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The Relationship between Collection Strength and Student Achievement

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Abstract

This chapter examines how selected accrediting bodies and academic librarians define collection strength and its relationship to student achievement. Standards adopted by accreditation bodies and library associations, such as the Association of Research Libraries, are reviewed to determine the most common ones which are used to assess library collections. Librarians' efforts to define and demonstrate the adequacy of library resources are also examined in light of increased focus on institutional accountability, and requirements to provide planned and documented evidence of student success. Also reviewed are the challenges and faced by academic librarians in a shift as they shift from traditional collection-centered philosophies and practices to those which focus on client-centered collection development such as circulation analysis, citation analysis, interlibrary loans and student satisfaction surveys to determine collection use and relevance. The findings from a review of standards and existing library literature indicated that student use of library collections depends on faculty perceptions of the library and whether they require students to use library resources and services for their research papers. Through marketing strategies, improvement of student awareness of collections and library services, the chapter concludes that multiple collection-related factors influence the academic success of students, not just the size and importance of library collections per se. The significance of the chapter lies in its identification of halting and difficult adjustments in measuring both collection "adequacy" and student achievements.

Keywords: Collection development, assessment, student learning, citation analysis, collection strength, academic libraries

Classification: General review

Introduction

Academic librarians have always claimed that the library is an indispensable tool to ensure students' academic achievement. On its face, this claim is reasonable. As faculty require students to complete research assignments from discipline-specific publications, colleges and universities have historically invested in library collections to guarantee access to those resources. Collection management librarians have sought to protect acquisition budgets in the face of decreased funding, in terms of absolute dollars and relative buying power. The argument that students require adequate resources to achieve academic success has become a matter of organizational survival and professional pride. Accrediting bodies also pressure institutions to provide adequate library resources for programs, or risk losing accreditation.

While collection management librarians have employed different types of collection strength analyses which are persuasive with other librarians, it has been much more challenging to convince faculty, administrators, and accrediting bodies that such measures are directly linked to student academic achievement. Will a stronger collection lead to improved achievement, or will a weakened collection lead to worsening of student achievements? These questions are hard to answer because many factors affect how students make constructive use of library resources. Information literacy instruction, liaison programs, reference services, faculty perceptions of librarians, and the quality of library holdings all influence actual student use of collections.

This chapter examines how accrediting bodies define collection strength, and how accreditors define and assess the role of academic libraries in providing resources and services which support institutional and curricular goals. It also addresses possible strategies to isolate the impact of library collections on student achievement, and frames measures of collection strength in ways that are compelling to faculty, administrators and accreditors. Since most of the literature about assessing student achievement has focused on undergraduate education, this chapter focuses on collections that support undergraduate curricula. Since higher education has embraced an assessment culture, this chapter argues for assessing collection strength vis-a-vis institutional goals in place of librarian-generated standards.

Accreditation and Academic Libraries

National Accreditation Infrastructure

For readers not familiar with the system of higher education in the U.S., a brief overview is provided.

The United States Department of Education (USDE) recognizes accrediting agencies that the Secretary of Education “determines to be reliable authorities as to the quality of education or training provided by the institutions of higher education and the higher education programs they accredit” (, 2012a, p.XXX). According to the of its Education Database of Accredited Postsecondary Institutions and Programs, “the goal of accreditation is to ensure that education provided by institutions of higher education meets acceptable levels of quality” (p. XXX). While USDE does not define quality of library collections, it does define basic accreditation procedures and has authority as follows:

1. Verifying that an institution or program meets established standards;
2. Assisting prospective students in identifying acceptable institutions;
3. Assisting institutions in determining the acceptability of transfer credits;
4. Helping to identify institutions and programs for the investment of public and private funds;
5. Protecting an institution against harmful internal and external pressure;
6. Creating goals for self-improvement of weaker programs and stimulating a general raising of standards among educational institutions;
7. Involving the faculty and staff comprehensively in institutional evaluation and planning;
8. Establishing criteria for professional certification and licensure and for upgrading courses offering such preparation; and
9. Providing one of several considerations used as a basis for determining eligibility for Federal assistance (U.S. Department of Education, 2012b, p. 2).

As of early 2012, USDE had approved 80 national, regional, faith related, career related and program based accrediting organizations. An overarching, voluntary association, the Council for Higher Education Accreditation (CHEA), provides oversight of accrediting agencies and coordinates activities of members in the U.S. All college and universities, as institutions, are accredited in their entirety through regional associations. There are currently six, some of which have recognized subdivisions:

1. Middle States Association of Colleges and Schools
 - The Middle States Commission on Higher Education (MSACS-MSCHE)
 - 2. The New England Association of Schools and Colleges
 - Commission on Institutions of Higher Education (NEASC-CIHE);
3. North Central Association of Colleges and Schools
 - The Higher Learning Commission of (NCA-HLC);
4. The Northwest Commission on Colleges and Universities (NWCCU);
5. The Southern Association of Colleges and Schools (SACS);
6. The Western Association of Schools and Colleges (WASC).

The standards of the above six regional accreditation agencies and the Association Council for Independent Colleges and Schools (ACICS) were the ones that formed the basis of this chapter's review of how library collections were gauged in terms of adequacy.

Accreditation and Library Collections

Academic library resources and services are usually subject to review by all types of accreditation agencies. The definition of “quality” of library resources and services varies according to accrediting agency, as does the type of information requested by each agency, and the data collection methods employed. While accrediting bodies use terms such as “sufficient” and “adequate” to describe library resources and services, these terms are rarely defined for librarians. Accrediting bodies do not always inform libraries of the assessment tools that they use to determine “adequacy” of collections. Some accreditors will accept librarian-generated narratives about the collections, volume counts, or a report that includes both types of reports. Factors such as student use of materials, student academic performance, or student satisfaction are not always taken into account when evaluating collection strength.

2.2 Postsecondary benchmarks for academic libraries

Programmatic accrediting bodies vary widely in the depth of their assessment of academic library collections. This is because each discipline has diverse information needs, and therefore a different level of dependence on library resources and services. For this reason, the authors of this chapter focused their study on regional institutional accrediting agencies in the United States. All regional institutional accrediting agencies include the library as a major component of their institutional evaluation.

There are six regional institutional accreditation bodies in the United States:

1. The Middle States Commission on Higher Education (MSCHE);
2. The New England Association of Schools and Colleges (NEASC);
3. The Higher Learning Commission of North Central Association of Colleges and Schools (HLC);
4. The Northwest Commission on Colleges and Universities (NWCCU);
5. The Southern Association of Colleges and Schools (SACS);
6. The Western Association of Schools and Colleges (WASC).

The academic library standards of these six organizations were reviewed, along with the standards of the Accrediting Council for Independent Colleges and Schools (ACICS) which is national in scope. These seven organizations were chosen because they set the standards for the type of undergraduate educational environments most discussed in the literature about student achievement.

Table I summarizes whether or not seven accrediting bodies address five main requirements for academic library collections, according to their standards and guidelines.

1. that the collection should be *appropriate* for the mission and curriculum;
2. the collection should contain *adequate* resources;
3. use of the collection should be taught (*instruction*);
4. the library collection should be *assessed* for relevance on a regular basis;
5. the collection should be *secure*.

Also included in the table are two requirements which have been historically valued by institutions – the number of *volumes* held and the *square footage* occupied by libraries.

TAKE IN TABLE 1

Table 1
Inclusion of Main Requirements in Accreditation Standards

| | Appropriate Collection | Adequate Collection | Collection Instruction | Collection Assessed | Collection Secure | Vols. in Collection | Library Sq. Ft. |
|--------------|------------------------|---------------------|------------------------|---------------------|-------------------|---------------------|-----------------|
| ACICS | x | x | | x | | | |
| HLC | x | | x | x | | | |
| MSCHE | x | x | x | | | | |
| NEASC | x | x | | x | | | |
| NWCCU | x | x | x | x | x | | |
| SACS | x | x | x | x | | | |
| WASC | x | | | | | | |
| TOTAL | 7 | 5 | 4 | 5 | 1 | 0 | 0 |

All seven institutional accrediting bodies believe that library collections should support the institutional mission and curricula “appropriately”. Only four of the seven agencies however require that instruction about library resources and services should be given by postsecondary institutions. Five of the seven agencies required that collections be “adequate” and be regularly assessed. If teaching faculty must use the library resources to support curricula, as NCCU explicitly states (2E.2), they would learn firsthand whether or not the existing collection meets student needs. If an accrediting body expects that librarians must develop their collections using feedback from users required to use the library resources, as NCCU explicitly states (2E.2) and others imply with their insistence on assessment, then collection strength, user satisfaction and student academic success would indeed interrelated.

While five of the seven institutional accrediting bodies explicitly stated that the library should provide “adequate” resources,” none of them provided guidelines for the number of volumes a collection should hold, or the square footage a library should have. In fact, several explicitly repudiate these metrics as irrelevant to describing collection strength or library quality.

At the same time, some institutional accrediting bodies still request information about library volume count, square footage, and expenditures. If the accrediting agencies provide no definition of adequate library resources, it seems that each institution would define adequacy through a feedback mechanism as well as peer comparison.

While they may not provide specific examples of strong collections or directives about assessing collection strength, accrediting bodies do demand that academic libraries serve

students and faculty, and affirm that the value of a library collection is determined by how well it supports the needs of students as well as the institution. For this reason, assessment of collection strength must take into account the use of library resources by students, as well as the level of satisfaction with those resources.

Library Association and Professional Standards for Collections

Historically, academic libraries—particularly at research institutions—have measured their value by the number of volumes in a collection, as well as the square footage of the library. Academic libraries still value quantitative data to date, as they are reflected in annual reports on expenditures, acquisitions, and circulation statistics. These statistics serve as benchmarks for comparison among select “peer institutions.

National Center for Education Statistics.

The primary federal entity for collecting and analyzing quantitative data related to education is The National Center for Education Statistics (NCES). A biennial NCES Academic Library Survey to collect quantitative data on library resources and services covering one fiscal year. In terms of collections, it reports what is spent on library materials for collections and the number of items in different formats that are acquired and weeded. The survey also asks about the number of items that circulated and the number of library instruction sessions and reference transactions. NCES does not use the data to determine the “quality” of an academic library or its collections and provide no indicators which link library resources to student success.

Association of Research Libraries.

The Association of Research Libraries (ARL) collects quantitative data annually about the resources available in by its member libraries. In terms of collections, ARL reports what is spent on library materials and on the number of items in different formats that were acquired and weeded. These statistics also report the, expenditures, staffing, and service activities of the member libraries (ARL, 2011). Like NCES, ARL does not addresses how library collections and expenditures contribute to student achievement.

Association of College and Research Libraries.

Only the Association of College & Research Libraries (ACRL), has begun to develop standards for libraries that address the effectiveness and strength of library collections in relation to student achievement (ACRL, 2011a). ACRL established their standards “to guide academic libraries in advancing and sustaining their role as partners in educating students, achieving their institutions’ missions, and positioning libraries as leaders in assessment and continuous improvement on their campuses” (ACRL, 2011b). The latest version differs from previous versions, articulating the new expectations for library contributions to institutional effectiveness. The standards contain Principles, Performance Indicators, and Sample Outcomes. In Table 2, ACRL’s standards for collections are compared with the measures in Table 1 used by institutional accreditation agencies.

TAKE IN TABLE 2

Table 2

ACRL Standards Relative to Institutional Accreditation Criteria

| | Appropriate Collection | Adequate Collection | Collection Instruction | Collection Assessed | Collection Secure | Vols. in Collection | Library Sq. Ft. |
|------|------------------------|---------------------|------------------------|---------------------|-------------------|---------------------|-----------------|
| ACRL | x | x | x | x | | | |

(ACRL, 2011b)

During a webinar about these academic library standards (ACRL, 2011a), Chair of the ACRL Standards Committee Patricia Iannuzzi stated that the traditional volume counts are no longer an indicator of quality and depth (Iannuzzi, 2011). At the same time, she provided no other information to define quality and depth of an academic library collection. Since ACRL provides no definitions for “quality,” “depth” and “diversity,” librarians have to provide their own definitions of collection strength, along with their own benchmarks and assessment instruments.

Determining Collection Strength in Academic Libraries

Defining Collection Strength.

Historically, academic librarians defined the strength of a collection based on its number of librarian-approved and subject-specific books. They would compare their collection against reading lists in each discipline. If their collection contained those titles (or if the library had funds to quickly purchase those titles) the librarians believed that they had built a strong collection. As collections budgets decreased, academic librarians had to reassess their collection development strategies as well as their definition of collection strength. Today, “collection strength” is identified by a variety of methods.

Circulation statistics. If the “adequate” and “relevant” terms used by accreditors, can be defined by frequency of use, then collection strength could be determined through general circulation statistics. Each item would have a perceived “value” based on its number of loans and browses. If more than half of the collection had circulated or been browsed at least once in recent history, librarians determined which areas of a collection were most “adequate” and “relevant and purchase more resources based on user preferences (Brush, 2007; Littman & Connaway, 2004; Mortimore, 2005; Ochola, 2003).

Citation analysis. In some cases, librarians defined “collection strength” in whole or in part as the percentage of library resources used in student research papers (Leiding, 2005; Knight-Davis & Sung, 2008; Kille & Henson, 2011). In that case, librarians might employ citation analysis in order to assess the percentage of titles used in research papers. The greater the percentage of titles used the more “adequate” would the resources be. While every discipline differs in its information resource needs, such assessments could determine which parts of library collections provided curriculum support and which needed further development. Citation analysis of student and research papers might indicate which disciplines depended heavily on books or journals, and thus drive collection development by format as well as subject.

Student satisfaction surveys. Some academic libraries ask users to define collection strength and “adequate resources” through satisfaction surveys. At Saint Cloud State University, students receive a biannual survey distributed by the Miller Center Library. It asks students about their use of library resources and services during their academic career. Collection-related survey questions include use of the library books, journals, and databases, whether or not they learned how to search for library materials and access them, and whether or not those library resources were helpful for their research assignments (Inkster, 2010). Students could provide their reasons for satisfaction or dissatisfaction, as well as suggestions for improvement. Such surveys help to determine whether or not accessibility or awareness, in addition to collection quality, influence student satisfaction with the library resources.

Interlibrary loan statistics. If an academic library serves external users “collection strength” might be derived from data analysis of their use patterns. Similarly if a percentage of the collection, or resources in particular subject areas, are requested frequently through interlibrary loan, those resources might be perceived as “valuable” and be retained (Mortimore, 2005; Ochola, 2003). If institutional goals include provision of “adequate resources” to the community, the interlibrary loan statistics can demonstrate the library’s role in that mission.

Enterprise Data Management. In the twenty-first century, some academic librarians have employed data mining to determine what online resources get the most use and who uses them.

The data are used not only to assess use of library collections, but also to “advertise” library resources of interest based on the number of page clicks and page visits that users have made.

Librarians at the University of Minnesota have built a “MyLibrary” portal for web users, based on their relationships to an academic department, degree program, or professional position. The portal tracks usage of online databases and journals through “affinity strings” (Hanson, Nackerud & Jensen, 2008). Enterprise data management has the potential to increase use of library resources by personalizing recommendations for each individual user, thus giving users a new way to perceive and report “adequacy” of library resources.

Relationship between Library Instruction and Collection Strength

Awareness of library resources and services will help to drive student use of collections. An accurate assessment of collection strength, regardless of definition, must include recognition and assessment of librarians’ efforts to promote their resources and services. Shifting from traditional methods to a client-centered collection development philosophy and practice, will require analysis of how faculty integrate library resources into the teaching and learning processes. Evidence from such studies has the potential to show the relationship between collection strength and student success, as well as the role that reference and instruction plays in educating users about collections.

Oakleaf (2010) summarizes this well by asking a critical question:

Librarians can undertake systematic reviews of course content, readings, reserves, and assignments...librarians should use this process to track the integration of library resources into the teaching and learning processes of their institution...What do library services and resources enable students to do or do better? (pp. 95-96)

In short, librarians and others need to know what has changed or improved in terms of students' skills, attitudes, knowledge, behaviors, status or life conditions as a result of their use of library collections. In order to know that these changes or improvements are in line with institutional student learning outcomes, librarians need reliable information about what those outcomes are and what success looks like.

Documenting student learning.

According to all the organizations discussed above, academic libraries must support the goals of their parent institutions. All of the accreditation organizations named in this chapter identify "support and promotion of student learning" in one incantation or another as a major institutional goal, under which all others fall. Yet "student learning" is a broader, more elusive concept than "academic achievement".

The Higher Learning Commission (HLC) does not provide a definition of student learning in any of its documents. Instead, it presents six "fundamental questions" to institutions:

1. How are your stated student learning outcomes appropriate to your mission, programs, degrees, and students?
2. What evidence do you have that students achieve your stated learning outcomes?
3. In what ways do you analyze and use evidence of student learning?
4. How do you ensure shared responsibility for student learning and for assessment of student learning?
5. How do you evaluate and improve the effectiveness of your efforts to assess and improve student learning?
6. In what ways do you inform the public and other stakeholders about what students are learning---and how well? (2007, p.1)

While institutions can prove that students received the grades required to pass their courses and earned degrees, it is more difficult to prove that students actually learned or retained information, and that they used library resources and services to do so.

Survey or interviews with students about their learning experiences, use of the library, and how the library improved or enhanced learning experiences, may be a more valid measure of how well the institution met its primary goal.

Faculty perceptions and involvement.

Faculty perception of library resources and services affects how and if they direct students to use library collections in support their research. Over time, faculty have become less likely to perceive libraries as the "gateway" to information, and more likely to perceive them as the "buyer" (Schonfeld & Housewright, 2010). This faculty perception of library as "buyer" often affects their perception of librarians as fellow educators, although library and information science programs often prepare librarians to teach (Wyss, 2010). At the same time, faculty believe that students must learn information literacy, traditionally the realm of librarians (DaCosta, 2010; Gullikson, 2006). An exception to this rule is faculty who teach distance and online courses in which more than half of them provide all of the research materials needed by their students, and do not require use of a library (Cahoy & Moyo, 2004).

Information literacy and instruction.

While faculty often teach students how to evaluate and analyze resources in discipline-specific contexts, librarians usually focus on locating resources in the online catalog and library databases, differentiating between popular and scholarly journal articles, and citation (DaCosta, 2010; Gullikson, 2006). This would imply that students who receive library instruction during their academic career would gain awareness of library resources, actively use them for research assignments, and record their use in bibliographies (DaCosta, 2010). Student bibliographies often indicate faculty and librarian involvement in their research process and, according to DeCosta (2010) faculty who do not include library instruction as part of their coursework receive student papers of lower “academic quality.” (DaCosta, 2010).

Focus on information literacy can however lead to an imbalanced view of outcomes assessment in libraries. ACRL (2011b) identified examples of outcomes as follows:

1. Faculty and students can access collections needed for educational and research needs from all user locations.
2. Users demonstrate effective access to library resources no matter what their starting point.
3. Users expand the types of sources (e.g., multiple formats—books, journals, primary sources, etc.) consulted when doing research as a result of a one-on-one consultation with librarians.
4. Users readily transfer the skills learned through one-on-one consultation with a librarian to other research contexts/assignments.
5. Students discover the appropriate library resources needed for their coursework.
6. Users characterize the library interface as easy to find and intuitive to navigate.
7. Users judge the library as up-to-date in methods provided for access.
8. Users judge integration of library interfaces and resources found through the library as one reason for their success.
9. Faculty and students judge access to collections sufficient to support their educational and research needs.
10. Faculty, students, and community users are satisfied with the collections provided by libraries for their educational, business, and research needs. Neither common definitions nor validated measurement tools exist to determine collection strength. Client-centered collection development, however, has clearly become a best practice in academic libraries that undergraduates. Unfortunately, collection strength is rarely linked with student achievement in the literature. Three recent studies point to potential methods show results that could potentially link student achievement with collection strength.

Leiding (2005) applied citation analysis to a sample of the bibliographies of undergraduate honors theses submitted by students for mandatory portfolios from 1993-2002. A stratified sample of 101 theses was selected with a total number of 3,564 citations of which 3,407 were unique. Of the total, 1,238 or 36.3% were books, 1,410 or 41.4% were journals and the remaining 759 were other types of materials such as newspapers, primary sources, websites (beginning 1997) and government documents. In Table 3 is shown the extent to which the institution’s library had the materials used in its collections.

TAKE IN TABLE 3

Table 3

Number and Percent of Cited Materials Available Locally

| | |
|---------------------|-------|
| BOOKS (N) | 1,238 |
| BOOKS (%) | 65.4 |
| JOURNALS (N) | 1,410 |
| JOURNALS (%) | 58.2 |
| OTHER (N) | 538 |
| OTHER (%) | 48.9 |

The study found an increase in journal citations over time, presumably due to increased access to online resources and the increased percentage of acquisitions budgets devoted to serials and databases. Findings did not support the hypothesis that the use of web citations would increase, partially due the faculty advisement and the fact that the early iterations of the web were not viewed as sources of scholarly material. While Leiding’s study provided a baseline to track trends in use of online sources and journals, it points out a methodology that can be used “to evaluate how well collections are responding to changing research demands (Leiding, p. 428).

Citation analysis was also used by Knight-Davis and Sung (2008) on undergraduate papers submitted as part of writing portfolios throughout their programs from 2000-2005. The study was done to provide baseline data for future information literacy programs and to collect evidence that could guide collection development. A random sample of 957 papers from 312 portfolios of which 293 had no citations or reference lists which resulted in 420 papers with a total of 1,961 citations for analysis.

Analysis of the data showed that of all types of materials, 587 (30.5%) were from books, 559 (28.5%) were from websites and 534 (27.2%) were from journals. The study also revealed “papers with more citations will typically have a higher word count” (p. 450) which could mean more detailed and thoughtful arguments, and thus higher achievement levels. In terms of comparison with Leiding, Table 4 provides data indicating the percentages of library holdings reflected in the cited works. Of the total citations, 559 or 57% were to online sources of all types including ebooks, ejournals and databases.

TAKE IN TABLE 4

Table 4

Number of Percent of Cited Materials Held by the Library

| | |
|------------------|------|
| BOOKS (N) | 587 |
| BOOKS (%) | 69.2 |

| | |
|---------------------|------|
| JOURNALS (N) | 534 |
| JOURNALS (%) | 80.0 |
| OTHER (N) * | 840 |
| OTHER (%) | N/A |

“Other” included online resources

The authors concluded that the study did provide insights which would be used to improve library instruction programs. They also concluded that the sources used by students are often “heavily influenced by [faculty] requirements... in the paper assignment” (p. 457).

Kille and Henson (2011) conducted a small pilot citation analysis in 2010-11 of undergraduate papers by students in the Environmental Studies program at Naropa University. The papers had been included in the university’s 2009 assessment portfolio for an accreditation self-study report. The authors used a coverage power test of collection strength (White, 2008) for specific academic disciplines. The study addressed two narrowly focused research questions:

- Is there a correlation between disciplinary collection strength and achievement of student learning outcomes across departments?
- Is there a correlation between library collections usage and achievement of student learning outcomes within a given department?

The results showed no correlation between student academic achievement and either the number of citations or the percent of locally-owned resources. Nothing interesting or significant emerged analysis of statistical relationships. The range of coverage power scores was fairly small, while the range of assessment scores was fairly broad. One possible interpretation of these results is that students with better-assessed papers made the best possible use of available resources even if they were weak, while students with worse-assessed papers made poor use of available resources, however strong those resources might have been.

The papers which cited a large percentage of resources not held by the Naropa University Library received excellent assessment score, as did papers receiving worse assessment scores. At the same time, papers citing a large percentage of locally-held resources received excellent assessment score, as did papers receiving worse assessment scores. One possible interpretation is that having students making good use of available resources is more important than the adequacy and appropriateness of the available resources. It is difficult to draw useful conclusions from a comparison of the results of these three studies. Leiding (2005) de-duplicated citations, i.e., if forty different students each cited *The Grapes of Wrath* once in assignments, and one student cited *The Return of the King* once, both instances were counted as one cited book. This de-duplication made the results difficult to use. The percentage of locally-owned materials cited is an important measure because it speaks directly to how students engage with collections. Therefore, it makes a difference if, say, 90 per cent of books cited are locally owned even if only 65 per cent of them are unique titles in the collection.

Research Challenges and Limitations

The challenges and limitations of doing research into relationships between collection strength and student achievement fall into three broad categories: theoretical, practical and cultural. Theoretical challenges and limitations involve conflict or confusion about conceptual frameworks, the definitions of terms, and the methods of gathering and interpreting data. Practical ones involve technological, legal, financial, and other structural barriers to a particular line of research. Cultural challenges and limitations involve problems that may have theoretical and practical solutions but which are unacceptable to a community.

Theoretical Challenges

One major theoretical issue is choosing what to measure. Collection evaluation based on holdings alone tells us nothing about usage, while collection evaluation based on usage alone indicates nothing about effectiveness. Measuring the number of citations in student papers provides information about usage of some (though not all) locally-owned materials. Results can potentially address effectiveness when paired with evaluation of the quality of student papers. Another theoretical issue is identification of trends in student research habits and advances in library technology. Defining the significance of local ownership and the meaning of local ownership in an environment of hosted content and services adds more issues to be addressed

In the past librarians understood collections to be assets: resources which are acquired and held. In today's changing libraries, collections are better understood as services. An Ithaca survey notes a "significant shift in expenditures away from monographs and towards journals over the past decades," with journals expenditures in libraries now averaging 88% digital and 12% print (Long & Schonfeld, p. 28). Publishers, including Oxford University Press and Cambridge University Press, have also introduced subscription models for e-books alongside purchasing options. As a result, libraries are quickly moving into an environment where collection strength cannot be measured without measuring the effectiveness of student-centered library services.

Reference and instruction therefore become critical aspects of what traditionally have been considered collection development issues. If librarians build impressive collections, students will not automatically come and use them. If students do not know how to use the library, or care not to use the library (because faculty have no expectation for the students to do so), then librarians cannot know if collections strong except by using client-centered methods of collection analysis.

Practical Challenges.

In their pilot study, Kille and Henson (2011) encountered a number of practical challenges. Only one of three responding departments had usable data, one stated that it had no data, and one had only aggregate student learning outcome data. Thus Kille and Henson could not compare the use of resources across departments. They did establish collection strength scores for individual courses within the one department with usable data. Another limitation was that the data set was very small; a small number of student assignments had been selected from various courses and assessed by departmental faculty. Further, it was impossible to correlate collection strength with student achievement because the assessment scores were not a continuous scale. Unfortunately,

academic departments at Naropa University did not consult with the library about the size of assessment data sets or the assessment methodologies used. A diversity of assessment methodologies across institutions also makes it a challenge to replicate the research. Finally, many library policies and systems enable the capture of data about usage only at a very coarse-grained aggregate level.

Cultural Challenges

One cultural challenge is that librarians have traditionally considered evaluation of library materials to be their unique professional domain. Linking collection strength to student achievement cedes some of that territory to administrators and accrediting bodies. At the same time, teaching faculty are feeling a shift in the balance of shared governance in favor of administrators (Tuchman, 2009). Outcome assessment by academic libraries is becoming the last, best hope and the tool to obtain financial, political and internal moral support. In the corporately-influenced field of higher education, everything comes down to the bottom line of reputation or revenue or both, as it operates more and more under what Tuchman (2009) calls an accountability regime.

Surviving and thriving in an accountability regime will require libraries to consider the ways external stakeholders may react to results that may not show a clear connection between library collections and improved student learning outcomes. Since librarians cannot assess collection strength with reference to universal standards, they must carefully design their assessment efforts to ensure that reports to stakeholders can highlight the positive work done by librarians and teaching faculty and show where the library may need more financial support from the administration.

According to accreditation and library association standards, academic libraries must support the goals of their institutions. The accreditation organizations documents studied by the authors also identify “support and promotion of student learning” as a major institutional goal, under which all others fall. “Student learning” is a broader, more elusive concept than “academic achievement.” Yet both lack solid definitions, which again gives library outcomes assessment external cultural constraints.

Conclusions and Recommendations for Future Research

If library collections are indeed assessed, a review of the literature should show studies of outcomes linked to library collections that are appropriate, adequate and the subject of instruction for students. The literature, however, largely focuses on assessment of outcomes linked to instruction. The three studies reported in this chapter did not provide show conclusive results and provided only partial models for future research.

Whether prior research used quantitative or qualitative methods, more research is clearly needed before conclusions can be drawn about the relationship between collection strength and student achievement. This future research will need to take into account the theoretical, practical and cultural challenges that have made conclusive results difficult to achieve thus far.

Numerous opportunities exist for interesting and meaningful research into the relationship between collection strength and ACRL’s ten sample outcomes. For example,

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researchers could study whether students can access collections from on-campus and distance locations by pairing citation analysis and assessment of assignments in courses that have online and classroom sections to determine if the quality of assignments differ between on-campus and distance students. Researchers could also determine whether students increase their usage of different types of information resources after one-on-one consultation with a librarian, or whether library instruction is effective with observable and measurable outcomes. The only limit on these kinds of research projects—other than the perennial questions of time and money—is the creativity and persistence of researchers.

Time and money are very real limits to thorough assessment, but an increasing urgency to defend staff and resources must push librarians to share measurable outcomes of library effectiveness with external stakeholders. These following recommendations for future research will enable librarians to develop the assessment tools that they need:

1. Prioritize access over ownership when studying library collections that support undergraduate education.
2. Focus on producing significant results, in particular with large data sets.
3. Provide methodologies and results which are replicable.
4. Lay the groundwork for more finely-grained future analyses.
5. Ensure that research is collaborative.
6. Report not only what their results say, but what they mean.

One potentially productive research program might begin with an extremely brief qualitative survey of undergraduate students that attempts to provide researchers with answers to the following questions:

1. Are library interfaces easy to find and intuitive to navigate?
2. Are accessible collections sufficient to support their educational and research needs?
3. Are library interfaces and resources as one reason for their success?
4. What is the respondent's current or anticipated major?
5. Is the respondent willing to participate in a more detailed survey?

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