding will be with the results of the 2016 presidential election. As stated by the same provost:

The election yesterday, and I think that... Trump winning the presidency may further call into question, higher ed, expenses and value and so forth, and that, again, had really broad impacts on us. [It can be difficult to justify research, and that] hits places like us that want to have a research piece and a teaching piece. Apparently, it is an art because people do not understand the role of research in a university and there would be all kinds of cries for more efficiency. And then by "efficiency," they mean faculty teaching more students. And the more students they are teaching, the less research they're going to do. So that's a really simple equation. (Provost PP02)

So far, this discussion has touched on some important themes that library administrators and staff need to address when demonstrating value, namely, mission alignment and strategy, space, communication, and collaboration. According to evidence from both the focus group and the semi-structured individual interviews, these latter three categories must reflect the mission alignment and strategy theme by keying into the institutional mission and goals. Library administrators and staff can align the library with institutional goals and mission by focusing on the lack of awareness at the institutional level of the new approaches to library assessment and evaluation within the LIS field.

The election yesterday, and I think that... Trump winning the presidency may further call into question, higher ed, expenses and value and so forth, and that, again, had really broad impacts on us.

—Provost PP02

As conveyed by other reviews of the assessment and evaluation literature, library administrators and staff perceive a demand to link value-based initiatives to direct outcomes.¹²³ AiA studies employ a heightened use of mixed and multiple methods, and measures—for example, correlation—to demonstrate this value. The analysis of the AiA projects and interview and brainstorming sessions with advisory group members showed that library administrators and staff are aware of and open to the potential for integrating more diverse data points. As conveyed by one advisory group member:

I think that in order to really truly be able to look at, and be able to tell those stories, and to come up with those snippets of information that will resonate with other leaders, we have to be willing to do types of data collection that libraries have shied away from in the past. And I think that involves tracking user behavior in a way that we've seen in a couple of the different studies that have looked at retention. But I think that there are ways of extrapolating and growing that out a little bit more so that we are dealing with large datasets, and we could... we could still keep it anonymous when we look at it in aggregate, right? I think that we have to be able to be willing to have conversations on campus about tracking user behavior in ways that libraries just haven't done. (Advisory Group Member LM14)

In this account, the library administrator recognizes new approaches to capture direct outcomes and demonstrate the library's effect on student learning and success. However, there appears to be a lack of awareness at the institutional level regarding these methods and the ability of library administrators and staff to employ them. Consider the following quote from the provost at the library administrator's institution: "We have never linked anything happening in the library to retention or graduation rates as we have done with the academic unit. We assume there are indirect effects" (Provost PP14).

One implication of this provost's lack of awareness of how and what student-centered outcomes librarians can capture is the importance of communicating with provosts, such as by having face-to-face meetings.¹²⁴ However, this strategy may not be feasible to those outside of library administration. For this reason, another strategy that library administrators and staff can utilize is to focus on the institutional mission and goals that are most relevant to the institution's administration and to determine appropriate library resources that can address those topics and ways to measure them. As an example, six of the fourteen provosts brought

up inclusivity and diversity topics as essential areas underlying their institutional mission and goals. These provosts stated the importance for libraries to identify students who may not have comfort and familiarity with libraries, such as distance or transfer students, and marshal collections, services, and spaces to address the barriers these students face.

Another way library administrators and staff can contend with context is by using mixed or multiple methods (see *Appendix A: Glossary* for the explanations of these terms). As discussed above in the *Methods* section, mixed methods are the use of both quantitative and qualitative methods. For instance, the research design for this study employed mixed methods by engaging in qualitative data collection (selected literature review and semi-structured individual interviews), qualitative analysis (content analysis), and quantitative analysis (basic and inferential statistics). It also employed multiple methods, also referred to as triangulation, defined as the use of two or more methods for data analysis and collection.¹²⁵ The benefit of using mixed and multiple methods is that they strengthen the validity of the observations being made.¹²⁶ Within the context of provost interviews and observations previously made, the use of mixed and multiple methods also addresses the multifaceted context that influences how higher education administrators view and interpret different outcome measures. The AiA projects provide some exemplars for how to use mixed and multiple methods, as these studies disproportionately employ these approaches when compared to non-AiA projects.

Another positive attribute of AiA projects is that they focus on space as an important theme, reflecting the importance assigned to this theme by provosts. These studies also include a variety of populations both regarding institutions (more diverse geographical locations, institution types, and sector affiliations when compared to non-AiA projects) and groups (more diverse concerning studying undergraduates, graduates, and other groups). Like using multiple methods, collecting data from varying populations also enhances the researcher's observations and provides contextually based examples to others who may wish to study a particular population. Therefore, library administrators, library staff, researchers, practitioners, and students can benefit from collaborating across institutions since collaboration can further enhance study findings by rendering them more generalizable across populations. The need for collaboration also is evidenced by the provost interviews when discussing limited resources, as well as from other, reported work.¹²⁷ Library administrators and staff can achieve these collaborations within consortia by not only collaborating in collection development and shared collections, but also working on curriculum design or co-teaching courses, sharing research data and teaching materials, and fostering joint research and communication-based projects that demonstrate library value.¹²⁸

This discussion of the findings identified in the project data collection and analysis has aided the development of priority areas for further research, which will provide the framework for the research agenda. The findings have also informed the identification of exemplary practices, studies, and research designs for aligning with and impacting student learning and success with institutional goals and objectives.

Priority Areas for Future Research and Effective Practices

We based the priority areas for future research on the findings of the selected literature review, the advisory group interview, and the provost semi-structured individual interviews. These priority areas intentionally are broad to foster discussion and input from library administrators, library staff, researchers, practitioners, and students. This section links these empirical findings to the identification of and justification for the priority areas for future research. It also explains how these findings informed our selection of exemplary studies and effective practices for each priority area. We follow these studies and practices by a discussion of how we identified specific, future-focused research questions and suggested research designs, again for each priority area.

Identifying the Priority Areas

The most important factor for identifying the priority areas was to discover which themes occurred most frequently in each data source (see table 4). The RFP explicitly stated that the project would “Begin with a high-level look at the trends in higher education that concern academic librarians in the broader context of academia and identify current academic library responses [in the form of resources] to the trends,” which is why we included these trends as themes in the codebook.¹²⁹ However, we did not include individual library resources in the form of specific collections, spaces, and services in the codebook. While we coded library resources as a theme, these codes were not included in the top five themes since each priority area addresses all three resource types. We decided on six themes because the RFP suggested five to ten examples, and the project proposal specified that “5–10 exemplar cases [would] be categorized by the trends and themes, context, level of effort and impact, populations studied, effectiveness, etc., as identified in the literature.”¹³⁰ Table 4 shows how we identified five of the six total priority areas—by examining the most frequently coded themes from all three data sources.

Selected literature	Library administrator focus group interview	Provost semi-structured individual interviews
<ul style="list-style-type: none"> • Collaboration (12%) • Teaching and learning (12%) • Communication (10%) • Teaching support (9%) • Student success (8%) 	<ul style="list-style-type: none"> • Communication (20%) • Collaboration (17%) • Mission alignment and strategy (11%) • Research support (7%) • Provision of tech (7%) 	<ul style="list-style-type: none"> • Communication (17%) • Mission alignment and strategy (14%) • Teaching and learning (11%) • Collaboration (10%) • Student success (5%)

Across all three data sources, the most frequently coded themes were communication, collaboration, mission alignment and strategy, teaching and learning, and student success. Another area that was not included as a thematic code, but is important for library administrators and staff to consider when evaluating how the library affects student learning and success, is learning analytics. The importance of this topic, and especially how it relates to privacy, was mentioned in the feedback for the initial report draft, in advisory group brainstorming

sessions, and by recent ACRL initiatives, such as the Learning Analytics e-Learning webcast series and ARL's Statistics Data Analytics.¹³¹ Based on the most frequently coded themes, feedback, and ACRL initiatives, the priority areas are as follows:

1. **Communicate the library's contributions.**
2. **Match library assessment to the institution's mission.**
3. **Include library data in institutional data collection.**
4. **Quantify the library's impact on student success.**
5. **Enhance teaching and learning.**
6. **Collaborate with educational stakeholders.**

Identifying Effective Practices

In addition to the priority areas, the report's RFP also asked for an identification of effective practices. Effective practices represent actions library administrators and staff should take under each priority area to impact student learning and success and to align with institutional goals and objectives. We examined the data from all three data sources coded under each theme that corresponded to one or more priority areas to identify these effective practices. We looked for instances where researchers, library administrators, and provosts identified an action that was useful in demonstrating the library's value to higher education stakeholders. We then categorized these activities into broader practices that libraries within various contexts (e.g., community colleges, universities) can adopt for each priority area. These practices are more specific than the actions described in the *Introduction* section because we contextualized them within the three data sources.

Identifying Exemplary Studies

Based on feedback from the advisory group, we decided that identifying exemplary studies, or success stories, would also be helpful in suggesting innovative ways that library administrators and staff can align with and impact student-centered outcomes, as well as communicate this impact to higher education stakeholders. The visualization component shows which documents we identified as exemplary studies so that library administrators, library staff, researchers, practitioners, and students can view more details about them. In addition to these exemplary studies for each priority area, the studies listed in *Appendix L: AiA Studies with Exemplary Design Elements*, which have at least one exemplary research design component, also are tagged as exemplary in the visualization component.

We determined that an exemplary study should be relevant to the priority areas and demonstrate an effective research design. We derived five criteria for assessment: the number of themes discussed, the type of institution where the study occurred, the use of various data collection and analysis methods, whether the study impact resonates outside the library, and the populations studied. For a detailed explanation of how we used these criteria to assign a score to each document, see *Appendix K: Detailed Scoring Scheme for Exemplary Research Designs and Practices*.

Identifying Research Questions

The research questions identified represent future-focused, outstanding research questions that remain essential for library administrators, library staff, researchers, practitioners, and students to explore going forward. Based on our analysis of the existing literature and interviews with library administrators and provosts, these

questions define gaps where library administrators, library staff, researchers, practitioners, and students must integrate the library's activities with institutional mission and goals and alignment. Therefore, the questions represent promising lines of inquiry to make a case for impact to higher education stakeholders.

Identifying Research Designs

We identified studies corresponding to each priority area that had exemplary research designs. We evaluated each of the following study components contributing to the research design: context, topic or problem, design, data sampling, data collection, data analysis, discussion, future work, and reporting.¹³²

The studies we selected had one or two exemplary components corresponding to each priority area. For instance, we assessed the data collection rationale and procedures for each study based on the appropriateness of the method, whether the study authors employed mixed and multiple methods, and the extent to which the method ensured user privacy or confidentiality. Each priority area includes a study or two that exemplify one or more selected components. We recognize that this evaluation system is highly contextual. For this reason, *Appendix L: AiA Studies with Exemplary Design Elements* lists studies that have exemplary design components to assist researchers, practitioners, and students in developing their research.

There are a variety of resources that cover the general steps in the research process and suggest exemplary design principles.¹³³ Connaway and Radford provide a detailed overview of research design, including its applications to qualitative, mixed, and quantitative methods.¹³⁴

ACRL Research Agenda for Student Learning and Success

Now that we have discussed how we identified the priority areas for the research agenda, as well as the effective practices, exemplary studies, research questions, and proposed research designs for each, we present the research agenda. This agenda outlines the priority areas and related components. Each priority area is discussed in five sections: (1) general discussion, (2) effective practices, (3) exemplary studies, (4) research questions, and (5) proposed research designs.

Communicate the Library's Contributions

General Discussion

Communication was identified as important in the RFP and the project plan; this was one of the main reasons that we created the advisory group. It allowed library administrators to connect with provosts at their institutions and provide data on how library administrators and staff can communicate the value the library brings to the academic community. As a theme, its definition was "Librarians communicate impact or other aspects of value with stakeholders."

As academic libraries strategically evolve to support student learning and success, library administrators and staff must effectively communicate the library's value to those outside of the library and high in the institution's hierarchy to compete for resources within funding and governance structures both within and outside the academic institution.

Communication was the most commonly identified theme in the selected literature and interview data analyzed for the agenda. The other five priority areas support this priority area. If library administrators and staff better align the library with the institutional mission and goals, understand how the library contributes to learning, teaching, and student success indicators, and collaborate more, then communicating the library's impact will be easier and more productive.

The increasing presence of communication as a theme in the selected literature indicates that as more research saturates this area, more questions arise. A significant difficulty in suggesting best practices for communication between different groups is the variability of factors that can affect with whom to communicate and how. In other words, communication is highly contextual. Our data analysis reflected this finding, demonstrating an overemphasis on service within the LIS literature and advisory group interview. Such overemphasis does not necessarily mean that provosts perceive library services as redundant and not proactive. It shows that library administrators and stakeholders are not clearly communicating the impressive breadth of services they offer and how these services are valuable.

To address this lack of clarity, those involved in this research area should explore ways to effectively communicate both up and out, regarding both the message and the method. Provosts can offer a bird's-eye view of what the library should be doing, to what extent it is succeeding, and the terminology library administrators and staff should use when communicating the library's value.¹³⁵ By communicating with provosts, library administrators and staff can also make them feel invested in and a part of the library, which can influence them to become advocates for and supporters of the library.

Effective Practices to Implement at the Library

We identified the following effective practices for this priority area:

- *Communicate with those outside of the library and high in the institution's administration because they can offer a bird's-eye view of what the library should be doing and be advocates for and supporters of the library if they feel invested in and a part of the library.* According to the results of this study, the institution's administration often directly or indirectly influences financial and other resources allocated to libraries. For this reason, it is essential that library administrators and staff communicate with these administrators to determine how to best demonstrate the library's value. Researchers, practitioners, and students should further investigate how provosts and similar administrators perceive the library, as there exist few published studies that include participants from these groups.¹³⁶
- *Determine the terminology used by provosts to communicate the library's value and adopt this terminology in subsequent communications.* To communicate with provosts and similar administrators, library administrators and staff must be familiar with the terminology they use and its alignment with how these stakeholders communicate. One way that library administrators and staff can learn what language their provosts and similar administrators use is by familiarizing themselves with the higher education publications that these administrators read. Further, they may also consider publishing in these venues, which provide a direct line of communication to provosts and similar administrators (Advisory Group Member LM14).

- *Make the provost aware of library participation in various efforts, particularly as they pertain to the institutional mission and goals.* According to both advisory group members and provosts, making provosts aware of the linkage between the library's efforts and the institutional mission and goals is essential. One way library administrators and stakeholders can engender this awareness is by presenting at meetings the provost holds (Advisory Group Member LM14). To get presentation time, library administrators and stakeholders need to identify efforts related to the institutional mission and goals and get involved in them (Provost PP03). Such involvement can also lead to one-on-one face time, which both advisory group members and provosts identify as crucial (Advisory Group Member LM14, Provost PP03). Other ways that library administrators and stakeholders can obtain provost involvement is by creating targeted stories featuring faculty and students that discuss the benefit of library initiatives (Advisory Group Member LM13) and inviting the provost to library events (Provost PP02).
- *Become involved in cross-departmental and divisional efforts to engage in meetings and conversation with leadership among various departments.* Such collaboration facilitates communication of the library's value using "one big megaphone instead of five little ones" (Advisory Group Member LM13). Library administrators and staff can become involved, for example, by attending faculty senate meetings (Provosts PP03, PP14) and monthly meetings of college deans (Provost PP03), participating in curriculum committees (Provost PP03), and forming a library committee to connect directly with faculty (Provost PP01).
- *Use library space to provide central meeting grounds for programs across departments to give a visual indication of the library's value.* According to the provost interviews, library space represents a resource that library administrators and staff do not communicate enough. They should communicate favorable reviews the library receives for events and initiatives using its space. However, they cannot advance communication solely via a newsletter or e-mail. Rather, they must programmatically integrate key stakeholders within the library space to best communicate its value. One way to achieve this integration is bringing administrative leadership into the library by inviting campus meetings and gatherings to occur in library buildings (Advisory Group Member LM08, Provost PP09).
- *Cultivate relationships with leadership by looking for opportunities for informal meetings.* Interviews with provosts for this report show the importance of library administrators and staff having close relationships with provosts. Personal relationships are important. The provost must know and trust those at the administrative levels of the library to approve initiatives that will advance the library's value (Provost PP09). Networking is essential for library administrators and staff to build these relationships (Provost PP12). While such networking must involve the careful development of institutional and community relationships, library administrators and staff should also prepare for serendipitous moments, such as having an elevator speech ready should they run into their provost at a local coffee shop (Advisory Group Member LM14).
- *Recruit individuals to advocate on the library's behalf.* Recruitment can occur by providing excellent services, space, or collections. Advisory group members noted the importance of having students and faculty champion their efforts. Some ways to recruit faculty and students to promote library resources include cultivating relationships with new faculty (Advisory Group Member LM03) and becoming involved in an embedded librarian program (Advisory Group Member LM12).
- *Consider how different groups of stakeholders envision effective communication emanating from various forms of media and position the library accordingly.* Communication is contextual. A mode of communication that might be successful in one context might fail in another. For instance, one advisory group member noted that social media works well with students, but not with faculty (Advisory Group Member LM09). Regardless of context, library administrators and staff must consider how higher education administrators prefer their information disseminated (Advisory Group

Member LM08). They might consider assigning one librarian to be responsible for communication (Advisory Group Member LM09). Provosts recommend being innovative and giving them a “different style of data” (Provost PP11). This innovation could include guerrilla marketing, such as making short videos (Provost PP01).

- *Work to dismantle “pigeonholed” perceptions of the library (e.g., as just providing collections) by thinking out of the box and providing new services, spaces, and collections.* As shown by the provost interviews, key stakeholders within their academic institutions believe several myths about the library. As a result, provosts indicated the importance of library administrators and staff communicating “how they bring people in touch with knowledge in various ways” (Provost PP02). One provost suggested that library administrators and staff could dispel these myths by inviting these stakeholders into the library. Specifically, they could hold a town hall meeting to address the question “What is the role of the library today?” Attendees could formulate an institution-specific response to this issue, which can yield buy-in from all those attending (Provost PP04).
- *Look at how other departments, and not just the academic ones, are communicating their value.* As an example, one advisory group member noted that his library administration and staff have taken notice of the fitness center and how it makes a value-based case. They have used these observations to inform their own assessment-related work.
- *Take advantage of the fact that, unlike other departments, the library serves all students and majors.* One of the questions we asked provosts was what library administrators and staff would need to do to enhance the possibility of the provost accepting a modest funding request. Four provosts stated that the library was at an advantage when making this request. As one provost said, the library is in an advantageous position when it comes to funding requests since it has “impacts beyond borders” (Provost PP01). Library administrators and staff can take advantage of this impact by articulating how they benefit key institutional stakeholders when making a funding request.
- *Keep communication regular and consistent.* Share news and events with the provost, faculty, and students on a regular basis using different channels, such as social media, conversation in the coffee shop and other places on campus, and library marketing materials and venues. Library administrators and staff do not need a lot of face time to highlight the library’s staff and services and advertise upcoming events and programs using different modes of communication.

Exemplary Studies

Few studies published since 2000 have looked at how administrators perceive the library and its collections, spaces, and services.¹³⁷ One study from 2007 found that according to multiple administrators at six American universities, the library’s functional role outweighed its symbolic role as the heart of the university. As a result, the library needed to “connect what it does to the values and mission of the university.”¹³⁸ A later study of nine Canadian provosts found that the participants most valued information access provided by the library and envisioned the library evolving into more of a learning space.¹³⁹ The third study we identified as exemplary is Fister’s survey of 134 administrators, which covered the highest number of themes ($n=11$) and received the highest score of all the studies using the scoring system explained in *Appendix K: Detailed Scoring Scheme for Exemplary Research Designs and Practices* (17 points).¹⁴⁰

Research Questions Requiring Further Study

1. How can library administrators and staff communicate their contributions to student outcomes more effectively with institutional stakeholders (e.g., administrators)?

2. What types of library services, collections, and spaces matter to institutional stakeholders?
3. To what extent do institutional stakeholders recognize library administrators' and staff's contributions to teaching and learning? What factors affect levels of recognition?
4. How do faculty envision the integration of library services, collections, and spaces for teaching and learning?
5. How can libraries support the information needs of stakeholders related to teaching activities?
6. How are other units effectively communicating with stakeholders?
7. What factors influence librarian communication with academic library users and potential users?
8. How can library administrators and staff leverage social media to increase student engagement?
9. What are the main barriers to communication between library administrators and staff and educational stakeholders (e.g., students, faculty, administrators)?

Proposed Research Design

The exemplary studies discussed above demonstrate the importance of understanding context and identifying the topic or problem in the research design process. When considering the context of the study, researchers, practitioners, and students must recognize the knowledge, experience, and possible bias that they bring to the project.¹⁴¹ They also need to consider and describe their environment, which includes their library and their parent institution. The environment can influence the priorities,¹⁴² opportunities, and challenges of the study. Perhaps most importantly, researchers, practitioners, and students must consider the audience for their research.¹⁴³ Some important audience distinctions include whether it consists of librarians or non-librarians and whether they are external or internal to the researcher's institution. Hahn and Jaeger provide more information on possible audiences, types of publications, and venues for publication.¹⁴⁴ The audience also influences how the researcher reports study findings. For instance, researchers, practitioners, and students should be careful to frame the research so that it is relevant to the intended reader's interests and avoid using library jargon when reporting to non-librarians.¹⁴⁵

Questions for Researchers: Context

1. Who is the audience?
2. What knowledge, experience, and possible bias might the researcher bring to the research?
3. How might the institutional and library environments affect the research?

When identifying the topic or problem, researchers, practitioners, and students must consult past work and literature in the area and craft their research questions based on this previous research and their context. The theoretical and methodological aspects of earlier work provide the researcher with examples of how to study a topic. Fisher, Erdelez, and McKechnie provide a detailed overview of LIS theories and examples of using these theories in research, which can help researchers, practitioners, and students identify how to study various LIS topics and problems.¹⁴⁶

The existing literature identifies topics that warrant further or initial research. Researchers identify their topic or problem based on contextual considerations and past work, and these elements influence the research questions for the study. In general, research questions should be open rather than closed.¹⁴⁷ Open questions usually

begin with *what*, *how*, or *why*. Closed questions usually begin with *does* and can be answered with a yes or no. Wildemuth provides more information on crafting compelling research questions.¹⁴⁸

For the three exemplary communication studies discussed above, the researchers realized potential audiences for library value research could extend beyond librarians and that administrators are an important population in any institution of higher education. Because the literature reviewed had few studies that included this population, the three exemplary studies began with research questions that addressed and engaged a variety of academic administrators.

Questions for Researchers: Topic or Problem

1. What do past work and literature say about the topic?
2. What gaps exist in the research on this subject, and how could this research design bridge those gaps?
3. To what extent are the research questions open-ended rather than closed?

Match Library Assessment to Institution's Mission

General Discussion

The definition for this theme was “Institutionally identified student outcomes (can be co-coded with learning and success).” It appeared in the top five themes in the advisory group and provost interviews, but it was the seventh theme in the analysis of selected literature. Moreover, there was a statistically significant difference between the higher proportion of this theme reported in theoretical documents and lower in research documents, which signifies that the theme likely is being discussed more than empirically tested. This finding means that while library administrators, library staff, researchers, practitioners, and students recognize the importance of integrating institutional mission, goals, and alignment with library assessment in theory, they do not seem to address this integration in practice.

Although provosts and other academic administrators develop institutional plans, supervise libraries and other institutional units, and allocate funds, few studies published since 2000 have investigated administrator perceptions of library collections, spaces, and services.¹⁴⁹ In fact, the number of research studies from LIS and higher education journals in the areas of accreditation and institutional mission, goals, and alignment has fallen from 2010 to 2016. One reason for the lack of research on this topic may be the gap between how higher education administrators and library administrators and staff perceive the library's role in mission strategy and alignment. While interviews with provosts from around the United States showed their concern with mission strategy and alignment, a recent study of 722 library directors indicates that they feel less aligned strategically with their supervisors and less valued by their administration, financially and otherwise.¹⁵⁰ Further, analysis of the LIS literature selected for this research agenda and from our focus group interview with library administrators shows that these two sources mention service more frequently than the provosts interviewed. This finding also suggests a mismatch between library administrators and staff and higher education administrators regarding perceptions of the library's role related to enhancing student learning and success outcomes.

While provosts, academic librarians, and current LIS and higher education literature do not often discuss accreditation, this finding does not signify that it is unimportant. Rather, higher education stakeholders perceive accreditation as a necessary task that the institution can accomplish with or without libraries. For this reason,

library administrators and staff must communicate how they contribute to accreditation standards and their importance in meeting these standards.

Library administrators and staff can support student learning and success by strategically aligning their programs, offerings, spaces, and collections to support institutional objectives in these areas. This strategic alignment might include measuring the library's support of nontraditional priorities for libraries, such as student recruitment.¹⁵¹ Library administrators, library staff, researchers, practitioners, and students doing research in this area should go outside of the library to collect data and suggest possible collaborations around common issues. They also should take care to use terminology similar to that used by others within the academic institution. Further, by working with faculty and staff members from teaching and learning support services, library administrators and staff can build a culture of assessment that adequately demonstrates library alignment with their institutional mission and goals.

Effective Practices to Implement at the Library

We have identified the following effective practices for this priority area:

- *Go outside of the library to collect data and to suggest possible collaborations around common issues.* As noted by advisory group members and provosts, these partnerships should be advantageous to fostering the institutional mission and goals. By getting involved in these partnerships, library administrators and staff will have opportunities for face time with the provost. For instance, Provost PP03 stated that she was made aware of the value-based efforts by library administrators and staff because some sit on the education council and the core educational requirements team.
- *Work with teaching and learning support services and directly with faculty and students to build a culture of assessment using both qualitative and quantitative data for collection, analysis, and reporting.* Provosts and advisory group members gave several examples of how a culture of assessment can be created. For instance, several suggest that library administrators and staff align with the research mission of their institution by creating open access institutional repositories for the work of faculty and students (Advisory Group Members LM06, LM07; Provost PP04). To assess the research productivity of the faculty and students, library administrators and staff could build a reputation cloud that summarizes their current research efforts (Advisory Group Member LM03). Data from this cloud and the institutional repository could feed into how library administrators and staff articulate their contribution to the institution's research mission.
- *Be open to adopting less traditional roles for services, collections, spaces, and staff to fulfill the strategic mission of the university.* While specific activities will vary based on institutional context, one advisory group member recounted an example of how the administrators and staff at her library began sponsoring three-minute research video competitions among graduate students (Advisory Group Member LM03). This action supported the research mission of the university and drew attention to the library's role in advancing this mission because students and faculty shared the videos. The provost from this advisory group member's institution also brought up this initiative as an effective practice (Provost PP03).
- *Be aware of student and faculty demographics and respond to their needs and characteristics.* Provost PP09 states the importance of library administrators and staff knowing their customer. She suggests that library administrators and staff marshal resources and design events that interest people. To develop interest, they must uncover a need and demonstrate how the library can satisfy this need. Provosts identified several approaches that library administrators and staff could take to exercise this awareness and response. Provost PP04 suggests that library administrators and staff

offer hours in the library space where students can come and work with a tutor. In the context of the provost's institution, this action assists the students in a state where six-year, rather than four-year, graduation rates are prevalent. Provost PP08 identifies the importance of diversity and inclusivity within higher education by contending that library administrators and staff should accommodate students with low socioeconomic statuses to demonstrate the importance of the "university as a gateway to a better life."

Exemplary Study

Lombard's 2012 study at Gannon University had a short write-up but was an exemplar in several ways.¹⁵² First, it looked at the library's influence on recruitment, which has been studied in higher education research documents addressing student outcomes, but rarely appears in library research documents. The data collection method, which relied on an online survey of students, also was interesting because the survey was posted on various non-library online spaces, meaning that it may have reached those who do not use the library. It also collected and analyzed qualitative data from interviews with fourteen admissions professionals from various institutions and, based on survey and interview findings, makes suggestions for ways library administrators and staff can collaborate with admissions departments.

Research Questions Requiring Further Study

1. In what ways has the support by library administrators and staff of the institution's mission and specific goals affected student learning and success outcomes?
2. How do libraries fit into the broader array of institutional resources and programs (e.g., writing centers, tutoring)?
3. How do libraries compare to other support units in demonstrating their impact on the institutional mission and goals?
4. How are budget constraints affecting the support by library administrators and staff of the institution's mission and specific goals related to student learning and success outcomes?
5. How do library administrators and staff support accreditation efforts, and are these efforts recognized by the institution?

Proposed Research Design

The exemplary study for matching library assessment to the institution's mission demonstrates the importance of designing a study to include quantitative, qualitative, and mixed methods as appropriate. Just as context and past work influence the study's research questions, so does the study's design affect the data's sampling, collection, and analysis. Qualitative, quantitative, and mixed designs each offer different ways of studying the topic.

Qualitative designs are interpretivist in nature and take an inductive or bottom-up approach. In other words, the researcher assumes that individuals tend to interpret reality differently and uses "collection, analysis, and interpretation of interview, participant observation, and document data to understand and describe meanings, relationships, and patterns."¹⁵³

Quantitative designs are (post)positivist in nature and take a deductive or top-down approach. In other words, the researcher assumes that individuals tend to interpret reality similarly and "use measurements and statis-

tics to transform empirical data into numbers and to develop mathematical models that quantify behavior.”¹⁵⁴ Robust quantitative designs often include a model that clearly delineates the factors concerning the topic of inquiry and their relationship to one another.

Although qualitative and quantitative designs offer different viewpoints, mixed methodologies assume that these positions can be complementary rather than polarizing.¹⁵⁵ A strong mixed-methods design must explain and justify what aspects of data sampling, collection, analysis, and interpretation are qualitative and which are quantitative. Creswell and Clark suggest six possible mixed-methods designs.¹⁵⁶ Their book contains guidance on how to choose the best mixed model; instructions for how to collect, analyze, interpret, and write about mixed-methods studies; and detailed examples of studies for each type of design. Despite its challenges, the use of mixed methods tends to lead to a stronger research design because using both qualitative and quantitative approaches can provide a complete look at the data, which constitutes the basis for data triangulation.¹⁵⁷

Using more than one data collection and analysis method, otherwise known as using multiple methods,¹⁵⁸ is another way to triangulate data. The exemplary study in this priority area uses multiple methods to collect and analyze data from two types of participants: survey data from students, and survey and interview data from admissions professionals.

Questions for Researchers: Design

1. What elements of qualitative and quantitative research can help answer the research questions?
2. How can triangulation using mixed or multiple methods create a more complete picture of the phenomenon studied by the researcher?
3. Is there a clear explanation as to why the researcher chose the selected approach instead of the alternatives?

An excellent study should clearly explain the methods used to sample, collect, and analyze the study’s data. *Data sampling* refers to the method researchers use to select the study data or participants from the available data or total study population.¹⁵⁹ The most important data sampling consideration is whether the data or participants are intended to represent a typical case, which is often the case in quantitative designs, or a range of possible cases, which is often the case in qualitative designs.

One issue in many LIS studies, primarily qualitative ones, is the use of convenience or availability sampling, in which participants are willing to participate or nearby, respectively.¹⁶⁰ Also known as accidental samples, convenience sampling is when the researcher selects the cases at hand until the sample reaches a desired size. For instance, researchers might select library users to participate in a study based on who walks through the door.¹⁶¹ Another related sampling issue is the recruitment of library study participants in library spaces, both in the physical and digital library. As a result of this sampling technique, researchers might disproportionately represent library users in LIS studies and ignore potential library users; these potential users provide different perceptions of library collections, spaces, and services. The exemplary study for this priority area offers one solution to these sampling issues by posting links to the survey on non-library websites. Another way to reach potential library users is by sending the recruitment notice through official channels, such as departmental administrative assistants or departmental chairs and asking them to forward to the faculty, staff, and students on their Listservs.¹⁶² For more information on different sampling types and methods, see Wengraf.¹⁶³

Questions for Researchers: Data Sampling

1. Who would be willing and able to participate in the study and provide the most useful data?
2. How can potential library users, who might not be using the collection, space, or service being considered by the researcher, be recruited?
3. Are there any gatekeepers who would be able and willing to forward the recruitment notice to relevant populations?

Include Library Data in Institutional Data Collection

General Discussion

Although learning analytics did not have a thematic code, documents such as ACRL's "Top Trends in Academic Libraries" and ACRL initiatives, such as the e-learning webcast series "Learning Analytics," identified learning analytics as an important area.¹⁶⁴ Learning analytics involve "data about learners and their contexts, for purposes of understanding and optimizing learning and the environments in which it occurs."¹⁶⁵ While research in this area is relatively new, three of the fourteen provosts interviewed for this agenda described data components that could track student progress on a variety of institutional, programmatic, and course levels. The range of data represented by these components offers library administrators and staff the opportunity to triangulate their data with those from other departments and to make these library data more visible to other departments, administrators, and provosts.

Research in this area mirrors that on analytics and privacy or confidentiality in other areas; for instance, one study assesses what analytics researchers can collect related to the reading behaviors of individuals when they are reading mass-market e-books versus scholarly journals.¹⁶⁶ Library administrators and staff need to inform themselves about how other academic stakeholders are using learning analytics, how librarians can integrate library data into these components, and what safeguards need to be implemented to ensure student privacy or confidentiality.

Those doing research in this area should strategically collect data to integrate into learning analytics software. As previously mentioned, library administrators and staff also should advocate for the inclusion of library data in the volumes of data collected from multiple systems within the academic institution that stakeholders statistically analyze to predict and facilitate student success.

Effective Practices to Implement at the Library

We have identified the following effective practices for this priority area:

- *Measure, collect, analyze and report* "data about learners and their contexts, for purposes of understanding and optimizing learning and the environments in which it occurs."¹⁶⁷ Library data should be included in the volumes of data collected from multiple systems within the academic institution and statistically analyzed to predict student success. In addition to the exemplar studies in this priority area and the previous priority area, several other research studies from the fields of LIS and higher education exist that discuss privacy and confidentiality and how to implement policies for both.¹⁶⁸

- *Use the data environment employed by senior leadership.* This practice was suggested by Advisory Group Member LM13. It ties into a key finding from our review of all three data sources that a gap exists between how provosts and library administrators and staff communicate the library's value. Implications of this finding for library administrators and staff are to ensure that they are using the same terminology employed by their provosts. This effective practice builds on this implication by suggesting that nonverbal forms of communication, such as the visual presentation of quantitative data, must also be presented in a way that is recognized by provosts.
- *Pull the sort of data to track user behaviors that library administrators and staff have shied away from in the past.* Provosts suggest that library administrators and staff must collect data on the holistic student experience including longitudinal metrics related to the student experience during and after graduation (Provosts PP03, PP11). One provost noted that library administrators and staff could be informed of new metrics to collect by referring to those obtained by independent, for-profit institutions (Provost PP14). An advisory group member suggested that library administrators and staff can initiate conversation with provosts about the types of user data they can collect categorized by departments (Advisory Group Member LM14).

Exemplary Study

Jantti and Heath's 2016 study describes the use of learning analytics at the University of Wollongong in Australia.¹⁶⁹ In addition to collecting library-related data in a repository called the Library Cube, this library collects and analyzes more sources of institutional data than any other. These data sets come from course management software called Moodle, student administration, tutorials, and data measuring student support service use.

Research Questions Requiring Further Study

1. How can library administrators and staff connect their data with student outcomes? To do this effectively, will library administrators and staff need to begin collecting different or additional data?
2. How are other stakeholders in higher education using analytics to affect the areas of teaching and learning and student success, and how can library administrators and staff contribute to these efforts?
3. What types of data do faculty and staff in institutional research offices or units collect that would supplement the data assembled by library administrators and stakeholders to measure the impact of courses, events, and so on, on student learning and success?
4. How can library administrators and staff use triangulated data to demonstrate the impact of library resources and programs on student learning and success?
5. How can library administrators and staff employ mixed methods or multiple methods to demonstrate how student usage of library collections affects retention?
6. How can library administrators and staff balance concerns about maintaining user privacy with the use of individual student data to measure learning and success outcomes?
7. What factors affect librarian decisions regarding the level of confidentiality or privacy of student data?

Proposed Research Design

The exemplary study for including library data in institutional data collection describes how to collect and store a variety of data ethically. When collecting data for a research study, the most important consideration is whether the methods are appropriate for the study's design. Qualitative methods are useful when researchers are developing a hypothesis, while quantitative methods can be used by researchers to test these hypotheses. In other words, qualitative methods take a deep dive into a particular context, and researchers can utilize them to identify a research problem, develop knowledge claims, and begin to develop a hypothesis, while using quantitative methods to test this hypothesis and generalize it across various contexts. While qualitative methods take a deep dive into inductively analyzing data from smaller samples (e.g., focus group and individual interviews), quantitative methods deductively analyze data from larger samples (e.g., log or usage data, demographic data) to test hypotheses and knowledge claims. However, qualitative and quantitative methods should not be viewed as mutually exclusive. Rather, these methods overlap for both data collection (e.g., observation and survey data can be qualitative or quantitative) and analysis. For the latter, researchers can use mixed and multiple methods, which employ both quantitative and qualitative approaches to enhance the rigor of analysis and strengthen the research claims.¹⁷⁰

Another important consideration regarding data collection is whether the data should be anonymous, confidential, or neither. Anonymous data means that the researcher does not know the identity of the participant, and confidential implies that the researcher knows the identity of the participant but takes steps to ensure that the audience will not. If the library staff collect user data, as in the exemplary study, they can ensure that library usage data, such as checkout and request history, is not accidentally forwarded to other units, such as offices of institutional research. LIS research methods books by Connaway and Radford and Wildemuth provide more information on how to choose a data collection method, guidance on collection procedures, and examples of different types of collection methods.¹⁷¹

Questions for Researchers: Data Collection

1. What are the possible ways that the data collected can be triangulated to give a more complete picture of what phenomenon the researcher is studying?
2. Is the rationale for the type of data collected clearly explained and justified?
3. How does one ensure the collection of relevant and critical data?

Quantify the Library's Impact on Student Success

General Discussion

We define student success as the more objective, usually quantifiable, indicators of learning. These outcomes are related to a particular assignment or semester, such as grades or GPA. It could also be related to whether the student re-enrolled or graduated.¹⁷²

Impact on student success has become the most significant way for institutions and their composite units to demonstrate their value to funding and governance boards. These outcomes relate to objective indicators of learning, which include assignment and semester grades and persistence to graduation.

In this report, the proportion of LIS and higher education literature analyzed related to student success peaked in 2013. By 2016, this theme was present in only about half of the documents examined. Based on the analy-

ses conducted for this agenda, we attribute much of this decline to the lack of established best practices and standards regarding student privacy.¹⁷³ However, recent research from the University of Minnesota and the University of Wollongong has developed suggested data collection and analysis methods that facilitate user confidentiality and can be used by library administrators, library staff, researchers, practitioners, and students to re-engage with research that quantifies student success.¹⁷⁴

Those doing research in this area should identify the quantifiable student success indicators at the individual and aggregate levels. These indicators include enrollment in postsecondary education, grades, persistence to the sophomore year, length of time to degree, and career after graduation. When focusing on the individual student, library administrators and staff can partner with other educational stakeholders, including those from other institutions, to identify factors that affect student success before the student begins his or her education at a college or university. Library administrators and staff also can partner with outside stakeholders, such as businesses, to identify factors that affect student success following undergraduate education.

It also is important that library administrators and staff select student success indicators that consider the diverse experiences of students. Six of the fourteen provosts interviewed identified diversity and inclusivity as important trends facing higher education. As the mode for dissemination of higher education changes (e.g., increase in online learning), so does the composition of students engaged in higher education (e.g., nontraditional students, such as military students and online-only students). Interviews with provosts suggest it is essential for library administrators and staff to consider how nontraditional students may or may not engage with library collections, services, and spaces and how this engagement corresponds to their student success outcomes. The success of interventions, such as partnering with community colleges to meet the needs of incoming transfer students, must be measured along with more traditional success factors.

Effective Practices to Implement at the Library

We have identified the following effective practices for this priority area:

- *Work with academic services and faculty to develop ethical collection and reporting methods for individual-level student data that retain individual privacy and confidentiality.* Library administrators, faculty, and staff should familiarize themselves with topics related to student privacy and confidentiality. While few examples of best practices exist, library administrators, library staff, researchers, practitioners, and students should combine their knowledge of their institutional review board's policies and LIS guidelines to create data collection and management systems that advance research in this area while upholding professional standards.¹⁷⁵
- *Engage with faculty and students for librarian inclusion in developing academic and everyday life support services for students.* This effective practice also builds on the priority areas related to communication and collaboration. Library administrators and staff must collaborate with other departments and stakeholders to nurture student development in higher education and increase student-centered outcomes, such as the likelihood of graduation. Further, these administrators and staff should communicate their contributions to student development. For instance, by collaborating with other departments and stakeholders to nurture student development, the library helps increase likelihood of graduation.¹⁷⁶
- *Select student success indicators that consider the diverse experiences of students.* Library administrators and staff need to be creative in identifying outcomes that address the needs of nontraditional students. For example, a possible outcome might include the use of library services, collections, and spaces by nontraditional students or the cost savings identified for students by the development of a LibGuide for open-access resources.

Exemplary Study

Soria, Fransen, and Nackerud's 2013 study found empirical evidence that first-time, first-year undergraduate students who used the library were more likely to re-enroll for the second semester and to have higher GPAs than those who did not use the library at the thirteen library access points covered in the data collected.¹⁷⁷ While this study has one of the strongest findings empirically, it was not given as many points using the scoring system explained in *Appendix K: Detailed Scoring Scheme for Exemplary Research Designs and Practices* as other exemplary studies. This lack of points awarded illustrates the difficulty of setting evaluative criteria. As a result, the team solicited additional exemplary studies from advisory group members and other relevant stakeholders. While these individuals did not offer many exemplary studies, they did provide several examples of effective practices, which are noted throughout this report.

Research Questions Requiring Further Study

1. How do library resources and programs (e.g., courses, events, etc.) impact indicators of student success?
2. Does access to library collections impact student retention? If so, how?
3. How do library spaces support student enrollment?
4. How does library instruction affect job placement and salary the first year after graduation? Five years after graduation?
5. What effects do libraries have on success outcomes for different types of students?
6. What are the effects of library instruction on success outcomes for diverse student populations (e.g., military students, non-US students, English language learners, nonresidential students, online-only students, etc.)?
7. How are library administrators and staff implementing continuous assessment to facilitate equal access to information for diverse student populations?
8. How can library administrators and staff supplement the data collected by other university departments (e.g., tutoring and writing centers) to document student learning and success?
9. How does library instruction at the secondary or earlier level affect information competencies at the postsecondary level?
10. How have library administrators and staff updated instruction based on the ACRL Framework for Information Literacy?¹⁷⁸
11. What factors affect library contributions to positive student learning outcomes?
12. How can academic, public, and school libraries work together to develop connected informal and formal learning opportunities that lead to measurable student success outcomes (e.g., retention, grades, time to graduation) for community college, four-year college, and university students?

Proposed Research Design

The exemplary study for quantifying libraries' impact on student success empirically and statistically demonstrated a correlation between library usage and student retention and success. In addition to collecting data from a variety of sources, which also makes this study a good example of data collection, the exemplary study provides an excellent example of data analysis. The most important criterion for judging data analysis is whether the results answer the research questions.¹⁷⁹ If not, the study's design, which includes the data sampling, collection, and analysis, may have to be modified and the study repeated. As with data collection, the data

analysis method should reflect the study's design. Quantitative analysis methods determine whether the data are statistically similar or different using tests based on the general linear model (e.g., regression, cluster analysis) or analysis of variance (ANOVA).¹⁸⁰ Qualitative methods, which include content and discourse analysis, do not have to be statistical or numerical in nature. Descriptive statistics and counts are numerical but do not assume a relationship between factors as in statistical analysis. One criterion for judging the goodness of a study's data analysis is whether the results are replicable.¹⁸¹ For quantitative data, this could entail sharing the data set so that other researchers are able to replicate the statistical tests. For qualitative data, this could require having another person code or analyze a portion of the data to see if he or she identifies the same themes or counts in the data. Charmaz provides more information on how to analyze qualitative, especially interview, data and formulate grounded theories based on the data.¹⁸² Denzin and Lincoln give more in-depth guidance on qualitative data analysis, and Garson's Statistical Associates publications provide the same for quantitative data.¹⁸³ Wildemuth and Connaway and Radford also provide information, overviews, and guidelines on analyzing various types of data.¹⁸⁴

Questions for Researchers: Data Analysis

1. Do the results of the analysis answer the research questions? If not, which aspect of the research design needs to be modified and what part of the study repeated?
2. Are the data analysis methods appropriate for the qualitative and quantitative data collected?
3. Does the data analysis reporting meet the necessary (e.g., qualitative, quantitative, statistical) standard?

Enhance Teaching and Learning

General Discussion

The definition for this theme was “the less objective concepts of learning, such as critical thinking. Usually not tied to a specific graded assignment or graduation.” In contrast to student success, we used this code to identify the less tangible or indirect effect of the library on students.

Teaching refers to the instruction that students receive in classrooms. Library administrators and staff have traditionally collaborated with course instructors at varying levels of involvement to enhance learning outcomes related to the instruction received. At the most basic level, library administrators and staff introduce students to the collections, spaces, and services that the library offers. At the highest level, they function as co-instructors. Teaching is grouped with learning because teaching activities have direct effects on student learning, which can cover a broad range of student-related activities and outcomes.

An established outcome related to student learning is engagement. In the last few years, faculty and staff have increasingly focused on creating more engaged students in school and more engaged citizens upon graduation. Activities that support these outcomes include undergraduate research and training students to identify credible information.¹⁸⁵ These outcomes relate to the less objective concepts of learning, such as critical thinking, instead of being tied to a result, such as an assignment grade or graduation.

Given their experience in information literacy instruction, library administrators and staff have an opportunity to lead the effort in creating more informed citizens. While LIS research from the last six years indicates that research in this area has increased, interviews with provosts from around the United States shows that student

learning outcomes are more likely to be associated with library collections, spaces, and services than student success outcomes. At the same time, provosts were much less inclined to associate libraries with providing teaching support than the LIS literature reviewed.

These data suggest that library administrators and staff need to articulate better their support of teaching and learning outcomes, particularly those related to instructional support. One way to incorporate these areas would be to engage teaching faculty and students in the process of making library resources and services more integrated into the academic community's workflows.¹⁸⁶ Those doing research in this area should engage with faculty and students to develop academic (e.g., research and writing workshops) and everyday life (e.g., extending hours and providing stress-relieving programs during final exam periods) support services for students.¹⁸⁷ Library administrators, staff, researchers, practitioners, and students can identify effective practices for collaboration between academic librarians, instructors, and teaching support staff to enhance teaching and learning.

Effective Practices to Implement at the Library

We have identified the following effective practices for this priority area:

- *Engage with faculty and students for librarian inclusion in developing academic and everyday life support services for students.* Librarians can partner with writing centers and teaching faculty to develop services that can support students through all stages of the research process. They can also partner with groups within and outside the institution to provide security and staffing to create safe and open spaces for studying, and services such as therapy dogs and massages during exam periods.¹⁸⁸ This effective practice also builds on the priority areas communication and collaboration.
- *Support student engagement with library services, spaces, and collections by aligning with related programs that require them.* Library administrators and staff should collaborate across departments to leverage library services, spaces, collections, and expertise to assist students in first-year experience programs (Advisory Group Member LM06, Provost PP08). Advisory group members and provosts mentioned the importance of such programs to advancing the institutional mission and goals. Given that these programs are cross-departmental, the library can provide centralized grounds for students in these programs to learn and collaborate.
- *Keep abreast of higher education trends.* As mentioned in the *Discussion* section, one way that library staff and administrators can contextualize their contributions to student learning and success is by showing how these contributions address emerging trends and issues in higher education and libraries. Some of the trends identified by provosts include fostering critical competency skills (Provosts PP03, PP10), supporting continuing learning and educating students to become “informed citizens” (Provosts PP06, PP14), and changing people’s perceptions of the library as a storehouse for collections (Provost PP02).

Exemplary Study

Brown-Sica’s 2013 study of space redesign at Auraria Library offers one way for various groups to provide multiple types of input and otherwise engage with the library.¹⁸⁹ The Auraria Library serves the University of Colorado Denver, the Metropolitan State College of Denver, and the Community College of Denver. Students were involved in all stages of the study, from formulating the questions to ask, to analyzing the data and offering suggestions based on the results. This study was a high-scoring example (using the scoring system explained in *Appendix K: Detailed Scoring Scheme for Exemplary Research Designs and Practices*) of learning in college

because, although not tied to an objective outcome such as student retention or GPA, this study gave students a voice in the project and facilitated unexpected collaborations with faculty. It also touched on library space, which was a library resource that provosts mentioned more frequently than library administrators.

Research Questions Requiring Further Study

1. What is the role of library administrators and staff in evaluating teaching and student learning outcomes?
2. What are the most common difficulties faced by library administrators and staff in measuring teaching and learning outcomes?
3. How do library administrators and staff measure the impact of library instruction on student learning outcomes?
4. How can library administrators and staff increase engagement among students?
5. How are library spaces (online or physical) affecting engagement among students?
6. In what ways have library administrators and staff implemented a continuous improvement process to support engaged student learning?
7. How are library administrators and staff implementing new models of outcomes-based measurement to assess the effectiveness of informal (e.g., Greek life, intramural sports) and formal learning opportunities?
8. Where do students go to discover information (e.g., answers to questions, resources for their needs)? If this is not library websites or online catalogs, what can library administrators and staff do to integrate library discovery systems into academic users' workflows?

Proposed Research Design

The exemplary study for enhancing teaching and learning also included the discussion section in the conclusion, which indicates that there is a lot of flexibility in how researchers can organize the discussion, future work, and conclusion of the study report. Clarity and relevance are the most important criteria for evaluating these aspects. The discussion should reiterate the findings from the data analysis and compare and relate them to past work and literature. A more detailed list of considerations for writing a useful discussion section is in Connaway and Radford.¹⁹⁰ The exemplary study included data from numerous data sources, and the author included several pictures and figures that broke up the text. The conclusion section lists the improvements that took place because of the study and contrasts the results of the study with ACRL's challenges in library design LibGuide.¹⁹¹ See the table in *Appendix L: AiA Studies with Exemplary Design Elements* for examples of studies with exemplary discussion sections.

Questions for Researchers: Discussion

1. Are the most relevant findings clearly stated?
2. What is the best way to reiterate and frame the findings?
3. How do the findings of the study compare and relate to past work and literature?

Collaborate with Educational Stakeholders

General Discussion

Collaboration is an important theme because of the academic library's primary mission as a research and teaching support unit.¹⁹² The AiA projects explicitly required librarians to collaborate with at least two people outside the libraries.¹⁹³ As a theme, it is defined here as, "Library administrators and staff work[ing] with other institutional departments to influence student outcomes or with other institutions."

The primary mission of the academic library is to support an institution's research and teaching, which necessitates collaboration with other educational stakeholders. Such collaboration includes all librarian efforts to work with those inside and outside their institution to influence student learning and success outcomes.¹⁹⁴

Findings from the agenda indicate that library administrators, library staff, researchers, practitioners, students, and others in higher education are collaborating at an increasing rate. The proportion of documents in the selected literature related to collaboration has more than doubled between 2010 and 2016. The provosts discussed collaboration numerous times in their individual interviews, which underscores the importance of these types of activities across all types of academic institutions. The library administrators in the advisory group also mentioned several collaborative efforts and the importance of communicating the library's role in supporting student learning and success to faculty and administrators.

In AiA projects that ACRL and IMLS supported, nearly 200 research teams collaborated with a variety of university units that also support research and teaching.¹⁹⁵ This report also summarizes how these units (e.g., offices of assessment, institutional research, student affairs, and information or educational technology) collaborate to support each other and students, as well as relevant programs, in bolstering student learning and success, such as study abroad.* Internal collaboration is not the only opportunity available. Library administrators and staff also can collaborate with other public institutions such as museums, libraries, and archives. A recent study found that public library staff support students in their learning because students will use public libraries if they know the staff or otherwise feel comfortable going there.¹⁹⁶

Collaborative research can include studies of how library administrators and staff modified their services and collections to better support other departments, and it also can lead to joint publications in other fields.¹⁹⁷ Those doing research in this area should understand that there are different types and levels of collaboration and consider looking at literature from related fields to see what outside researchers say about libraries and information-related topics. Library administrators, library staff, researchers, practitioners, and students also should work with academic and regional stakeholders, which include administrators, academic services staff, faculty, students, alumni, and other members of their local communities to identify mutual areas of research interest and to initiate collaborative research projects.

Effective Practices to Implement at the Library

We have identified the following effective practices for this priority area:

- *Understand that there are different types and levels of collaboration, and consider looking at literature from other related fields to see what it says about libraries and issues that libraries are facing or may face.* Collaboration can exist on individual, course, departmental, and program levels. It can also relate to the level of involvement. Concerning information literacy, a lower level of collaboration

* See section Measuring Student Learning and Success outside the Library.

between a librarian and a course instructor could include a librarian giving a single session, the next level could include the librarian teaching multiple sessions on information literacy, and a higher level could include the librarian co-teaching the course.

- *Work with academic administrators, academic services, faculty, students, alumni, and other members of the regional and local communities.* The AiA projects offer several examples of how various educational stakeholders have collaborated with librarians.¹⁹⁸ Some examples include projects that collaborated with a student-athlete academic success program, military campus program, professional development center, and advising center for students with disabilities.¹⁹⁹
- *Identify needs of students and partner with related departments to meet them—think outside of the box.* As advised by one provost, library administrators and staff must “reach across a variety of disciplinary areas and identify those particular areas that might benefit from a cooperative activity because the library must work with everyone. I think that’s the biggest challenge—to reach across a variety of disciplinary areas” (Provost PP10). Several provosts gave examples of how library administrators and staff could accomplish such cooperative activity. One example we identified as also exhibiting thinking outside the box is to have library administrators and staff provide or support efforts such as career counseling (Provost PP05).
- *Use library space to provide central meeting grounds for programs across departments.* As suggested by one provost quoted in the *Discussion* section, library staff and administrators should not engage in “turf wars,” but rather promote the programmatic integration of other departments into the library space (Provost PP01). This integration can be accomplished by housing a cross-disciplinary program and allowing spaces for students to learn and work (Advisory Group Member LM03), creating a teaching commons for faculty to engage in programs to improve instruction (Advisory Group Member LM13), and engaging in interdisciplinary work by bringing different departments into the space (Provosts PP03, PP08), among other activities.
- *Partner with other departments to reach shared institutional goals.* One provost provided a detailed account of how library administrators and staff could achieve this partnership. She suggested that library administrators and staff engage everyone in the community in redefining the library’s role by hosting a town hall meeting and asking, “What is the role of the library today?” By collaborating with other departments, library administrators and staff can formulate an institution-specific response to that question, which gets buy-in from everyone (Provost PP04).
- *Partner with institutions outside the university or college, such as government and commercial institutions.* It is important for library administrators and staff not only to collaborate with those internal to the institution, but also to bring in those external to it. As an example, one provost suggested that library administrators and staff allow community groups from outside the institution to come into the library and give them space in which to engage (Provost PP13). This practice also aligns with a higher education trend identified by provosts, which relates to the growing decentralization of students from their physical institutions due to factors such as the increase in distance learning and the rising importance of continuing education. For these reasons, integrating the outside community into the institution can engender buy-in from those not geographically linked to the institution.

Exemplary Studies

The 2015 study by Hess, Greer, Lombardo, and Lim at Oakland University Libraries is exemplary because it documents the libraries’ efforts to collaborate with other departments in support of student success and persistence.²⁰⁰ The documented and suggested collaborations cover a broad range of services and collections. Another notable collaboration was between Wolfe, an assistant professor in the behavioral and social sciences

at Hostos Community College (CUNY), and her college's librarians. Wolfe published in a higher education journal the results of a study that incorporated information literacy into a class assignment. We assigned one of the highest scores to this document, which we retrieved from a higher education database.²⁰¹

Research Questions Requiring Further Study

1. How can library administrators and staff collaborate with staff and faculty members from other academic institutions to increase student learning and success?
2. How can library administrators and staff collaborate with staff and faculty from other academic departments within the same academic institution to increase student learning and success?
3. What can library administrators and staff learn from institutional units that have increased student learning and success? How can library administrators and staff use this information to accomplish these increases and communicate their efforts?
4. What types of collaboration are the most effective in facilitating student learning and success outcomes?
5. How do collaborations between library administrators and staff and other libraries affect contributions to student success outcomes?
6. How can library administrators and staff contribute to areas that demonstrate the most promise for benefiting from library collaboration to increase positive student learning outcomes?

Proposed Research Design

The exemplary studies for collaborating with educational stakeholders also provide good examples of developing future work and reporting the findings. Future work suggests how other research can build on the findings and other aspects of the current study. The limitations and implications of the study help identify how researchers can extend the work in future studies. Since the study results inform future work, implications, and limitations, these elements sometimes are combined. A more detailed list of considerations for organizing and presenting research is in Connaway and Radford.²⁰² The 2015 study by Hess and colleagues provides several suggested collaborations that involve a broad range of library services and collections and does an exemplary job of suggesting how librarians can collaborate with stakeholders in their institutions.²⁰³ See the table in *Appendix L: AiA Studies with Exemplary Design Elements* for additional examples of studies with exemplary future work sections.

Questions for Researchers: Future Work

1. How can the limitations of the study be clearly stated?
2. How can the implications of the work be connected to suggestions for future research?

When reporting a study, the researcher should report what is appropriate based on format (e.g., poster, paper, presentation) and audience. Like the discussion and future work sections of the research process, the only real criterion for identifying exemplary reporting in studies is how precisely the study presents this information and how relevant it is to the audience. The Wolfe study that we identified as exemplary for this priority area was published by the author in a non-LIS journal. This action is a useful reminder that LIS conferences, journals, and other venues are not and possibly should not be the only sites for sharing LIS research.

Questions for Researchers: Reporting

1. What non-LIS venues should researchers consider for sharing LIS research?
2. Is the information clearly reported?
3. Is the information being shared relevant to the audience?

Visualizing Academic Library Impact: The ACRL/OCLC Literature Analysis Dashboard

To aid researchers, practitioners, and students in answering the research questions above, or library administrators and staff in using the priority areas for the development of effective programs and examples of student learning and success, we created a visualization component. Findings from the data analysis and collection portion of this project informed the development of the component, consisting of a literature search tool and a charts and graphs tool.* Visualizing Academic Library Impact: The ACRL/OCLC Literature Analysis Dashboard is a web application providing two primary functions:

1. A literature search tool for searching through the database of documents analyzed for this report and compiling and sharing reference lists for further study.
2. A charts and graphs tool for producing and sharing visualizations and graphics from data within the document database as well as user-uploaded data.

The literature search tool and the charts and graphs tool both protect the database metadata related to the literature review of this report. We made these data immutable and read-only to protect them from accidental harm. However, regular users can upload their studies, data, and metadata. This uploaded data will be visible only to the uploading user and cannot impact the experience of others. Some modifications to the global, underlying database can be made by Super Users (such as website administrators) so that the database can be kept up to date.

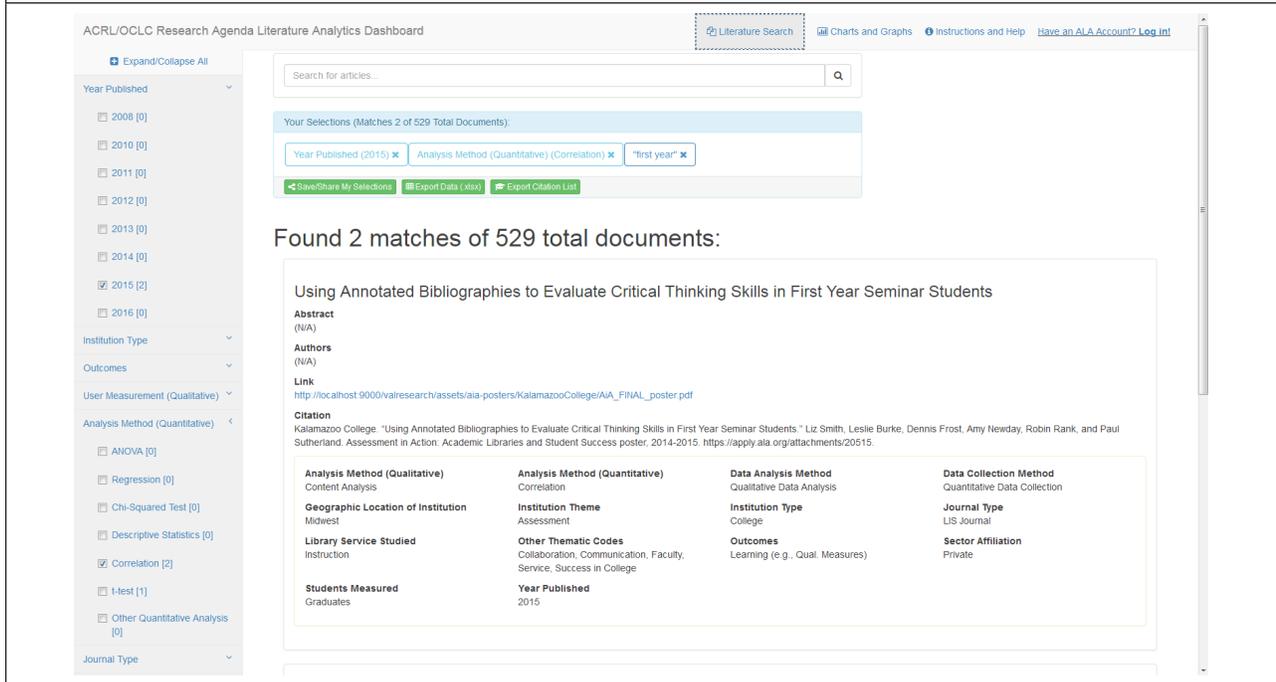
Unlike most web applications, both the visualization backend and its frontend are written in a single strongly typed free and open-source programming language (Scala; <http://scala-lang.org>). Use of the Scala language enforces software correctness and quality to provide a seamless user experience. Several open-source technologies power the visualization component. These technologies are

- Scala.js (client-side JavaScript generation; <http://www.scala-js.org>)
- Play Framework (backend application; <https://playframework.com>)
- H2 database engine (database persistence; <http://h2database.com/html/main.html>)

* For recognition and usability purposes, we chose to name the tool “charts and graphs.” However, we recognize that the tool fulfills the functions of a graph as defined by the Merriam-Webster dictionary as “a diagram (such as a series of one or more points, lines, line segments, curves, or areas) that represents the variation of a variable in comparison with that of one or more other variables.” See *Merriam-Webster Dictionary Online*, s.v. “graph,” accessed July 1, 2017, <https://www.merriam-webster.com/dictionary/graph>.

Literature Search Tool

Figure 8
Literature search tool interface



The literature search tool allows library administrators, library staff, researchers, practitioners, and students to search the 535 selected LIS and higher education documents analyzed for the *Literature Review* section of this report. To reiterate, the selection criteria for LIS and higher education documents reviewed are (1) indexed by LIS or higher education databases or identified by the project team or ACRL (e.g., ACRL AiA projects, Ithaca S+R surveys; see *Relevant ACRL Documents* section), (2) published between 2010 and 2016, (3) containing themes identified in the 2010 *VAL Report*, and (4) published in the United States, except for studies outside the United States deemed relevant by the project team.

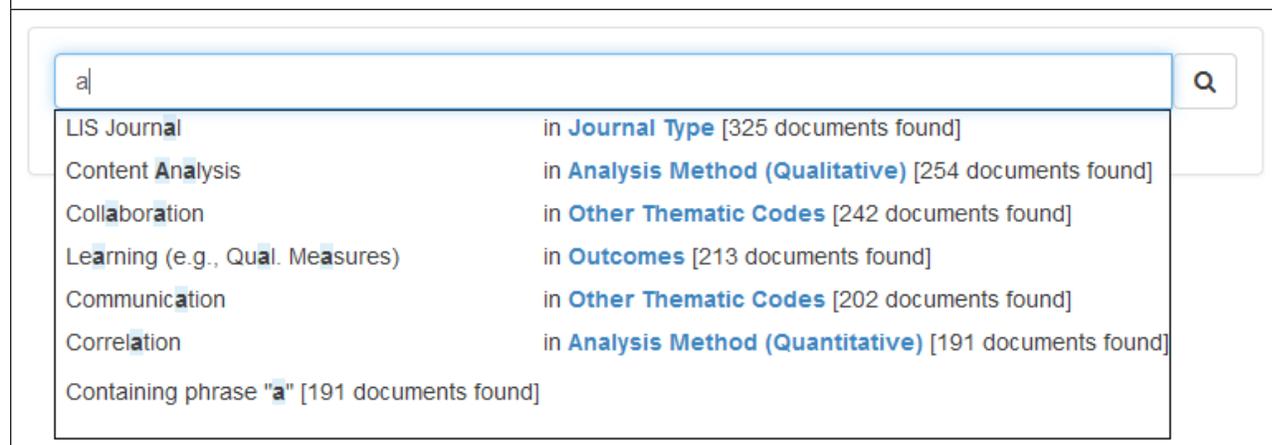
The tool provides faceted search (i.e., a category-based search) and text search to help users quickly navigate through the document database and find items of interest. It also allows users to save and share reference lists through persistent URLs that can be copied and pasted easily.

Faceted Search

The left navigation bar of the literature search tool features a collection of “search facets.” These facets represent areas of interest to search identified by us and reflected in the Thematic and Research Document Characteristics Coding Schemes (see *Appendix D: Codebook*). Facets (i.e., study-related categories) appear as organized checkboxes that filter the document database in real time. As facets are selected, documents are either filtered away or added to the current list of pertinent documents. The currently selected set of facets and text filters is displayed using a breadcrumb metaphor under the Selected Document Attributes panel shown in figure 8. We were inspired by the design of the Zappos website (<http://www.zappos.com>) and WorldCat Fiction Finder (<http://experimental.worldcat.org/xfinder/fictionfinder.html>) when designing this feature.

Text Search

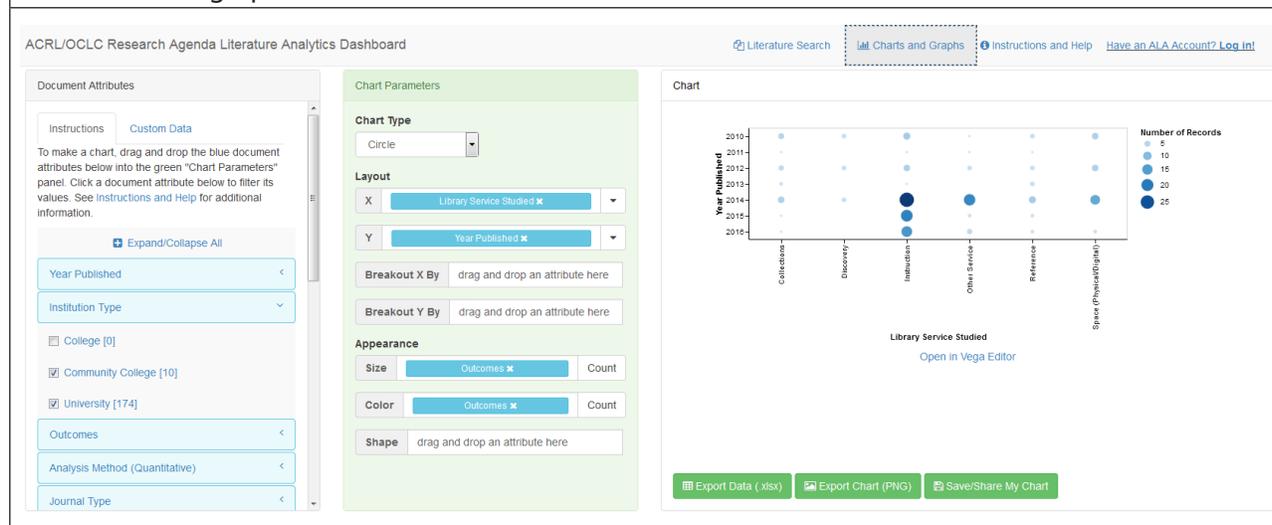
Figure 9
Text search with real-time feedback



The text search function (figure 9) provides real-time feedback on available documents as a user enters text. This function can help searchers get a sense for the thematic and research document characteristics codes available in the database, as well as other document categorizations. The search function transparently supports basic Boolean queries using *and*, *or*, *not*, and phrase-based search.

Charts and Graphs Tool

Figure 10
The charts and graphs tool



The charts and graphs tool (figure 10) emulates Tableau software (<http://www.tableau.com/Tableau-Software>), which is sometimes used to generate visualizations both within and outside LIS, by providing a Tableau-like drag-and-drop interface for constructing visualizations and graphics.²⁰⁴ We have populated this tool with the same documents and metadata from the 535 selected LIS and higher education documents included in the

literature search tool. Like the literature search tool facets, the metadata used by the charts and graphs tool has been derived by the team from the Thematic and Research Document Characteristics Coding Schemes (see *Appendix D: Codebook*). While this document database is the default data source for the charts and graphs tool, users can import additional data in supported columnar formats (e.g., Excel tables).

A significant strength of this tool is its use of a powerful visualization grammar called Vega Lite. This grammar is very expressive and can be used to create detailed charts with support for advanced user interaction, streaming data, and chart layering, among other things. However, it is currently available only as grammar, meaning that an individual must understand how to write in this grammar to use these powerful features. For this reason, the charts and graphs tool uses a bidirectional compiler that consumes and generates visualization specifications conforming to the Vega Lite visualization grammar. In other words, users get some of the features of Vega Lite without the learning curve. Only a relatively small number of Vega Lite features are exposed to preserve the simplicity of the user interface. Advanced users with specific needs (such as animation, or “brushing and linking”²⁰⁵ that associates two or more charts, so that interacting with one chart will highlight data items in the other charts) can export their charts in Vega Lite format and enhance them with these advanced features using the online Vega Lite Editor (<https://vega.github.io/new-editor/?mode=vega-lite>).

When users finish editing a chart, they can export the chart as an image to share with colleagues or stakeholders. Also, the chart can be saved within the web application so that users can edit it later. An additional feature that we added following feedback from usability testing allows users to download data as a Microsoft Excel document. As we learned from usability testing (detailed below), some users prefer the familiarity of that tool when creating visualizations and graphics.

Administration and Sandboxed Content Tagging

One of the chief objectives of the visualization component is to give users access to the database and related metadata from the *Literature Review*, while also allowing users to upload their data and generate metadata. For these reasons, the visualization component provides standard role-based access control to endow user accounts with special administrator privileges. These privileges will allow a database maintainer to fix typos in the database, edit existing data, or add or delete data.

The typical user can create a set of tags (analogous to “labels” used in Gmail²⁰⁶) for labeling existing documents, allowing the user to create personalized metadata. Users can also upload documents to the database. This action is sandboxed, meaning it is reflected only in the user’s particular database and not across the visualization component tools. These users can also perform some other sandboxed augmentations to the document database. Since the team has sandboxed these augmentations, there will be no way for a user to affect another user’s view of the database, and a non-administrator user cannot harm the database contents.

Usability Testing

A prototype of the visualization component was usability tested in the OCLC Usability Lab in early March 2017. Six participants were recruited to assess the tool. The participants represented academic librarians and administrators, and LIS researchers and students. They varied in their usage of the ACRL AiA tool (<https://apply.ala.org/aia/public>). The team compared this tool to the visualization component prototype in a post-evaluation interview question.

Participants performed four tasks:

1. a search-related task requiring only faceted search within the literature search tool
2. another search-related task requiring text and keyword search
3. a third search combining both faceted and text and keyword search
4. a fourth task requiring the user to use the charts and graphs tool to create a histogram graph of document data

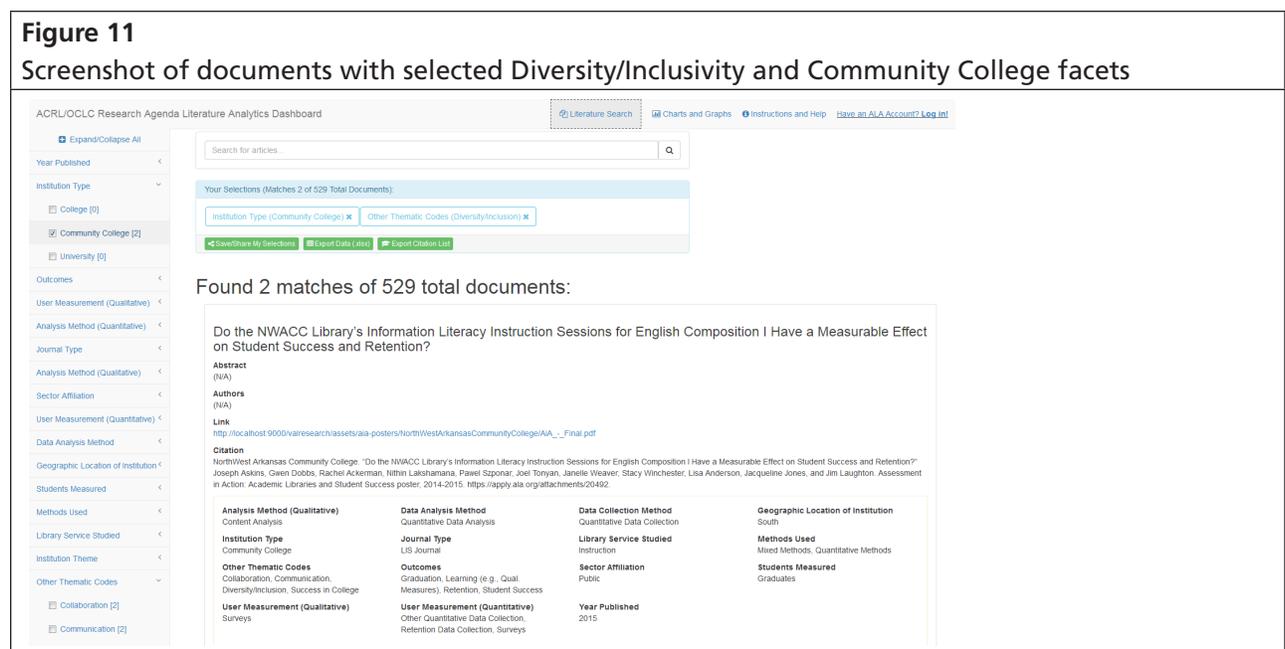
By observing users and soliciting feedback early in the design and implementation phase of the project, we could pivot to improve the visualization component and acquire empirical assurance that user expectations are satisfied as they interact with the tool. This feedback helps to ensure that users' interactions with the visualization component software and interface are positive and have as little friction as possible.

Searching the Visualization Component Using the Priority Areas

To illustrate how to use the visualization component tools, consider two sample scenarios posed to the usability testing participants.

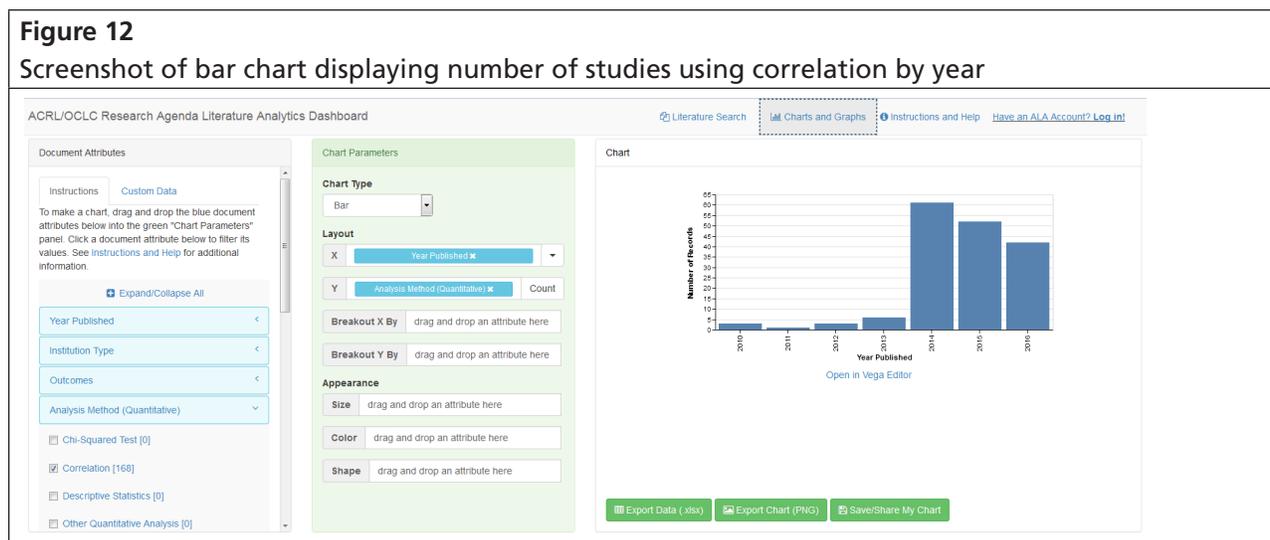
For the first scenario, imagine being a librarian at a community college who wants to examine how the library impacts the inclusivity and diversity of the student body. Before beginning this study, the librarian wants to get an idea of what recent literature exists on the topic.

To generate a reference list of studies about inclusivity and diversity at community colleges, one could use the literature search tool. The user can accomplish this task by using facets. Specifically, the user could check the Diversity/Inclusivity and Community College facets. Doing so will display a list of references from the 535 documents indexed in the tool's database that we have labeled with these facets. If the user has added additional documents and labeled them with this metadata, the tool also displays those documents in the references list (figure 11).



For the second scenario, imagine being a library director who has an upcoming meeting with the provost. The director wants to demonstrate to the provost that correlation is considered a viable means through which to demonstrate the library's impact. To make this demonstration, the director wants to create a bar chart that displays the increase in studies that use correlation over time.

One could use the charts and graphs tool to generate a bar graph showing the number of studies using correlation from 2010 to 2016. The user can assign the Year Published facet to either the x - or y -axis and the aggregate field COUNT, which generates a count of the number of document records corresponding to the desired query, to the other axis. This action will display a graph illustrating the number of studies indexed in the database. To then show the number of studies using correlation over time, the user could filter the results by checking the Correlation facet so that the resulting graph displays only results tagged as Correlation. Finally, if the graph does not present as a bar, the user can change the display by choosing Bar from the Marks menu (figure 12).



A significant strength of the visualization component is that its document database was developed based on data collection and analysis informed by our expertise and feedback from the ACRL board, VAL committee, and advisory group members. For these reasons, the documents in the database and their metadata correspond to the agenda's priority areas. *Appendix J: Examples of Research Questions That Can Be Addressed Using the Visualization Component, Organized by Priority Area* includes a list of sample research questions, organized by priority area, which can be approached using the visualization component. These questions are more specific than the research questions listed under each priority area in the body of the report because they integrate context, such as the institution type or population studied. A key benefit of the visualization component is the facilitation of targeted research questions.

Limitations

The research report and priority areas are the basis for the research agenda. The exemplary studies and visualization component are the foundation for the identification of the data collection and analysis methods that researchers can use to address the research questions. Although the report, agenda, and visualization component were developed and informed by methods that are systematic and grounded in research theory and practice,

as with any project, we must address some limitations. These limitations indicate which conclusions one can draw from the project findings and which one cannot draw.

We divide the limitations of the project into the areas of data collection and analysis. The data collection provides a US-centric perspective of issues related to library assessment and evaluation. The selection criteria for the literature mainly are focused on documents from the United States, and all advisory group members and provosts who participated in the interviews were from United States institutions.

Another limitation in data collection relates to the selection of data sources. Selected LIS and higher education documents may reflect trends from two or more years prior to publication, especially the research documents, given the time it takes to complete a research project, write up the results, submit it for review for publication, and have it accepted for publication and published. The literature disproportionately represents studies addressing public sector universities and institutions, as opposed to colleges and community colleges and institutions in the private sector. The selection of advisory group members, who also are the focus group interview participants, from a variety of institutional settings, with representation from all three institutional types, both public and private sectors, and secular and nonsecular institutions, was intentional to provide a broader perspective on the project.

Since the sample of documents indexed in databases was nonrandom, we may have missed some documents that would be relevant to the literature review (e.g., gray literature, such as other research agendas). We minimized this missed selection by soliciting feedback from the ACRL board and members, as well as the advisory group, regarding what studies we should add to the content analysis of selected LIS and higher education documents.

The selection of the advisory group members and their institutions' provosts provides only an indication of important themes from a high-level administrative perspective. Since the interview participants and the literature samples are purposive and not random, the findings reported do not represent all professional librarians', high-level administrators', and researchers' perspectives on the themes. However, we can draw some conclusions by examining the overlaps between the smaller sample of administrators and the larger sample of the literature.

Due to our purposive sample of all three data sources, our research methodology did not capture the everyday practices and areas of research explored by academic libraries. For this reason, we suggest that a future research direction for libraries is to pursue further study and survey of effective practices beyond what the literature review, advisory group members, provosts, and ACRL board and VAL committee indicated.

Finally, comparing three data sources using the same coding scheme, which was generated deductively from relevant ACRL literature, may have stifled the emergence of other themes. In an attempt to mitigate this limitation, we inductively added codes to the coding scheme when they emerged from the data. These codes included inclusivity/diversity and privacy.

The charts and graphs tool within the visualization component is designed with a tradeoff between simplicity of user interaction and support for Vega Lite features. Usability testing in the OCLC Usability Lab indicated that the interface should favor simplicity over expressive power. Thus, some kinds of graphics that are expressible in Vega Lite cannot be expressed using the charts and graphs tool. However, the Vega Lite source code of graphs within the charts and graphs tool can be exported, edited, and rendered using the Vega Lite online editor. Additionally, users who are comfortable in Excel can export an Excel workbook file for producing visualizations.

Conclusion

This research agenda responded to two areas that ACRL identified as essential for library administrators, library staff, researchers, practitioners, and students to address in future research and practice. These areas are (1) how libraries align with and impact institutional effectiveness related to student learning and success, and (2) how library administrators and staff best communicate this alignment and impact in a way that resonates with higher education stakeholders. This agenda relied on empirical analysis of three data sources to inform the identification of six priority areas for future research, with exemplary studies, practices, research designs, and future-focused research questions under each area. Further, we created a visualization component to facilitate inquiry into these areas and research questions.

The empirical research informing this agenda consisted of our analysis of three data sources: (1) 535 documents from the LIS and higher education literature, (2) focus group interview and brainstorming sessions with an advisory group comprised of academic library administrators, and (3) semi-structured individual interviews with provosts from advisory group members' institutions. The selection criteria for LIS and higher education documents were (1) indexed by LIS or higher education databases or identified by the project team or ACRL (e.g., ACRL AiA projects, Ithaka S+R surveys); (2) published between 2010 and 2016; (3) containing themes identified in the 2010 *Value of Academic Libraries* (VAL) report; and (4) published in the United States, except for studies outside the United States deemed relevant by the project team.

Findings from analysis of selected literature show that it focuses on the themes of collaboration, teaching and learning, and library service. Theoretical documents (e.g., literature reviews, research agendas) discussed the mission alignment and strategy theme more than research documents, which signifies that library administrators, library staff, researchers, practitioners, and students are not addressing this important topic in their work. Documents from the higher education literature examined service less than those within the LIS literature, suggesting a disproportionate focus on this theme among library administrators, library staff, researchers, practitioners, and students.

Findings from the focus group interview with advisory group members, who are library administrators, showed an emphasis on the themes of collaboration, communication, and library service. These findings confirm those from the analysis of selected literature in suggesting that library administrators, library staff, researchers, practitioners, and students may focus on service as a library resource at the expense of the other resources related to space and collection. Building on the analysis of selected literature's emphasis on the theme of collaboration, advisory group members contextualized the need to link both collaboration and communication to the institutional mission and goals, rather than isolate both themes within the library.

Provosts valued the themes of communication, mission alignment and strategy, and space as a library resource. Provosts' valuing communication aligns with the priorities of the ACRL AiA studies and advisory group members. However, provosts discussed mission alignment and strategy to a greater degree than the other data sources. Provosts further emphasized the importance of librarians communicating how the library contributes to institutional goals by marketing, customer service, and sharing space with other groups, both on and off campus.

Relying on three data sources to inform this agenda strengthens the comparisons that can be made between the sources to determine similarities and differences in how each discussed student learning and success. This comparison guided the development of the priority areas by identifying emerging areas related to student learning and success that require future investigation. Library administrators and staff should use the priority areas to influence and guide their efforts in developing academic programs and offerings focused on student learning and success. Researchers, practitioners, and students should use the research questions as a catalyst

for the study of college and university student learning and success. The visualization component aids these researchers, practitioners, and students in addressing the identified priority areas and research questions, as well as providing the flexibility to pursue related areas.

Suggested Topics of Interest for Communicating with Academic Administrators

- Inform the provost of a newly created library position. (LM14)
- Get the provost's permission to attend meetings with the student affairs director. (LM14)
- Get involved in efforts related to institutional mission and alignment, which includes face time with the provost. (PP03)
- Create targeted stories featuring faculty and students that discuss the benefit of library initiatives. (LM13)
- Invite the provost to library events. (PP02)
- Run into the provost at a coffee shop and informally discuss the library's value. (LM14)
- Communicate to leadership favorable reviews the library receives for events and initiatives. (LM12)

Appendix A: Glossary

Assessment: Research on the effectiveness of a program, product, or service to facilitate its ongoing improvement; is driven in part by scrutiny on the affordability of higher education. For more information, please see the discussion on Assessment and Evaluation in this report's *Literature Review* section.

Codebook: Documentation of themes derived from coding, their definitions, and examples.

Coding: Placing data in categories, or themes, for organization and analysis.²⁰⁷

Communication: Conveying impact or other aspects of value to stakeholders.

Collaboration: Working with other units to influence student outcomes. Collaboration can be intra-institutional (e.g., with mission alignment and strategy unit, faculty) or inter-institutional (e.g., with multiple institutions).

Evaluation: Research on the effectiveness of a program, product, or service that tends to be more holistic,²⁰⁸ occur on a larger scale, focus on more generalized end results, and be written for a wider audience than assessment. In other words, an evaluation perspective will take a big picture or helicopter view of a collection, space, or service in a larger (e.g., institutional) context. For more information, please see the discussion on Assessment and Evaluation in this report's *Literature Review* section.

Learning analytics: "Data about learners and their contexts, for purposes of understanding and optimizing learning and the environments in which it occurs."²⁰⁹

Teaching and learning: An outcome focused on the less objective concepts of learning, such as critical thinking. These encompass the outcomes not covered by the "student success" theme, which the team defines as "quantifiable student attainment indicators, such as enrollment in postsecondary education, grades, persistence to the sophomore year, the length of time to degree, and graduation."²¹⁰ Usually not tied to a particular graded assignment or graduation. For more information, please see the discussion on Learning and Success in this report's *Literature Review* section.

Method: "Any procedure employed to attain a certain end"; used to address a research-related goal or goals.²¹¹

Mixed methods: The use of qualitative collection or analysis and quantitative collection or analysis methods. All mixed methods are multiple methods.

Multiple methods: More than one type of method, but can be two or more qualitative methods or two or more quantitative methods. All mixed methods are multiple methods, but not all multiple methods are mixed.

Student success: An outcome focused on the more objective, usually quantifiable, indicators of learning, or "quantifiable student attainment indicators, such as enrollment in postsecondary education, grades, persistence to the sophomore year, the length of time to degree, and graduation."²¹² These outlines relate to a specific assignment or semester, such as grades or GPA. This outcome could also be related to whether the student re-enrolled or graduated. For more information, please see the discussion on Learning and Success in this report's *Literature Review* section.

Appendix B: Provost Semi-structured Interview Protocol

1. Do you have any questions before we begin?
1. How do the specific people that you meet with articulate what they are doing and how well they are doing it?
 - a. [Probes: Trying to find out how academic departments/units communicate their activities. If the interviewee mentions them, they are memorable to the administrator.]
2. What information do you or your institution use to measure the effectiveness/impact of different academic departments/units?
 - a. [Probes: Trying to identify how the interviewer measures success/impact.]
3. How do you find out about the library's/libraries' activities?
 - a. [Probes: Trying to find out how the library communicates its services and activities to the campus and the community. How does the library staff make you aware of services?]
4. How does your institution measure the effectiveness/impact of the library's/libraries' services?
 - a. [Probes: How involved is your institution's academic library with each of the following high impact practices: first-year seminars and first-year experiences; common intellectual (curricular or co-curricular) experiences; learning communities; writing-intensive courses; collaborative assignments and projects; undergraduate research; diversity and global learning; service learning and community-based learning; internships; capstone courses and projects.]
 - b. [Probes: Are there specific library services, resources, or practices that stand out as evidence of involvement with the high-impact practices we just discussed?]
5. Suppose your institution's library dean or director approached you with a moderate (noncapital) funding request, such as for new positions or an increase in the collections budget, that competed with funding requests from other (revenue-generating) academic units. What data types would influence you to prioritize the library's funding request over those of the other academic units?
6. What challenges do you see in the way the library staff communicates with the academic community, including students, faculty, and administration?
7. What do you think would facilitate communication between the library staff and your academic community, including students, faculty, and administration?
 - a. [Probes: What are the most effective modes of communicating each evidence of value that you just mentioned?]
8. What changes do you envision in higher education in the next five years?
9. In what ways can the library be a major contributor to this new higher education environment?
10. If you could create an ideal academic environment, what would that look like? How could the library/libraries enhance or support this environment?
11. Based on your knowledge of our project and the topics we have just covered, is there anything I did not ask you that you think I should have asked?

Appendix C: Provosts' Titles and Carnegie Class for Provosts' Universities

Advisory Group Member Code	Title	Carnegie Classification: Basic
PP01	Associate Provost and Associate Dean of Faculty	Baccalaureate Colleges: Arts & Sciences Focus
PP02	Provost	Doctoral Universities: Higher Research Activity (R2)
PP03	Vice Provost for Education	Doctoral Universities: Highest Research Activity (R1)
PP04	Teaching Professor in Biological Sciences	Doctoral Universities: Highest Research Activity (R1)
PP05	Associate Provost for Undergraduate Affairs	Associate's Colleges: High Transfer-Mixed Traditional/ Nontraditional
PP06	Assistant Dean of Arts and Sciences	Doctoral Universities: Highest Research Activity (R1)
PP07	Assistant Provost for Assessment	Doctoral Universities: Highest Research Activity (R1)
PP08	Chancellor	Doctoral Universities: Higher Research Activity (R2)
PP09	Associate Vice President for Undergraduate Education	Doctoral Universities: Highest Research Activity (R1)
PP10	Associate Provost for Faculty Affairs	Doctoral Universities: Higher Research Activity (R2)
PP11	Associate Provost for the Advancement of Teaching and Learning	Doctoral Universities: Highest Research Activity (R1)
PP12	Vice Provost and Associate Vice Chancellor for Undergraduate Education	Associate's Colleges: High Transfer-Mixed Traditional/ Nontraditional
PP13	Interim Vice President for Learning	Doctoral Universities: Moderate Research Activity (R3)
PP14	Associate Provost for Student Success and Accreditation	Master's Colleges & Universities: Larger Programs (M1)

Appendix D: Codebooks

Theme Coding Scheme

Identify the appropriate library resource (collection, service, or space) discussed and that can be inferred based on the codebook definitions.

All trends and studies in this report deal with student outcomes. However, trends may involve other stakeholders as indicated below.

Library Resources

Service: Ways that the library interacts with users or facilitates use of its spaces or collections (e.g., reference, information literacy instruction)

Space: Areas where users can interact with library services and collections in a physical or digital environment (e.g., physical facilities, seating, library’s Facebook page)

Collection: The library’s physical and digital holdings (e.g., books, periodicals, microfiche)

Higher education trend	Trend defined	Example of library resources related to trend
<i>Students</i>		
Teaching and learning (and beyond)	Outcome is focused on the less objective concepts of learning, such as critical thinking. These encompass the outcomes not covered by the student success theme, which are “quantifiable student attainment indicators, such as enrollment in postsecondary education, grades, persistence to the sophomore year, length of time to degree, and graduation.” ^a Usually not tied to a specific graded assignment or graduation. For more information, please see the discussion on Learning and Success in this report’s <i>Literature Review</i> section.	Service: Library instruction Space: Collaborative working space for students Collections: Repository of online tutorials not linked to a specific class

Higher education trend	Trend defined	Example of library resources related to trend
Student success (for multiple student groups)	Outcome is focused on the more objective indicators of learning, or “quantifiable student attainment indicators, such as enrollment in postsecondary education, grades, persistence to the sophomore year, length of time to degree, and graduation.” ^b These tended to be linked to a specific assignment/semester, such as grades/GPA. Outcome could also be related to whether the student re-enrolled or graduated. For more information, please see the discussion on Learning and Success in this report’s <i>Literature Review</i> section.	Collections: Physical collections Collections: Digital collections Space: Study spaces Service: Library instruction Service: Collection discovery
Students/Faculty		
Research support	Outcome was tied to research or other use of the library’s collections that was not explicitly tied to a class.	Collections: Physical Collections: Digital Service: Data storage Service: Consultation Service: Teach data management Service: Teach data mining methods Service: Collection discovery Space: Research (as opposed to learning) commons
Faculty		
Teaching support	Outcome was viewed from an instructor perspective, and it deals with a specific course.	
Institution		
Accreditation	Accreditation-related student outcomes	Service: Help institutions meet federal guidelines/requirements
Assessment (driven in part by affordability of higher ed)	Institutionally identified student outcomes (can be co-coded with learning and success)	Service: Educate library and other employees Service: Align with institutional mission and goals
Provision of technology	Outcome also dealt with hardware/software that affect student outcomes	Service: Provide expertise for data management Space: Provide hardware and software in makerspaces
Other thematic codes (does not have to align with library service, space, or collection)		
Inclusivity	(Possibly) marginalized groups	First-generation college students; People of color; Commuters; Distance learners; English as a second language; Lower socioeconomic level
Collaboration	Librarians work with other institutional departments to influence student outcomes or with other institutions.	Collaboration could be intra-institutional (e.g., with mission alignment and strategy unit; faculty) or inter-institutional (e.g., with multiple institutions)
Communication	Librarians communicate impact or other aspects of value with stakeholders	

Higher education trend	Trend defined	Example of library resources related to trend
a.	George D. Kuh, Jillian Kinzie, Jennifer A. Buckley, Brian K. Bridges, and John C. Hayek, What Matters to Student Success: A Review of the Literature, Commissioned Report for the National Symposium on Post-secondary Student Success: Spearheading a Dialog on Student Success (Washington, DC: National Post-secondary Education Cooperative, 2006), 5, https://nces.ed.gov/npec/pdf/kuh_team_report.pdf .	
b.	Ibid.	

Research Document Characteristics Coding Scheme

Code name	Code definition	Values
Year	Year study was published.	2010–2016
Geographic location	Major geographic regions as defined by census at https://www2.census.gov/geo/pdfs/maps-data/maps/reference/us_regdiv.pdf or outside of the United States where the study was performed. Do not code if institutions were in different regions.	Northeast; Midwest; Outside the US; South; West
Type	Type of institution where the study was performed. Do not code if multiple institution types were studied.	College; Community college; University
Sector affiliation	Whether institution was public, private, secular, or nonsecular. Do not code if multiple institutions are not the same.	Private; Public
Multiple institution	Code if study involved multiple institutions.	Multiple institutions
Outcomes	Specific student outcomes that are tied to a more objective qualitative or quantitative indicator of learning for a specific assignment, class, or graduation.	Enrollment; Graduation; Learning; Retention; Student engagement; Student success
Library service	Library service studied.	Collections; Discovery; Instruction; Reference; Space (physical or digital)
Library measurement	How the library service was measured.	Usage; Attendance
User measurement—Qualitative	How the user data were collected via qualitative methods. Interviews include individual and group interviews. Reference interviews are considered content analysis.*	Interviews; Surveys; Other
User measurement—Quantitative	How the user data were collected via quantitative methods. Interviews include individual and group interviews.	GPA; Persistence; Pre/post test; Retention; Survey; Rubric; Other
User measurement—Student type	Status of participants. Other includes faculty/staff.	Undergraduate; Graduate; Other
Analysis method—Qualitative	How the data were analyzed via qualitative methods.	Content analysis; Other
Analysis method—Quantitative	How the data were analyzed via quantitative methods.	ANOVA; Regression; X2; Descriptive statistics; Correlation; Other

* Note: When the researchers use a rubric to evaluate student work, the analysis method is considered quantitative only if they discuss the numerical values assigned to student work. If they report qualitative findings (e.g., themes) from the student work, then the qualitative analysis method may also be used (e.g., content analysis).

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Appendix F: Advisory Group Members' Titles and Institutions' Carnegie Class

Advisory Group Member Code	Title	Carnegie Classification: Basic
LM01	Library Director	Baccalaureate Colleges: Arts & Sciences Focus
LM02	Dean of Libraries	Doctoral Universities: Higher Research Activity (R2)
LM03	Associate Dean & Director of Research & Academic Services	Doctoral Universities: Highest Research Activity (R1)
LM04	Associate Chair, Associate University Librarian	Doctoral Universities: Highest Research Activity (R1)
LM05	Reference Librarian	Associate's Colleges: High Transfer-Mixed Traditional/ Nontraditional
LM06	Associate University Librarian for User Services and Associate Dean of Libraries	Doctoral Universities: Highest Research Activity (R1)
LM07	Vice President for Information Services and University Librarian	Doctoral Universities: Highest Research Activity (R1)
LM08	Associate Dean	Doctoral Universities: Higher Research Activity (R2)
LM09	Dean of Libraries	Doctoral Universities: Highest Research Activity (R1)
LM10	Dean & Director of Library	Doctoral Universities: Higher Research Activity (R2)
LM11	Dean of Libraries	Doctoral Universities: Highest Research Activity (R1)
LM12	Library Director	Associate's Colleges: High Transfer-Mixed Traditional/ Nontraditional
LM13	University Librarian	Doctoral Universities: Moderate Research Activity (R3)
LM14	Dean of Libraries and Educational Technologies	Master's Colleges & Universities: Larger Programs (M1)

Appendix G: Library Administrator Focus Group Interview Protocol

1. Explain or tell me how your academic library/libraries has/have succeeded in supporting the mission and goals of your institution.
2. How do you communicate your library's activities to your larger institution's administration?
 - a. [Probe: How do you make the institution's administration aware of the services your library provides?]
 - b. [Probe: How do you tie these activities to advancing your institution's mission and goals?]
3. How has your library collaborated with other libraries (both on campus and off campus) and other academic departments? Explain the collaborations (i.e., which academic departments, staff, etc.).
 - a. [Probe: How do you communicate/collaborate with students, faculty, and administration?]
 - b. [Probe: How did the library initiate these collaborations? Why did the library initiate these collaborations?]
 - c. [Probe: Were these collaborations effective? If yes, why and what factors made them effective? If not, why and what factors made them ineffective?]
 - d. [Probe: How did these collaborations facilitate communication with your institution's administration?]
 - e. [Probe: How did these collaborations impact the students, faculty, or staff at your institution? How were these impacts measured?]
4. What could facilitate improved communication between your library and your larger institution's administration, faculty, and students?
 - a. [Probe: What different types of engagement could facilitate communication (i.e., face-to-face or online events, update sessions, new service offerings, etc.)?]
5. What factors hinder communication between your library and your institution's administration?
6. If you had a magic wand, how would you better communicate and make your administration, faculty, and students more aware of the services the library offers and their impact on student learning and success?
7. What else would you like to share about:
 - a. How your library supports the mission of your larger institution?
 - b. How you communicate this support to your institution's administration?
 - c. How you articulate value to your institution's administration?

Appendix H: Further Description of the Coding Process for Data Analysis

Once the two codebooks were developed and revised, the three data sources (i.e., documents from the literature review, focus group interview transcript, provost interview transcripts) were imported into NVivo, a qualitative research environment that facilitates the maintenance and application of codes across various data sources.²¹³ Specifically, NVivo allows coders to highlight sections of text and label these sections with the relevant codes from the codebook that describe it. If an individual renames or deletes a code, the change will be updated in NVivo. NVivo also keeps track of the number of times an individual applies a code and for which data sources they used the code. This information was used to complete post hoc data analysis.

Another useful feature of NVivo is its ability to determine if team members agreed with one another when labeling sections of text, and the degree of this agreement. Multiple team members engaged in coding and measuring the agreement of this coding, referred to as “inter-coder reliability.”²¹⁴ For each of the three data sources, at least two project team members coded 20 percent of the data using the thematic codes. For instance, if a data source was ten pages, the team coded two pages of text. Twenty percent of all the literature review documents coded as research also were coded using the research document characteristics codebook. The team reviewed the codes assigned, discussed coding discrepancies, and revised the codebooks to reflect the changes (e.g., making a definition more specific). Based on these actions, inter-coder reliability was calculated for the research document characteristics at 95 percent agreement and 99 percent agreement for the theme coding. The coding of the two team members was compared to a third team member’s coding, again discussing any coding discrepancies and revising the codebook to reflect changes. Following this discussion, the team attained 100 percent agreement for both coding schemes on 20 percent of the documents. Two team members coded the remainder of the documents. During this latter phase of coding, team members also labeled portions of the data as being “juicy quotes,” which are particularly interesting or notable statements. Use of juicy quotes “brings the research to life and enables the reader to hear the participant’s voice, which adds validity to the findings.”²¹⁵ Another team member then reviewed the codes, amending them as necessary based on the codebooks.

Appendix I: Description of Post Hoc Techniques Used in Report

Below is a description of the three post hoc techniques used in this report. There exist several resources that provide a comprehensive review of post hoc analysis with relevant examples.²¹⁶ The three post hoc techniques used in this report are

1. *Linear regression*. To observe and assess trends related to how the proportion of themes coded in the selected documents changed over time. Linear regression (line fitting) was applied and coupled with significance testing via F-tests. By measuring the goodness of fit of a statistically significant linear model to the proportion data and considering the slope of the resulting model, prevalence of a theme could be assessed over time as increasing (positive slope), decreasing (negative slope), or stable (roughly zero slope).
2. *Two-proportion z-tests*. To identify significant differences between the proportions of times that codes were applied among the three data sources. Two-proportion z-tests²¹⁷ are ideal for making this determination, as they compare two groups (here, data sources) sampled from separate, independent populations (e.g., from focus group interviews, from a literature search). Some online resources provide examples, as well as Microsoft Excel workbooks containing formulas and worksheets for performing z-tests.²¹⁸ In the *Findings* section, we use a significance level of $\alpha = 0.05$ (equivalently, $p < 0.05$) to identify statistically significant differences in proportions. While the p -value is useful in determining whether differences exist between a proportion of codes applied to each data source, it is not the only measure that can be used, and it does not indicate the degree of difference (effect size) or the likelihood of differences occurring (probability). P -values, therefore, should be viewed as indicators that observations are “on the right track.” In this analysis, reporting p -values was used to bolster the observation of differences in proportions of each code among the three document sources.
3. *Benjamini-Hochberg procedure*. To ensure that the differences found between the proportions of times that codes were applied among the three data sources were sound. Post hoc analysis must accommodate for multiple comparisons, as the chances of making false discoveries increases with each hypothesis test. The Benjamini-Hochberg procedure was applied to p -values prior to significance testing to adjust for false-discovery rates.²¹⁹

Appendix J: Examples of Research Questions That Can Be Addressed Using the Visualization Component, Organized by Priority Area

Below are examples of research questions that can be addressed using the visualization component. These questions are organized by priority area. *Italicized* words represent facets and metadata labeled using the Theoretical and Research Document Characteristics Coding Schemes. Underlined words represent those identified by the free text search feature.

I. Institutional mission and goals and alignment

1. What types of diversity/inclusivity outcomes does library instruction support for undergraduate students?
 - a. How can library services increase graduate student engagement?
2. Are writing centers having an effect on student retention in community colleges?
 - a. In what ways are writing centers affecting student retention at community colleges?
 - b. How do other units track impact on student graduation?
 - c. Where do libraries fall in the institutional mission and goals or other strategic planning at four-year colleges?
 - d. How are budget constraints affecting libraries at research universities?
3. To what extent are librarians involved with accreditation?
 - a. How have librarians at four-year colleges assisted other departments with accreditation?
 - b. How do current accreditation standards affect libraries in the South?

II. Teaching and learning

1. How are teaching and learning being evaluated at community colleges in the Midwest?
 - a. What are the most common difficulties in measuring teaching and learning?
 - b. How is the impact of library instruction being measured at public four-year colleges?
2. How can libraries increase engagement among undergraduate students?
 - a. How are library spaces (online or physical) affecting engagement among graduate students?
 - b. How have libraries modified their instruction based on undergraduate student feedback?
3. How will libraries evolve to affect teaching and learning at their institutions?
 - a. What have been the unexpected consequences of partnering with others with regard to teaching and learning outcomes in research universities?
 - b. Have university libraries enriched student engagement with their communities? If so, how?

III. Student success

1. How do academic library resources or services impact success outcomes for students?
 - a. How do library collections impact student retention for undergraduate students?
 - b. How do library spaces support student enrollment?
 - c. How does library instruction affect job placement or salary?
2. How do academic library resources or services impact success outcomes for different students?
 - a. What difference in information literacy test scores (test/retest scores) do graduate and undergraduate students exhibit?
 - b. How do military students benefit from library instruction?
3. What outcome data do other departments/units in different institution types collect?
 - a. What data do university tutoring centers collect?
 - b. What student success and library instruction data do libraries at community colleges collect?
 - c. How does library instruction at the primary level affect information literacy in four-year colleges?

IV. Learning analytics

1. How are analytics being used?
 - a. What types of data do offices or units relating to institutional research collect?
 - b. What data are being used to correlate resources and services with student success in the Midwest?
2. How have libraries triangulated data on their resources and services to demonstrate their impact on student success?
 - a. How have librarians used (mixed or multiple methods) to demonstrate how undergraduate student usage of library collections affects retention?
 - b. What qualitative data collection methods have been used to measure the impact of library instruction on graduate student success?
3. How have libraries at research universities balanced concerns about maintaining user privacy with correlation studies?
 - a. How are administrators monitoring student success?
4. What data collection methods have LIS researchers used to measure the impact of library instruction on student learning and success?

V. Collaboration

1. What types of collaboration exist between libraries and other departments that share space in private research universities?
 - a. What departments are sharing library space in four-year colleges?
 - b. Were libraries sharing space differently in 2010 compared to 2016?
2. How do libraries collaborate with other units to support teaching and learning in community colleges?
 - a. Where do undergraduate students go to discover information?
3. What affects collaboration at four-year colleges?
 - a. How can libraries increase collaboration with faculty when teaching graduate students?
 - b. How is collaboration with writing centers measured?
4. How have collaborative relationships between library administrators and staff, faculty, and staff from different academic departments evolved over time?
5. How are library contributions to collaborative efforts measured?

VI. Communication

1. What types of library resources or services matter to administrators?
 - a. How do provosts view libraries' contributing to teaching and learning?
2. What do faculty surveys tell us about how they envision library resources or services?
 - a. What types of information do instructors need for teaching?
3. How can libraries develop better communication?
 - a. What are the main barriers to communication for undergraduate students at four-year colleges?
4. What factors influence library communication with community college users and potential users?
 - a. How does the use of social media increase library communication?

Appendix K: Detailed Scoring Scheme for Exemplary Research Designs and Practices

As noted in the *Selected LIS and Higher Education Literature* section, there were 369 research documents coded in this project. To identify the studies that relate to the priority areas and that demonstrated exemplary designs and effective practices, the studies were scored quantitatively. This provided a relatively simple and objective way to identify studies that covered a relatively wide range of higher education trends. To quantitatively score the 369 studies for consideration as exemplar, a method of assigning points to each study was developed. There were five criteria each for which points were assigned. These criteria are:

Number of themes it incorporates (each theme = 1 pt). Covering more themes is desirable since it indicates that the study was based on research, or at least knowledge, of what was going on in higher education.

Context (community college = 1 pt, multiple institutions = 2 pts). Based on evidence from the literature review and feedback from advisory group members and the ACRL board, there exists a lack of research in community colleges. For this reason, studies that took place in this type of institution were awarded a point. Studies between multiple institutions broadened the context of a finding and suggested that the study could be replicated at another institution, so these studies were awarded two points.

Level of effort of data collection and analysis (mixed methods = 2 pts, multiple methods = 1 pt). Use of mixed or multiple methods strengthens the validity of a study's findings. Mixed methods are worth more than multiple methods since they employ qualitative and quantitative approaches.

Level of impact (collaboration/communication/mission alignment and strategy/teaching and learning/student success = 1pt). The level of impact includes whether the research document would resonate with those outside libraries. This translated into codes that involved interactions with those outside the library, specifically collaboration and communication, or evaluative standards from the institution and outside the library, specifically mission alignment and strategy, student learning, and student success.

Population studied (inclusivity = 1 pt). The RFP suggested that the research agenda and report include studies that “include[d] but [were] not limited to studies of defined populations (e.g., economically disadvantaged students, adult learners, or students who are the first in their families to attend college) in a manner that promotes equity mindedness and inclusive excellence.”²²⁰ The theme of inclusivity also came up in the provost interviews as a key strength of the libraries because all students were welcome there, and in many ways, the library spaces were more neutral meeting grounds between various academic and institutional units.²²¹ Therefore, studies that were coded with the inclusivity theme also received a point.

Appendix L: AiA Studies with Exemplary Design Elements

Context

- Balci, Leanna F., Ben Crowder, and Nancy Wentworth. "Lost Library Links: Student's Ignore LMS Library Integration." *Assessment in Action*. Accessed January 5, 2017. <https://apply.ala.org/attachments/26857>.
- Erickson, Sue, Patty Clark, David Dirlam, Denise Wilkinson, Stephen Leist, and Cathal Woods. "Understanding the Liberal Arts through Book Displays at Hofheimer Library." *Assessment in Action*. Accessed January 5, 2017. <https://apply.ala.org/attachments/20599>.
- Samuel, Judith, and Sally Romero. "Measuring Information Literacy Success: From One-Shot Basic Skills Workshops to Embedded Librarian in California Acceleration Project." *Assessment in Action*. Accessed January 5, 2017. <https://apply.ala.org/attachments/8871>.
- Tharp, Julie, Lisa Kammerlocher, Ashley Barckett, Kate Frost, and Jeanne Hanrahan. "Bridging the Critical Thinking Gap: Assessing the Integration of Information Literacy into the Curriculum for At-Risk Students." *Assessment in Action*. Accessed January 5, 2017. <https://apply.ala.org/attachments/8866>.

Data Collection

- Blank, Michelle, Lisa Crumit-Hancock, Nathan Griggs, and Abigail Taylor. "'I Just Use Google': The Role of Information Literacy Skills in Academic Inquiry." *Assessment in Action*. Accessed January 5, 2017. <https://apply.ala.org/attachments/20474>.
- Carbery, Alan, Ellen Zeman, Josh Blumberg, and Steve Wehmeyer. "Authentic Assessment: Building a Longitudinal Information Literacy Assessment Model Using Student Research Artifacts." *Assessment in Action*. Accessed January 5, 2017. <https://apply.ala.org/attachments/20610>.
- Epperson, Anne, James Henderson, and Evan Welch. "Designed and Furnished for Success: Fostering an 'Academically Social' Campus Space." *Assessment in Action*. Accessed January 5, 2017. <https://apply.ala.org/attachments/8881>.
- Ireland, Ashley, Jana Hackathorn, Jamie Mantoath, Aleeah McGinnis, Adam Murray, and Kelley Wezner. "Predictor of Success: The Relationship between Known Library Use and Student Retention at a Regional Public University." *Assessment in Action*. Accessed January 5, 2017. <https://apply.ala.org/attachments/8986>.
- Massengale, Lisa, Pattie Piotrowski, and Devin Savage. "Galvin Library Assessment." *Assessment in Action*. Accessed January 5, 2017. <https://apply.ala.org/attachments/20544>.

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