

## **Action-oriented Research Agenda on Library Contributions to Student Learning and Success**

### **Submitted 10 January 2017 by:**

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### **Executive Summary**

The following action-oriented research agenda investigates how libraries can align with and have impact on student learning and success and communicate to higher education stakeholders. These two areas are addressed by a comprehensive review of selected library and information science (LIS) and higher education literature, and an analysis of interviews conducted with library administrators and provosts from institutions varying in location, institutional sector, and type.

As documented in the project plan, this second draft includes the analysis of 535 selected LIS and higher education documents, a focus group interview with the project Advisory Group comprised of library administrators representing different types of academic institutions within the US, and semi-structured individual interviews with representatives from the Advisory Group members' provost offices.<sup>1</sup> The selection criteria for LIS and higher education documents reviewed are: 1) indexed by LIS and/or higher education databases or identified by the project team or ACRL (e.g., ACRL *Assessment in Action* (AiA) studies, Ithaka S+R surveys, see *Relevant ACRL Documents* section), 2) published between 2010-2016, 3) contained themes identified in the 2010 *VAL Report*, and 4) published in the US, except for studies outside the US deemed relevant by the project team.<sup>2</sup>

Based on the themes identified by the literature and interviews, this report provides recommendations and exemplar cases for impacting student learning and success, and aligning this impact with institutional goals and objectives.

The key recommendations for librarians based on this analysis of the selected LIS and higher education literature and interviews include:

- Identify and articulate both learning and success outcomes when documenting student-centered outcomes. Engaging students in how to redesign library space can demonstrate the library's impact on a learning outcome. Library resource or service usage and its relationship to student retention is an example of the effect of the library's service, collection, and/or space on a success outcome.<sup>3</sup>
- Focus less on service and more on sharing space with other groups both on and off campus
- Bolster collaboration with other campus units or external partners, including consortia, on assessment-based efforts.
- Communicate how library services, collections, and spaces address the larger mission of the institution by becoming better at marketing and customer service.
- Study the assessment and student-centered outcomes of diverse populations across various institutions using multiple methods.
- Develop relationships within different academic service areas, such as teaching and learning, at various levels throughout the institution.
- Continue to develop and foster relationships and engagement with academic administrators and other service providers, such as student services, offices of sponsored programs, teaching and learning, etc.
- Present data in different contexts and representations to make a case with diverse groups of academic administrators.

### **Priority Areas for Future Research**

Priority Areas for future research, which provide the framework for the research agenda, are also included for review and discussion with the ACRL membership and the academic community. These Priority Areas

intentionally are broad to foster discussion and input from academic librarians and to include more specific research questions within each Priority Area. The Priority Areas are:

1. **Communication.** Communicate with those outside of the library and high in the institution's hierarchy. 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 part of the library.
2. **Collaboration.** 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 similar issues facing them. Work with academic administrators, academic services, faculty, students, alumni, and other members of regional and local communities.
3. **Institutional planning.** Go outside of the library to collect data and suggest possible collaborations around common issues. 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.
4. **Learning in college.** Engage with faculty and students for librarian inclusion in developing academic and everyday life support services for students. This area also builds on the first two Priority Areas, communication and collaboration.
5. **Success in college.** Identify the quantifiable student attainment indicators, such as enrollment in postsecondary education, grades, persistence to the sophomore year, length of time to degree, and graduation, and work with academic services and faculty to develop ethical collection and reporting methods for individual-level student data that retain individual privacy and confidentiality.
6. **Learning analytics.** 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."<sup>4</sup> 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.

This second draft provides a research agenda framework for discussion by key stakeholders. There will be several conference presentations outlining this initial report, demonstrating the visualization component, and soliciting comments and suggestions.<sup>5</sup> Your feedback and suggestions are important to the success of this project. Please submit your feedback and suggestions at <http://www.oclc.org/research/forms/feedback-acrl-agenda> by February 17, 2017 as this input will be valuable for informing the final report, expected for public release in late May 2017. The final report will include the full report of all project phases and findings, as well as the research agenda. The research agenda will include the Priority Areas, future-focused research questions, and a summary of the literature that supports each Priority Area. We expect to present the final project results and visualization component at an ACRL Online Open Forum in June and at the ALA 2017 Annual Conference in Chicago, IL.

## **Action-oriented Research Agenda on Library Contributions to Student Learning and Success: Initial Report**

### **Revised and Submitted 10 January 2017 by:**

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This report includes a review of selected library and information science (LIS) and higher education literature and an analysis of interviews conducted with library administrators and provosts from institutions varying in location, institutional sector, and type. This review provides librarians, researchers, and students (see *Appendix A* for a glossary of terms) with best practices for identifying, aligning with, and supporting student-centered outcomes and for documenting and communicating the impact of library services on student-centered outcomes to higher education stakeholders.

### **Introduction**

With growing federal and organizational pressures, academic libraries now must demonstrate their value more than ever.<sup>6</sup> The Association of College and Research Libraries (ACRL) is at the forefront in assessing these demonstrations and recognizes the need for more research on critical elements of the higher education sector such as student learning and success. An open and competitive request for proposals was issued by ACRL to investigate this area and a team from OCLC Research and two doctoral candidates from Rutgers University were selected to support this ongoing work. The project team will develop an action-oriented research agenda on library contributions to student learning and success.

This report provides an update of the project from its start in mid-July 2016 through December 2016. In this period, a content analysis of 535 documents from the LIS and higher education literature has been completed. The selection criteria for LIS and higher education documents are: 1) indexed by LIS and/or higher education databases or identified by the project team or ACRL (e.g., ACRL *Assessment in Action* studies, Ithaka S+R surveys); 2) published between 2010-2016; 3) contained themes identified in the 2010 *VAL Report*,<sup>7</sup>; and 4) published in the US, except for studies outside the US deemed relevant by the project team.

Further, an online focus group interview with academic library administrators, who are members of the project Advisory Group, and semi-structured individual interviews with provosts from each group member's institution have been conducted and the transcripts from the interviews have been coded and analyzed. Informed by findings from content analysis of selected literature and interview transcripts, Priority Areas for academic library research have been identified, with an exemplar study represented for each Priority Area. Examples of library programs and services that provide evidence for ways to measure and articulate student learning and success to the academic community are included for possible replication and dissemination.

A database for the visualization tool is being developed to assist librarians, researchers, and students in identifying relevant literature and trends. The visualization tool will be presented to members of the ACRL board following usability testing, which is expected to be conducted in March 2017.

### **Background**

One significant challenge in assessing academic library value is the lack of consensus on measures of student learning and success.<sup>8</sup> Often, determining these measures is left up to individual campus units, which effectively isolates the assessment practices of library stakeholders from those within higher education. Due to this lack of synergy, libraries face difficulty in demonstrating their significance in a way that aligns with higher education stakeholder objectives. Perhaps for this reason, librarians often are not included in discussions of value within a broader academic context, such as how they might contribute to accreditation standards and affect student retention and achievement.<sup>9</sup>

ACRL issued a request for proposals (RFP) in May 2016 to address these challenges by answering the following research questions:

**RQ1.** What are the ways that library services align with and have impact on student learning and success?

**RQ2.** How can librarians communicate their alignment with and impact on student learning and success in a way that resonates with higher education stakeholders?<sup>10</sup>

Guided by the proposal directives, the project includes the following activities to answer these research questions:

1. Review current definitions of learning and success and identify higher education trends that affect academic librarians as well as librarians' responses to these trends.
2. Collect individual semi-structured and focus group interview data from provosts and academic library administrators who are members of an Advisory Group for this project and, based on these data, identify extant programs and services that have evidenced effectiveness of or potential for contributing to student-centered outcomes.
3. Identify understudied research areas for academic librarians by asking future-focused research questions and creating a dynamic visualization tool.

These activities, while initially linear, have become iterative as both the research findings and feedback from ACRL members inform and guide the project. This report includes the initial findings from the first two project stages, which consist of a content analysis of selected LIS and higher education literature. In addition, it reports on findings from analysis of interviews with Advisory Group members and provosts at their universities. Finally, the report identifies Priority Areas for future research based on these initial activities. These Priority Areas and related future-focused research questions will be modified based on additional data collection and feedback received before the final report is issued.

The report is structured to guide the reader through the steps taken to derive the Priority Areas before presenting them. First, a brief literature review is provided to overview some of ACRL's work on the value of academic libraries and to describe how this work informed development of a codebook. This codebook was then used to identify the 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 data from these three sources were collected and how they were analyzed using a codebook, as well as basic and inferential statistics. Next, a discussion of findings from each data source is presented, followed by a comparison between the three data sources. The team then summarizes what was learned by comparing these data sources, and identifies six areas of inquiry. These areas of inquiry are defined and exemplar studies and practices are overviewed for each. The report concludes with a discussion of limitations concerning how the team identified the Priority Areas and next steps.

### **Literature Review**

This literature review outlines four types of value research conducted by librarians, researchers, and students. Each type varies by the library response measured (collection, service, and/or 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 responses on institutional level goals, such as student-centered outcomes. Two of these outcomes, learning and success, are then detailed, including how they are studied outside the library.

Following this review, relevant ACRL documents are outlined. These documents were intended to inform the team of themes to look and code for when analyzing relevant documents and interviews. The team kept a list of these themes, which are overviewed in the subsequent *Relevant ACRL Documents* section. See *Appendix A* for a glossary of relevant terms.

### **Assessment and Evaluation 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,<sup>11</sup> 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 ongoing improvement of the collection, space, or service being assessed, and the purpose of evaluation is to measure the library’s resources and activities against a pre-determined standard of value. Taking 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 students. Based on their performance, instruction could be modified 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 also 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 attainment of broader critical thinking skills. Because this report examines the influence of academic libraries on student learning and success, it is more concerned with evaluation, which is reflected in the report’s data collection, data analysis, and Priority Areas. However, because the two terms are often used interchangeably and because assessment can provide contextual details to aid in evaluation, assessment studies, most notably the *Assessment in Action* (AiA) studies, are included in the content analysis of 535 selected LIS and higher education documents (see *Relevant ACRL Documents* section).<sup>12</sup>

The past few decades of LIS literature on academic library value can be differentiated based on the use of evaluation and/or assessment activities, and how these activities are reported. The project team has identified four types of value research conducted by librarians, researchers, and students. The first type of value research includes library evaluations based on collection size or amount of other library resources. LIS research published prior to the 1980s tends to fall in this category, but this type of research 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.<sup>13</sup> They also can include how a library compares to its peers in terms of resources, such as space, budgets, or collection size, similar to the statistics compiled by the Association of Research Libraries (ARL).<sup>14</sup> The results of these evaluations usually are intended for other librarians or administrators rather than the staff, faculty, and students of an institution.<sup>15</sup>

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 in terms of value that only concern 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 worth<sup>16</sup> 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 buying materials that library users may be more interested in, and then assess those efforts via checkout volumes over time.<sup>17</sup> These results can be and often are reported to librarians within or external to the institution. The reports often are shared with a wider internal audience that includes students, administrators, as well as an external group who may look at these numbers and believe that the library is valuable because it provides materials that people check out. The emphasis on collections can be difficult because of shared collections and shared storage facilities, as well as the availability of online content.

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.<sup>18</sup> The most common types of studies 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: affect 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.<sup>19</sup> 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.<sup>20</sup> Survey results can be mixed with other data, such as funding and collection size data.<sup>21</sup> 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, which in this case is monetary value. These studies lend themselves to comparing libraries with other units in the academic institution and between institutions. While satisfaction, ROI, and other, similar studies consider the perspectives of those outside the libraries, they may not be as interesting or useful to those outside the library since they do not include user-centered goals or outcomes.

The fourth type of value research includes assessments and evaluations of how library collections, spaces, and services affect user-centered goals or outcomes.<sup>22</sup> For instance, the number of checkouts for each student may be tracked year-to-year and then compared to the grade-point averages (GPAs) of each student.<sup>23</sup> The results would frame the library's value in terms of 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 at the academic institution.<sup>24</sup> This increase is based on the overall growth in studies and other literature focusing on the themes of collaboration, communication, learning in college, success in college, and teaching support (see *Data Analysis* section).

#### Learning and Success

Learning and success are two student-centered outcomes prioritized by the ACRL RFP, which is entitled "Action-Oriented Research Agenda on Library Contributions to Student Learning and Success."<sup>25</sup> 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."<sup>26</sup> Students' demonstration of learning can be categorized in terms of 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 of learning has been with the experimental manipulation of a variety of variables in an effort 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.<sup>27</sup>

In other words, it is difficult to tell if a university unit, such as the library, has affected the student's learning or the student's ability to perform well on a graded event or other indicator of success, such as their 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."<sup>28</sup> Another conceptualization puts one in the service of the other. An Advisory Group Member suggested that student learning is associated with attaining learning goals and objectives, and that student success is associated with programs to support attainment of those goals (Advisory Group Member LM13). A third conceptualization looks at the qualitative or quantitative measurability of the terms. Using that conceptualization, student success is defined as "quantifiable student attainment indicators, such as enrollment in postsecondary education, grades, persistence to the sophomore year, length of time to degree, and graduation."<sup>29</sup> To maintain the distinction between these terms when coding and analyzing the selected documents and interviews, the team used the third definition to connect "Success in college" to more specific and objective outcomes. "Learning in college" denotes less specific and objective 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 on 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.<sup>30</sup> Although the study did not include the library, the library could easily contribute to the two most effective practices: supporting and/or collaborating with undergraduate research and creating or redistributing space to facilitate collaborative learning. Findings from the study indicated that actions taken to support and/or collaborate with undergraduate research positively affected critical thinking, attitudes towards literacy, inclination to inquire and lifelong learning, and intercultural effectiveness. Creating or redistributing space to facilitate collaborative learning positively affected critical thinking, inclination to inquire, lifelong learning, and intercultural effectiveness. In addition to giving more support or collaborating with the institutional departments or units that engage in these practices, librarians also can collaborate or learn from those that offer similar resources and services as libraries. Examples include:

1. *Writing centers/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.<sup>31</sup> 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 only applied to students who received higher grades. An earlier study used mixed methods to evaluate the effectiveness of a writing center course at a university.<sup>32</sup> 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 compared the differences between remedial writing courses, a reportedly understudied service despite their widespread availability, at a community college to those offered at a research university using multiple qualitative methods.<sup>33</sup> 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/courses are understudied, and that more recent studies are more likely to focus on student success and use multiple or mixed methods.
2. *Advising/tutoring consultations.* A library's reference service can be similar to consulting services, which also are provided by tutoring or advising/career services. Both departments connect students with resources and information. They also can contribute indirectly or directly to students' learning and success. However, evaluating the influence of activities, such as tutoring from one department, on learning and success can be difficult to isolate from similar support from other units.<sup>34</sup> 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.<sup>35</sup> Qualitative analysis of open-ended survey questions also led to the development of themes related to this type of tutoring. Like 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.<sup>36</sup> 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.<sup>37</sup> This study, and the other quantitative studies of departmental/unit influence on student learning and success also suggest that other departments besides the library are comfortable with collecting this sort of data.
3. *Study abroad.* Study abroad programs were related significantly to intercultural effectiveness.<sup>38</sup> It could be a very effective collaborative effort for librarians to work with these programs, and libraries can contribute and collaborate with them because the students involved are a special type of distance student. Another similarity between research on study abroad and libraries is that community colleges are often under-represented, as noted in a recent study, which uses mixed methods to show that studying abroad positively affects learning and academic success.<sup>39</sup> Another

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 being studied.<sup>40</sup> The researcher used participant age to create two different groups, and because he found that this variable did not have an effect on participant's learning and other outcomes he concluded that studying abroad did have an effect. While the validity of the results can be debated, this study does indicate that others working in the higher education environment are facing challenges similar to those experienced by librarians.

In order 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 C*).

#### 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.<sup>41</sup> The project team read these documents before responding to the RFP, which led to the suggested methods as noted in the RFP proposal.<sup>42</sup> A qualitative analysis of themes in the key documents from the RFP led to the formation of two initial codebooks (see *Appendix D* for the codebooks). The definition of a codebook, as well as its purpose, is described in more detail in the subsequent *Data Collection* section. Three of these publications are summarized below to exemplify how these codes emerged.

ACRL's 2010 *Value of Academic Libraries* 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 having most relevance to this project detail the importance of the academic library to not only establish student outcome measures, but also to document and communicate outcome attainment to higher education stakeholders, as well as to engage in higher education assessment initiatives.<sup>43</sup> While the determination and establishment of outcome measures must be made, 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.<sup>44</sup> Findings from the shared assessment methodologies and tools informing the codebooks denote 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.<sup>45</sup>

To capture the broader, higher education context of assessment, ACRL regularly completes an environmental scan in odd years<sup>46</sup> and identifies trends in higher education in even years.<sup>47</sup> 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.<sup>48</sup> These areas are mirrored in the "2016 Top Trends in Academic Libraries" report, particularly the importance of the library in supporting digital scholarship. 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, *Assessment and Evaluation Literature*.<sup>49</sup> As with the prior resources addressed in the literature review, these identified areas informed development of the initial codebooks, and are discussed in greater detail in the *Methods* section.

As mentioned at the beginning of the *Literature Review*, the areas identified in this review informed the following data collection methods, which will be discussed next: 1) review of the literature on how library services and resources may influence student learning and success published since 2010; 2) the development of an Advisory Group of academic librarians at diverse institutions in the US to participate in



focus group interviews and to provide feedback on the project; and 3) semi-structured individual interviews with provosts at the same institutions as the Advisory Group Librarians.

### **Methods**

Defined as “any procedure employed to attain a certain end,” a method is used to characterize a research-related goal or goals.<sup>50</sup> The premise of this report is to: 1) determine the ways that libraries align with and have impact on institutional effectiveness, and 2) determine how librarians can best communicate their service alignment with and impact on institutional effectiveness in a way that resonates with higher education stakeholders. A review of the LIS and higher education literature published on these topics within the past five years and interviews with library administrators and representatives from academic provost offices are the data collection and analysis methods used for the initial project activities. A series of criteria used to select relevant LIS and higher education research was developed and a focus group interview and semi-structured individual interviews were conducted and analyzed. Selection criteria for documents include: indexed by LIS and/or higher education databases or identified by the research team (e.g., ACRL AiA studies, Ithaka S+R surveys), published since 2010, contained themes identified in the 2010 *VAL Report*,<sup>51</sup> and published in the US, except for studies outside the US deemed relevant by the research team

Both qualitative and quantitative methods, or mixed methods, were used for the 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 serve as a checks and balance of the data collection and analysis methods as well as the findings.<sup>52</sup> 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.

### **Data Collection**

#### **Selected LIS and Higher Education Literature**

The team 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 & Information Science Full Text (H.W. Wilson), and Library, Information Science & 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 studies, 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*,<sup>53</sup> and published in the US, except for studies outside the US deemed relevant by the project team

The retrieved documents were reviewed based on their alignment with the project research outcomes and questions, and documents were added and removed accordingly. Therefore, the literature review does not represent an exhaustive review of all assessment and evaluation literature, but rather only literature pertaining to student outcomes, libraries, and higher education. A total of 535 documents were added to the report bibliography (see *Appendix E*) and designated 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 a library response to that trend on specific library collections, spaces, and services or a combination of these. Such non-study pieces represented what LIS and higher education professionals addressed as emerging and/or important areas to examine. The documents coded as research involve some type of data collection and analysis for measuring outcomes or answering practical or empirical questions and identify a higher education trend or a library response to that trend. The research category includes all AiA studies that have been completed and are accessible from the AiA project page website – a total of 178 studies.<sup>54</sup>

#### **Focus Group Interviews**

To ensure that the findings from this report resonate with professional librarians and administrators in higher education, an Advisory Group was created. The members are academic library administrators from fourteen institutions that include community colleges (n=2), four-year colleges (n=2), and research universities

(n=10) from secular (n=11), non-secular (n=3), public (n=9), and private (n=5) institutions representing the four geographical regions of the US. Eleven Advisory Group members (the other three members have been asked to provide written responses to the focus group protocol; responses are forthcoming) addressed the research questions via an online focus group interview, which was conducted on Tuesday, October 11th from 1:00pm-2:30pm EST.

The focus group interview was conducted virtually using WebEx conference software and audio from the meeting was recorded and transcribed. This conference software enabled both audio and visual, meaning that team members could see non-verbal 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,”<sup>55</sup> first by beginning with broad discussion and gradually winnowing down to the core research focus.<sup>56</sup> Focus group interviews can be used for multiple purposes; those most relevant to this project are to “examine known research questions from the participants’ perspective”<sup>57</sup> and obtain “participants’ interpretations of results from earlier studies,” namely from the literature review portion of the study.<sup>58</sup> To this end, findings from initial analysis of the literature review themes were used to structure focus group questions. Project lead, Connaway, moderated the focus group interview and ensured that participation was equitable, desired themes were addressed, and the session ended on time. While an interview protocol was developed for the focus group interview (see *Appendix B*), 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.<sup>59</sup> The audio of the focus group interview was then sent to an outside agency for transcription.

The Advisory Group members who are attending the American Library Association (ALA) 2017 Midwinter Conference in Atlanta, GA in January will participate in one of two brainstorming sessions. The sessions will provide an opportunity for the Advisory Group members to discuss this initial report and to expand upon the identified Priority Areas for the research agenda and suggest other possible Priority Areas not identified in the data collection and analysis of the selected LIS and higher education literature or the interviews with Advisory Group members and the representatives from their institutions’ provost offices. Results of the brainstorming sessions will be used to further define the research agenda and reported in the final project report due May 2017.

### **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 specific subject.<sup>60</sup> Semi-structured individual interviews were conducted by three team members with provosts from each of the Advisory Group member’s 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 learn about each individual’s ideas and thoughts on the academic library’s contribution to the institution and on the future of higher education. The interviews were semi-structured, meaning that control of the interview was shared between the interviewer (one of the project team members) and the provosts. In this way, the provosts could re-direct some of the interview topics as desired and the interviewer could probe in areas of interest.<sup>61</sup>

Between the time periods of Friday, November 4th through Friday, November 11th, three team members conducted telephone interviews with fourteen provosts. Two team members interviewed five provosts and one interviewed four. Like the focus group interviews, findings from the literature review informed the development of the provost semi-structured individual interview protocol (see *Appendix C* for the provost interview protocol). 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 the notes were used to code and analyze these interviews.

### **Data Analysis**

Once the three data sources (i.e., relevant literature, Advisory Group member focus group interview transcript, provost semi-structured individual interview transcripts) were collected, it was necessary to develop a system to describe the context of each data source, as well as to compare the data sources. To

make this comparison, a standard way to describe the data, referred to as “coding,” was developed. Once cods were applied, the team members were able to 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.”<sup>62</sup> An initial identification of categories occurred before the data collection, when the team reviewed relevant ACRL documents to identify important categories, or themes (see *Relevant ACRL Documents* section).<sup>63</sup> Based on these documents, a codebook was developed to document the themes, definitions were included for each theme, and examples were provided for each theme.<sup>64</sup>

After the documents for the literature review were identified and reviewed, the original codebook was divided into two separate codebooks. The first codebook includes the theme coding scheme, which included the categories identified within the ACRL documents identified in the ACRL RFP and was used to code and analyze all three data sources. The second codebook, which contained 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 only found in research documents, including information about the populations studied (type of institution, group studied) and methods used, which can be referred to as the demographic characteristics of the documents. These codes were collected to make the studies more accessible and findable when using the visualization tool the team will develop during a later project stage.

As mentioned above, student learning and success are two distinct terms. When developing the coding scheme, it was decided that any library collection, space, or service objectively tied to a specific grade or outcome was coded as “success.” In this case, objectively means that the variables are measurable. If the library collection, space, or service did not have a measured or measurable effect on the student or their success, then it was coded as “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 only was applied to the literature review research documents. Refer to *Appendix D* for full versions of both codebooks.

**Table 1. Excerpt from theme codebook**

<i>Higher education trend</i>	<i>Trend defined</i>	<i>Example of library responses to trend</i>
Learning in college (and beyond)	Outcome is focused on the less objective concepts of learning, such as critical thinking. These encompass the outcomes not covered by the Success in college 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.” <sup>65</sup> 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 literature review section.	Service: Library instruction  Space: Collaborative working space for students  Collections: Repository of online tutorials not linked to a specific class
Success in college (for multiple student groups)	Outcome is focused on the more objective indicators of learning, or	Collections: Physical collections

	“quantifiable student attainment indicators, such as enrollment in postsecondary education, grades, persistence to the sophomore year, length of time to degree, and graduation.” <sup>66</sup> These tended to be linked to a specific assignment/semester, such as grades/GPA. It 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.	<p>Collections: Digital collections</p> <p>Space: Study spaces</p> <p>Service: Library instruction</p> <p>Service: Collection discovery</p>
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**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

Once the two codebooks were developed, used for coding a sample of the documents, 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.<sup>67</sup> Specifically, NVivo allows coders to highlight sections of text and label these sections with the relevant codes from the codebook that describe it. If a code is renamed or deleted, the change will be updated in NVivo in all sections of the data in which the code had been applied. NVivo also keeps track of the number of times a code is applied and to which data sources the code has been applied. This information was used to complete post hoc data analysis, discussed in the following section.

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. Since it is important to ensure codes not be subjectively assigned, multiple team members engaged in coding and measuring the agreement of this coding, which is referred to as “inter-coder reliability.”<sup>68</sup> For each of the three data sources, at least two project team members coded 20% 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 codes were reviewed, coding discrepancies were discussed, the codebooks were revised to reflect the changes (e.g., making a definition more specific), and the inter-coder reliability for the research document characteristics coding was calculated at 95% agreement and 99% 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% agreement for both coding schemes on 20% of the documents. Two team members coded the remainder of the documents. During this latter phase of coding, team members also labeled certain sections 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.”<sup>69</sup> Another team member then reviewed the codes, amending them as necessary based on the codebooks.

### **Descriptive Statistics and Post Hoc Analysis**

All three data sources (i.e., selected literature, librarian administrator focus group interview, and provost semi-structured individual interviews) were coded and each data source was divided per its respective unit of analysis. The units of analysis dictate the “what” or “who” that is being studied or quantified,<sup>70</sup> and were

chosen to be the document, the group interview transcript, and the provost interview transcript for the three data sources, respectively. For each selected document, the team was concerned with whether a code was applied or not, not how many times the code was applied. This decision allowed the team to see what themes were being discussed frequently and less frequently across the literature. For provost and focus group interviews, the team was concerned with how many times each theme was discussed, rather than whether a theme was discussed or not. This decision was made given the small sample size of both focus group and semi-structured interview participants. Based on the selected units of analysis, the team was 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. To compare how often themes were discussed by each data source, the team 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 across each data source.

Within each data source, the team also calculated basic descriptive statistics (e.g., mean, median, mode, and standard deviation). This process broadly summarized and described the data, giving the team insight when deriving the findings. Post hoc analysis techniques were also used to search for trends and patterns within the three coded data sources. Such techniques allowed for additional findings and discoveries beyond what could be uncovered using descriptive statistics.<sup>71</sup> 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-tests<sup>72</sup> 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.<sup>73</sup> In the Findings section, we use a significance level of  $\alpha = 0.01$  (equivalently,  $p < 0.01$ ) 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.<sup>74</sup>

The *Findings* section includes an independent examination of the expressed codes for each data source to identify the emerging themes. The differences between the codes of each data source also are addressed.

## Findings

This section examines key findings from analysis of three data sources, i.e., selected LIS and higher education literature, the focus group interview transcript, and provost interview transcripts. These key findings include:

- *The selected literature focused on service, collaboration, and learning in college.* Institutional planning was discussed more in theoretical documents than the 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 literature,

suggesting a disproportionate focus on this theme among librarians and LIS researchers. The AiA studies were compared to the non-AiA studies, finding that the former sampled from more varied populations and used mixed methods more frequently than non-AiA studies. AiA studies focused more on collaboration, communication, and instruction than non-AiA ones. However, these were all requirements of the AiA projects.

- *Focus group interview participants, who are library administrators, prioritized service, collaboration, and communication.* Like the AiA studies, participants also addressed collaboration and communication. However, participants contextualized the need to link both collaboration and communication to the institutional mission of the university, rather than isolate both themes within the library.
- *Provosts valued communication and institutional planning.* Provosts' valuing communication aligns with the priorities of the AiA studies and library administrator focus group participants, however provosts discussed institutional planning 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.

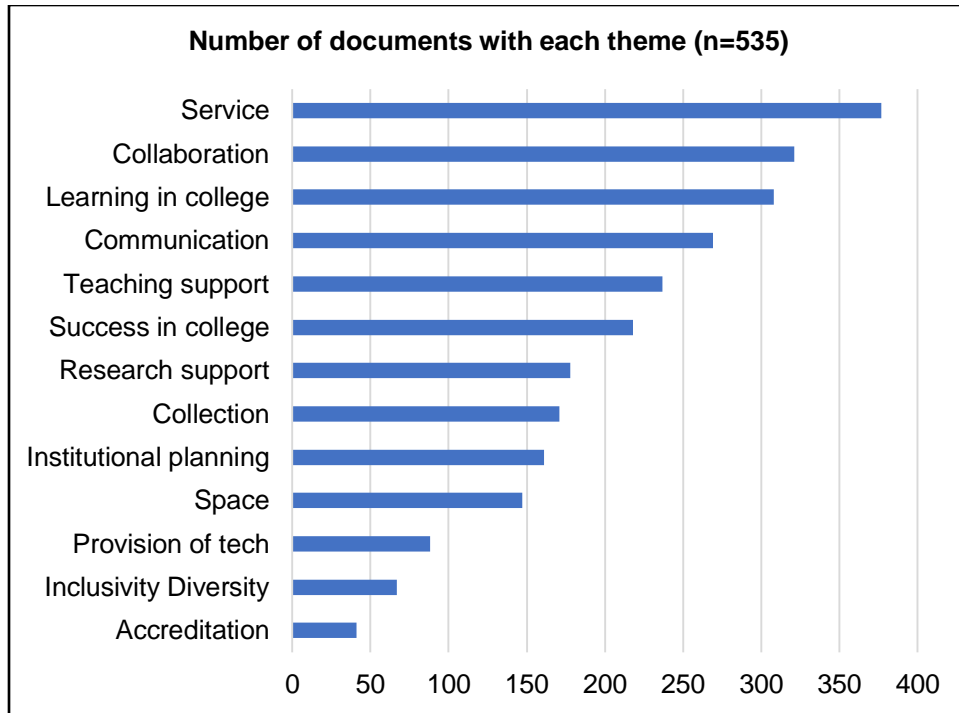
The empirical basis for these findings is discussed below in more detail.

#### Selected LIS and Higher Education Literature

As stated in the *Data Collection* section, a total of 535 documents were coded using the theme codebook (see *Appendix D* for the theme codebook for a list of all theme codes). Figures 1 and 2 depict the number of documents with each theme. On average, a code was applied to 37% of the documents (n=199). Themes that are more than one standard deviation (+/- 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 learning in college (n=308, 58%). Those least discussed are: provision of technology (n=88, 16%), inclusivity/diversity (n=67, 13%), and accreditation (n=41, 8%).

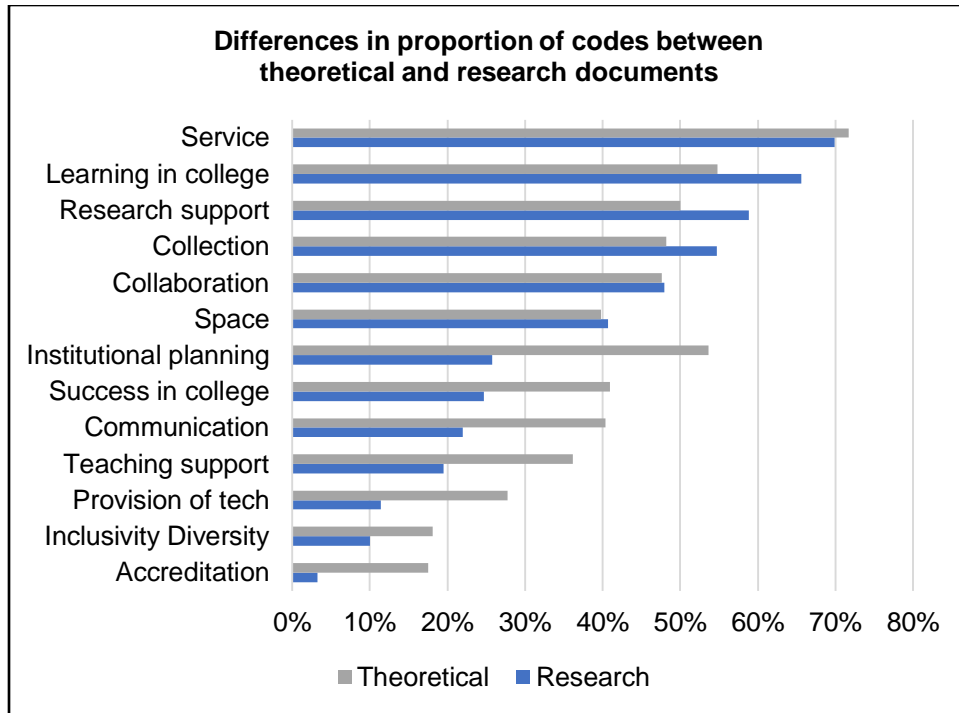


**Figure 1:** A WordCloud depicting the number of documents coded as each theme.



**Figure 2:** A histogram depicting the number of documents coded as each theme.

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



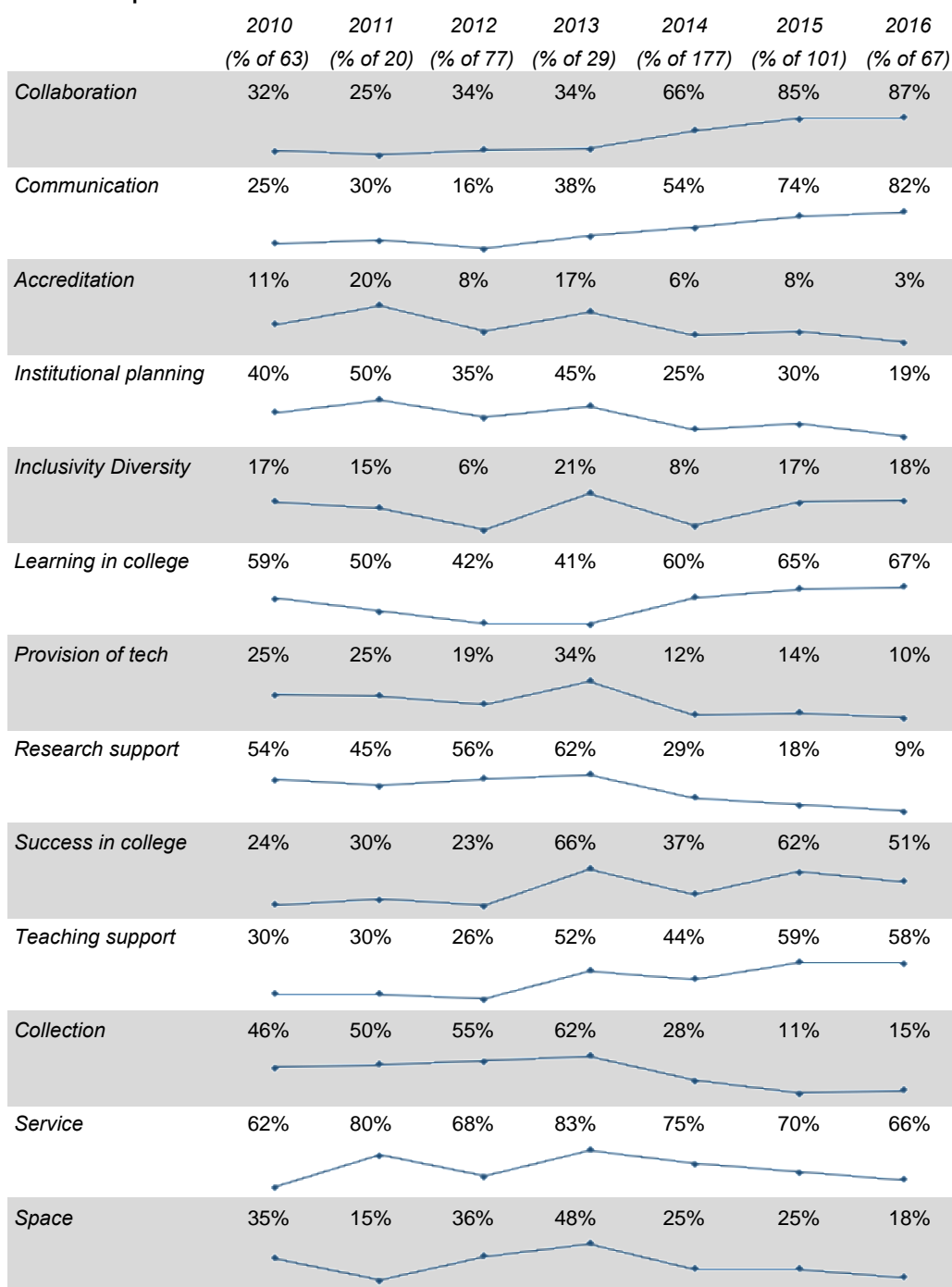
**Figure 3:** Differences between the percentage of codes applied to theoretical compared to research documents.

On average, theoretical documents contain 7% more codes than research documents. This observation may be explained by the fact that theoretical documents include literature reviews and predictions of future trends. Therefore, discussing one document will include more themes as compared to a research document, which empirically investigates one or two themes. Institutional planning is discussed 28% more in theoretical documents than in research documents and is more than one standard deviation of difference from the mean (+/- 12%).

The team 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. There were a few themes that experienced a significant decrease in the proportion of codes applied over time, however the p-value determining their significance was higher ( $p < 0.05$ ). This indicates that while these themes still 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: institutional planning, research support, and collection.

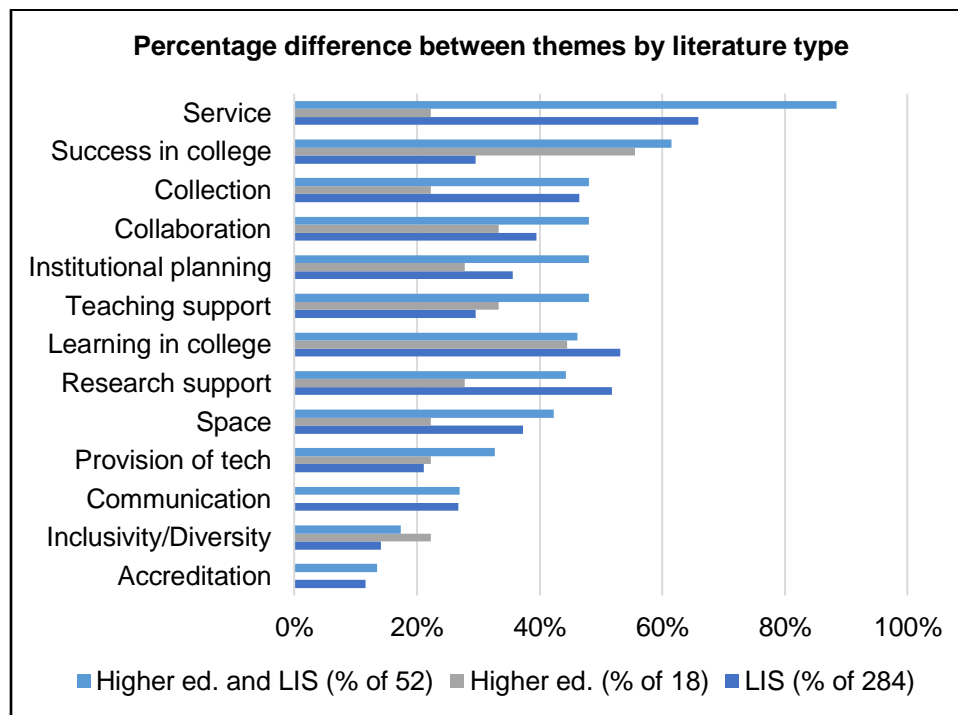


**Table 3. Proportion of themes coded over time**



Following this comparison of literature review documents by type (theoretical or research) and year, the differences in proportion of themes discussed in documents from the higher education literature versus the LIS literature were compared. It should be noted that the search terms used for the database searches included the word “library” and its derivatives. For this reason, this comparison only can inform of differences in the proportion of themes between what is being said 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 were not indexed by LIS databases and reports from Ithaka S+R. For this reason, a total of 354 documents of the total 535 documents (66%) were reviewed when making this comparison given that the team retrieved documents for review that were not indexed by databases (e.g., AiA studies). Five percent of documents were designated as higher education literature (n=18). Fifteen percent (n=52) were designated as both higher education and LIS literature since they were indexed by both databases. The remainder of the documents (n=284, 80%) were from LIS literature. Figure 4 illustrates the percent difference between themes coded in the higher education literature, the LIS literature, or both the higher education and LIS literature.



**Figure 4:** Percentage of documents coded by theme, divided by whether each is from the higher education literature, the LIS literature, or both.

Higher education literature has less 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 less codes for success in college (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, the research document characteristics codes were applied to documents coded as research, about 68% (n=369) of all documents. These latter codes provide more insight into the study details.

Per the selection criteria for the selected literature review, the studies mostly were conducted in the US (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).

In defining methods for this project as “Any procedure employed to attain a certain end,” methods are the specific actions and/or tools employed during data collection and analysis.<sup>75</sup> 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 the most popular method being interviews (18%, n=65). The most popular 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 are defined as “plans and the procedures for research that span the steps from broad assumptions to detailed methods of data collection, analysis, and interpretation.” These approaches fit into three categories: qualitative, quantitative, and mixed methods.<sup>76</sup> The quantitative approach was most often used (92%, n=338), followed by qualitative (73%, n=271), and mixed method (67%, n=246). Many studies also employed multiple methods (80%, n=296). See *Appendix A* for a glossary of definitions overviewing the difference between mixed and multiple methods.

Given that the data collection and analysis of this report has proceeded iteratively, literature has been added 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 studies. The findings from analysis of these studies have been folded into all prior discussion of selected documents, except for the discussion of theoretical documents (all AiA studies were labeled 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, it was noted that some key themes and study demographics that AiA studies addressed were not prevalently identified in non-AiA studies. These differences are now highlighted.

### **Differences in AiA Studies Versus Non-AiA Studies**

The AiA program was developed through a collaborative planning grant, which involved “senior librarians, chief academic administrators, and institutional researchers.”<sup>77</sup> Participation in the program required librarians to collaborate with at least two team members outside of the library. AiA studies all are within the US except for six in Canada, whereas 11% (n=40) of non-AiA studies collected are outside the US. This latter finding can be attributed to the selection criteria of literature reviewed for this project, which emphasized studies within the US, with a few exceptions from Australia and the UK. AiA studies are more evenly dispersed throughout the four areas of the US (Northeast, 25%, n=43; West, 20%, n=34; Midwest, 28%, n=48; South, 26%, n=45) as compared to non-AiA studies, which are less representative of the Northeast (9%, n=19).

In terms of the populations studied, by both institution type and group focused on within the institution (e.g., undergraduates), AiA studies focus more on community colleges (6%, n=22) and colleges (8%, n=31) than non-AiA studies (1%, n=5; 2%, n=8, respectively). AiA studies also focus more on private institutions (18%, n=67) than non-AiA studies (8%, n=30). Both study types primarily examine universities (non-AiA, 38%, n=141; AiA, 34%, n=125). Regarding the groups studied, AiA studies focus less on undergraduates. Thirty-three percent (n=120) of non-AiA studies examine undergraduates, while six percent (n=23) of AiA studies do. Instead, AiA studies have a more evenly dispersed focus in the study of graduates, undergraduates, and other populations.

In the analysis of theme coding, AiA studies focus more on communication (48%, n=178) and collaboration (48%, n=178) than non-AiA studies (25%, n=91; 39%, n=143). On the other hand, AiA studies focus less on space (4%, n=13) and research support (1%, n=2) than non-AiA studies (36%, n=134; 48%, n=176). Since all AiA studies were conducted between 2014 and 2016, AiA studies likely account for the observed increase in the focus on communication and collaboration, and the decrease of focus on research support over time. Although AiA studies focus more on collaboration than non-AiA studies, the latter are more collaborative across institutions, with 24% (n=50) of non-AiA studies conducted at multiple institutions, as compared to only 1% (n=1) of AiA studies.

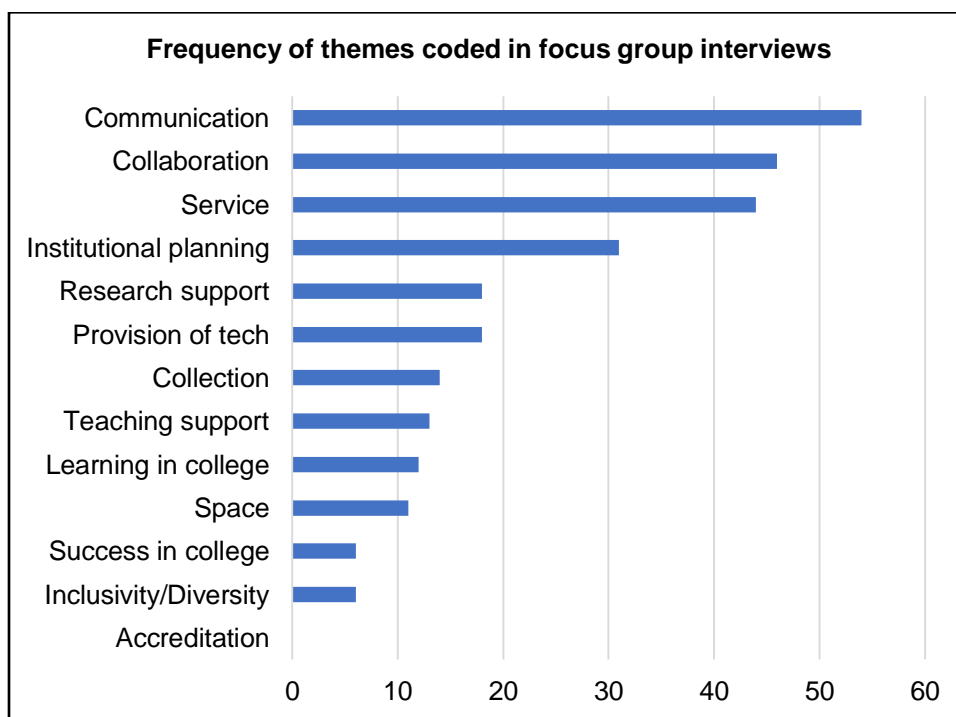
In terms of types of library responses studied, AiA studies focus much more on instruction as a library service (37%, n=135) than non-AiA studies (17%, n=64). This observation plays out when examining quantitative data collection methods used, with AiA studies more often employing rubrics (22%, n=82) to assess instructional effectiveness than non-AiA studies (5%, n=20). Regarding methods in general, AiA studies experience a heightened use of quantitative data collection methods (53%, n=195) versus non-AiA

studies (26%, n=97), whereas non-AiA studies employ more qualitative data collection methods (20%, n=74) than AiA studies (8%, n=28). Both types of studies emphasize quantitative data analysis, but the type of analysis employed varies. Specifically, 37% (n=165) of non-AiA studies employ descriptive statistics as a quantitative data analysis method, whereas no AiA studies coded use this analysis method. Instead, 45% (n=166) of AiA studies employ correlations whereas 7% (n=25) of non-AiA studies do. AiA studies also demonstrate a heightened use of mixed methods (45%, n=166) as compared to non-AiA studies (22%, n=80). See *Appendix A* for a glossary of definitions overviewing the difference between mixed and multiple methods.

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

#### Focus Group Interviews

Figure 5 depicts the frequency of themes coded within the focus group interview transcript of the Advisory Group members of this project. 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), representing those most or least discussed by focus group participants 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.



**Figure 5:** Frequency of themes coded in focus group interviews.

On first pass, it may be surprising that the focus group interview participants did not discuss student learning (4%, n=12) and success (2%, n=6), compared to how often these themes are mentioned in the literature (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 of 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 personal opinion, are those that are directly connected to the mission of their unique institution (Advisory Group Member LM13).

As perceived by this participant, the library's role in enhancing student learning and success is perceived by librarians to be inherent to the mission of the academic library. This participant felt that solely being concerned with fulfilling library-oriented goals would detract from the effect they would be able to have at the university level. This observation may be explained by the fact 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).

However, making such connections is not as simple as having a conversation with one specific group or implementing the same strategies to make connections across various ones. Rather the type of outreach beyond the library necessary for its success relates to recognizing and adapting to the unique "ecosystem" of relationships within the specific institution (Advisory Group Member LM14). As stated by the following participant:

There's one other thing I was uh, when I was sitting here thinking about every, 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, that librarians and staff have with faculty and students. You know, all of 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, librarians must 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). Some examples of how focus group interview participants achieved successful collaborations that resulted in communicating value are:

- Partnering with departments to support university-required student research projects by offering instructional courses, publishing research in a student-run journal and institutional repository, and hosting relevant campus events, such as research competitions (Advisory Group Members LM06)
- Inviting 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 Members LM08)
- Working with the student government association to advocate to the administration on the library's behalf (Advisory Group Member LM01)
- Partnering with faculty members to institute an embedded librarians program, which results in the former advocating on the latter's behalf (Advisory Group Member LM12)
- Establishing a marketing communication program that considers the best approaches to engage different user groups, e.g., using social media to market to students (Advisory Group Member LM09)
- Completing a two-year pilot study with grant funding to build use of special collections materials into course curriculum, using the feedback from faculty and staff to make a case to the provost to continue the program (Advisory Group Member LM01)
- Examining the learning goals and influential practices articulated by other departments to see where potential synergies are present (Advisory Group Member LM07)
- Collaborating with the career office to articulate library effects with student learning outcomes (Advisory Group Member LM07)

A common thread throughout these examples is that the library's alignment with institutional planning and communication of value not only pertains to the library, but also captures how the library is integrated within the larger university system. As stated by a focus group interview participant, when considering the library and librarians as "university citizens" (Advisory Group Member LM13), "it is easier to 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 response to engendering collaboration and communication efforts was service-based (16%, n=44), rather than collections (5%, n=14) or space (4%, n=11).

Privacy only was mentioned 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 best practices and standards addressing the methods and contexts that may threaten the privacy of students.<sup>78</sup> For this reason, privacy, when broadly defined, can be viewed by librarians in some instances as less of an ethics issue and more of an impediment, as articulated by the following participant:

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)

This is in stark contrast to the level of detail that would be available with some of the data dashboards mentioned by three of the provosts in the semi-structured individual interviews that are discussed in detail in the following section of this report. As one provost explained:

We're creating dashboards that's institutional, programmatic and... course level. And, you know, having an intervention assigned to each...You know, each department will have its own interventions to increase, you know, basically numbers that are associated with completion. Umm, and we'll keep track of those through uh, software program what else, that is available to me as well as everybody, you know, at different levels with different permissions. So that'll probably roll out January. (Provost Interviewee PP12)

Although arguments for using individual level data have been made and in some cases put into practice, certain dashboards can anonymize data or only make it available to specific levels.<sup>79</sup> The University of Wollongong and University of Minnesota are highlighted as two exemplar cases because they have successfully navigated the line between privacy/confidentiality and using individual level data. Unfortunately, because the provosts were not asked 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 have been established.

Some of the themes addressed in the focus group interviews also were discussed by provosts. However, provosts also emphasized how these themes could be integrated with the themes of institutional planning and space, which will now be overviewed.

#### Provost Semi-Structured Individual Interviews

Figure 6 depicts how frequently themes were discussed in the provost semi-structured individual interviews. 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 important to provosts interviewed. Those considered important to provosts are: communication (17%, n=199) and institutional planning (14%, n=159). Accreditation, on the other hand, was not discussed frequently by provosts (2%, n=18).

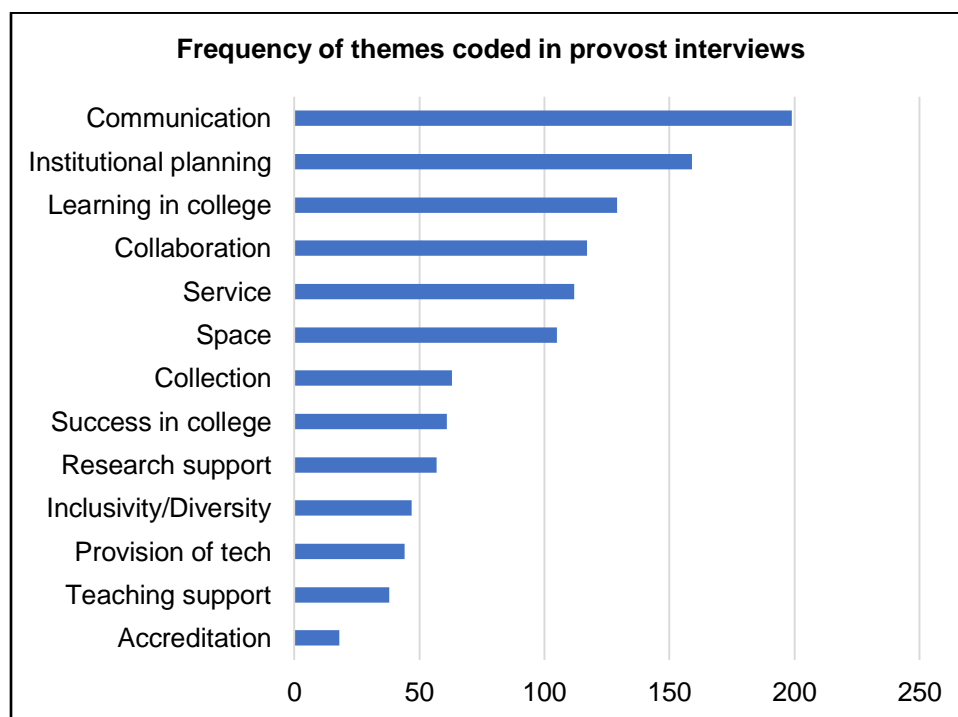
One key observation made by provosts is the difficulty faced by librarians in getting the attention of potential users and stakeholders. In some cases, the provosts themselves do not perceive the library as relevant to immediate needs. One provost stated, “The library is viewed as a service body. People communicate with them when they need to” (Provost Interviewee PP13). Other provosts recognized the value of the library,

but recognized the challenges it faces in dispelling “myths” that others hold about it. As stated by one provost:

The big myth since I, I think I mentioned earlier, is that, that many faculty don't engage with the library, because they feel that, "Well, the library's online." Right? Students can access everything from a distance. (Provost Interviewee PP04)

To demonstrate value, this provost contended that the library needs to communicate its importance. However, communication is not viewed by the provost to be significant in and of itself. This point is exemplified by the following anecdote from the same provost of a “not helpful” communication strategy:

Uh we, a number of years ago, before I started, and I started here in this position in September so...Of 2015. Been here over a year. Uh, there was some agreement and I don't know how this came about but to buy huge TV screens. They're big ones. Like, I don't know. I can't tell you. They're just huge. And put them in our library umm, as a means of sharing information for students. And so they're inter--interactive screens. Uh, so what...You know, what resources are available to students and, and then it also advertises other things going on on-campus. Like award winners and that sort of thing. Well, we've got 'em by the main entrance of these libraries and I have yet to see a single student interested in those things. [chuckle] Okay? So these passive forms of communication are not helpful. Umm, I would say another email is not helpful. Even a newsletter that's, you know, beautiful, by email, probably not helpful. (Provost Interviewee PP04)



**Figure 6:** Frequency of themes coded in provost interviews.

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

So I think the key for units like the library, since they are dependent upon the deans, whether it's 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. So I think customer service...becomes really important in this kind of environment. (Provost Interviewee PP07)

To fulfill this role, provosts suggest the importance of collaborating with faculty and students, such as introducing a liaison program. As conveyed by one provost, it is very important for libraries 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 Interviewee PP05). The goal of the library should be to go beyond its role as "a service body" and instead be integrated into the lives of its potential users (Provost Interviewee PP13). As stated by one provost:

I think that for so long they've 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's less about going to a physical space but accessing information in their offices...And so trying to imagine a new way in which it's not just a service model, but it's actually an integration and partnership model, I think that that is one of the challenges of...changing the paradigm. (Provost Interviewee PP03)

One of the ways librarians can collaborate with potential users is 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 (see previous page; Provost Interviewee PP04), 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 Interviewee PP04)

But space cannot be limited to supporting library collections or services, as stated by the following provost:

...If the library gets into turf protection, it's gonna lose...it's gonna look and feel like sort of the, the stereotypical, antiquated repository of knowledge with dusty books that nobody ever pulls off the shelves. (Provost Interviewee PP01)

Instead, provosts want librarians to collaborate with others in using space. This can be achieved 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 the library space being used by those outside of the library leaves an impression of the library as "a hub of student learning" (Provost Interviewee PP03). Per one provost:

I think is one of the... Is you know, is one of the most effective ways to get the message out. You know, so that also then, might involve as an example, umm, making meeting rooms in the library more generally available for people to come and do projects. Umm, you know, creating that the library as this sort of center of intellectual activity. (Provost Interviewee PP09)

Yet communication and collaboration do not occur in a vacuum. Instead, they complement institutional planning. Namely, if the library actively is assessing services, systems, spaces, etc. participating in institutional planning, then they are naturally having to communicate and collaborate with the administrators and faculty on a regular basis. Provosts indicate that communication and collaboration-based efforts on part of the library must be tied to the larger institutional mission to sell them to higher education administrators: "...if, if it can help a university-wide initiative, that's gonna be helpful. So find out what the provost is very interested in, and then, try to, to find a way that the library can help, help support that initiative" (Provost Interviewee PP04). One provost provided a rich, detailed anecdote concerning the importance of the library linking communication and collaboration efforts to the institutional mission:



We are a science and technology university. There is no way on God's green earth that our faculty are ever gonna leave the peer review journal conference proceedings world. And yet we've got a couple of very bright, very interesting, very cool young library faculty, who when you talk to them, you can tell that like they, they have no idea who their audience is here. They have very exciting ideas. But, you know, the kinda stuff they're interested in, and they're kind of wondering why they don't get more response and that sort of thing, this is just not the kinda institution where they're gonna get a lot of response. And, and so, then you get into this kind of weird situation where you've got these incredibly bright people who are out there, uh, talking to other librarians about ideas that are very important to librarians, and that librarians on... As a body, agree, are important. But the engineers don't think it's important. Umm, and the biologists don't think it's important because they're 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's, you know, what's 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," you know. Those are... That's like... But that's not what's compelling. What's 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% increase in their citations?" (Provost Interviewee PP09)

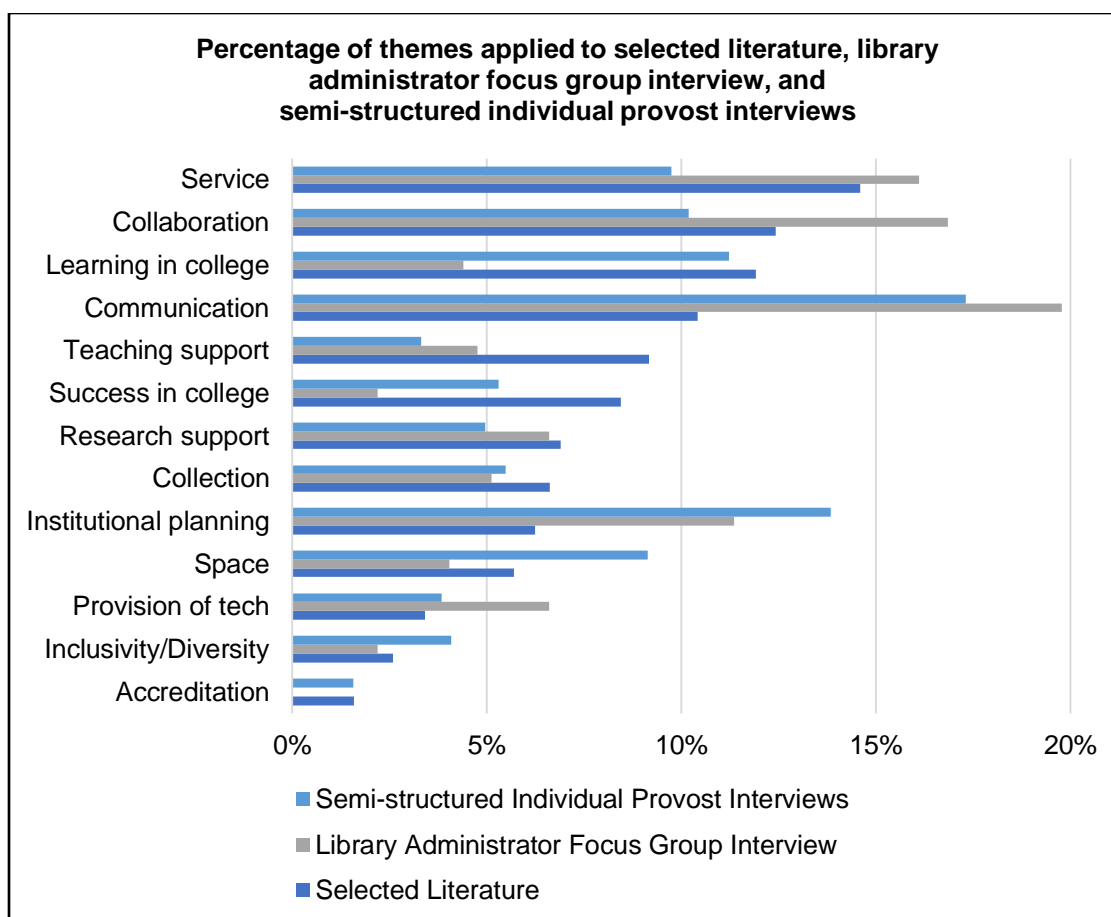
However, this provost's account, especially her conclusion, should not be interpreted as provosts emphasizing direct outcomes as indicators of library value. Provosts recognized that the influence of the library often is indirect, which has been suggested in older literature, as exemplified by the following quote and supported by their discussion of learning in college (16%, n=44):<sup>80</sup>

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

Rather than librarians concerning themselves with whether an impact is direct or indirect, they should instead connect these impacts strategically to the overarching institutional mission (Provost Interviewee PP14). This finding also was reflected in the focus group interview.

#### Comparing Three Data Sources

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



**Figure 7:** Percentage of themes coded compared across all three data sources.

When comparing all three data sources, some differences among the themes prevalent in each can be drawn. Literature review documents discussed success in college more than library administrator focus group interview or provost semi-structured individual interviews and communication less. Focus group interview participants discussed learning in college 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 discussed institutional planning less than the provosts in their individual interviews, whereas provosts focused less on teaching support than the selected literature.

### Discussion

The *Findings* section provided empirical evidence for the identification of themes important in the selected literature, to library administrators, and provosts, respectively, as well as for comparisons made between these data collection sources and within data sources (theoretical and research). The *Discussion* section summarizes what was identified in the data collection and analysis of the three data sources.

One of the first key findings is that librarians, as indicated both within the literature review and by the focus group interview participants, 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.<sup>81</sup> Service might be focused because of stagnant or reduced funding since it can be a cost-effective library response. However, as suggested by comparing the higher education literature to the LIS literature, as well as discussed in the provost interviews, higher education stakeholders and administrators are not as concerned with service as librarians seem to be. Instead, as suggested by one provost's comment (see Provost Interviewee PP13 in previous section), viewing the library in terms of simply its services may not be an effective communicator of value.

As indicated by the frequency of themes coded in the provost interviews, space is considered an important library response by higher education administrators. However, based on the difference in frequency of space as discussed in the provost semi-structured individual interviews compared to the library administrators' focus group interview and the review of the selected LIS literature, space is not as important to librarians. Space might not be discussed by librarians because it may be associated with costs, such as renovations and additions. However, it also could be that librarians do not want to call attention to the amount of space allocated to libraries, especially if the space is dedicated to shelving for materials. Librarians may be involved in or wanting to not become involved in "turf wars," and are reticent to share their space with groups outside the library.

Such reticence needs to be eschewed by librarians, as the collaborative sharing of space with outside groups (i.e., those within the institution but not part of the library, those external to the institution, such as the community) was a theme frequently addressed by provosts. An effective way to communicate value to provosts is for them to see how various groups are being served by the library, which is reflected by their use of space.<sup>82</sup> This value also might be considered more important with the increase of distance learning, as noted by the following provost:

Well I think space, you know, for one thing. If we're talking about distance, but it could be a fantastic umm, you know, place to... Especially on-campus students who want to gather together. Okay? So this is my biggest concern, is that the students aren't coming together. Uh, the library can be that place, that nexus, where, you know, the crossroads where students can come uh, to study together, you know. So, yes, everything's posted online and they, you know, they can do this alone, but there's 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 Interviewee PP04)

While this same provost was the only one to mention virtual space this is an area that should be considered and addressed, especially as online learning offerings increase. Libraries are working to support distance students, but their efforts are often not assessed.<sup>83</sup>

While librarians do not consider collaboration in relation to space, they do consider it an important theme, as indicated in both the selected literature review, particularly within the AiA studies and focus group interview. However, findings from the provost interviews indicate that institutional planning also needs to be considered. Specifically, librarians need to connect collaboration, as well as communication, to institutional planning outcomes.<sup>84</sup> Institutional planning is addressed more in thematic pieces from the literature review and is important to provosts; it is less frequently addressed in studies from the literature review and by librarian administrators in the focus group interview. This observation supports the argument that in theory librarians and researchers recognize the importance of institutional planning within higher education, but they do not address it in practice. This may be attributed to librarians' disconnection to institutional planning initiatives, such as accreditation, which was only discussed in a few pieces of relevant literature. However, librarians need to market and link their service offerings to the institutional mission. Hopefully, this linkage will be made stronger, as conveyed by the analysis of the selected literature review documents, suggesting the increase of the theme's frequency within the literature over time.

The way that libraries can make this link seems to be contextually-bound because of their dependency on the mission and goals unique to their institution. The importance of context in shaping how librarians communicate value is exemplified by the following provost account:

There's not one specific thing a library can do, because the environments are so different. Umm, but I think, umm, you know, 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 information, umm, in those particular kinds of environment, then that... That's... That's what libraries need to do to be successful. (Provost Interviewee PP02)

Aside from being abreast of context by linking library value to the mission and goals of one's specific institution, librarians also need to consider the contextual nature of their relationships with higher education administrators.<sup>85</sup> As conveyed by one focus group participant:

I think one of the challenges, uh, uh, of building relationships, umm, is, if you look at like the average tenure of a provost or another chief academic officer, which is something, it's less than five years. So sometimes you're, you're fostering relationships, umm, umm, that maybe key relationships that, that you know are gonna make change over the time when you've established these relationships. Umm, we had a plan, umm, a year ago to, umm, build out a model for successful tutoring center that included peer tutoring. Umm, we have one in our science library and we're gonna do a more across campus one, but they, umm, those plans had to get set aside while there are some changes in, in, in the president in the chancellor, umm, that kind of, umm, put, 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, where you're gonna be prepared to, umm, umm, learn to... To forge a relationship with new players, and to wait for those times when that idea that you had laid the ground work for previously, uh, you can start laying that ground work again when you have new players in some of those positions. (Advisory Group Member LM06)

If not already aware of the challenges associated with higher education funding, librarians should become more aware of and involved in the broader landscape of higher education funding.<sup>86</sup> The nature of this environment has become more obtuse with the results of the recent presidential election and it is generally unknown among provosts (who were interviewed both before and after the election results), how it may influence funding. As stated by one provost:

The election yesterday, and I think that the...The...Trump winning the presidency may further call into question, uh, higher ed., uh, expenses and value and so forth, and that, again, had really brought impacts on us. Umm, the one thing that's happening in the industry is that people are... Because of making that challenge...that challenge is...Hits places like us that want to have a... A research piece and a teaching piece. Umm, apparently, it's an art, uh, because people do not un...Understand the role of research in a...In a university and, you know, there'd be all kinds of cries for more efficiency. And then by "efficiency," they mean, umm, faculty teaching more students. And the more students they're teaching, the less research they're gonna do. So that's a really simple equation. (Provost Interviewee PP02)

So far, this discussion has touched on some important themes that librarians need to address when demonstrating value, namely, institutional planning, space, communication, and collaboration. Per evidence from both the focus group and semi-structured individual interviews, these latter three categories must reflect the institutional planning theme by keying into the institutional mission. The library can align itself with institutional goals and the institutional 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.

As conveyed by other reviews of the assessment and evaluation literature, librarians perceive a demand to link value-based initiatives to direct outcomes.<sup>87</sup> As indicated by the analysis of the AiA studies, librarians are aware of and open to the potential for integrating more varied data points, as indicated by heightened use of mixed and multiple methods, and measures, e.g., correlation, to demonstrate this value. This finding also is supported by the account from Advisory Group Member LM14 on page 22.

In this account, the library administrator recognizes emergent methods 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 library's ability 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 Interviewee 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.

However, this strategy may not be feasible to those outside of library administration. For this reason, another strategy that librarians can utilize is to focus on the institutional mission and goals, e.g., inclusivity and diversity, that are most important to the institutions' administration, and to determine appropriate library responses to those topics and ways to measure them.

Another way librarians can contend with context is by using mixed or multiple methods (see *Appendix A* for the explanations of these terms). As discussed 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, which is defined as the use of two or more methods for data analysis and collection.<sup>88</sup> The benefit of using mixed and/or multiple methods is that the validity of the observations being made is strengthened.<sup>89</sup> Within the context of provost interviews and observations previously made, the use of mixed and/or multiple methods also addresses the multifaceted context that influences how higher education administrators view and interpret different outcome measures. The AiA studies provide some exemplars for how to use mixed and/or multiple methods, as these studies disproportionately employ these approaches when compared to non-AiA studies.

Other positive attributes of AiA studies is that they focus on space as an important theme, reflecting the importance attributed to this theme by provosts. These studies also include a variety of populations both in terms of institutions (more diverse geographical locations, institution types, and sector affiliations when compared to non-AiA studies) and groups (more diverse in terms of studying undergraduates, graduates, and other groups). Like using multiple methods, collecting data from varying populations also enhances the observations that can be made, and provides contextually-based examples to others who may wish to study a specific population. However, all academic library studies can benefit from collaborating across institutions. Such collaboration can further enhance study findings by rendering them more generalizable across populations. These collaborations can be achieved within consortia by not only collaborating in collection development and shared collections, but also by collaborating 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.

The discussion of the findings identified in the project data collection and analysis have informed the identification of exemplar studies for aligning with and impacting student learning and success with institutional goals and objectives. The findings also have aided the development of Priority Areas for further research, which will provide the framework for the research agenda.

### **Priority Areas for Future Research and Best Practices**

The Priority Areas for future research are based on the findings of the selected literature review, the library administrator focus group interview, and the provost semi-structured individual interviews. These Priority Areas intentionally are broad to foster discussion and input from academic librarians and to include more specific research questions within each Priority Area. After the identification of and justification for the Priority Areas for future research, each Priority Area and corresponding exemplar cases is briefly summarized.

#### **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 specifically 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 to the trends,” which is why these trends were included as themes in the codebook.<sup>90</sup> However, individual library responses, such as information literacy instruction and data analytics were not included in the codebook. Therefore, it should be noted that while library response (collection, service, space) was coded as a theme, these codes were not included within the count of the top five themes since each Priority Area addresses a theme across all three responses. Six themes were included because the RFP requested 5-10 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.”<sup>91</sup> Identifying six initial Priority

Areas also allows other themes to be suggested through Advisory Group and other stakeholder feedback. Table 4 denotes how five of the six total Priority Areas were identified – by examining the most frequently coded themes.

**Table 4: Top Five themes per data source**

<i>Selected literature</i>	<i>Library administrator focus group interview</i>	<i>Provost semi-structured individual interviews</i>
<ul style="list-style-type: none"> <li>• Collaboration (12%)</li> <li>• Learning in college (12%)</li> <li>• Communication (10%)</li> <li>• Teaching support (9%)</li> <li>• Success in college (8%)</li> </ul>	<ul style="list-style-type: none"> <li>• Communication (20%)</li> <li>• Collaboration (17%)</li> <li>• Institutional planning (11%)</li> <li>• Research support (7%)</li> <li>• Provision of tech (7%)</li> </ul>	<ul style="list-style-type: none"> <li>• Communication (17%)</li> <li>• Institutional planning (14%)</li> <li>• Learning in college (11%)</li> <li>• Collaboration (10%)</li> <li>• Success in college (5%)</li> </ul>

Across all three data sources, the most frequently coded themes were communication, collaboration, institutional planning, learning in college, and success in college. Another area that was not included as a theme code, but is important for academic libraries 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, and by recent ACRL initiatives, such as the Learning Analytics e-Learning webcast series and ARL's Statistics Data Analytics.<sup>92</sup> Based on the most frequently coded themes, feedback, and ACRL initiatives, the Priority Areas are:

1. Communication
2. Collaboration
3. Institutional planning
4. Learning in college
5. Success in college
6. Learning analytics

#### Identifying Exemplar Cases

In addition to identifying the Priority Areas, the report's RFP also asked for an identification of best practices. However, based on feedback from the Advisory Group, the team has decided that identifying exemplar cases, or success stories, would be more helpful in suggesting innovative ways to align with and impact student-centered outcomes, as well as communicate this impact to higher education stakeholders. The exemplar cases will be included in the visualization component of the project so that librarians, researchers, and students will be able to select exemplar studies based on the document characteristics of interest to them (e.g., exemplar studies assessing student learning taking place in community colleges). The visualization component includes a "web-based visualization dashboard to help librarians filter the existing literature for studies relevant to their research interests," and more information and a mock-up are available in the proposal excerpt.<sup>93</sup>

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 best 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 categories each for which points were assigned. These categories are:

1. *Number of themes it incorporates (each theme = 1pt)*. 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.
2. *Context (community college = 1pt, multiple institutions = 2pts)*. 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.

3. *Level of effort of data collection and analysis (mixed methods = 2pts, multiple methods = 1pt).* Use of mixed and/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.
4. *Level of impact (collaboration/communication/institutional planning/learning in college/success in college = 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 institutional planning, student learning, and student success.
5. *Population studied (inclusivity = 1pt).* 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."<sup>94</sup> 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 neutral meeting grounds between various academic and institutional units.<sup>95</sup> Therefore, studies that were coded with the inclusivity theme also received a point.

Based on the results of the quantitative scoring method, as well as the qualitative criteria of how the research documents contributed to the Priority Areas and suggested Best Practices that could apply to future studies, one exemplar study for each Priority Area was selected.

### **Priority Area 1: Communication**

The importance of communication was identified in the RFP and in the project plan, and was one of the main reasons for the creation of the Advisory Group.<sup>96</sup> It provided the opportunity for library administrators to connect with provosts at their institutions and provide data on how librarians 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." However, only three studies published since 2000 have looked at how administrators perceive the library and its collections, spaces, and services.<sup>97</sup> An earlier study from 2007 found that according to multiple administrators at six American universities, the library's symbolic role as the heart of the university was outweighed by its practical role, through which it needed to "connect what it does to the values and mission of the university."<sup>98</sup> 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.<sup>99</sup> The study the team identified as exemplar is Fister's (2010) survey of 134 administrators, which covered the highest number of themes (n=11) and received the highest score of all the studies (17 points).<sup>100</sup>

*Best practice identified.* Communicate with those outside of the library and high in the institution's hierarchy 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.

### **Priority Area 2: Collaboration**

Collaboration is an important theme because of the academic library's primary mission as a research and teaching support unit.<sup>101</sup> The AiA projects also explicitly required librarians to collaborate with at least two other people outside the libraries.<sup>102</sup> As a theme, its definition was: "Librarians work with other institutional departments to influence student outcomes or with other institutions." 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.<sup>103</sup> Their documented and suggested collaborations cover a wide range of services and collections. Another notable collaboration was between Wolfe, who is an Assistant Professor in the Behavioral and Social Sciences at Hostos Community College (CUNY), who published the results of a study that incorporated information literacy into a class assignment in a higher education journal, and was one of the highest scoring research documents from the higher education databases.<sup>104</sup>

*Best practices identified:* Understand that there are different types and levels of collaboration, and consider looking at literature from other related fields to see what they say about libraries and similar issues that libraries are or may face. Work with academic administrators, academic services, faculty, students, alumni, and other members of the regional and local communities.

### **Priority Area 3: Institutional Planning**

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’s focus group interview and the provosts’ semi-structured individual interviews, but it was the seventh most common theme in the literature. Moreover, there was a statistically significant difference in the number it was reported in theoretical documents compared to research documents, which means that it likely is being discussed more than being empirically tested. Lombard’s 2012 study at Gannon University had a short write up, but was exemplar in several ways, which led to its relatively high score.<sup>105</sup> 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 also was interesting because the survey was posted on various non-library online spaces, meaning that it may have tapped into 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 librarians can collaborate with admissions departments.

*Best practices identified:* Go outside of the library to collect data and to suggest possible collaborations around common issues. 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.

### **Priority Area 4: Learning in College**

The definition for this theme was: “Outcome was focused on the less objective concepts of learning, such as critical thinking. Usually not tied to a specific graded assignment or graduation.” In contrast with student success, the code was used for identifying the less tangible or indirect effect of the library on students. 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.<sup>106</sup> 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, analyzing the data, and offering suggestions based on the results. This study was a high scoring example 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 response that was mentioned by the provosts that was not mentioned as often by librarians.

*Best practice identified:* Engage with faculty and students for librarian inclusion in developing academic and everyday life support services for students. This best practice also builds on the Priority Areas communication and collaboration.

### **Priority Area 5: Success in College**

Success in college is defined as: “Outcome was focused on the more objective indicators of learning. These tended to be linked to a specific assignment/semester, such as grades/GPA. It could also be related to whether the student re-enrolled or graduated.” As mentioned earlier in the report, it is useful for librarians to collect individual-level data to document how the library affected student success. 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 a 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.<sup>107</sup> While this study has one of the strongest findings empirically, it was not given as many points using the scoring system explained above as compared to the other exemplar studies described in this section. This lack of points rewarded illustrates the difficulty of setting evaluative criteria and suggests that additional exemplar studies should be solicited from Advisory Group members and other relevant stakeholders.



*Best practice identified:* Work with academic services and faculty to develop ethical collection and reporting methods for individual-level student data that retain individual privacy and confidentiality. Engage with faculty and students for librarian inclusion in developing academic and everyday life support services for students. This best practice also builds on the Priority Areas communication and collaboration.

### **Priority Area 6: Learning Analytics**

Although learning analytics did not have its own thematic code, it was identified as being an important area in documents such as ACRL's top trends in academic libraries and ACRL initiatives, such as the e-Learning Webcast Series on Learning Analytics.<sup>108</sup> Jantti and Heath's 2016 study describes the use of learning analytics at the University of Wollongong in Australia.<sup>109</sup> 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 student support service usage data.

*Best practice identified:* 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."<sup>110</sup> 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.

These Priority Areas are the basis for the research agenda and the exemplar studies are the foundation for the identification of the data collection and analysis methods that can be used for addressing the research questions. Although these methods are systematic and grounded in research theory and practice, as with any project, there are limitations that must be addressed. These limitations indicate the conclusions that can be drawn from the project findings and those conclusions that cannot be drawn.

### **Limitations**

The limitations of the project can be divided 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 is focused on documents from the US and all Advisory Group members and provosts who were interviewed were from US institutions.

Another limitation in data collection relates to the selection of data sources. Selected LIS and higher education documents may be dated two or more years in terms of the relevant themes identified, especially the research documents, given the time it takes to complete a research project, write up the results, submit it for review for publication, have it accepted for publication, and the lag time between acceptance and publication. The literature disproportionately represents studies addressing public sector universities and/or institutions, as opposed to colleges and community colleges and/or institutions in the private sector. The selection of Advisory Group members, who also are the focus group interview participants, from a variety of institutions, with equal representation from all three institutional types and from both public and private sectors, and representation from secular and non-secular institutions, was intentional to provide a broader perspective to the project.

The selected documents also are limited to those examining student-centered outcomes within a library context. This selection decision was made since it was explicitly stated as the scope for the content analysis of relevant literature in the project RFP.<sup>111</sup> However, based on findings from focus group and individual interviews, as well as feedback from Advisory Group members, the team has determined that this scope may constitute a blind spot in identifying areas where the library currently is not engaged, but should be. Given the importance of collaboration as a Priority Area, the team will engage in a review of higher education literature focusing on the major themes associated with student-centered outcomes that occur outside of the library. This high-level review of the literature will be completed and incorporated into the first draft of the final report that will be released in May 2017. Findings from this review will strengthen and focus identification and discussion of Priority Areas as well as the development of future-focused research questions by eliciting ideas for identifying and measuring student-centered outcomes outside of the LIS literature and discussions.

Since a non-random sample of documents indexed in databases was selected, some documents that are not indexed in the databases that would be relevant to the literature review may have been missed (e.g., grey literature, such as research agendas). This missed selection is minimized by the solicitation of feedback from the ACRL board and members, as well as the Advisory Group regarding what studies should be added to the content analysis of selected LIS and higher education documents.

The selection of the Advisory Group members and their institutions' provosts only provide an indication of important themes from a high-level, administrative perspective. Since the interview participants and the literature were selected as a purposive sample and not a random sample, the findings reported do not represent all professional librarians' and researchers' perspectives on the themes. While the sample of library administrators and provosts is derived from varied institutions, the sample is small, purposive, and non-random, which indicates that it cannot be generalized to all high-level administrators. However, some conclusions can be drawn by examining the overlaps between the smaller sample of administrators and the larger sample of the literature.

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. An attempt to mitigate this limitation was to inductively add codes to the coding scheme when they emerged from the data. These codes included inclusivity/diversity and privacy.

### **Conclusion and Next Steps**

Based on the collection and analysis of the three data sources (i.e., selected LIS and higher education literature, library administrator focus group interview, and the provost semi-structured individual interviews), the Priority Areas for future research and exemplar cases identifying how libraries can align with and have impact on student learning and success were developed. This initial project report provides a framework for the research agenda for discussion by key stakeholders. The Priority Areas are the foundation for the development of future-focused research questions based on quantitative and qualitative data collection and analysis of the LIS and higher education literature and interviews with academic library administrators and representatives from provost offices.

The key recommendations for librarians based on this analysis of the selected LIS and higher education literature addressing the articulation and involvement in student learning and success include:

- Identify and articulate both learning and success outcomes when documenting student-centered outcomes. Engaging students in how to redesign library space can demonstrate how libraries enhance learning outcomes. Library resource or service usage and its relationship to student retention is an example of the effect of the library's service, collection, and/or space on a success outcome.<sup>112</sup>
- Focus less on service and more on sharing space with other groups both on and off campus.
- Bolster collaboration with other campus units or external partners, including consortia, on assessment-based efforts.
- Communicate how library services, collections, and spaces address the larger mission of the institution by becoming better at marketing and customer service.
- Study the assessment and student-centered outcomes of diverse populations across various institutions using multiple methods.
- Develop relationships within different academic service areas, such as teaching and learning, at various levels throughout the institution.
- Continue to develop and foster relationships and engagement with academic administrators and other service providers, such as student services, offices of sponsored programs, teaching and learning, etc.
- Present data in different contexts and representations to make a case with diverse groups of academic administrators.

The next steps include a presentation and two brainstorming sessions with the Advisory Group members based on the report findings and Priority Areas for future research at the ALA 2017 Midwinter Meeting in Atlanta, GA to gather suggestions and feedback on the report. The visualization component will be

developed, usability tested, and presented for feedback at the ACRL Conference in Baltimore, MD in March 2017. Feedback and suggestions will be collected and addressed in the public release of the final report in May 2017, which will include the full report of the entire project phases and findings as well as the research agenda, which will include the Priority Areas and future-focused research questions and a summary of the literature that supports each Priority Area. The final project results and visualization component will be presented in an ACRL Online Open Forum in mid-June 2017 and again at the ALA 2017 Annual Conference in Chicago, IL.

## 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 during coding, their definitions, and examples.

**Coding:** Placing data in categories, or themes, for organization and analysis.<sup>113</sup>

**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 institutional planning 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,<sup>114</sup> 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."<sup>115</sup>

**Learning in college:** An outcome focused on the less objective concepts of learning, such as critical thinking. These encompass the outcomes not covered by the Success in college 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."<sup>116</sup> 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 literature review section.

**Librarians, researchers, and students:** A group working in library and information science (LIS) that includes librarians and other employees of academic or other libraries, scholar-practitioners in LIS, LIS researchers, and students enrolled in LIS programs

**Method:** "Any procedure employed to attain a certain end;" used to address a research-related goal or goals.<sup>117</sup>

**Mixed methods:** The use of qualitative collection and/or analysis **and** quantitative collection and/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.

**Success in college:** An outcome 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."<sup>118</sup> These tend to be linked to a specific assignment/semester, such as grades/GPA. It 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: Library Administrator Focus Group Interview Protocol**

### **ACRL Research Agenda**

#### **Advisory Group Online Focus Group Interview Questions**

**Tuesday, October 11<sup>th</sup>**

**10:00-11:30AM PDT/ 11:00AM-12:30PM MDT/ 12:00-1:30PM CDT/ 1:00-2:30PM EDT**

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 C: Provost Semi-Structured Interview Protocol**

### **Semi-Structured Interview Questions for the Academic Institution's Provost's Office Representative**

1. Do you have any questions before we begin?
2. 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.]
3. 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.]
4. 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?]
5. How does your institution measure the effectiveness/impact of the library's 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 & projects; undergraduate research; diversity & global learning; service learning & community-based learning; internships; capstone courses & 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?]
6. Suppose your institution's library dean or director approached you with a moderate (non-capital) 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?
7. What challenges do you see in the way the library staff communicates with the academic community, including students, faculty, and administration?
8. 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?]
9. What changes do you envision in higher education in the next 5 years?
10. In what ways can the library be a major contributor to this new higher education environment?
11. If you could create an ideal academic environment, what would that look like? How could the library/libraries enhance or support this environment?
12. 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 D: Codebook

### Theme Coding Scheme

Identify the appropriate library response (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 responses

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 responses to trend
<i>Students</i>		
Learning in college (and beyond)	Outcome is focused on the less objective concepts of learning, such as critical thinking. These encompass the outcomes not covered by the Success in college 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." <sup>119</sup> 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 literature review section.	Service: Library instruction  Space: Collaborative working space for students  Collections: Repository of online tutorials not linked to a specific class
Success in college (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." <sup>120</sup> These tended to be linked to a specific assignment/semester, such as grades/GPA. It 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.	Collections: Physical collections  Collections: Digital collections  Space: Study spaces  Service: Library instruction  Service: Collection discovery
<i>Students/Faculty</i>		

Higher education trend	Trend defined	Example of library responses to trend
Research support	Outcome was tied to research or other use of the library's collections that was not explicitly tied to a class.	<p>Collections: Physical</p> <p>Collections: Digital</p> <p>Service: Data storage</p> <p>Service: Consultation</p> <p>Service: Teach data management</p> <p>Service: Teach data mining methods</p> <p>Service: Collection discovery</p> <p>Space: Research (as opposed to learning) commons</p>
<i>Faculty</i>		
Teaching support	Outcome was viewed from an instructor perspective, and it deals with a specific course.	<p>Service: Library instruction</p> <p>Service: Help instructors manage pedagogical and curricular changes</p> <p>Collection: Online repository of syllabi</p> <p>Space: Faculty development center</p>
<i>Institution</i>		
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)	<p>Service: Educate library and other employees</p> <p>Service: Align with institutional mission</p>
Provision of technology	Outcome also dealt with hardware/software that affect student outcomes	<p>Service: Provide expertise for data management</p> <p>Space: Provide hardware and software in Makerspaces</p>
<i>Other thematic codes (does not have to align with library service, space, or collection)</i>		
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 institutional planning unit; faculty) or inter-institutional (e.g., with multiple institutions)



Higher education trend	Trend defined	Example of library responses to trend
Communication	Librarians communicate impact or other aspects of value with stakeholders	

#### 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: <a href="http://www.census.gov/econ/census/help/geography/regions_and_divisions.html">http://www.census.gov/econ/census/help/geography/regions_and_divisions.html</a> or outside of the US 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 non-secular; 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. Can choose up to 2.*	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. Can choose up to 2. 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. Can choose up to 2.	GPA; Persistence; Pre/post test; Retention; Survey; Rubric; Other
User measurement – Student type	Status of participants. Can choose up to 2. Other includes faculty/staff.	Undergraduate; Graduate; Other
Analysis method – Qualitative	How the data were analyzed via qualitative methods. Can choose up to 2.	Content analysis; Other

<b>Code name</b>	<b>Code definition</b>	<b>Values</b>
Analysis method – Quantitative	How the data were analyzed via quantitative methods. Can choose up to 3.	ANOVA; Regression; X2; Descriptive statistics; Correlation; Other

\* Additional other categories may be added in the notes section of the study, and separated by pipes (The straight line that you get when you hit Shift + \). Example: If there were more than 2 outcomes, code Enrollment and Other, and in the notes write “Other outcomes are Graduation|Learning|Student engagement”

\*\*Note: When the researchers use a rubric to evaluate student work, the analysis method is considered only quantitative if they only 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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## Notes

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