

The Relationship between Undergraduates' Background Characteristics and College Experiences and Their Academic Library Use

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This study examines factors that influence undergraduates' academic library use during the first three years of college. Undergraduates' high school library use, student–faculty interactions, and active learning and engaged writing activities predicted library use for all three years of the study. There was an interesting relationship between undergraduate library use and self-reported and objective critical thinking scores. These findings are useful for the redesign of current academic library services and future research studies on information-seeking behavior.

In order to provide adequate resources and to design effective services for undergraduates, academic librarians must understand the factors that influence undergraduate library use. A number of studies have been done to determine those factors. In their study, Paul W. Grimes and Marybeth F. Charters examined several aspects of the college environment that contribute to the amount of time that undergraduates spend in the academic library.¹ These aspects included:

- demographic characteristics (gender, race, age, alcohol consumption);
- academic aptitude (American College Test [ACT] score and grade point average [GPA]);
- instruction experiences (study skills or bibliographic instruction);

- college experiences related to their access to the library (jobs, living on campus, member of sorority/fraternity, remote access to library);
- library activities (catalog, periodical, full-text, Internet, books, reserve, interlibrary loan, photocopies, reference, government documents, study hall/social, computer lab).

The authors found that women and African American and other minority undergraduates spent more time in the library, as did undergraduates with lower ACT scores and those who lived on-campus. Undergraduates who worked full-time and attended a bibliographic instruction session spent less time in the library. It is hoped that these undergraduates now know how to use the library more efficiently. Three library activities appeared to influence the amount of time that un-

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dergraduates spent in the library: using it as a place to study, using it as a place to socialize, and using it for its reference services.

A study by Qun G. Jiao and Anthony J. Onwuegbuzie investigated the reasons that undergraduates used the library. One aspect of this study specifically examined the relationship between reasons for library use and frequency of library visits.² The authors found that older undergraduates, male undergraduates, nonnative English speakers, undergraduates who lived near the library, undergraduates who preferred to study alone, and undergraduates who had lower levels of library anxiety reported more frequent library use. Five reasons affected frequency of library use: to study for a test, to read current newspapers, to read own textbook, to use computerized indexes and online facilities, and to meet friends.

In his study at a Canadian university, A Paul Williams also examined the factors that influence undergraduate library use, including:

- student characteristics (e.g., gender, first language, prior education, age);
- program characteristics (e.g., program type, field of study, library use required of course, library orientation, library discussed in class);
- perceptions of library services (e.g., inadequate collections, limited weekend access, library hours, lack of staff, did not know how to use the library, did not know how to get the card).³

Williams defined library use as using study areas, using photocopiers, borrowing books, reading periodicals, asking for staff assistance, and using reserve collections. The results of the regression analysis indicated that the most important factor contributing to library use was program characteristics (33% of the variance in total library use), followed by perceptions of the library (11% of the variance). Student characteristics accounted for five percent of the variance.

Finally, in his 1988 dissertation, Charles B. Harrell evaluated the relationship between various student character-

istics and undergraduate academic library use.⁴ This study defined library use as number of books borrowed. The personal and academic characteristics of undergraduates included: gender, age, secondary school attended, parents' occupation or education, standardized test scores, class standing, academic major, credit hour enrollment, grade point average, extracurricular activities, distance of residence from the library, and hours of employment. Five variables influenced library use: hours spent on campus, credit hour enrollment, gender, grade point average, and academic major.

Purpose of This Study

Although a few studies examined the factors that influence undergraduate library use, no study examined these factors longitudinally. The purpose of this study is to answer two key research questions:

- What factors influence undergraduate academic library use?
- Do the factors influencing undergraduate academic library use change during college?

Methods

Data Source

This study is a secondary analysis of data obtained from the National Study of Student Learning (NSSL). The NSSL sought to "expand knowledge about college impact by examining the influence of academic and nonacademic experiences on (a) student learning, (b) student attitudes about learning, (c) student cognitive development, and (d) student persistence."⁵ The NSSL consisted of several survey instruments. The College Student Experiences Questionnaire (CSEQ) supplied information about undergraduate college activities and learning outcomes (e.g., self-reported critical thinking). Another instrument, the National Center on Postsecondary Teaching, Learning, and Assessment (NCTLA), provided additional information about undergraduate college experiences and background characteristics. The Collegiate Assessment of Academic Proficiency (CAAP), a thirty-

TABLE 1
The Gender Distribution
of the Sample

Gender	Number	Percentage
Female	682	65%
Male	364	35%
Total	1,046	100%

two-item instrument designed by the American College Test (ACT) program, measured undergraduate critical thinking ability (e.g., the ability to clarify, analyze, evaluate, and extend arguments).

Subjects

The 1,046 participants in this study were selected from the original sample of 3,840 undergraduates. These students participated in all stages of the data collection process during the 1992–1995 academic school years. These undergraduates attended eighteen different four-year institutions throughout the United States. The majority of the undergraduates were female, traditional aged (e.g., nineteen years old), and white/Caucasian, although there were a large number of undergraduates of color in the sample. Other background characteristics included information about the undergraduates' high school library use and their initial critical thinking scores upon college entry. The majority of the undergraduates in the sample did not spend much time studying in the high school library (see tables 1–4 for additional information). Undergraduates' initial critical thinking scores during the fall 1992 term ranged

TABLE 3
The Racial/Ethnic Distribution of
the Sample

Race	Number	Percentage
White/Caucasian	624	59.7%
Students of color	422	40.3%
Total	1,046	100.0%

TABLE 2
The Age of the Sample during
Freshman Year

Age	Number	Percentage
21 years old or less	1,003	96%
Older than 21	43	4%
Total	1,046	100%

from a low of forty-nine to a high of seventy-three (the range was forty to eighty). The mean critical thinking score of the sample was sixty-four.

The strongest relationship was between undergraduates' engaged writing activities and their academic library use.

Measures

Two sets of variables were examined to determine the factors that influence undergraduate academic library use: (1) background characteristics, and (2) college experiences. Figure 1 displays the variables representing these independent variables.

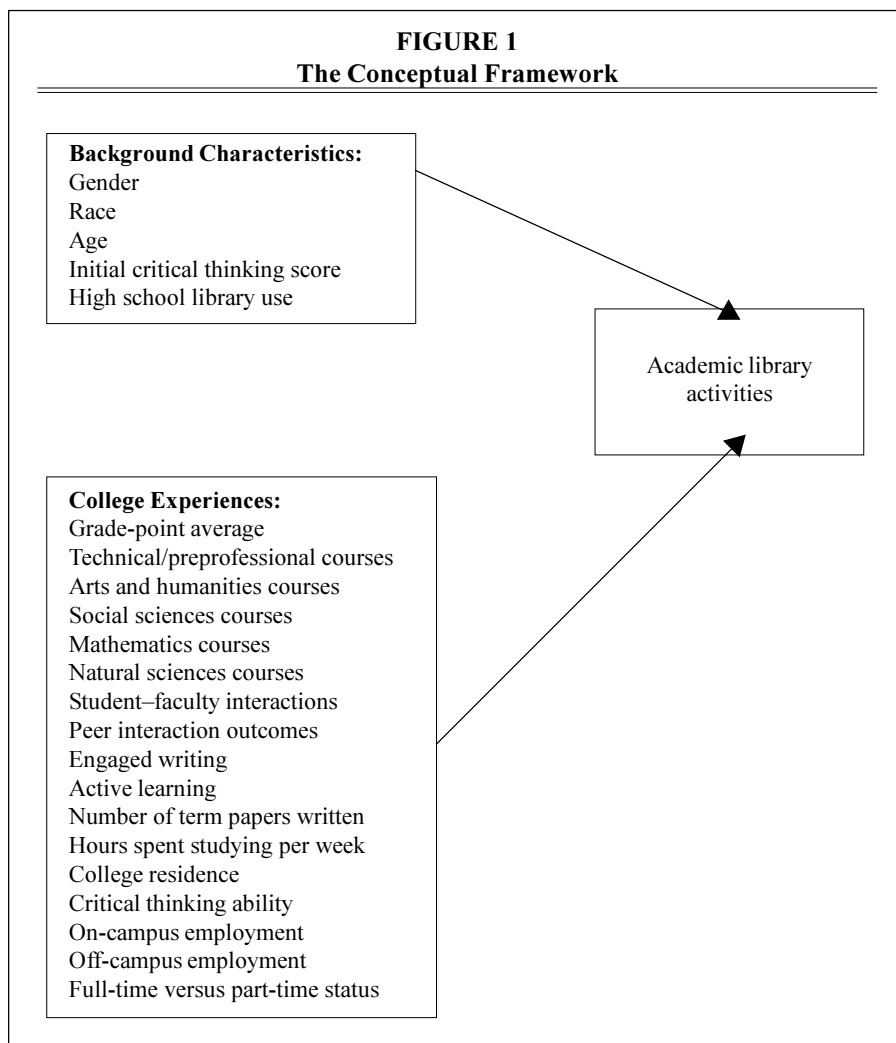
Scales were created for the following college experiences by adding the items in each category together to create one construct to represent a particular college experience: student–faculty and peer interactions, engaged writing and active learning activities, self-reported critical thinking, and academic library use. Figure 2 provides more details about the items comprising each construct.

Table 5 presents the alpha reliabilities of the scales for each year of the study to

TABLE 4
Time Spent Studying in the High
School Library

High School Library Use	Number	Percent
Never	257	24.6%
Occasionally	562	53.7%
Often	169	16.2%
Very often	58	5.5%
Total	1,046	100.0%

FIGURE 1
The Conceptual Framework



determine how well each scale measures the construct it purports to represent. The alpha reliability coefficients range from .79 to .91. This range indicates that these scales are valid measures of the constructs in this study.

Table 6 displays the means, standard deviations, and definitions of all of the measures in the study.

Analyses

Data analysis was conducted in several stages. First, the means and standard deviations of all the variables in the study were calculated. Second, Pearson's prod-

uct moment correlations were calculated to determine the relationship among undergraduates' background characteristics, college experiences, and academic library use. Finally, multiple regressions were run for each year of the study to determine which background characteristics and college experiences influenced undergraduate academic library use.

Results

An examination of the means and standard deviations in table 6 reveals that throughout the three years of the study, undergraduates engaged in library expe-

periences only occasionally. Although library use increased each year from 2.07 to 2.10 to 2.14, the mean of the academic library experiences variable never rose to the level of undergraduates engaging in library activities often or very often.

Table 7 shows the results of the correlation analyses determining the strength of the relationship among undergraduates' background characteristics, college

experiences, and academic library use during their first three years of college. A number of variables correlated to undergraduate academic library use during the freshman year. The strongest relationship was between undergraduates' active learning and engaged writing activities (tied) and their academic library use. The weakest relationship was between gender and library use. Female undergradu-

FIGURE 2 Factor Scales

Student–faculty interactions:

Talked with faculty member; asked for information related to a course; visited informally after class; made office appointment with faculty; discussed term paper/project with faculty; discussed career plans with faculty; asked for comments/criticism about work; had coffee, cokes, snacks with faculty; worked with faculty on research project; discussed personal problems with faculty

Peer interaction outcomes:

Peers affect intellectual growth, peers affect ability to analyze, peers affect ability to write, peers affect understanding numerical concepts, peers affect reading ability, peers affect expressing ideas orally, peers affect pursuing ideas from class, peers affect understanding scientific concepts, peers affect interests in new things, peers affect ability to work with others, peers affect success in college

Engaged writing:

Used dictionary or thesaurus; thought about grammar, etc. while writing; wrote rough draft and revised it; spent five or more hours writing a paper; asked others to read something you wrote; referred to style book or grammar manual; revised paper two or more times; asked instructor for advice on writing; made appointment to talk about criticism; submitted writing for publication

Active learning:

Took detailed notes in class, participated in class discussions, underlined major points in readings, saw how facts and ideas fit together, thought about practical applications, integrated ideas from various sources, summarized major points and information, explained material to another student, made outlines from notes or readings, did additional readings

CSEQ critical thinking:

Gains in the ability to put ideas together, gains in the ability to think analytically, gains in the ability to learn on one's own

Academic library use:

Used computers for library searches, used indexes to journal articles, developed a bibliography, used card catalog or computer, asked librarian for help, read in reserve or reference section, checked out books, checked citations in things read, read basic references or documents, found material by browsing in stacks

TABLE 5
Internal Consistency (Alpha Reliabilities) for All Scales

Factor	# of items	1993	1994	1995
Student-faculty interactions	10	.89	.90	.91
Peer interaction outcomes	11	.90	.90	.91
Engaged writers	10	.85	.87	.88
Active learners	10	.84	.84	.86
CSEQ critical thinking self-reports	3	.80	.79	.82
Academic library experiences	11	.86	.86	.86

ates used the library more often. Other variables correlated with freshman-year academic library use were (in descending order of importance): student-faculty interactions, self-reported critical thinking, peer interactions, high school library use, lower initial critical thinking scores, undergraduates of color, hours spent on schoolwork, number of term papers written, lower critical thinking scores, and fewer social sciences courses.

Enrollment in natural sciences, mathematics, and technical and professional courses did not impact library use.

Many variables correlated with undergraduate academic library use during the sophomore year. Again, the strongest relationship was between undergraduates' engaged writing activities and their academic library use. The weakest relationship was between enrollment in social sciences courses and library use. Other variables correlated with sophomore-year academic library use were (in descending order of importance): active learning activities, student-faculty interactions, high school library use, peer interactions, self-reported critical thinking, number of term papers written, lower critical thinking scores, arts and humanities courses, undergraduates of color, hours spent on schoolwork, and gender (female).

Several variables correlated with undergraduates' academic library use during the junior year. For the third year in a row, the strongest relationship was between undergraduates' engaged writing

activities and their academic library use. The weakest relationship was between working off-campus and library use. The more hours that undergraduates worked off-campus, the less likely they were to engage in academic library use. Other variables correlated with junior-year academic library use were (in descending order of importance): active learning activities, student-faculty interactions, self-reported critical thinking, peer interactions, number of term papers written, high school library use, arts and humanities courses, hours spent on schoolwork, social sciences courses, lower critical thinking scores, and living on-campus.

Table 8 reports the results of the regression analyses for all three years of the study. The background characteristics and the college experiences entered the regression equations in one block in order to determine which factors predicted undergraduate academic library use. Several factors predicted freshman-year academic library use (in descending order of importance): active learning activities, engaged writing activities, student-faculty interactions, high school library use, and race (students of color). A number of factors predicted sophomore-year academic library use (in descending order of importance): engaged writing activities, active learning activities, high school library use, and student-faculty interactions. Many factors predicted junior-year academic library use (in descending order of importance): engaged writing activities, student-faculty interactions, active learning activities and high school library use (tied), off-campus employment (negative

TABLE 6
Means and Standard Deviations of the Measures in the Study

Variable	Fall 1992 Mean		Fall 1992 S.D.		Variable Definition		
Age	18.74		3.57		Range 17–87		
Gender	.65		.48		1 = female, 0 = male		
Race/ethnicity	.61		.49		1 = white/caucasian, 0 = student of color		
High school library use	2.03		.79		1 = never, 2 = occasionally, 3 = often, 4 = very often		
1 st CAAP critical thinking scores	63.61		5.23		Range = 40–80		
	Spring 1993 Mean	Spring 1993 S.D.	Spring 1994 Mean	Spring 1994 S.D.	Spring 1995 Mean	Spring 1995 S.D.	
Self-reported grade-point average	3.27	1.11	3.30	1.04	3.35	1.03	1 = C or lower; 2 = B-,C+; 3 = B; 4 = A-, B+; 5 = A
Student–faculty interactions	1.97	.54	2.06	.58	2.17	.62	1 = never, 2 = occasionally, 3 = often, 4 = very often
Engaged writing	2.61	.60	2.54	.63	2.48	.65	1 = never, 2 = occasionally, 3 = often, 4 = very often
Peer interaction outcomes	2.33	.66	2.54	.65	2.58	.66	1 = never, 2 = occasionally, 3 = often, 4 = very often
Number of term papers written	3.12	1.02	2.92	1.04	2.98	1.08	1 = none; 2 = fewer than 5; 3 = between 5 and 10; 4 = between 10 and 20; 5 = more than 20
Active learning	2.78	.54	2.81	.54	2.84	.55	1 = never, 2 = occasionally, 3 = often, 4 = very often
Full-time versus part-time enrollment	.98	.12	.97	.17	.96	.20	1 = full-time; 0 = part-time
Campus housing	.65	.48	.65	.48	.68	.47	0 = no, 1 = yes

TABLE 6 (CONT.)
Means and Standard Deviations of the Measures in the Study

	Spring 1993 Mean	Spring 1993 S.D.	Spring 1994 Mean	Spring 1994 S.D.	Spring 1995 Mean	Spring 1995 S.D.	Variable Definition
Natural sciences courses (Astronomy, botany, biology, chemistry, physics, geology, zoology, microbiology)	1.50	1.59	1.83	2.16	1.60	2.35	Number of courses taken during the academic year
Social sciences courses (Anthropology, economics, geography, political science, psychology, sociology)	1.63	1.33	1.94	1.74	1.78	2.01	Number of courses taken during the academic year
Technical/preprofessional courses (Drawing, drafting, architectural design, criminology, education, agriculture, business, physical therapy, pharmacy, physical education, nursing, engineering, computer programming, audiology/speech pathology, child and family studies, communications, or social work)	1.43	1.56	2.26	2.59	2.96	2.61	Number of courses taken during the academic year
Mathematics courses (Pre-algebra, algebra, calculus, statistics, computer science, geometry, matrix algebra, accounting, or business math)	1.32	1.20	1.34	1.63	1.18	1.92	Number of courses taken during the academic year

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C	2	8	.66	2	6	.65	2	6	.68	1
C	6	0	5	2	N/A	N/A	6	7	5	7
A	2	7	.58	2	0	.56	2	4	.55	1

relationship), social sciences courses, self-reported critical thinking, and gender (male). An examination of the R²s in table 8 indicates that the variables predicting library use account for 32 to 36 percent of the reasons that undergraduates use the library.

Table 9 provides a summary of the factors influencing students' academic library experiences throughout their first three years of college.

Discussion

This section describes the implications for the academic library based on the findings. A review of the correlations for all three years of the study reveals several patterns. Although background characteristics such as gender, race, and initial critical thinking scores initially correlated with library use during the freshman and sophomore years, they were no longer statistically significant by the junior year. However, high school library use continued to have a strong relationship with undergraduate academic library use during all three years of the study. The finding that high school library use remained a predictor of undergraduate academic library use after three years in college indicates the importance of assisting undergraduates to develop their library skills during secondary school.

Undergraduates with lower critical thinking scores on the CAAP tests during all three years of the study used the library more often than

TABLE 7
Correlations between Background Characteristics, College Experiences,
and Academic Library Activities by Academic Year

	1993 Academic Library Activities	1994 Academic Library Activities	1995 Academic Library Activities
Background Characteristics			
Gender	.072*	.086**	.046
Age	.029	.018	.005
Race	-.143**	-.099**	-.051
Initial critical thinking	-.148**	-.129**	-.057
High school library use	.274**	.266**	.209**
College Experiences			
On-campus employment	-.008	.038	.021
Off-campus employment	-.004	-.011	-.074*
Full-time versus part-time status	.019	.039	.025
CAAP critical thinking score	-.108**	N/A	-.079*
Grade-point average	.041	-.027	.034
Number of term papers written	.109**	.174**	.217**
Active learning	.414**	.416**	.421**
Engaged writing	.414**	.454**	.463**
Student-faculty interactions	.373**	.312**	.409**
Peer interactions	.284**	.260**	.270**
Natural science courses	-.029	.003	.019
Mathematics courses	.041	-.011	-.038
Social sciences courses	-.074*	.085**	.129**
Technical/preprofessional courses	.060	.044	-.007
Arts and humanities courses	.027	.127**	.172**
Hours spent on schoolwork	.122**	.088**	.167**
Campus housing	-.026	.021	.075*
CSEQ self-reported critical thinking	.307**	.232**	.333**

* $p < .05$; ** $p < .001$

did undergraduates who scored higher on the standardized test. However, there was a positive relationship between undergraduates' self-reported critical thinking (e.g., the ability to put ideas together, to think analytically, and to learn independently) and their academic library use. Students with higher self-reported critical thinking used the library more frequently.

Enrollment in arts and humanities during the sophomore and junior years and social sciences courses during all three years of the study impacted under-

graduate academic library use. Enrollment in natural sciences, mathematics, and technical and professional courses did not impact library use.

Not surprisingly, undergraduates who spent more hours on their schoolwork also engaged in more academic library activities. The more students studied, the more they used the library.

The variables having the strongest relationship with undergraduate academic library use involved their academic activities. Student-faculty and peer interactions, active learning and engaged writ-

ing activities, and being assigned term papers impacted library use for all three years of the study.

A review of the regression analyses for all three years of the study reveals that four measures predicted academic library use (e.g., used computers for library searches, used indexes to journal articles, developed a bibliography, used card catalog or computer, asked librarian for help, read in reserve or reference section, checked out

books, checked citations in things read, read basic references or documents, found material by browsing in stacks). Active learners (e.g., took detailed notes in class, participated in class discussions, underlined major points in readings, saw how facts and ideas fit together, thought about practical applications, integrated ideas from various sources, summarized major points and information, explained material to another student, made outlines from

TABLE 8
Academic Library Activities Regressed on Background Characteristics, College Experiences, and Academic Library Activities by Academic Year

	1993 Academic Library Activities	1994 Academic Library Activities	1995 Academic Library Activities
Background Characteristics			
Gender	-.049	-.050	-.081**
Age	.013	.017	-.008
Race	-.100**	-.060	-.042
Initial critical thinking	-.078	-.016	.013
High school library use	.143***	.156***	.118***
College Experiences			
On-campus employment	-.011	.002	-.052
Off-campus employment	-.033	.002	-.105***
Full-time versus part-time status	-.013	.026	-.040
CAAP critical thinking score	.051	N/A	-.032
Grade-point average	-.001	-.071	-.062
Number of term papers written	.035	.071	.069
Active learning	.189***	.203***	.118***
Engaged writing	.185***	.249***	.262***
Student-faculty interactions	.174***	.101**	.172***
Peer interactions	.038	.053	.052
Natural science courses	-.039	.022	-.001
Mathematics courses	.042	-.014	-.039
Social sciences courses	-.014	.057	.097***
Technical/preprofessional courses	.026	.010	-.001
Arts and humanities courses	-.002	.051	.046
Hours spent on schoolwork	.007	.006	.060
Campus housing	-.024	.028	.014
CSEQ self-reported critical thinking	.065	-.012	.088**
R ²	.321	.319	.363

*** p < .001; **p < .05

The variable definitions are located in table 6

TABLE 9
Summary of Factors Influencing Academic Library Experiences by Year
and in Order of Importance

1993	1994	1995
Active learning	Engaged writing	Engaged writing
Engaged writing	Active learning	Student–faculty interactions
Student–faculty interactions	High school library use	Active learning (tie)
High school library use	Student–faculty interactions	High school library use (tie)
Race (students of color)		Off-campus job (negative)
		Social sciences courses
		Self-reported critical thinking
		Gender (male)

notes or readings, and did additional readings) engaged in more academic library activities during all three years of the study.

Engaged writers (e.g., used dictionary or thesaurus; thought about grammar, etc., while writing; wrote a rough draft and revised it; spent five or more hours writing a paper; asked others to read something you wrote; referred to style-book or grammar manual; revised paper two or more times, asked instructor for advice on writing; made appointment to talk about criticism; submitted writing for publication) also engaged in more academic library activities during all three years of the study.

In addition, students who interacted with faculty (e.g., talked with faculty member; asked for information related to a course; visited informally after class; made office appointment with faculty; discussed term paper/project with faculty; discussed career plans with faculty; asked for comments/criticism about work; had coffee, cokes, snacks with faculty; worked with faculty on research project; discussed personal problems with faculty) also engaged in more academic library activities during all three years of the study. Finally, high school library use predicted subsequent college library use for all three years of the study.

Implications

Off-campus work had a negative impact on students' library use during the jun-

ior year. This finding is similar to the study in the literature review where students whose full-time employment had a negative impact on the amount of time spent in the academic library. This study only examined library use in the academic library building. Academic libraries can assist undergraduates who do not have time to visit the academic library because of off-campus work obligations by offering electronic access to parts of the collection and digital reference services.

Two findings, the relationships between peer interactions and library use and writing term papers and library use, have implications for the design of academic library services. Academic libraries should consider developing more programs such as the University of Michigan's Peer Information Counselor (PIC) program.⁶ This program and others like it are designed to have undergraduates work the reference desk and assist their peers with information searches. Some programs also include assistance with term papers.

Future research should explore the nature of the relationship between critical thinking and academic library use. This study found a positive relationship between self-reported critical thinking and library use and a negative relationship between objective measures of critical thinking and library use. Moreover, junior-year self-reported critical thinking predicted junior-year academic library use. One question to investigate is, Do

students with different levels of critical thinking exhibit different library use patterns or information-seeking behavior?

Finally, and most important, a review of the means revealed that the undergraduates in this study collectively engaged in academic library activities only occasionally. An examination of the findings from this study is useful for understanding the factors that influence undergraduates' library activities, but addi-

tional research is needed to determine how to increase students' library activities. In addition, the background characteristics and college experiences identified in this study explained only approximately one-third of the reasons that students use the academic library. Future research is needed to determine what other factors influence undergraduates to use the academic library's services and resources.

Notes

1. Paul W. Grimes and Marybeth F. Charters, "Library Use and the Undergraduate Economics Student," *College Student Journal* 34 (Dec. 2000): 557-70.
2. Qun G. Jiao and Anthony J. Onwuegbuzie, "Prevalence and Reasons for University Library Usage," *Library Review* 46, no. 6 (1997): 411-20.
3. A. Paul Williams, "Conceptualizing Academic Library Use: Results of a Survey of Continuing Education Undergraduates in a Small Canadian Undergraduate University," *Canadian Journal of Higher Education* 25, no. 3 (1995): 31-48.
4. Charles B. Harrell, "The Use of an Academic Library by University Undergraduates" (Ph.D. diss., Univ. of North Texas, 1988).
5. Ernest T. Pascarella, Elizabeth J. Whitt, Amaury Nora, Marcia I. Edison, Linda S. Hagedorn, and Patrick T. Terenzini, "What Have We Learned from the First Year of the National Study of Student Learning?" *Journal of College Student Development* 37 (Mar. 1996): 182-92.
6. Karen E. Downing, Barbara MacAdam, and Darlene P. Nichols, *Reaching a Multicultural Student Community: A Handbook for Academic Librarians* (Westport, Conn.: Greenwood Pr., 1993).