

Book Availability: Academic Library Assessment

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In the climate of increasing calls for academic assessment, the authors undertook a study to ascertain book availability in an academic library. The study described here uses the methodology pioneered by Tefko Saracevic, W. M. Shaw, Jr., and Paul Kantor and is a follow-up of earlier research reported in College & Research Libraries in 1987. The authors designed the study to identify any improvements in availability after the implementation of recommendations following the first study. The study provided a quantitative measure of library performance based upon the outcomes of card catalog searches. The research serves as a model for ongoing assessment in the library.



The 1980s could be characterized as the decade of assessment for those involved with education in the United States. The new era probably began in April 1983 when the National Commission on Excellence in Education published *Nation at Risk: The Imperative for Educational Reform*.¹ This document chronicling the myriad failures of the educational system served as the impetus for new initiatives in hundreds of political arenas and in all levels of education. The resulting call for accountability led to assessment efforts in colleges and universities from coast to coast. In a 1987 study, 25 percent of the institutions surveyed reported their state agencies were mandating assessment procedures while 70 percent without such requirements were expecting to introduce some form of assessment soon.²

Originally the term *assessment* focused on the measurement of student outcomes

for the purpose of student development and institutional accountability.³ Many writers expanded its scope to include such activities as evaluation, program review, and accreditation.⁴ Using this wider understanding, the entire academic institution in all its many interfaces with the student becomes a possible focus for assessment proceedings. "Teaching, after all, is only one of the things university faculty do, only one of the activities into which institutions invest energy and resources."⁵ This new academic introspection carries within it the seeds for a blossoming of institutional awareness. Assessment can be designed to serve a variety of purposes and evaluate a multitude of programs. The greatest service it can perform in each of these functions is to "identify aspects of performance where improvement is desirable."⁶ Assessment can transcend mere evaluation of present performance. It can become a vital agent for change,

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providing an impetus for structuring a meaningful direction for growth.

Within this context, the college library, as a significant component of the academic community and its curricular goals, would appear to be an appropriate agency for assessment. Yet except for an article by Thomas Shaughnessy determining library quality, no substantive work tying the current concerns and controversies in academic assessment to the campus library exists.⁷ The reason for this is unclear, but may rest solely on the fact that "there is no relatively straightforward mechanism by which a library can demonstrate effectiveness."⁸

Using a book availability methodology pioneered by Paul Kantor, Tefko Saracevic, and others, and later modified by Anne Ciliberti, a group of librarians at a medium-sized public college library in New Jersey prepared a study to determine how that library could improve its service.^{9,10,11} The resulting study, designed around the notion that one of an academic library's major goals was to provide books for its patrons' curricular needs, reported in 1987 that 54 percent of the patrons surveyed found the materials they were seeking.¹² Although these results mirrored those of other college libraries, the researchers sought improvement. The study design provided an opportunity to ascertain the stage in the process at which patrons had difficulty in locating or retrieving the desired books. The librarians made thirteen recommendations to remedy library malfunctions and patron misunderstandings. The staff implemented these recommendations during 1987 and 1988. The authors then undertook a follow-up study during the 1988 fall semester to assess whether any improvement in availability occurred.

THE MODEL

The model used in this study provides a quantitative measure of library performance based upon the outcomes of known-item and subject card catalog searches. A known-item search is one in which the patron is looking for a specific book and knows the author's name or the book's title or both. The measure of library

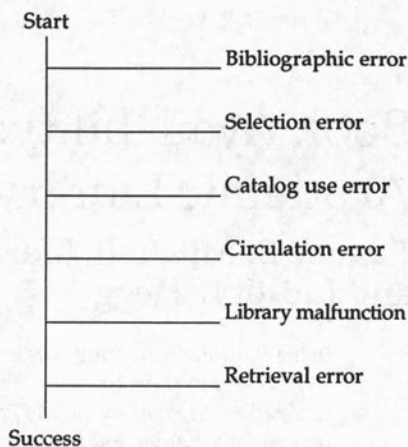


FIGURE 1
Branching Analysis
of Known-Item Searches

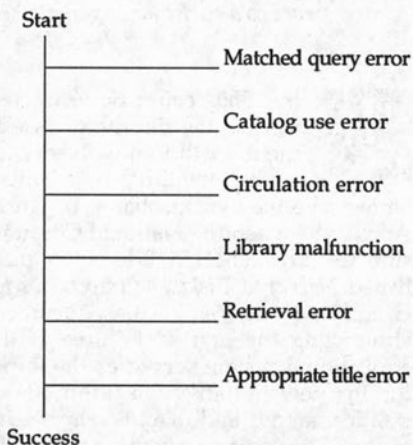


FIGURE 2
Branching Analysis of Subject Searches

performance, expressed as a probability of success, is calculated both as an overall measure of library performance and as a series of discrete, sequential steps which all successful patrons must complete. These calculations, therefore, provide important diagnostic information about the relative strengths and weaknesses of library subsystems such as selection, circulation, cataloging, and so forth. Figures 1 and 2 represent the sequential steps involved in known-item and subject

searches, respectively. For each of these branches an independent performance measure is calculated.

Definitions of Error Categories

Selection and bibliographic errors occur only in known-item searches. Selection errors occur when the library has not purchased the desired material (earlier studies referred to these as acquisition errors). Selection errors also occur when the library does not fully represent the material in the card catalog when it is on order, in process, etc. *Bibliographic errors* occur when patrons do not find the desired materials because their bibliographic citations are incorrect.

Two types of errors are present in subject searches only. *Appropriate title errors* occur when patrons either fail to select titles found in the catalog or fail to borrow or use them in the library. Patrons may choose not to consult items found on their topics because they have already read the material, it is written in the wrong language, outdated, at an inappropriate reading level, or is in another way unsuitable to the information need.

Matching errors involve matched query terms. A matched query term is one that either fully or partially agrees with the subject heading used in the catalog. When patrons fail to discover a subject heading that matches their query terms, a matched query error occurs. Matching errors may be of two kinds. They occur when no match can be made from the initial query to a standard subject heading because none exists in the alphabetical range of the query term. They also occur when the subject heading is not listed in the catalog.

The final four types of errors occur in both known-item and subject searches. *Catalog use errors* occur when patrons cannot properly identify the call number. *Circulation errors* occur when the desired material is on loan or on a "hold" shelf waiting to be charged out. *Library malfunction errors* are due to shortcomings in the policies or routines of the library or its staff. For example, desired items may be missing, misshelved, waiting to be reshelved, etc. The final type of

error, *retrieval*, occurs when patrons cannot find the desired material although they identify the correct and complete call number and the book is in its proper shelf location.

METHODOLOGY

Data collection took place during the fall 1988 semester from card catalog users. The first patron approaching the card catalog at randomly selected times received a self-selecting data collection form. Of 137 forms distributed, 111 were returned for a rate of 81 percent.

Each day, the authors collected the forms returned during the previous twenty-four hours and randomly selected one title from each form for analysis. If the patron had not found or used this title, the type of error was determined by systematically verifying the call number, subject heading, or bibliographical reference; checking the card catalog; searching the book stacks and sorting shelves; and examining the circulation records and reserve book shelves.

RESULTS

A total of 61 (55 percent) of the patrons conducted known-item searches while 50 (45 percent) conducted subject searches. These results were consistent with the 1986 study. Apparently, some patrons had difficulty understanding the concept of subject searching. For example, one patron was searching for *The Autobiography of Cyrus McCormick*, a known item, in the subject card catalog. Another patron was searching the subject *apartheid* in the title catalog. This problem may have been exacerbated by the divided card catalog in the library under study. If patrons are not sure whether they are looking for a title, name, or subject, they may choose the wrong section of the card catalog. They also may lack the persistence or problem-solving skills to look somewhere else or to ask for help when they find few books on a topic. Finally, patrons may have low expectations; when they do not find the books they want, they may not question it because they never expected to be successful.

TABLE 1
SUCCESS IN KNOWN-ITEM AND
SUBJECT SEARCHES BY STUDY

	Success	
	1986 Study (N = 401)	1989 Study (N = 111)
All searches	215 (54%)	71 (64%)
Known-item searches	107 (50%)	40 (56%)
Subject searches	108 (50%)	31 (44%)

Analysis of the Success Rates

The overall success rate for the 111 usable searches was 64 percent (see table 1). Although this represented a 10 percent improvement over the 1986 success rate of 54 percent, chi-square tests on the failure of known-item and subject searches by study and on the comparison of success and failure by study both indicated that the improvement was not statistically significant at the .05 level of confidence.

Analysis of Search Failures

As previously noted, the problems encountered by patrons resulting in their failure to locate the books they seek can be divided into six categories for both subject and known-item searches. The data shown in tables 2 and 3 represent these error categories listed in the order in which patrons encounter them and illustrate the success rate at each step of the search process.

Known-Item Search Failures. The data in table 2 show that two of the 61 patrons conducting a known-item search had erroneous bibliographic citations. Of the 59 persons who had correct bibliographic information, 4 were searching for titles the library had not purchased for the collection. Of the 55 who had accurate citations and were looking for books the library owned, one was unable to use the card catalog correctly, that is, to locate the appropriate card and identify information necessary to find the book. Another patron at the next step failed to find the book because it was in circulation. At this point 53 people were looking for titles that osten-

sibly should have been on the shelves. Seven of these were unsuccessful because of some library malfunction—that is, the books were not in their expected location. Another 6 were unable to retrieve a volume shelved in the correct location. The total error rate was 34 percent.

Placing these errors in order of relative negative impact on the search process, it is possible to assess the greatest needs for future library planning. The success rates of 87 percent at both the library malfunction and retrieval error stages of a patron's search were of primary concern. They were followed by selection,

TABLE 2
KNOWN-ITEM SEARCH
PERFORMANCE BY TYPE OF ERROR
AND SUCCESS RATIO

Type of Error	No. of Errors	Total Patrons Searching	Success Ratio (%)
Bibliographic	2	61	97
Selection	4	59	93
Catalog use	1	55	98
Circulation	1	54	98
Library malfunction	7	53	87
Retrieval	6	46	87

Total errors: 21.

Total known-item searches: 61.

% errors: 34%.

Start

97%	Bibliographic error
93%	Selection error
98%	Catalog use error
98%	Circulation error
87%	Library malfunction
87%	Retrieval error

Success

bibliographic, catalog use, and circulation concerns.

Subject Search Failures. Table 3 also lists subject search errors in the order the patron encountered them. One patron of the 50 conducting subject searches was either seeking a subject for which the library had purchased no titles or was unable to select subject terms that matched his or her need. Of the 49 persons remaining, 2 had difficulty in using the card catalog. Either they could not correctly identify the call number or they left out the location symbol such as "Ref." Forty-seven patrons successfully reached this point, but 3 of these were looking for titles that were in circulation and therefore not accessible. Three pa-

TABLE 3
SUBJECT SEARCH
PERFORMANCE BY TYPE OF ERROR
AND SUCCESS RATIO

Type of Error	No. of Errors	Total Patrons Searching	Success Ratio (%)
Matching and selection	1	50	98
Catalog use	2	49	96
Circulation	3	47	94
Library malfunction	3	44	93
Retrieval	8	41	81
Appropriateness	2	33	94

Total errors: 19.

Total subject searches: 50.

% errors: 38%.

Start		
98%	Matched query error	
96%	Catalog use error	
94%	Circulation error	
93%	Library malfunction	
81%	Retrieval error	
94%	Appropriate title error	
Success		

trons of the 44 remaining were unable to locate their books because of a shortcoming in the policies or procedures of the library that caused the book to be unavailable. Examples of library malfunctions include missing books, volumes waiting to be shelved, or books awaiting cataloging or repair. Forty-one patrons successfully negotiated these problem categories, but 8 more errors occurred because patrons could not find books correctly shelved in the stacks.

Two patrons encountered the sixth type of error, appropriateness. These patrons found books on the shelf but decided that they were inappropriate for their needs. Thus, only 31 patrons performing subject searches located books appropriate to their needs. Nineteen were unsuccessful, resulting in a failure rate of 38 percent.

Again, it is possible to place the patron errors in order of their negative impact on the search process. This order is retrieval error followed by library malfunction, appropriateness and circulation, catalog use, and matching and selection errors.

Library Errors. The data in this study were further examined to evaluate the origin of the failures. Forty-seven percent of the search failures could be

TABLE 4
ORIGINS OF LIBRARY AND
PATRON ERRORS

Origin of Error	Errors	
	No.	%
<i>Library errors</i>		
Malfunction	10	(56)
Circulation	4	(22)
Selection	4	(22)
Total	18	(100)*
<i>Patron errors</i>		
Retrieval	14	(70)
Matching and catalog use	4	(20)
Bibliographic	2	(10)
Total	20	(100)†

* These 18 library errors represent 47% of all search errors excluding those classified as appropriateness errors.

† These 20 patron errors represent 53% of all search errors excluding those classified as appropriateness errors.

considered library errors, or shortcomings in library routines. As table 4 indicates, 10 patrons (56 percent) failed because they could not locate the titles sought on the shelves or in the circulation records. An additional 4 (22 percent) sought titles that were already on loan. The remaining 4 (22 percent) desired titles not owned by the library.

Library Malfunction Errors. These errors constituted 56 percent of all library errors. In more than half of these cases patrons consulted the card catalog and found titles they determined to be useful but were unavailable. A closer look at these ten errors indicated one was the result of a book being located on a sorting shelf, two were declared lost, and the remaining seven were unable to be located by library staff and were considered lost. These seven may have been unavailable for a variety of reasons. For example, they may have been stolen, misshelved, or in staff offices but not checked out.

Circulation Errors. Four (22 percent) of the failures resulted from the fact that titles were already on loan when the patron searched for them.

Selection Errors. Four (22 percent) of the library errors were selection errors. Patrons were searching for specific titles or books by a specific author that the library did not own. An analysis of these titles determined the extent to which they were compatible with the collection development goals of the library. One was clearly inappropriate for the collection, the second was a textbook considered outside the usual collection criteria, and the third had been purchased at the time of its publication but could not be replaced when it was lost or stolen. The fourth title probably should have been in the collection at the time of this study.

Patron Errors. Over half the search failures were errors committed by the patrons. Of those thus identified, 14 (70 percent) occurred because patrons could not locate a title on the shelf when it was there. Another 4 (20 percent) failed either to use the card catalog correctly or interpret its contents accurately. The final 2 (10 percent) of the errors resulted from

erroneous bibliographic information brought to the catalog by the patrons.

Retrieval Errors. A disturbingly high percentage of the patron errors were retrieval errors. A total of 14 (70 percent) of the 20 patron errors represented patrons who, while they had correct bibliographic and card catalog information, could not find books on the shelf even though the books were in their correct locations.

Matching and Catalog Use Errors. A total of 4 (20 percent) patrons made matching and catalog use errors. These people were ineffective users of the card catalog. They experienced difficulty in gaining subject access to the catalog, in understanding the use of the call number, and in differentiating between the various sections of the divided catalog.

Bibliographic Errors. Judging from the small percentage (10 percent) of patrons who committed bibliographic errors, most patrons brought adequate bibliographic information to the card catalog.

Other Sources of Error. In addition to library and patron errors, a third source of failure existed in subject searches, termed *appropriateness* errors. Whereas errors in the initial two categories typically represented titles not available at the time of need, appropriateness errors occurred when patrons either failed to select titles found in the card catalog or, after examining selected titles at the shelf, decided not to use the books found. In contrast to the large numbers of library and patron errors surveyed, only 5 percent of the errors were appropriateness errors. It was not possible from the available data to document the reasons why patrons did not select or use these books. If patrons had a better understanding of the information contained on the catalog card, perhaps they could have distinguished inappropriate titles earlier.

COMPARISON OF THE TWO STUDIES

The purpose of this study was to follow up on the efforts of the 1986 study to determine if the implementation of the recommendations made any difference

in the patrons' success at finding library books. Although it cannot be said with certainty that these changes helped in specific instances, the situation did improve with respect to most of the sources of error examined.

A comparison of the performance of the library patrons between the 1986 and 1989 studies indicates that there was a large increase in the overall success rate from 54 percent to 64 percent. This increase is significant at the .06 level of confidence.

Table 5 shows the differences in success rates between the two studies. With respect to known-item searches, success rates improved in four out of six error categories: selection (from 90 percent in 1986 to 93 percent in 1989), catalog use (from 92 percent to 98 percent), circulation (from 91 percent to 98 percent), and library malfunction (from 74 percent to 87 percent). Success rates dropped in the bibliographic (98 percent to 97 percent) and retrieval (93 percent to 87 percent) error categories. In subject searches, the success rates improved in five out of six error categories: matching

TABLE 5
SUCCESS RATES BY TYPE OF
ERROR FOR EACH STUDY

Type of Error	Success Rates (%)	
	1986 Study	1989 Study
<i>Known-item searches</i>		
Bibliographic	98	97
Selection	90	93
Catalog use	92	98
Circulation	91	98
Library malfunction	74	87
Retrieval	93	87
<i>Subject searches</i>		
Matching and selection	94	98
Catalog use	94	96
Circulation	93	94
Library malfunction	87	93
Retrieval	91	81
Appropriateness	89	94

and selection (from 94 percent to 98 percent), catalog use (from 94 percent to 96 percent), circulation (from 93 percent to 94 percent), library malfunction (from 87 percent to 93 percent), and appropriateness (from 89 percent to 94 percent). Again, retrieval error success rates dropped (from 91 percent to 81 percent).

TABLE 6
ORIGIN OF LIBRARY AND PATRON
ERRORS FOR EACH STUDY

Type of Error	Errors (%)	
	1986 Study	1989 Study
<i>Library errors</i>		
Malfunction	56	56
Circulation	25	22
Selection	21	22
Total	100	100
<i>Patron errors</i>		
Retrieval	32	70
Matching and catalog use	60	20
Bibliographic	8	10
Total	100	100

Table 6 displays a comparison of library errors versus patron errors by study. The library error category shows approximately the same breakdown of errors between the two studies. The patron errors, however, show retrieval failures to be a much greater problem in the 1989 study. Conversely, matching and catalog use success improved.

The follow-up study revealed that there was an increase in overall success rate from 54 percent to 64 percent since 1986. With respect to known-item searches, success rates improved in the selection, catalog use, circulation, and library malfunction error categories. Success rates dropped in the retrieval and bibliographic error categories. With respect to subject searches, success rates improved in the matching and selection, catalog use, circulation, library malfunction, and appropriateness error categories. Success rates dropped in the retrieval

error category. Overall, retrieval errors were the greatest source of patron errors.

RECOMMENDATIONS

Besides its usefulness as a tool for assessment purposes, the book availability study can be used as a guide to improvement. For example, the first study indicated that the overall success rate of card catalog users was 54 percent. An extensive list of recommendations was developed, giving priority to the largest causes of patron failure. The greatest causes of patron failure were library malfunctions, followed by appropriateness, retrieval, circulation, matching and selection, and catalog use errors. Among the recommendations for improving library malfunctions were the initiation of an inventory and regularization of shelf-reading programs. Recommendations for remedying circulation, patron, and selection errors included improving signs, purchasing duplicate copies of high demand items, and incorporating discussions of patron retrieval and card catalog use problems into bibliographic instruction classes.

In the second study, the major causes of patron errors were library malfunction and retrieval problems, as seen in tables 2 and 3. With respect to retrieval errors, a continuing need was recognized to focus on the difficulty patrons appeared to have in locating a desired title when the book was on the shelf in its proper location. Despite the installation of new signs after the 1986 study, it was recommended that improved and more creative signs be investigated. Other recommendations included the regular assignment of a staff member or student assistant at an information or help desk during the busiest hours of the semester and preprinted forms at the catalog with appropriate spaces for call number, title, and author to aid those students who do not have all the necessary information from the catalog card when they go to the shelves. The reverse side of the form would have a simplified floor plan of the library indicating regular shelves, sorting shelves, and special collection areas.

Recommendations to improve library instruction classes included enhanced discussions on the use and interpretation of the card catalog, the arrangement of the books on the shelves, and the location of special collection areas. Discussions would also emphasize that patrons should persist in asking for help when they cannot locate books. Finally, the reference librarians were urged to be alert to patrons who, in asking questions, reveal a lack of understanding of the card catalog. With respect to library malfunction errors, the conduct of an annual partial inventory was recommended.

The effect of these new recommendations remains to be seen. Shaughnessy stated that assessment "presents library managers with an opportunity to focus staff attention on service quality and library effectiveness."¹³ The availability study described here provides both an opportunity and a mechanism to determine whether any benefits have accrued and the extent to which they may have had an impact.

CONCLUSIONS

The study as described has major implications for assessment. This methodology provides a means for evaluation of one component part of a complex system. This work has focused on an important aspect of the academic library, that of providing access to library materials. The design of this study does not provide a complete assessment of the myriad variables involved in the evaluation of library services. Many areas were not addressed here (reference, staffing, funding, etc.). This research tool could be employed as one of several components if a broader assessment is desired.

Another vital implication for this work is that the results of this and similar studies provide benchmarks for future investigations. One purpose of assessment is to evaluate present performance to determine the impact of change. Improvements in performance and areas that continue to be problematic can be identified and monitored. Academic libraries exist as dynamic entities, their form and function shifting in an increasingly computerized environment. The li-

brary in this study is soon to convert its existing card catalog to an online catalog. A possible future direction would be to modify the technique described above to assess the impact of the online catalog on the success this academic library has in providing the materials its patrons want and need.

This analysis has provided valuable information and insights into the work-

ings of the complex system of the academic library. In undertaking and performing this evaluation, many benefits have resulted, including an increased awareness of patrons' major problems in interacting with the library organization and access points of materials. In order to promote productive use of the library, academic institutions should include libraries in their assessment plans.

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