

Assessment of Learning Outcomes: A Measure of Progress in Library Literacy

Arlene Greer, Lee Weston, and Mary Alm

Mandated by Colorado's legislators to assess learning outcomes, James A. Michener Library—at the University of Northern Colorado—developed a survey instrument with a test component against which students' self-assessed skills could be compared by academic status, freshmen through graduate students. Although the library has no formalized course or program for library skill development, the investigators examined the four components of library literacy outlined in the Colorado Academic Library Master Plan through ten test questions incorporated into the survey. Findings indicated no dramatic trend of higher proficiency when comparing results of freshmen and seniors in the test portion of the survey, although self-assessed skills showed such a trend.



James A. Michener Library, at the University of Northern Colorado (UNC), completed its second annual assessment of learning outcomes as part of a state-wide program mandated by Colorado's legislators to assess the outcomes of higher education. In 1985, the legislature approved House Bill 1187, "Concerning the Reorganization of Higher Education," as law. Article 13 of the act states that institutions are "accountable for demonstrable improvements in student knowledge, capacities and skills between entrance and graduation." It then outlines institutional responsibilities: to identify goals; to identify activities that advance students toward those goals; and to develop means for evaluating the achievements of students in the targeted areas.¹

In order to discharge the responsibility for assessment, the director of univer-

sity libraries established a University Libraries Assessment Committee in September 1988. The university libraries include the James A. Michener Library, the music library, the laboratory school library, and educational materials services. It was later decided that initial efforts at assessment should focus on Michener Library. In order to comply with deadlines for reporting, the committee had to establish goals, identify an existing survey or design one, and administer the survey during the fall of 1988. Efforts of the first year focused on collecting data regarding students' purpose and frequency of library visits, awareness of resources and services, and self-assessment of success in using the library. The survey also sought opinions regarding aspects of the library environment, such as noise level, ventilation, and lighting. Time constraints did not permit development of a test compo-

Arlene Greer is Reference Librarian, Lee Weston is Reference Services Librarian, and Mary Alm is Government Publications/Archives Librarian at James A. Michener Library, University of Northern Colorado, Greeley, Colorado 80639.

TABLE 1
SELF-ASSESSED SKILLS/1988-89

	Frequency of Library Use			Class Level	
	Almost Daily (N=373)	Once a Week (N=330)	Once a Month or Less (N=183)	Fr. (N=190)	Jr. (N=199)
Excellent or Good Library Skills (%)	81	71	57	57	75

ment. Not surprisingly, the data (see table 1) indicated greater self-assessed skills at higher class levels and with increased frequency of use. Noise was cited by 52% of the respondents as the most serious ambiance problem.

A separate faculty survey was designed and distributed to obtain data on the faculty's perceptions of library resources, services, and facilities, the nature of library assignments, and student skills, as well as when these skills should be in place. The intent was to establish a basic understanding of library and curricular interrelationships. Faculty described resources as adequate, services as good, and the environment as noisy. Student skills generally were assessed as adequate, although needing improvement. Most responses indicated that faculty expected entering freshmen to be proficient in using the online catalog and locating library materials, and junior-level students to be able to use printed indexes, abstract sources, and automated or CD-ROM facilities. When asked to indicate at what level they expected students to be able to select, evaluate, interpret, and organize information effectively, faculty responded surprisingly, with levels ranging from entering freshmen through junior or more advanced levels, although 39% of faculty indicated that they expected such performance at the freshman level. Such abilities, as well as the more obvious library skills, are integral to the production of quality term papers and reports, as well as other work. Obviously, assumptions about the presence of skills may preclude skill development.

With no compelling need to resurvey faculty opinion and with more time available, the committee decided that for

the second year of assessment it would examine the validity of self-assessment of library skills by measuring objectively determined skill levels. A skills test would also provide data for compliance with reporting guidelines, as established by university officials and the Colorado legislature. Annually testing the same population of library users is not possible. However, the incorporation of objective questions could reveal whether significant differences in skills and knowledge exist between freshmen and seniors.

Fundamental to the objective of assessment is the issue of accountability. Michener Library cannot require student attendance at instruction sessions, nor does it offer courses. Of 26 department assessment plans on file with the university's assessment coordinator as of July 1989, 11 (43%) included objectives to develop library or research skills and knowledge. The means by which these were to be developed and the methods by which progress would be measured were not specified in any of the program documents. For its part, Michener Library provides basic and subject-focused bibliographic instruction, primarily through the reference librarians at the request of the classroom faculty. Usually, the instruction is for a single class period and is designed to fulfill the requirements of an assignment or a term paper. In addition, the library provides public assistance, guides, and handouts, which further assist skill development. Although both the library and the classroom faculty bear responsibility for the development of skills in library use, at present funding and staffing levels, the library has little opportunity and insuf-

ficient personnel for organized, sustained, and comprehensive instruction for the majority of students.

UNC's incoming freshmen for 1989-90 totaled 2,668, which likely would require some 90 sections of 30 students each for a library course aspiring to levels beyond the superficial. A commitment to library literacy might demand such measures, but the expectation is unrealistic. Although the intent to evaluate library skills is laudable and desirable, ad hoc instruction is quite unlike systematic coverage of course content for all incoming students. Such courses test for progress at the culmination of the programs.² Even so, the library is an academic unit, and both the Colorado legislature and the university mandate assessment. Moreover, determining existing library skills and evaluating progress toward improved library literacy are worthy objectives.

Reference services and other service areas cannot provide assistance to a totally library-ignorant public during all of its hours of operation.

A search of the literature reveals that most library questionnaires geared to an academic population resemble UNC's 1988-89 survey in principally addressing issues of user satisfaction relative to ambiance, quality of service, or access.³ The committee, then, was faced with the inherently difficult task of designing a survey instrument that also would attempt to measure objectively competency. In order to ensure compliance in completion of a survey that incorporated test questions, the committee recognized the necessity of brevity and also respected the difficulty of evaluating library literacy based on relatively few objective questions. Consequently, test content was carefully considered. The four components of library literacy outlined in the *Colorado Academic Library Master Plan*, provided a focus for the study: (1) knowledge of the function and use of information sources; (2) ability to

select relevant information; (3) knowledge of the physical arrangement of materials; and (4) knowledge of the options available for using local, state, regional, and international systems.⁴ The test portion was designed to measure library literacy factors that corresponded to objectives of the *Master Plan*.

The committee developed a survey instrument that included five demographic questions, the most important of which was class status (freshman, sophomore, junior, senior, graduate). Four miscellaneous questions asked: (1) how often respondents used the library; (2) whether they had received a bibliographic instruction class presented by a librarian; (3) how they rated their library skills; and (4) who most helped them learn to use the library. Eight questions asked whether respondents used specified materials or services and, if answered affirmatively, whether they were "usually" or "seldom" successful in using them. Ten questions were introduced in an attempt to measure objectively skills pertaining to the four components of library literacy—that is, identifying, finding, and using relevant tools, services, information, and materials. Students were questioned on appropriate sources for professional journal articles (by topic), procedures for locating a book, effective construction of a search logic for CD-ROM (Silver Platter), selection of an appropriate source for a listing of materials on a subject, procedures for identifying a reference book, evidence of ability to select appropriate titles of articles and books for specified topics, information coverage of the online public access catalog (PAC), and selecting the service area (interlibrary loan—ILL) to be used for obtaining a book or an article the library does not own. Copies of the instrument are available from the authors.

One thousand questionnaires were distributed to users at the library entrance on a single day in March 1990. Tables were placed in the area to facilitate completion of the forms. Six hundred and ninety-four forms were returned. Table 2 shows the levels of participation.

TABLE 2
PARTICIPATION IN THE SURVEY BY USER STATUS/1989-90

Status	Spring 1990 Enrollment	No. of Participants
F.	1,858	115
S.	1,856	141
J.	1,672	163
S.	2,011	140
OTHER (Non-UNC, Faculty, Grad)		135

TABLE 3
AGGREGATED SCORES OF SELF-ASSESSMENT AND KNOWLEDGE/1989-90

Status	Self-Assessed "Excellent or Good Library Skills" (1 question) (%)	Average Self Assessed "Usually Successful" (7 questions) (%)	Average Test Scores (10 questions) (%)
F.	54	50	38
S.	59	58	39
J.	66	60	41
S.	81	70	45

Persons surveyed were presumed to be users of the library, although some respondents were doubtless using the library for purposes other than information access. The survey population parallels those populations used to assess outcomes in other academic units that tested or surveyed program participants rather than nonparticipants. The committee was somewhat concerned about respondents consulting with each other regarding the test questions, but a more controlled setting was not possible and did not appear necessary because anonymity was ensured.

As part of the data computations carried out by the computer center, user status (freshman, sophomore, junior, senior, graduate student, or faculty) was cross-tabulated with all other survey questions in order to establish a profile that might form a basis for determining progress. Table 3 shows aggregate responses to questions of self-assessed skills, success, and knowledge. The self-assessment category in column 1 of this table reflects data from a single question that asked respondents to assess their library skills on a scale from excellent to poor. Column 2 shows the results of av-

eraged data from seven questions aimed at determining success rates in using particular tools or services—for example, PAC, printed indexes or abstracts, CD-ROMs, serials lists, and ILL. The ten knowledge questions (averaged in column 3) were framed in a multiple-choice format, requiring—in some cases—more than one answer and testing actual knowledge or mastery of the items previously self-assessed for success.

In contrast to what was found in comparable self-assessment data, no dramatic trend of higher proficiency from freshmen to seniors exists in the test categories.

Through analysis of these data, the committee attempted to test the hypothesis that both skill and confidence levels increase as a result of cumulative exposure to the library and its services. This relationship seems confirmed, in part, by findings that reveal (as in the previous year's survey) that self-assessed excellent or good library skills are markedly higher for seniors than for

TABLE 4
 SELF-ASSESSED SUCCESS (S) AND AVERAGED TEST SCORES (K)/1989-90

Status	Use of PAC (%)		Use of Printed Indexes (%)		Use of InfoTrac/PAC for Articles (%)		Locating Books (%)		Locating Periodicals/Use of Serials List (%)		Use of CD-ROM/ Boolean Logic (%)	
	S	K	S	K	S	K	S	K	S	S	S	K
F.	70	29	41	36	48	37	71	75	63	38	19	23
S.	71	30	59	36	55	41	78	80	80	43	20	26
J.	78	30	55	36	57	42	86	75	75	42	25	34
S.	80	30	75	37	63	46	89	79	84	60	37	39

freshmen. However, in contrast to what was found in comparable self-assessment data, no dramatic trend of higher proficiency from freshmen to seniors exists in the test categories. Table 4 compares paired results of self-assessed success (percentage usually successful) and averaged test scores (percentage of correct answers).

The smallest self-assessed success differential (10%) occurred where 70% of the freshmen indicated that they were usually successful in using the online PAC, while the largest margin of difference (34%) was registered regarding the successful use of printed indexes and abstracts. Other success rates showed a range of 15% to 22% difference between freshmen and seniors in using such tools and techniques as electronic indexes to periodicals, locating books and periodicals, and interpreting the serials holdings list. It should be noted that locating periodicals and using the *Serials List* are both self-assessed categories. However, the committee thought that without using the *Serials List* (indicated in the second column of that pairing), students would enjoy haphazard success at best because the *Serials List* indicates format (fiche, film, or bound) for specified volumes and years. This information is essential to locating the material successfully.

When the committee turned to questions designed to test objectively the appropriateness of users' feelings of efficacy, it discovered results somewhat at odds with self-assessed success and, indeed, with the committee's general hypothesis

that skill levels will increase with library exposure. Test (K) data in table 4 reveal an apparent lack of awareness of the breadth of information contained in the online PAC. Accuracy rates in distinguishing false hits from relevant information when using this system were only slightly higher. The ability to use Boolean logic on CD-ROM systems shows higher skill rates at the senior level, but can be partially attributed to the likelihood that higher level courses would promote use of a more sophisticated retrieval system. Lending more weight to this assumption is the high percentage of undergraduates who indicated CD-ROM as "not used." The results of a question designed to test knowledge of printed indexes indicated that a lesser percentage of seniors were able to identify correctly an appropriate source (for professional journal citations) than were freshmen (31% to 35%). Some hopeful notes were struck by results that showed that 50% of seniors, as opposed to 29% of freshmen, could correctly identify the function of a bibliography, and that respectable percentages of students (62% to 92%) at all levels seemed objectively competent in determining book locations and identifying the roles of major library departments. The committee found, for example, that the percentage of students recognizing the role of ILL increased from 68% at the freshman level to 92% at the senior level. However, these positive results did not carry over to government publications services, which—the data indicated—are woefully underused at all levels.

TABLE 5
PARTICIPATION IN
BIBLIOGRAPHIC INSTRUCTION
PROVIDED BY A LIBRARIAN/1989-90

Status	%
F.	45
S.	48
J.	52
S.	68

The role of bibliographic instruction in the development of library literacy at UNC is unclear at this time, as indicated by the responses to queries in the survey. From July 1989 through June 1990, reference librarians delivered 133 hour-long class presentations at the undergraduate level. Students were asked to indicate on the questionnaire whether they ever attended a presentation given by a librarian. Table 5 shows the percentage of student participation in instruction classes provided to supplement the course curriculum.

That 68% of the surveyed seniors have had bibliographic instruction at some level of their college experience represents a significant undertaking on the part of UNC's library and classroom faculty to educate students about the library facility, including methodology for information retrieval, use of special discipline-related resources, and general information on the library's services and collections. However, the actual impact of these classes is quite another matter. Table 6 shows that students perceive other influences as more primary to the development of personal skills.

The 32% of users influenced by library personnel had individual assistance at the time of need. Thus, unsurprisingly, this kind of personalized attention is recognized as a major influence on development of library skills. That only 7% of the respondents claimed that bibliographic instruction was the primary influence in their learning also was to be expected, for this type of presentation is intended as a springboard experience and happens only sporadically, if at all, in a student's career at UNC. Some interesting comparisons regarding self-assessed and actual skills may be made among the groups citing different primary influences in the development of these skills. Those data are shown in table 7.

A new faculty position for bibliographic instruction is being added to the library's staff in 1991, partly as a result of this survey.

The level of self-assessed skills developed through a professor's instruction during a course is relatively high and may reflect a positive attitude toward the professor. However, average test scores do not support the students' assumptions about success or the committee's assumptions about the benefits to be expected from college research paper courses or any similar situation providing continuing contact, relevance to course content, emphasis through assignments, and the great incentive of testing and grading. In fact, the data suggest that

TABLE 6
PRIMARY INFLUENCES IN THE DEVELOPMENT OF LIBRARY SKILLS/1989-90

Primary Influences	%	No. of Responses
Assistance from other students	23	145
Professor teaching course	7	43
Presentation(s) given class by librarian	7	43
Library handouts, brochures guides	4	21
Assistance from library personnel	32	195
Other ("Self-taught," etc.)	26	156

TABLE 7
 SELF-ASSESSMENT AND KNOWLEDGE BY "PRIMARY INFLUENCE" GROUPS

Primary Influence	Self-Assessed "Excellent or Good Library Skills" (1 question) (%)	Average Self-Assessed "Usually Successful" (7 questions) (%)	Average Test Scores (10 questions) (%)
Other students	50	54	41
Teaching faculty	84	68	45
Librarian presentations	72	70	42
Library handouts	67	66	43
Library personnel	66	64	45

little difference in results exists, regardless of the source of skill development.

CONCLUSIONS

Data from the test portion of the survey indicate areas of concern in evaluating the development of library literacy. Negative comments about the presence of test questions were written on some of the instruments or made when the surveys were returned. However, the committee was pleased by the cooperative efforts of so many respondents who completed the test portion of the survey. Although response to the presence of test questions was good (97 of 694 respondents did not respond to some part of the survey, and 83 did not respond to the test portion), the committee thought that even better compliance might have resulted from providing a brief explanation of the purpose of the survey near the top of the first page. The test content of the instrument is being reexamined. Although the test questions may require refinement, the pairing of self-assessed and test categories to objectives stated in the *Master Plan* provided interesting insights; furthermore, the testing of skills provided a unique opportunity to deliver data on library literacy to university officials and, ultimately, to the Colorado legislature. Another concern is the means by which students learn. Because 23% of the respondents indicated that the influence primarily responsible for development of their library skills came from other students, future assessment may attempt to discover the cause of this pattern. This seems all the more

imperative in light of the table 7 findings that suggest that students who tutor each other have lower self-assessments than those whose major influences in library use are classroom faculty or librarian personnel. However, the relatively small variation in test scores, regardless of primary influence, calls into question the effectiveness of current instructional practices.

The level of self-assessed skills developed through a professor's instruction during a course is relatively high.

Although debate on the effectiveness of library instruction will no doubt continue, there should be an identifiable core of essential information that can be taught and that both enables and enhances library use.⁵ Possessing a core of basic library knowledge might, at least, improve the librarian-student dialogue, which all too often becomes a one-way street. Reference services and other service areas cannot provide assistance to a totally library-ignorant public during all of its hours of operation. While some students receive help, it is not possible to know how many do not.

Michener Library's involvement in the assessment effort has certainly encouraged the gathering of data on how knowledgeably and effectively students use the library and with what levels of confidence. However, the library's inability, on a campus of more than 10,000

students, to teach library literacy in a structured, ongoing program has made assessment a somewhat frustrating, problematic exercise. Exactly what is being assessed in the absence of such a program is not readily evident. If, as much of the data indicate, students are expressing higher (albeit, it would seem to us, somewhat misplaced) feelings of efficacy in using the library as they spend more time on campus, is this finding much more than a truism? If students feel they are successful, could this perhaps mean that, for the purpose of meeting requirements placed on them by teaching faculty, they may indeed be successful and, therefore, should not be held accountable for failing to reach higher levels of proficiency that we, as professional librarians, might wish to impose on them?⁶

Perhaps library services do adequately address problems for most students, even though much of their "success" comes amid a disturbing pattern of wasted time and effort stemming from low skill levels.⁷ Apparently, the development and practice of effective library skills should be emphasized throughout the university's curriculum. Meanwhile, as a palliative, closer cooperation with certain programs (e.g., basic

composition) could be promoted. In its deepest meaning, library literacy should allow students to engage in effective independent research. The importance of bibliographic instruction in library literacy cannot be judged on the basis of data presented in this article. On the contrary, the committee's conclusion is that much more bibliographic instruction is needed. What remains to be defined is when, by whom, under what circumstances, and with what content. How can library skills be developed meaningfully? The effectiveness of bibliographic instruction is directly related to its design, and it cannot be effective as an isolated occurrence.

In complying with the mandate from the Colorado legislature and university administration, the committee has obtained a more precise view of student skills as defined in the *Master Plan* and as adapted in the test. A new faculty position for bibliographic instruction is being added to the library's staff in 1991, partly as a result of this survey. Michener Library will continue its efforts at bibliographic instruction, and the provision of services will enable students to find resources, but the effectiveness of all of these stratagems would best be determined by future assessments.

REFERENCES AND NOTES

1. "Higher Education Accountability," article 13 of Title 23, "Higher Education and Vocational Training, *Colorado Revised Statutes* v.9, 1988 replacement volume (Denver, Colo.: Bradford, 1988), p.465-66.
2. Studies evaluating outcomes of formal programs of library instruction are fairly numerous. See, for example, John C. Selegean, Martha L. Thomas, and Marie L. Richman, "Long-Range Effectiveness of Library Use Instruction," *College & Research Libraries* 44:476-80 (Nov. 1983); and Larry Hardesty, Nicholas P. Lovrich, Jr., and James Mannon, "Evaluating Library-Use Instruction," *College & Research Libraries* 40:309-17 (July 1979).
3. Some surveys have been developed to pretest students in skill knowledge levels in order to determine appropriate library instruction content. See Ellen R. Paterson, "An Assessment of College Student Library Skills," *RQ* 17:226-29 (Spring 1978).
4. Colorado Academic Library Committee, *Colorado Academic Library Master Plan*, 3d ed. (Denver: Colorado Commission on Higher Education, 1988), p.30.
5. The methodology and effectiveness of bibliographic instruction in academic libraries have been explored in innumerable studies. Among the more recent are Frances F. Jacobson, "Teachers and Library Awareness: Using Bibliographic Instruction in Teacher Preparation Programs," *RSR: Reference Services Review* 16, 4:51-55 (1988); Sonia Bodi, "Teaching Effectiveness and Bibliographic Instruction: The Relevance of Learning Styles," *College & Research Libraries* 51:113-19 (Mar. 1990); Jean Sheridan, "The

Reflective Librarian: Some Observations on Bibliographic Instruction in the Academic Library," *Journal of Academic Librarianship* 16:22-26 (Mar. 1990); Tom Eadie, "Immodest Proposals: User Instruction for Students Does Not Work," *Library Journal* 115:42-45 (Oct. 15, 1990); and Stan Nash and Myoung Chung Wilson, "Value-Added Bibliographic Instruction: Teaching Students to Find the Right Citations," *RSR: Reference Services Review* 19:87-92 (Spring 1991).

6. For a discussion of this issue see Joanne Bessler et al., "Do Library Patrons Know What's Good for Them?—A Symposium," *Journal of Academic Librarianship* 16:76-85 (May 1990).
7. Other studies have produced similar findings. See, in particular, Beth J. Shapiro and Philip M. Marcus, "Library Use, Library Instruction, and User Success," *Research Strategies* 5:61-69 (Spring 1987), especially p.65-66, where data indicate a relatively high degree of satisfaction in using the library among patrons who employed methods that the authors claim could not have yielded effective information retrieval results. It should be pointed out, of course, that a substantial body of literature deals with the many positive consequences stemming from the perception (even if illusory) of self-efficacy and self-competency. For a recent review of this literature, see Viktor Gecas, "The Social Psychology of Self-Efficacy," in *Annual Review of Sociology*, v.15, ed., W. Richard Scott (Palo Alto, Calif.: Annual Reviews, 1989), p.291-316.

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