

Library Use and Undergraduate Student Outcomes: New Evidence for Students' Retention and Academic Success

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Note: This article will be published in the April 2013 issue of *portal: Libraries and the Academy*

Abstract

Academic libraries, like other university departments, are being asked to demonstrate their value to the institution. This study discusses the impact library usage has on the retention and academic success of first-time, first year undergraduate students at a large, public research university.

Usage statistics were gathered at the University of Minnesota during the Fall 2011 semester for thirteen library access points. Analysis of the data suggests first-time, first-year undergraduate students who use the library have a higher GPA for their first semester and higher retention from fall to spring than non-library users.

Introduction

As colleges and universities seek to thrive in an era of increased accountability for student success outcomes, many have adapted by prioritizing assessment of programs and services to demonstrate evidence of their effectiveness. Academic libraries are not exempt from this growing trend—recent scholarship has documented the growing interest among academic libraries in articulating their value to campus communities. Acknowledging the effect of increased assessment pressures on academic libraries, Mary Ellen K. Davis and Lisa Janicke

Hinchliffe noted that “librarians are increasingly called upon to document and articulate the value of academic and research libraries and their contribution to institutional mission and goals.”¹ In this study, we demonstrate the relationship between library usage and factors important to all colleges and universities: student retention and academic success. To isolate the potential impact of library usage and eliminate the potential for confounding influences to affect student outcomes, we examined only first-time, first-year students and their library usage during their first semester (Fall 2011) of enrollment at a large, public research university.

Literature Review

Academic libraries are essential to the core mission of colleges and universities across the nation. To that end, George D. Kuh and Robert Gonyea noted that “the library is the physical manifestation of the core values and activities of academic life [...] the library’s central role in the academic community is unquestioned.”² Questioning the importance of libraries to student learning is, according to Kuh and Gonyea, “almost heretical”; yet, along with other higher education colleagues, academic librarians face increased external pressure for accountability while also undertaking ongoing internal commitments to improvement.³ According to Marilee Bresciani, Megan Moore Gardner, and Jessica Hickmott, American higher education is facing a distinct shift that compels the need for assessment:

increasing demands for accountability for student learning by internal and external stakeholders, ever-decreasing resources, eroding public confidence, and greater numbers of students from diverse backgrounds going to college than ever before present many challenges to those responsible for creating meaningful and inspiring co-curricular learning environments.⁴

Nearly two decades ago, Sarah Pritchard stressed the importance of assessment in library services by remarking that “the future vitality of libraries in academia will be dependent upon whether they can dynamically and continually prove their value to the overall educational endeavor.”⁵ Library research scholarship within the last two decades has increasingly addressed important questions related to the impact of libraries on students’ acquisition of information literacy skills and development of critical thinking skills. Kuh and Gonyea’s comprehensive, multi-institutional study affirmed that students who attended institutions that promoted the importance of information literacy reported higher levels of information literacy.⁶ John C. Ory and Larry A. Braskamp’s early study demonstrated that participation in academic activities (which included library experiences) was moderately correlated with students’ gains in critical thinking skills.⁷ Similarly, Ethelene Whitmire discovered that students engaged in more focused library activities reported significant impacts on their critical thinking skills.⁸

Other studies have examined the association between library use, student learning, and student engagement; for example, Thomas F. Nelson Laird and Kuh found that participation in information and library-related activities (for example, using the library website to find academic resources, asking librarians for help, etc.) were positively and moderately correlated with student engagement in other areas; namely, participation in information technology was associated with factors the researchers labeled as active and collaborative learning (for example, working with other students on class projects, working with other students outside of class, etc.), student-faculty interactions (for example, discussing grades or assignments with faculty, talking about career plans with faculty, etc.), and academic challenges (for example, working harder than students thought they could to meet an instructor’s standards, preparing two or more drafts of a paper before turning it in, etc.).⁹ Beyond student participation, researchers have found that the

support institutions provide to academic services results in increased engagement: Gary R. Pike and others discovered that institutional expenditures on academic support (including libraries) have strong positive correlations to student engagement.¹⁰

Some researchers have examined the association between library use and students' academic performance; however, many of those studies present limitations due to their age or limitations in sample sizes. Additionally, many libraries do not collect data related to students' use of services to protect library user privacy; consequently, the lack of data collection leads to a shortage of studies examining the association between library use and student outcome.¹¹ An early study conducted by Patricia B. Knapp demonstrated associations between attendance in library skills programs, students' grades, and students' GRE scores.¹² Patrick Barkey also discovered that students who checked out books had higher grade point averages.¹³ While both articles are important contributions to the literature, more contemporary evidence of associations between library use and students' academic achievements is needed. Even amidst the presence of recent scholarship in this area, more concrete and reliable research is somewhat lacking; for example, while Andrew M. Robinson and Karen Schegl found correlations between citation behavior and students' grades on assignments, they noted that the correlation may have been based on the quantity of citations rather than the quality of citations.¹⁴ While K. De Jager found positive correlations between students' course grades and the number of books they checked out, the study was limited to data from 240 students across two courses.¹⁵

More promising research has emerged that further interrogated the relationship between students' library use and their academic achievement. Shun Han Rebekah Wong & T.D. Webb discovered positive associations between the number of items that students have checked out of the library and students' grade point averages at graduation; however, the correlations were small

to medium across all of the majors and colleges under review at one institution.¹⁶ Further, this study was limited because it only examined the association between one library activity—checking out material—and students’ academic achievement. Students engage in a wider variety of interactions with their libraries and it is important to examine the differences those interactions can have on student outcomes. Additionally, the researchers did not attempt to control for additional variables also associated with students’ academic achievement (such as demographics, college experiences, pre-college academic performance, etc.).

Several researchers have also investigated the impact of libraries on students’ retention.¹⁷ While the earlier studies connected library use to retention,¹⁸ more recent studies have examined the relationships between library expenditures and retention rates.¹⁹ Elizabeth M. Mezick, for example, found moderate relationships between library expenditures, library materials, serials, and student retention among several hundred four-year institutions.²⁰ Yet, even among those diverse studies, there is little evidence regarding the impact that specific library activities (for example, using licensed, web-based resources; interacting with reference librarians, etc.) may have on student retention. Colleges and universities have a very small window of opportunity to establish strong connections with students, as 75 percent of non-returning students will withdraw during or immediately following their first semester. Therefore, activities and interventions that can be designed to enhance students’ academic success and retention are valuable undertakings for higher education institutions.²¹

In our study, we expand upon prior research to examine the association between a variety of library interactions, student retention, and student academic achievement. In an effort to eliminate confounding variables that might influence our dependent measures, we have

examined only first-time, first-year students in the first semester of their study at a large, public research institution. The research questions guiding this study are as follows:

- Do first-year students who access library services in their first semester have higher academic achievement and retention rates from fall to spring semester than students who do not use library services?
- Is the use of specific library services associated with first-year students' academic achievement and retention? Do these observations hold when controlling for demographic characteristics, pre-college academic characteristics, and students' other experiences on campus?

Methods

Participants and Institutional Setting

In Fall 2011, 5,368 non-transfer first-year students were enrolled at the University of Minnesota – Twin Cities, a large public university classified by the Carnegie Foundation as having very high research activity. Approximately 30,000 undergraduate students attended the University in the 2011-2012 academic year and were enrolled in one of seven large colleges.

Measures

Library usage.

Data were gathered on students' use of a variety of library services in two primary ways: the first group of data was automatically collected by virtue of student log-ins to central databases and websites. Library services in this group include:

- Database, electronic book, and electronic journal logins: Use of all three of these digital resources was captured through a “click-thru” script for licensed resources. The script authenticates and authorizes users, while also capturing user information, before launching users into the University’s installation of EZProxy.
- Website logins: Using the Drupal content management system, the Libraries capture user login information using the Drupal registration module. The Libraries website has many features, such as account information and recommendations, which are only available to users after logging in.
- Loans: Check-outs and renewals were extracted from the University’s Ex Libris Aleph catalog transaction records. For this analysis, no distinction was made between initial check-out and renewal.
- Interlibrary loans: Interlibrary loan transactions were extracted from the University’s instance of ILLiad, an ILL management system provided and hosted by OCLC.
- Workstations: For the majority of computer workstations within the University of Minnesota Libraries, users must log in through a shared computer management service called CybraryN™. Login data includes Internet ID and was extracted from the CybraryN database.

The second group of data was developed by building lists of patrons who engaged with library staff through instruction sessions and reference interactions. Library services in this group include:

- Workshops: The Libraries host in-person workshops throughout the year in four on-campus libraries. Students, faculty, and staff can register for these free workshops

through the Libraries' Drupal registration module. Registration information, including Internet ID, is readily available in Drupal.

- Course-integrated instruction: Liaison librarians frequently coordinate with faculty to deliver in-class library instruction. Liaisons record the number and section of each class they instruct in a database. Staff pulled the class list for each of these and added Internet IDs for registered students to the dataset.
- Introduction to Library Research workshops: Intro to Library Research Part 1 and Intro to Library Research Part 2 workshops, typically taken in conjunction with the freshman writing course, are available online. Part 1 is also offered as an in-person workshop. Internet IDs were collected when students completed and turned in a worksheet to receive credit for attending the workshop from their writing instructors.
- Peer research consultations: With the Peer Research Consultant service, trained undergraduates help students narrow down their research topic, choose keywords, evaluate articles and websites, and other key research skills. Consultations are by appointment, so Internet IDs were harvested from appointment lists.
- Reference: Most in-person reference interactions do not provide for the collection of Internet IDs. For this study, the group downloaded data on chat reference transactions from OCLC QuestionPoint™ and parsed the data into a list of Internet IDs.

Table 1 demonstrates first-year students' interactions with the university libraries in their first semester. We removed twelve outliers from the descriptive and inferential analyses in this study. While the majority of variables are continuous (for example, database access, electronic book requests, etc.), some are categorical; for example, students either participated or did not participate in workshops or in classes with course-integrated instruction. Among the first-year

class, we discovered that 71.3 percent had used at least one library service ($n = 3,818$) while 28.7 percent did not use any library services. Additionally, more than half of first-year students used the databases during their first semester and more than one-quarter of students accessed electronic journals and library workstations. First-year students were least likely to work with peer research consultants, utilize the interlibrary loan service, and participate in workshops.

Table 1

Library Usage among First-Year Students

	<i>m</i>	<i>sd</i>	<i>n</i>	<i>%</i>
Database	4.76	8.79	2742	51.2
Electronic Journal	2.41	6.79	1604	29.9
Workstation	1.73	6.48	1462	27.3
Loan	1.03	4.16	1105	20.6
Website	.45	1.84	968	18.1
Intro to Library Research Part 1			772	14.4
Electronic Book	.26	1.44	460	8.6
Course-integrated Instruction	.09	.28	465	8.6
Intro to Library Research Part 2			226	4.2
Reference	.03	.23	147	2.7
Workshop			80	1.5
Interlibrary Loan	.02	.31	58	1.1
Peer	.01	.10	51	1.0

Note. %'s equal number of students who used the service at least one time.

Demographics, academic background, and student experience variables.

We controlled for the influence of demographic characteristics on students' academic outcomes, including gender, race/ethnicity, and international status. We also controlled for whether students had received Pell grants, were first-generation college students (that is, neither parent had earned

a bachelor's degree), and had military veteran status. The demographic variables were all dummy-coded and Table 2 demonstrates the frequency of demographic characteristics among first-year students. Demographic variables are important to consider in research examining the impact of libraries on student outcomes, as several authors have found unique differences in library use among students.²²

Additionally, we wanted to control for the effect of students' pre-college academic characteristics. For these measures, we used students' ACT composite scores. When ACT scores were not present, we converted SAT composite scores to ACT scores based on ACT's recommended concordance tables. Additionally, we controlled for the effects of the number of AP credits that students had transferred into the university. The average ACT among first-year students was 27.5 ($sd = 3.63$) and the average AP credits transferred was 8.74 ($sd = 11.94$).

Further, we controlled for the effects of students' experiences known to influence their academic success and retention, including whether students lived on campus, participated in freshman seminars, and were members of the Access to Success (ATS) program, an advising community that provides personalized, holistic, and culturally competent advising that advances academic excellence, campus engagement, and professional development for students. These variables were also dummy-coded and Table 2 demonstrates the rate of participation in these programs among the first-year class.

Table 2

First-Year Students' Demographics and Participation in College Experiences

	<i>n</i>	<i>%</i>
Female	2798	52.2
Students of Color	990	18.5
International	307	5.8
First-Generation	1388	25.9
Pell Grant	1193	22.3
Military Veteran	30	.6
Residence Hall	4573	85.4
Access to Success	471	8.8
Freshman Seminar	1490	27.8

Academic achievement and retention.

Our primary outcome variables include students' first-semester cumulative grade point average (GPA) and retention from the first semester to the second semester. In the sample, the average cumulative GPA among first-year students was 3.12 and 96.7 percent of students were retained from fall to spring semester. These data, in addition to the demographic, academic, and college experience variables, were all derived from institutional records.

Procedures

Independent samples *t*-tests were run to determine whether there were statistically significant differences between the cumulative GPA of first-year students who used at least one library service and students who did not use the library services. Next, chi-square tests of independence were used to examine the differences in fall to spring retention between those who used the library and those who did not. Multiple linear regression was used to examine whether the use of

different types of library services were associated with students' grade point averages. Finally, logistic regression was used to examine whether the use of library services were associated with students' retention.

Results

The results suggest statistically significant differences in cumulative GPA between first-year students who used at least one library service compared to students who did not use any library services (Table 3). Students who use the library had an average GPA of 3.18 compared with the average GPA of students who did not use the library, which was 2.98. The effect size (denoted by Cohen's *d*) suggests that the difference is close to medium.²³

Table 3

Differences in First Semester GPA between Students Who Used Library Services and Those Who Did Not Use Library Services

	<i>Non-Users of Library Services</i>		<i>Users of Library Services</i>		<i>t</i>	<i>SE (95% CI)</i>	<i>d</i>
	<i>n</i>	<i>M (SD)</i>	<i>n</i>	<i>M (SD)</i>			
GPA	1514	2.98 (0.77)	3804	3.18 (0.66)	-9.09***	0.02 [-0.25, -0.16]	-0.28

Further, the data suggest a significant association between library usage and students' first to second semester retention ($\chi^2(1) = 6.86, p < .01$). In our sample, 2.9 percent of the students who used the library services in their first semester did not return for the spring semester compared with 4.3 percent of students who did not use any library services. The differences are relatively small, because the majority of students at this institution persist from their first semester to their second semester.

We next examined correlations between students' use of all available library services (Table 4). The majority of correlations were weak and positive; however, the strongest correlations were observed between the number of databases and e-journals accessed ($r = .454$), the number of databases accessed and enrollment in Intro 1 library instruction ($r = .342$), and enrollment in Intro 1 and Intro 2 library instruction ($r = .474$).

Table 4

Correlation Matrix of Library Usage Variables

	Database	Electronic Book	Loan	Electronic Journal	Inter-library Loan	Intro to Library Research 1	Intro to Library Research 2	Peer	Reference	Website	Workshop	Workstation	Course Integrated Instruction
Database	1												
Electronic Book	.148***	1											
Loan	.143***	.091***	1										
Electronic Journal	.454***	.150***	.087***	1									
Interlibrary Loan	.136***	.113***	.087***	.157***	1								
Intro to Library Research 1	.342***	-.087***	.061***	.209***	.060***	1							
Intro to Library Research 2	.214***	.01***	.072***	.113***	.051***	.474***	1						
Peer	.116***	.105***	.035*	.066***	.094***	.043**	.034*	1					
Reference	.143***	.049***	.089***	.072***	.031*	.051***	.009	.095***	1				
Website	.257***	.110***	.183***	.158***	.032*	.138***	.067***	.053***	.055***	1			
Workshop	.105***	.023	.065***	.048***	.001	.269***	.097***	.018	.008	.142***	1		
Workstation	.040**	.023	.157***	.023	.026	.003	-.014	.034*	.004	.043**	.007	1	
Course Integrated Instruction	.060***	.006	.021	.089***	.005	.024	.021	.003	-.003	.006	.000	-.021	1

Note. * $p < .05$, ** $p < .01$, *** $p < .001$

Our first model predicting students' GPA by whether they had used any library service was statistically significant, $F(12, 5190) = 61.32, p < .001$. The model explains 12.4 percent of the variance in cumulative GPA (Table 5). The model suggests that library usage is positively associated with students' GPA, with first-year students who used the library reporting a .23 higher grade point average over students who did not use any library services holding other data constant in the model. Furthermore, several demographic variables were also associated with students' GPA: females had a higher GPA than males while students of color had a lower GPA

than white students. A one-unit increase in ACT scores and AP credits was associated with a .03 and a .01 increase in GPA, respectively. Students who lived in residence halls, enrolled in freshman seminars, and those who participated in ATS had higher GPAs compared to their referent groups. Finally, students who received Pell grants had a lower GPA compared to their peers.

Our second model predicting students' GPA by type of library services used was statistically significant, $F(24, 5178) = 34.28, p < .001$ (Table 5). The model explains 13.7 percent of the variance in GPA. Four types of library uses were significant in this model: a one-unit increase in database use was associated with a .01 increase in students' GPA controlling for other factors and holding them constant. Every one-unit increase in electronic journals accessed was associated with a .00 increase in students' GPA (Table 5 rounds to two decimal points and the actual value is .002). Every one-unit increase in a book loan was associated with a .01 increase in students' GPA while students who participated in a course-integrated instruction session reported a .08 decrease in GPA compared to their peers. The demographic characteristics, pre-college academic characteristics, and college experiences were significantly associated with students' GPA in the same ways as in the first model.

Table 5

Results of a Regression Model Predicting First-Year Students' Cumulative Grade Point Average

Predictor	B	SE	B	SE
(Constant)	1.94***	.10	2.03***	.10
Female	.16***	.02	.16***	.02
Students of Color	-.12***	.03	-.12***	.03
International	.06	.05	.02	.05
First Generation	-.04	.02	-.04	.02
ACT	.03***	.00	.03***	.00
AP Credits	.01***	.00	.01**	.00
Freshman Seminar	.06**	.02	.06**	.02
Veteran	-.06	.12	-.13	.12
Residence Halls	.11***	.03	.11***	.03
ATS	.13***	.04	.11**	.04
Pell Grant	-.10***	.02	-.10***	.02
Any Library Use	.23***	.02		
Database			.01***	.00
Electronic Book			.00	.01
Electronic Journal			.00*	.00
Loan			.01**	.00
Website			.00	.01
Interlibrary Loan			.02	.03
Workstation			.01**	.00
Peer			.12	.10
Reference			.07	.04
Workshop			.08	.08
Intro to Library			.02	.03
Research Part 1				
Intro to Library			.04	.05
Research Part 2				
Course Integrated			-.08**	.03
Instruction				
R^2		12.4%		13.7%

Note. * $p < .05$, ** $p < .01$, *** $p < .001$

The first logistic regression analysis was conducted to predict student persistence into their second semester by whether they had used the library services at least once during their fall

semester. A test of the full model against a null model was statistically significant, indicating that the predictors are reliably distinguished between returners and non-returners ($\chi^2 = 85.90, p < .001, df = 12$) (Table 6). Additionally, the regression correctly classified 96.7 percent of the observed cases. The odds ratio suggests that students who had used the library at least once during their fall semester were 1.54 times more likely to return for the following semester.

The second logistic regression analysis was conducted to predict student persistence into their second semester by whether they had used different types of library services during their fall semester. A test of the full model against a null model was statistically significant, indicating that the predictors are reliably distinguished between returners and non-returners ($\chi^2 = 99.01, p < .001, df = 24$) and the model correctly classified 96.7 percent of the observed cases (Table 6). The odds ratio suggests that students who enrolled in the “Intro to Library Research Part 2” course were 7.08 times more likely to return for the following semester. For every one-unit increase in database use, students were also 1.03 times more likely to return for their second semester.

Table 6

Logistic Regression Analysis of the Effects of Library Use on Students' Retention

	B	SE	Wald's χ^2	e^B (odds ratio)	B	SE	Wald's χ^2	e^B (odds ratio)
Female	-.48**	.16	8.30	.62	-.46**	.17	7.60	.63
Students of Color	.23	.22	1.07	1.25	.26	.22	1.35	1.29
International	1.42*	.72	3.86	4.13	1.53*	.73	4.35	4.61
First Generation	-.44*	.18	6.35	.64	-.45*	.18	6.52	.64
ACT	-.02	.03	.48	.98	-.02	.03	.32	.98
AP Credits	.05***	.01	19.22	1.05	.05***	.01	19.65	1.05
Freshman Seminar	-.17	.17	.94	.85	-.17	.17	.93	.85
Veteran	.25	1.03	.06	1.28	.15	1.04	.02	1.16
Residence Halls	.80***	.19	17.58	2.23	.80***	.19	17.42	2.23
ATS	.06	.30	.03	1.06	.08	.31	.06	1.08
Pell Grant	-.02	.19	.01	.98	.00	.19	.00	1.00
Any Library Use	.43**	.16	7.07	1.54				
Database					.03*	.01	4.58	1.03
Electronic Book					.08	.10	.67	1.08
Loan					-.02	.02	1.00	.98
Electronic Journal					.00	.01	.03	1.00
Interlibrary Loan					-.09	.23	.15	.92
Intro to Library Research Part 1								
Intro to Library Research Part 2					1.96*	1.03	3.60	7.08
Peer					.09	.98	.01	1.09
Reference					-.10	.30	.11	.90
Website					-.01	.04	.01	.99
Workshop					-.26	.65	.17	.77
Workstation					.00	.01	.05	1.00
Course Integrated Instruction					.39	.33	1.34	1.47
Constant	3.08***	.86	12.96	21.73	3.08***	.86	12.96	21.77

Note. $R^2 = .016$ (Cox & Snell), .064 (Nagelkerke) for Model 1. $R^2 = .019$ (Cox & Snell), .074 (Nagelkerke) for Model 2. * $p < .05$; ** $p < .01$; *** $p < .001$

Discussion

The data suggest that first-year students who used the library at least once in the fall semester had higher grade point averages compared to their peers who did not use the library at all during their first semester. Further, the data suggest that first-year students who used the library at least one time during their first semester had higher retention from their fall to spring semester. Both of these findings held when controlling for demographic characteristics, pre-college academic characteristics, and college experience variables.

Further, we discovered that the types of library services that first-year students used were also differentially associated with their academic achievement and retention. Four particular types of library resources were significantly and positively associated with students' academic achievement: using the library workstations (indicating physical presence in the libraries), accessing online databases, accessing electronic journals, and checking out books. Only two library activities were associated with students' retention: enrollment in the Intro to Library Research Part 2 workshop and use of online databases.

Recommendations

We have several recommendations for institutions seeking to implement their own assessment related to the benefits of library usage among their undergraduate populations. First, we recommend that libraries seek to gather and record data associated with library usage. Privacy concerns are valid, but data can be gathered, stored, and aggregated without compromising individual privacy. We recommend putting infrastructure in place to begin gathering data as soon as possible, even if staff are not readily available to immediately analyze the data. Diverse types of data collected over time will yield greater opportunities to spot trends in user behaviors. As

Megan Oakleaf stated, “demonstrating the full value of academic libraries is only possible when libraries possess evidence that allows them to examine the impact of library user interactions.”²⁴

Second, it is important to identify outcomes of importance to institutions; while our study examined retention and cumulative grade point averages, other institutions may wish to seek evidence for the potential benefits of libraries on students’ sense of belonging, satisfaction, and student learning or development outcomes. Eric Ackermann recommended that institutions seek to assess factors beyond customer service-type frameworks—since libraries would stand little chance of funding compared to, for example, sports/entertainment complexes, if projects were approved solely on client satisfaction.²⁵

Third, we recommend that institutions consider some of the limitations associated with assessment and consider those limitations in the context of the data provided. For example, we found odd patterns with library instruction: course-integrated library instruction was associated with lower grade point averages while the Introduction to Library Research Part 2 course was positively associated with students’ retention. Ackermann advised that measuring the effectiveness of library instruction can be challenging because there are no stable groups to access, the scope/content of the courses can vary widely, and the variability in how courses are implemented is too great.²⁶ Most library instruction courses are conducted in a single class session at the request of faculty,²⁷ so there are limitations in measuring the effectiveness of these types of library interactions.

Finally, as the results in this paper suggest that library usage is associated with first-year students’ retention and academic success, we recommend that practitioners working in areas such as new student orientation or academic advising encourage first-year students to explore and use their campus libraries. Faculty of first-year students—especially those teaching first-year

seminars or first-year experience courses—are especially encouraged to help acclimate their first-year students to the campus library system.

Limitations and Directions for Future Research

There are a number of limitations to address in this analysis. Several of the library use variables had limitations during the time of the study that have since been mitigated. Other variables are limited due to the nature of the collection method. Limitations are described in more detail below.

Digital Resource Use

Due to IP based authentication, users on campus do not need to log in to access licensed resources. The logging script can often log an Internet ID even while on campus if the user has logged in through central authentication for some other purpose, but some portion of digital resource use was not tied to an Internet ID.

Interlibrary Loan Requests

At the time of this project, ILLiad users created their own ILLiad account. Most people used their University of Minnesota Internet ID, but a small number of users created unique ILLiad IDs. Therefore, their transactions were not recorded for this study. ILLiad authentication is now tied to an institutional central authentication system.

Workstation Use

At the time of this project, computers within the Libraries SMART Learning Commons did not yet utilize CybraryN and were not included in this study.

Reference

Reference desk staff and liaisons focus on the patron's question rather than their identity, and identifying information is almost never recorded. Therefore, the data used in this study are limited to online interactions where an Internet ID was provided.

Workshops

Because the one- to two-hour library workshops are free, students often walk in without registering or choose not to attend without canceling their registration.

Course-integrated Instruction

Student lists for courses that included library instruction include all students registered; however, there is no way to verify whether an individual student actually attended the librarian's instruction session.

With the limitations in the measurement of variables in mind, some of the findings should be interpreted with caution; however, these findings provide us with the foundation from which we can begin to measure and understand impacts of library usage on students' success. We recommend that future researchers seek to measure library usage using the most accurate procedures possible and interpret their findings accordingly. Additionally, future researchers can consider the impact of other library measures not gathered here, particularly use of library spaces

and personal interactions with library staff. Finally, we recommend that future researchers consider developing additional ways to gather information from students regarding the benefits of academic libraries on their campuses; for example, qualitative research may reveal deeper insights into the meaningfulness of libraries in students' learning and development.

Conclusion

This study provides evidence for the importance of libraries in first-year students' academic achievement and retention: first-year students who used libraries in their first semester had higher grade point averages and retention when controlling for additional factors. We suggest that other campuses seek ways in which to begin collecting data on students' usage of libraries—especially nuanced forms of library usage, as within our study we found that factors uniquely predicted academic achievement and retention.

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Notes

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