A Review and Analysis of Library Availability Studies

By Thomas E. Nisonger

The concept of availability (can a library patron locate a desired item on a library's shelves?) and Kantor's branching method for identifying barriers to availability (acquisition, circulation, library operations, and the user) are described. A literature review identifies more than fifty investigations of availability reported in journal articles, dissertations, theses, or conference presentations during the last quarter century. The mean availability rates for known-item searches by actual patrons of 61.3 percent or 63.1 percent (depending on the calculation method) are quite similar to the 61 percent found in an earlier review covering the years 1934 to 1984. Analysis of availability in Kantor's branches shows variation among libraries, but no branch standing out as a major barrier. The paper concludes with the argument that the traditional availability measure can be modified for use as an objective, user-centered evaluative tool in the electronic environment.

Libraries and the library and information science (LIS) discipline are in the midst of a rapid paradigm shift, calling for new research approaches and evaluative measures. During the twentieth century a host of library evaluation techniques that generally focused on the collection itself, including the checklist approach, circulation studies, and the Conspectus, were developed for a relatively stable, mostly print environment. See Lockett for a synopsis of the major approaches.[1] The Association of Research Libraries (ARL) New Measures Initiative and LibQual, among several possible examples, illustrate how the discipline is now searching for new, user-centered evaluation strategies suitable for a more complex, hybrid print-electronic environment, which may soon morph into an all-electronic environment. This paper concludes with the suggestion that a proven library evaluation technique that has been used for more than seven decades, usually termed an "availability study," can be modified to help meet the evaluation challenges in the emerging environment.

The word "availability" can have a wide variety of meanings, including a politician's availability as a candidate for office or someone's availability for a Saturday night date. Within LIS, the term has been applied to a variety of contexts, including the holding of a journal title by a library or the ability to obtain a book in the out-of-print market, among numerous credible examples.[2] Yet, availability has a well-established and fairly specific meaning as a library performance or collection evaluation measure. It has been defined as "the extent to which patron needs for specific documents are promptly satisfied" and "immediate access to known-items sought."[3] In essence, availability tests whether a library patron can immediately find whatever document he or she is seeking in the library. The terms "shelf availability study," "failure study," or "frustration study" have alternatively been used for this method or variations upon it.

Thomas E. Nisonger (nisonge@indiana.edu) is Professor, School of Library and Information Science, Indiana University.

Availability is often considered a measure of library effectiveness or overall performance. As White stated, "The user doesn't care that the library owns a million books if he can't find the one he wants."[4] Availability studies have been compared to systems analysis because they view the library as a system for providing documents demanded by patrons and can identify which subsystem, such as acquisitions or circulation, is responsible for failure.[5] Investigation of availability constitutes an established LIS research approach that has been used in doctoral dissertations, master's theses, and many refereed journal articles.

The majority of availability studies have been "real," as they were based on surveying actual library patrons during designated time periods, usually asking them to complete a questionnaire reporting the items sought and whether they were found. Some studies have been simulated with library staff checking the shelf availability for a list of citations. A few studies have used log records of patron OPAC searches.[6] A number of investigations have taken a macro approach, simply calculating an overall availability rate. Many have been conducted at a micro level, using Kantor's branching technique (as will be explained further in this paper) to analyze why books and articles were not available. This macro-micro distinction is based on Lancaster's work.[7]

A number of sources have reviewed the advantages and disadvantages of availability studies, including Lockett, and Bachmann-Derthick and Spurlock.[8] The advantages of the approach include: provision of objective data concerning the library's ability to meet patron need, use of a well-established methodology, and repeatability at later or even regular intervals allowing longitudinal comparison. Also, bottlenecks can be identified and policy changes or appropriate corrective actions can be made.

The disadvantages associated with availability tests are their design and implementation can be relatively complex and time-consuming; user cooperation is required; users may not accurately report the necessary information; the needs of nonusers are not addressed; and, because they are based on a sample, they only provide an estimate of overall availability.

This paper's purpose is to review and tabulate the results of more than thirty-five studies reporting more than fifty availability tests conducted or published since the early 1980s, focusing on overall availability rates and the reasons items were not available to patrons. The potential applicability of the availability concept to the electronic environment is then advocated.

A Brief Historical Sketch of Availability Studies

Studies of availability have appeared in the literature for at least seven decades. Gaskill, Dunbar, and Brown's 1934 use survey at the Iowa State College library calculated the percentage of time both undergraduate students and graduate students "obtained what they sought" and identified eleven reasons for failure to locate the sought-after book or magazine.[9] In 1975, Buckland's major monograph, *Book Availability and the Library User,* based on research at the University of Lancaster, reported that circulation was the major barrier to book availability, and recommended variable loan periods and purchase of duplicate copies to increase availability.[10]

At least forty availability studies were published between the 1930s and the mid-1980s, according to a seminal literature review and analysis published in 1986 by Mansbridge.[11] He discovered that most investigations were based on known-item searches conducted in academic libraries, while two-thirds were based on real users, and the remaining third used a set of citations simulating user needs. This literature review will only mention the most seminal items included in Mansbridge, while focusing on research published later or not covered by him.

Kantor's Branching Method

"The branching method," developed by Kantor during the 1970s, is probably the best-known availability technique and the one most frequently employed in research. Kantor's original 1976 article, which reported results at Case Western University's Freiberger Library, outlined four branches or barriers to patron "satisfaction" in obtaining a desired book, which are generally termed: "acquisitions"—it was not acquired; "circulation"—it is checked out to another patron; "library operations"—it is not in the correct shelf location; and "the user"—it can not be located when correctly shelved.[12] Later modifications added a "bibliographic" branch—the user did not have the correct citation—and a "catalog" branch—the user could not locate the book in the catalog and record the correct call number.[13] Rashid used a "collection development policy" branch (actually a subdivision of the acquisitions branch), whereby the desired title was not covered by the collection development policy's scope.[14] Two additional branches have been used in the small number of studies of subject searching—i.e., the patron is seeking a book on a particular subject rather than a specific title—"appropriate title," in which the patron deems a book listed in the catalog inappropriate due to such factors as age, language, or reading level; and "matched query," in which the client fails to find a subject heading in the catalog matching his or her information need.[15]

Numerous permutations of branches have been used in the studies based on Kantor's methodology. The three most frequently used sets of branches for known-item searches by patrons are

- Acquisitions, Circulation, Library Operations, User;
- Acquisitions, Catalog, Circulation, Library Operations, User; and
- Bibliographic, Acquisitions, Catalog, Circulation, Library Operations, User.[16]

Other less frequently employed permutations include "Acquisitions, Catalog, Circulation, and Library"—because the investigation took place in a closed stack library; "Bibliographic, Collection Development, Acquisitions, Catalog, Circulation, Library Operations, and User"; and "Acquisitions, "On-the-Shelf.""[17] Some studies have combined branches, such as circulation and library operations.[18] Variant terminology has occasionally been used—e.g., "selection" for "acquisitions" or "retrieval" for the "user" finding the document on the shelf.[19] Each of the branches described above represents a barrier to the user locating a sought-after book or item. Failures in different branches have been variously termed as "dissatisfactions," "errors," or "malfunctions" throughout the literature.

ARL published a detailed manual by Kantor explaining the implementation of his branching method, and some collection evaluation and library performance guides or textbooks, such as one by Hall, have provided succinct summaries of the technique.[20] During the 1980s, doctoral dissertations using Kantor's method were completed at Case Western Reserve University by Kuraim, Ajlan, Abduljalil, and Rashid, as well as at Rutgers by Ciliberti.[21] Kantor's branching analysis has also been applied in master's papers or theses written at the University of North Carolina at Chapel Hill by Roberts and Chandler, the University of the Punjab in Pakistan by Bashir, and the University College of Wales by Salter.[22]

The fact that Kantor's branching method has been implemented in the United States, Europe, Africa, Asia, the Middle East, and Australia testifies to its wide international acceptance. In the United States, not counting studies already covered in Mansbridge's literature review, it has been used at

- the University of Illinois Health Sciences Center by Kolner and Welch;
- the William Patterson College Library by Ciliberti et al., and Mitchell, Radford, and Hegg;
- the University of California at Santa Cruz Library by Ferl and Robinson; and
- the San Jose State University by Thorne and Whitlatch.[23]

Internationally, it has been utilized at

- a Tokyo city library system in Japan in a severely modified form by Tamura and Sakai;

- Liverpool Polytechnic Library Service in the United Kingdom twice by Revill;
- the Friesland Provincial Library in the Netherlands by Lieshout;
- the University of the Punjab in Pakistan by Rehman and Bashir;
- the University of Western Australia by Harris and Garner;
- the University of Münster in Germany by Boekhorst;
- the International Islamic University in Malaysia by Rehman, Arif, and Chaudhry;
- the King Fahd University of Petroleum and Minerals in Saudi Arabia by Chaudhry and Ashoor;
- the University of Zululand in South Africa by Zondi;
- four universities in the state of Tamil Nadu in India by Urs and Dominic; and
- a simulated study at the University of Cape Town Medical Library by Steynberg and Rossouw.[24]

Kantor's method has been primarily used for known-item searches by actual patrons in academic libraries, although it also has been employed in

- the Shaker Heights Senior High School and Cleveland Heights High School libraries in Ohio by Abduljalil;
- the Cleveland Heights-University Heights Main Public Library by Wood, Bremer, and Saraidaridis and by Kuraim;
- the Cameron Village Regional Library in North Carolina in a simulated study by Chandler; and
- a Tokyo city library system by Tamura and Sakai.[25]

While the method has primarily been used to measure book availability to actual patrons, it has also tested the availability of

- journal articles at the University of New Mexico by Bachmann-Derthick and Spurlock;
- journal articles at Adelphi University by Ciliberti et al.;
- journal articles at the University of North Carolina Health Sciences Library by Shaw-Kokot and Varre;
- both books and articles at the University of Western Australia by Harris and Garner; and
- both books and articles at the King Fahd University of Petroleum and Minerals by Chaudhry and Ashoor.[26]

Kantor's method has also been employed for analysis of subject searching at William Patterson College by Ciliberti et al., plus Mitchell, Radford, and Hegg; and at Adelphi University by Cilibert et al.[27]

Other Approaches to the Study of Availability

Various availability tests have been developed as performance or so-called "output" measures for public libraries. *Performance Measures for Public Libraries,* by De Prospo, Altman, and Beasley, proposed and tested in twenty U.S. public libraries a simulated shelf availability measure using samples of book titles from the *American Book Publishing Record* and each library's shelflist plus periodical articles selected from leading indexes.[28] *Output Measures for Public Libraries,* by Van House et al., includes three availability measures according to type of search: the Title Fill Rate, the Subject and Author Fill Rate, and the Browsers' Fill Rate.[29] The "title fill rate," as a known-item search, is essentially equivalent to the author-title searches generally used by those implementing Kantor's method. *Output Measures for Public Library Service to Children,* by Walter, contains a "children's fill rate," "homework fill rate," and "picture book fill rate."[30] Its companion volume of output measures for young adult services incorporates a "young adult fill rate" and a "homework fill rate."[31] While some public libraries have simply posted availability scores on the Web without reporting details of the study, this review is limited to formal research reports (e.g., Simpson at the Pikes Peak Library District and Thompson at Augustana College Library).[32]

A few studies have calculated availability based on patron known-item searches without using Kantor's branching analysis or explicit "fill rates," such as those conducted at Macquarie University in Australia by Knox and Wivell, and at Cardiff University in the United Kingdom by Wall and Williams.[33] Simulated availability studies not involving actual patrons have been conducted at the University of Illinois at Urbana-Champaign by Stelk and Lancaster, the University of Cape Town by Steynberg and Rossouw, and the Cameron Village Regional Library in North Carolina by Chandler.[34] In addition, simulated investigations have supplemented "real" studies at the Cleveland Heights-University Heights Main Public Library by Kuraim, and the King Faud University of Petroleum and Minerals by Chaudhry and Ashoor.[35]

Accessibility Studies

Related, yet distinct from availability, is the concept of accessibility, which measures the amount of time required to obtain a document (from either internal or external resources) rather than its immediate availability. Similar to availability, the term "accessibility" is sometimes used inconsistently in the literature. The best-known accessibility measure was developed during the late 1960s and early 1970s, and has entered LIS lore as "Orr's Document Delivery Test" (DDT).[36] In this technique, the time required to obtain a sample of approximately 300 documents is used to calculate a Capability Index ranging from 0—no documents available within a week—to 100—all documents available within 10 minutes—which would be considered availability. Orr's test has been implemented in 92 U.S. medical libraries by Orr and Schless; 2 Canadian LIS libraries by Penner; 13 California secondary school libraries by Greenberg; and 7 South African medical libraries by Steynberg and Rossouw.[37] Although Orr's DDT was not used, the comparative accessibility of books through recall or interlibrary loan was recently investigated at Iowa State University by Gregory and Pedersen.[38] Tangential to document delivery tests are the numerous performance evaluations of interlibrary loan and commercial document delivery, which include "turnaround" or delivery time as an important variable. This author tabulated the results from approximately 30 such studies published during the 1990s.[39] It is beyond this paper's scope to analyze the results of accessibility studies.

An Analysis of Availability Studies Conducted During the Previous 20 to 25 Years

This section analyzes the results of the availability studies issued since Mansbridge's literature review (the cutoff date was 1984) as well as a small number of studies published between 1980 and 1984 not included in Mansbridge—mainly Ph.D. dissertations, a format he did not address. Appendix A summarizes 46 investigations of availability based on actual clients conducting known-item searches that were published from 1980 to 2001, listing the author, publication date (or degree date for dissertations), institution, sample size, the number of successful searches, and the overall availability rate. For the purpose of consistency and accurate comparison, the availability percentages have been calculated by the author to the first decimal point based on the data reported by the original researchers. Recalculation of the initially reported percentage was sometimes necessary due to inconsistent practice in rounding off numbers by some researchers, inexplicable errors in the originally reported percentage, or cases in which the researchers derived a final percentage by multiplying the percentage results at each branch (the method used by Kantor) rather than by simply dividing the number of successes by the total number of searches. Instances in which the percentage in appendix A differs by more than half a percentage from that which was initially reported are noted in footnotes to the appendix.

Examination of appendix A reveals that overall availability ranged from 33.8 percent at the University of Münster to 83.8 percent at Cardiff University. The high rate at the latter can probably be attributed to the study's focus on "short loan," items—i.e., "reserve" in North American terminology. Twenty-nine of the 46 reported results showed an availability rate in the 50s or 60s percentage range. The unweighted mean availability rate (with each of the 46 percentages

counting equally) is 61.3 percent, a figure remarkably similar to the 61 percent reported by Mansbridge, who used this method for calculating the mean.[40] However, Mansbridge found a larger range in the results from different studies (8 to 89 percent).[41] This literature review's weighted mean (a calculation method not used by Mansbridge that factors in the size of each investigation) was 63.1 percent (17,801.3 successes in 28,207 searches) for 43 investigations. Excluded from calculation of the weighted mean were Simpson's two surveys at the Pikes Peak Library District (for which the raw data is unavailable) as well as Jacobs and Young's University of Sussex research, where the 99,778 searches would badly skew the overall average. The 61 or 63 percent mean availability rates found in this review are a bit higher than the general 50 to 60 percent range cited by Bachmann-Derthick and Spurlock; Lieshout; Ciliberti et al.; and Chandler.[42]

The three cases focusing exclusively on serial or journal articles, Bachmann-Derthick at the University of New Mexico, Roberts at East Tennessee State, and Ciliberti et al. at Adelphi University, found lower-than-average availability rates, 55.7 percent, 54.5 percent, and 44.9 percent, respectively.[43] Among the investigations addressing multiple formats, Chaudhry and Ashoor's study at King Fahd University reported a 58.6 percent availability rate for journal articles, while Harris and Garner found a 54 percent serials availability rate at the University of Western Australia.[44] While these data might lead to a facile assumption of a lower general availability rate for serials (and a confirmation of the longstanding perception that serials cause difficulties), in the final analysis, the number of cases involving serials is too small to allow firm conclusions.

As indicated in appendix A's footnotes, three studies measured the availability rate before and after librarian intervention. (Note that the vast majority of availability studies have not included librarian assistance as a factor in the equation, so only the initial result is included in appendix A's final column.) A librarian's help increased availability at the Cleveland Heights-University Heights library from 52.4 to 60.8 percent (Kuraim's study), at the Cleveland Health Sciences Library from 59.6 to 63.5 percent (Rashid's study), and from 62.8 to 68.5 percent at the King Fahd University of Petroleum and Minerals (Chaudhry and Ashoor's study).[45] These investigations suggest, as one would intuitively think, that librarian assistance does result in somewhat higher availability.

The small number of subject-based availability studies (not tabulated in appendix A) display less variation in their availability rates than was apparent in the known-item searches, although the results were comparable. Overall availability was 56.8 percent (108 of 190 searches) and 62 percent (31 of 50 searches) at William Patterson College and 62.2 percent (153 of 246 searches) at Adelphi University or 60 percent, as reported by Ciliberti et al., if the availability rates at each of Kantor's branches are multiplied by each other.[46]

Following appendix A's format, appendixes B through G summarize availability at each of Kantor's branches, covering respectively, the bibliographic citation, acquisitions, the catalog, circulation, library operations, and the user. While the fractional results occasionally reported in these appendixes may seem counterintuitive, they are easily explained by the location of one volume of a multivolume title, or the use (in a few studies) of a "correction factor" to distribute proportionally among the branches failed searches for which the precise cause could not be determined. Not represented in these appendixes are the investigations that did not employ Kantor's branching technique plus the reports by Zondi as well as Thorne and Whitlatch, where useable data were not presented.[47]

Appendix B shows a consistently high level of availability at the bibliographic branch, ranging from 94.9 to 100 percent. The unweighted mean availability for the nine reported cases is 97.1 percent, while the weighted mean is 97.7 percent (6,990 of 7,154 searches were successful). Failures in this branch were usually due to incorrect citations for the author or the title.

Appendix C tabulates 33 reported cases of availability at the acquisitions branch—the branch most frequently included in studies employing Kantor's methodology. While availability ranged from 66.1 to 97.2 percent, it exceeded 90 percent in the majority of instances (17 of 33) and was more than 80 percent on all but six occasions. It is noteworthy that the two lowest availability rates, 68 percent and 66.1 percent, appear in studies of journal articles by Roberts at East Tennessee State University and Ciliberti et al. at William Patterson College.[48] However, the findings from the other two studies focusing on journal articles, Bachmann-Derthick and Spulock at the University of New Mexico (85.2 percent) and Shaw-Kokot and Varre at the University of North Carolina at Chapel Hill (94.4 percent), are generally consistent with the other results in the appended table.[49] The unweighted mean availability rate for these 33 reported results at the acquisitions branch is 87.1 percent and the weighted mean for 32 cases (all but Revill's 1988 study at the Liverpool Polytechnic Library Service, which reported availability percentages but no raw data for the branches) is 89.6 percent with 19,080 successes among 21,299.9 sought-after items.[50] At the sub-branch level, the predominant reason for failure was the fact the library had not acquired the item. Other causes of acquisitions failure included weeding, cancellation, the sought-after item's location in a different branch, the item having been declared missing, and an "on order" title having not been received.

Appendix D demonstrates a high success rate at the catalog branch, with the reported availability percentages running from 86.4 to 99.6 percent. Indeed, the rate was

more than 90 percent in 20 of 21 instances and more than 95 percent in more than half the cases (11 of 21). The unweighted mean availability rate was 94.7 percent and the weighted mean 96.5 percent (13,328.4 of 13,806). Appendix D's footnotes show that librarian assistance increased availability at this branch at the Cleveland Heights-University Heights Public Library from 93.4 to 98.8 percent (Kuraim's study) and at the Cleveland Health Science Library from 96.9 to 98.6 percent (Rashid's study).[51] Frequent reasons for catalog branch failure were inability to locate the record in the catalog as well as transcription of an incorrect call number or an incorrect location.

Despite early studies identifying circulation as a major barrier to book availability, success rates in the circulation branch, presented in appendix E, exceeded 80 percent in all but four instances, ranging from 66.2 to 100 percent. The circulation branch's unweighted mean availability rate for 31 reported results was 87.9 percent and the weighted mean for 30 cases, excluding Revill's 1988 study, was 87.4 percent (16,899.73 of 19,337.7).[52] It is noteworthy that each of the three investigations of journal articles found high availability rates in this branch: Bachmann-Derthick and Spurlock (96.7 percent), Roberts (97.5 percent), and Ciliberti et al. (100 percent), possibly reflecting the fact that journals are less likely to circulate.[53] As would be expected, the overwhelming majority of circulation failures were attributable to the item being checked out by a patron while another reason was checkout for interlibrary loan purposes.

Appendix F's tabulation of 31 availability rates in the library operations branch shows a range from 65.7 to 98.9 percent with more than half (18) exceeding 90 percent and only four less than 80 percent. This branch's unweighted mean availability rate is 88.8 percent, and the mean weighted rate, for one less case with the 1988 Revill study not counted, stands at 89.9 percent (15,185.6 successes in 16,889.73 attempts).[54] Of library branch failures, major causes of error were missing items, bindery operations, reshelving operations, misshelved items, and items in technical processing.

Appendix G tabulates success rates at the user branch as defined and reported by the original investigators. This branch almost always includes user failure to locate the item on the shelf, but may also include user failure with the bibliographic citation or in the catalog. Ranging from 77.7 to 96.6 percent, the user success rate exceeded 90 percent in 18 of the 32 reported results and was less than 80 percent only once. Both the unweighted means (32 instances) and the weighted means (31 instances with 13,833 satisfactions out of 15,413.8 searches) equal 89.7 percent. A high proportion of user errors was due to the inability to locate the item on the shelf, while another cause of failure was the user not understanding the classification system.

Whereas appendixes B through G summarize success rates in each branch, appendix H analyzes failures by branch, indicating for the various studies the number and percentage of failures attributed to each branch. In order to provide a more accurate estimation of total user failure, appendix H's user column combines the results from appendix B (user bibliographic failure), appendix D (user failure at the catalog), and appendix G (user failure at the shelf or overall user failure). The findings have been calculated by the author from the original researchers' raw data.

Within each branch, appendix H shows wide variation in the proportion of failures attributable to the branch, ranging from 5.9 to 70.4 percent in acquisitions; 0 to 50 percent in circulation; 1.4 to 46.4 percent in library operations; and 6.7 to 42.9 percent for the user. Of 8,991.7 total failures, 25.3 percent were in the acquisitions branch; 27.1 percent in circulation; 19.0 percent in library operations; 24.7 percent by the user; and 3.9 percent were not solely attributable to any of these branches. Disregarding the four investigations (Wood, Bremer, and Saraidaridis; Kuraim; Tamura and Sakai; and Jacobs' fall survey) that did not include all of these branches, the largest portion of failures was caused by the circulation branch in eleven cases; the acquisitions branch in eight cases; and library operations and the user in five cases each.[55] While Mansbridge concluded that circulation and library operations were the largest source of book unavailability in academic libraries, this analysis found that the highest percentages of total failures were in the acquisitions and user branches, and that the circulation and acquisitions branches were the largest cause of failures in the most cases.[56] However, it is apparent from careful review of the data that no branch emerges as the major obstacle to availability.

Appendix I summarizes the results of simulated studies that did not involve actual patrons. Note that Kuraim as well as Chaudhry and Ashoor included both real and simulated components in their research projects.[57] Availability ranged from 13 to 84 percent with an unweighted mean of 61.8 percent and a weighted mean of 60.6 percent (2,010 successes out of 3,315)—figures quite similar to the averages for real studies. One would intuitively anticipate a higher availability rate in a simulated study because user errors would be eliminated and, when a shelflist sample is being used, the items would already have been acquired by the library. Indeed, when the one outlier (the 13 percent availability in Kuraim's sample from the *American Book Publishing Record*) is disregarded, the mean availability rates increase to 68.8 percent (unweighted) and 69.1 percent (weighted with 1,945 of 2,815 on the shelf).[58]

Finally, many of these studies have addressed subsidiary issues beyond the scope of this analysis, such as

- whether user type (student or faculty, full or part-time student, and so on) is a variable influencing the ability to locate items;
- comparison of the performance of different libraries; and

- longitudinal comparisons within a single library.[59]

Summary

This literature review and analysis of more than fifty specific investigations of availability found that the majority used Kantor's branching method (but numerous combinations of branches), were implemented in academic libraries (with some in public and school libraries), and were for known-item searches by actual patrons. About half the studies were conducted in U.S. libraries with the remainder carried out in ten other countries.

There is considerable variation among libraries in overall availability as well as availability in different branches. One of the values of these studies is the identification of reasons for lack of availability in a specific library context. Branch-level analysis shows that availability at each branch only occasionally falls below 80 percent and frequently exceeds 90 percent. Moreover, no branch stands out as the major bottleneck or barrier to availability. This study, in conjunction with Mansbridge's review, demonstrates that, in a print environment, patrons on average find what they are looking for only slightly more than 60 percent of the time. An obvious question concerns what the availability rate would be for electronic resources on the Web or licensed by a library.

A New Definition of Availability

More than a decade ago, Kaske argued that the availability concept was no longer applicable to the then current environment because user needs were often met through externally-procured print items. He advocated the development of a new availability model that would incorporate the searching of multiple libraries and the time the user could wait to obtain the item.[60]

Expanding upon Kaske, this paper maintains that the traditional availability concept reviewed here can be adopted with modification for an electronic environment to measure user success in immediately obtaining sought-after items on the Web or in the proprietary e-resources licensed by a particular library. While many patrons may no longer expect the immediate gratification of finding an item on a library shelf, they may nevertheless expect immediate gratification in locating it electronically. The extent to which they are successful in doing so can serve as an objective, user-centered evaluation and performance measure in the newly emerging electronic environment. Such tests could also identify barriers to user success and facilitate the design of better electronic systems.

A detailed outline of the procedures for conducting an electronic availability study is beyond this paper's scope. As with traditional availability studies, the method would work best for known-item searches by real users, although a simulated study would be a possibility.

Future Research

Future research issues regarding electronic availability studies include

- development of a method for measuring availability of electronic resources;
- determination of an expected standard for availability rates in an electronic environment;
- comparison of electronic availability rates with those reported in the numerous studies conducted in traditional print environments; and
- identification of the major barriers to electronic availability and the relative success rates at the various barriers.

One might hypothesize the following potential barriers or branches: the item is not on the Web; the URL has changed; the item is only available in a proprietary database that is not licensed by the user's library; the maximum licensed number of simultaneous users are logged on; technological failure, such as a server is down or the local power off; and the user is unable to locate an otherwise available item. Many of the issues that have been investigated in typical availability studies could be addressed in an electronic availability study. Examples would include

- comparative availability among different user groups;
- comparative availability among libraries;
- longitudinal comparison within a library;
- the impact of professional assistance to the user upon availability; and
- the impact of policy changes on availability.

Finally, one could design and conduct electronic accessibility tests, modeled on Orr's DDT, to ascertain the time requited to obtain electronic documents.

Conclusions

While availability studies are sometimes viewed as a research approach from the 1970s and 1980s, this literature review has demonstrated their continued use on an international scale throughout the 1990s and into the twenty-first century.[61] Although developed for a print environment, the issues

investigated in an availability study are equally relevant to an electronic environment. Mansbridge contended that an availability study could be used for nonlibrary purposes, such as analyzing the availability of audio-visual equipment in an academic setting.[62] If, at some future point, libraries cease to exist or are radically transformed into now unrecognizable entities, an electronic availability study could still be employed in an academic institution as an objective, user-centered evaluation measure to help assess how effectively faculty and student information needs are being met.

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Appendix A. Known-Item Search Availability Rates in Studies Incorporating Library Patrons

Authors	Pub. Year	Library	Number of Searches	Successes	Percent Available
Wood, Bremer, and Saraidaridis[1]	1980	Cleveland Heights-University Heights Main Public Library	350	132	37.7
Kuraim[2]	1983	Cleveland Heights-University Heights Main Public Library	500	262[3]	52.4
Tamura and Sakai[4]	1983	a Tokyo city library system	68	54	79.4
Abduljalil	1985	Cleveland High School	432	203	47.0
Abduljalil	1985	Shaker Heights High School	432	236	54.6
Ajlan	1985	King Saud U., Saudi Arabia	500	265	53.0
Ajlan	1985	U. of Petroleum and Minerals, Saudi Arabia	500	268	53.6
Kolner and Welch	1985	U. of Illinois Health Sci. Lib.-Peoria	760	447	58.8
Kolner and Welch	1985	U. of Illinois Health Sci. Lib.-Rockford	65	35	53.8
Kolner and Welch	1985	U. of Illinois Health Sci. Lib.-Chicago	60	44	73.3
Ferl and Robinson	1986	U. of California, Santa Cruz	408	250	61.3
Ciliberti et al.	1987	Willaim Patterson College	211	107	50.7 [5]
Revill	1987	9 site libraries of Liverpool Polytechnic Library Services, U.K.	1,458	1,003	68.8
Thompson	1987	Augustana College, 1986 survey	364	258	70.9
Thompson	1987	Augustana College, 1987 survey	235	190	80.9
Knox and Wivell	1988	Macquarie U., Australia Oct. 9, 1986 survey	384	312	81.3 [6]
Knox and Wivell	1988	Macquarie U., Australia Oct. 26, 1986 survey	290	240	82.8
Revill	1988	9 site libraries of Liverpool Polytechnic Library Services, U.K.	2,064	1,548	75
Bachmann-Derthick and Spulock[7]	1989	U. of New Mexico	483	269	55.7
Roberts[8]	1989	East Tennessee U., College of Medicine	297	162	54.5
Rashid	1990	Cleveland Health Sciences Lib.	1,000	596[9]	59.6
Simpson	1990	Pikes Peak Library District, 1988 survey	Not reported	Not reported	66
Simpson	1990	Pikes Peak Library District, 1989 survey	Not reported	Not reported	59
Boekhorst	1992	U. of Munster, Germany	751	254	33.8
Harris and Garner	1992	U. of Western Australia, Australia	589[10]	259	44.0

Authors	Pub. Year	Library	Number of Searches	Successes	Percent Available
Lieshout	1992	Friesland Provincial Lib., Netherlands	401	227.3	56.7
Rehman and Bashir	1993	U. of Punjab, Pakistan	300	124	41.3
Salter	1993	Acton College, U.K	124[11]	86	69.4
Chaudhry and Ashoor	1994	King Fahd U. of Petroleum and Minerals, Saudi Arabia	607[12]	381[13]	62.8
Mitchell, Radford, and Hegg	1994	William Patterson College	61	40	65.6[14]
Rehman, Arif, and Chaudhry	1994	International Islamic U., Malaysia	441	233	52.8
Thorne and Whitlatch[15]	1994	San Jose State U., April 1993	93	61	65.6
Thorne and Whitlatch	1994	San Jose State U., April 1988	499	270	54.1
Thorne and Whitlatch	1994	San Jose State U., April 1983	350	239	68.3
Jacobs	1995	U. of Sussex, U.K., spring 1994 survey	4,103	2,566	62.5
Jacobs	1995	U. of Sussex, U.K., fall 1994 survey	1,585	1,136	71.7
Jacobs and Young	1995	U. of Sussex, U.K.	99,778[16]	75,126	75.3[17]
Zondi	1996	U. of Zululand, South Africa	353	178	50.4
Ciliberti, et al.	1998	Adelphi U.	195	119	61.0[18]
Ciliberti, et al. (journal articles in CD-ROM index)	1998	Adelphi U.	127[19]	57	44.9
Urs and Dominic	1999	Anna U., India	1,254	855	68.2[20]
Urs and Dominic	1999	Bharathiar U., India	870	460	52.9[21]
Urs and Dominic	1999	Bharathidasan U., India	957	544	56.8[22]
Urs and Dominic	1999	Tamilnadu Agricultural U., India-	1,150	766	66.6[23]
Wall and Willaims	1999	Cardiff U., U.K.	480[24]	402	83.8
Shaw-Kokot and Varre[25]	2001	U. of North Carolina-Chapel Hill-Health Sciences Lib.	2,056	1,663	80.9

Notes

1. Although earlier than the 1984 end point for Mansbridge's literature review, this item was not covered in the review.
2. Not covered in Mansbridge's review.
3. There were 262 successes and a 52.4 percent success rate without librarian assistance increasing to 304 and a 60.8 percent success rate with librarian assistance.
4. Not covered in Mansbridge's review.
5. Overall availability was 53.6 percent for 401 searches, when 190 subject searches were considered.
6. Based on calculation from the raw data of the researchers, who reported a 76.8 percent availability.
7. Journal articles.
8. Journal articles.
9. There were 596 successes and a 59.6 percent success rate without librarian assistance increasing to 635 and a 63.5 percent success rate with librarian assistance.
10. Includes books, reserve items, and serial articles.
11. Results for one day for which complete data was reported. 500 forms were distributed during 5 days, but the number of titles sought is not reported. The five-day availability rate was 70 percent.
12. Includes books and journal articles. When 600 simulated items were also considered, availability was 63.8 percent for 1,207 items.
13. There were 381 successes and a 62.8 percent success rate without librarian assistance increasing to 416 and a 68.5 percent success rate with librarian assistance.
14. Overall availability was 64.0 percent for 111 searches, when 50 subject searches were considered.
15. Thorne and Whitlatch also reported results from April 1979 and April 1976 which are not summarized here because they precede this review's 1980 cut-off point.
16. Patron searches in an online public access catalog.
17. Measured whether books searched for in the OPAC were available for circulation without addressing whether the patron actually located them on the shelf.
18. The overall availability rate was 57.9 percent for 568 attempts when subject searches and searches in a CD-ROM journal index are included.
19. Searches for articles in a CD-ROM journal index.
20. Corrected percentage calculated by author from raw data of Urs and Dominic, who reported 66 percent based on multiplying the success rate percentages at the 4 branches.
21. Corrected percentage calculated by author from raw data of Urs and Dominic, who reported 52 percent based on multiplying the success rate percentages at the 4 branches.
22. Corrected percentage calculated by author from raw data of Urs and Dominic, who reported 55 percent based on multiplying the success rate percentages at the 4 branches.
23. Corrected percentage calculated by author from raw data of Urs and Dominic, who reported 64 percent based on multiplying the success rate percentages at the 4 branches.
24. "Short loan" (i.e., reserve) books.
25. Journal articles.

Appendix B. Availability Rates in Kantor's Bibliographic Branch

Authors	Pub. Year	Number of Searches	Successes	Percent Available
Kuraim	1983	500	500	100
Ajlan, King Saud U.	1985	500	491	98.2
Ajlan, Petroleum and Minerals U.	1985	500	476	95.2
Ciliberti et al.	1987	211	206	97.6
Rashid	1990	1,000	949	94.9
Mitchell, Radford, and Hegg	1994	61	59	96.7
Jacobs, spring 1994 survey[1]	1995	4,103	4,038	98.4
Ciliberti et al.	1998	195	191	97.9
Cilberti el al., journal articles	1998	84	80	95.2

Note

1. The term "mis-citations" was used for the bibliographic branch.

Appendix C. Availability Rates in Kantor's Acquisitions Branch

Authors	Pub. Year	Number of Searches	Successes	Percent Available
Wood, Bremer, and Saraidaridis	1980	350	287	82.0
Kuraim	1883	500	486	97.2
Tamura and Sakai	1983	68	63	92.6
Abduljalil, Cleveland Heights	1985	432	389	90.0
Abduljalil, Shaker Heights	1985	432	393	91.0
Ajlan, King Saud U.	1985	491	414	84.3
Ajlan, Petroleum and Minerals U.	1985	476	450	94.5
Kolner and Welch, Illinois-Chicago	1985	760	711.5	93.6
Kolner and Welch, Illinois-Peoria	1985	65	56	86.2
Kolner and Welch, Illinois-Rockford	1985	60	55	91.7
Ferl and Robinson	1986	408	368	90.2
Ciliberti et al.	1987	206	185	89.8
Revill	1987	1,458	1,347.5	92.4
Revill	1988	Not Reported	Not Reported	92.0
Bachmann-Derthick and Spurlock[1]	1989	483.2	411.8[2]	85.2
Roberts[3]	1989	297	202	68.0
Rashid	1990	899[4]	800	89.0
Boekhorst	1992	751	521	69.4[5]
Harris and Garner	1992	589[6]	478	81.2
Lieshout	1992	401	293.5	73.2
Rehman and Bashir	1993	299.4	250.4[7]	83.6
Salter	1993	124[8]	117	94.4[9]
Chaudhry and Ashoor	1994	606[10]	555	91.6[11]
Mitchell, Radford, and Hegg[12]	1994	59	55	93.2
Rehman, Arif, and Chaudhry	1994	441	390	88.4
Jacobs, spring 1994 survey	1995	4,038[13]	3,921	97.1
Ciliberti et al.	1998	191	171	89.5
Ciliberti et al., journal articles	1998	127	84	66.1
Urs and Dominic, Anna U.	1999	1,254	1,195	95.3
Urs and Dominic, Bharathiar U.	1999	870	660	75.9
Urs and Dominic, Bharathidasan U.	1999	957	751	78.5
Urs and Dominic, Tamilnadu U.	1999	1,150	1,078	93.7[14]
Shaw-Kokot and Varre[15]	2001	2,057.30	1,941.3[16]	94.4

Notes

1. Journal articles.
2. Data includes a built-in correction factor for the 31 cases where it was impossible to determine the cause of unavailability.
3. Journal articles.
4. If data for collection development policy failure (i.e., the policy did not call for the book's acquisition), which Rashid used as a separate branch, is included, 800 of 949 attempts were successful for an 84.3 percent availability rate.
5. The availability rate is 68.3 percent if the 8 items received but not cataloged (which Boekhorst used as a separate branch) are considered. 607 (80.8 percent) were acquired by the library system, but not necessarily available in the main library.
6. Includes books, reserve items, and serial articles.
7. Data includes a built-in correction factor for the 4 cases where it was impossible to determine the cause of unavailability.
8. Based on the one day for which complete data was presented of a five-day study.
9. Calculated by the author from Salter's raw data.
10. Includes books and journal articles. The reason for unavailability could not be determined for 1 item in the 607 item sample.
11. This percentage calculated by the author from Chaudhry and Ashoor's raw data, who erroneously reported 88.1 percent as a result of applying Kantor's branches in reverse order.
12. The term "selection" was used for the acquisitions branch.
13. Calculated by the author from Jacobs' raw data.
14. Urs and Dominic reported 93 percent.
15. Journal articles.
16. Data includes a built-in correction factor for 50 failures due to bibliographic error, bad citations, or undetermined reasons.

Appendix D. Availability Rates in Kantor's Catalog Branch

Authors	Pub. Year	Number of Searches	Successes	Percent Available
Wood, Bremer, and Saraidaridis	1980	287	264.7	92.2
Kuraim	1983	486	454[1]	93.4
Abduljalil, Cleveland Heights	1985	389	365	93.8
Abduljalil, Shaker Heights	1985	393	375	95.4
Ajlan, King Saud U.	1985	414	377[2]	91.1
Ajlan, Petroleum and Minerals U.	1985	450	430	95.6
Ferl and Robinson	1986	368	346	94.0
Ciliberti et al.	1987	185	170	91.9
Bachmann-Derthick and Spurlock[3]	1989	411.8	355.6[4]	86.4
Rashid	1990	800	775[5]	96.9
Boekhorst	1992	513	488	95.1
Harris and Garner	1992	478[6]	433	90.6
Lieshout	1992	293.5	272.3	92.8
Rehman and Bashir	1993	250.4	249.4[7]	99.6
Mitchell, Radford, and Hegg	1994	55	54	98.2
Rehman, Arif, and Chaudhry	1994	390	375	96.2
Jacobs, spring 1994 survey	1995	3,921[8]	3,881	99.0
Jacobs, fall 1994 survey	1995	1,529[9]	1,517	99.2
Ciliberti et al.	1998	171	158	92.4
Ciliberti et al., journal articles	1998	80	77	96.3
Shaw-Kokot and Varre[10]	2001	1,941.3	1,911.4[11]	98.5

Notes

1. There were 454 successes and a 93.4 percent success rate without librarian assistance increasing to 480 and a 98.8 percent success rate with librarian assistance.
2. Ajlan reported 374, but analysis of the raw data and reported percentages indicates 377 is the correct number.
3. Journal articles.
4. Data includes a built-in correction factor for the 31 cases where it was impossible to determine the cause of unavailability.
5. There were 775 successes and a 96.9 percent success rate without librarian assistance increasing to 789 and a 98.6 percent success rate with librarian assistance.
6. Includes books, reserve items, and serial articles.
7. Data includes a built-in correction factor for the 4 cases where it was impossible to determine the cause of unavailability.
8. Calculated by the author from Jacobs' raw data.
9. Calculated by the author from Jacobs' raw data.
10. Journal articles.
11. Data includes a built-in correction factor for 50 failures due to bibliographic error, bad citations, or undetermined reasons.

Appendix E. Availability Rates in Kantor's Circulation Branch

Authors	Pub. Year	Number of Searches	Successes	Percent Available
Abduljalil, Cleveland Heights	1985	365	346	94.8
Abduljalil, Shaker Heights	1985	375	359	95.7
Ajlan, King Saud U.	1985	377	343[1]	91.0
Ajlan, Petroleum and Minerals U.	1985	430	336	78.1
Kolner and Welch, Illinois-Chicago	1985	711.5	596.5	83.8
Kolner and Welch, Illinois-Peoria	1985	56	44.33	79.2
Kolner and Welch, Illinois-Rockford	1985	55	47	85.5
Ferl and Robinson	1986	346	284	82.1
Ciliberti et al.	1987	170	155	91.2
Revill	1987	1,347.5	1,187	88.1
Revill	1988	Not Reported	Not Reported	91
Bachmann-Derthick and Spurlock[2]	1989	355.6	343.9[3]	96.7
Roberts[4]	1989	202	197	97.5
Rashid	1990	775[5]	692[6]	89.3
Boekhorst	1992	488	323	66.2
Harris and Garner	1992	433[7]	342	79.0
Lieshout	1992	272.3	229.8	84.4
Rehman and Bashir	1993	249.4	229[8]	91.8
Salter	1993	117[9]	102	87.2[10]
Chaudhry and Ashoor	1994	555[11]	493	88.8[12]
Mitchell, Radford, and Hegg	1994	54	53	98.1
Rehman, Arif, and Chaudhry	1994	375	309	82.4
Jacobs, spring 1994 survey	1995	3,881[13]	3,260	84.0
Jacobs, fall 1994 survey	1995	1,517[14]	1,341	88.4
Ciliberti et al.	1998	158	139	88.0
Ciliberti et al., journal articles	1998	77	77	100.0
Urs and Dominic, Anna U.	1999	1,195[15]	1,049	87.8[16]
Urs and Dominic, Bharathiar U.	1999	660	550	83.3
Urs and Dominic, Bharathidasan U.	1999	751	616	82.0
Urs and Dominic, Tamilnadu U.	1999	1,078	962	89.2
Shaw-Kokot and Varre[17]	2001	1,911.4	1894.2[18]	99.1

Notes

1. Ajlan reported 340 successes in 374 searches, but analysis of the raw data and reported percentages indicates the correct figures are 343 successes in 377 searches.
2. Journal articles.
3. Data includes a built-in correction factor for the 31 cases where it was impossible to determine the cause of unavailability.
4. Journal articles.
5. 775 attempts without librarian assistance, 789 with librarian assistance.
6. There were 692 successes and a 89.3 percent success rate without librarian assistance increasing to 706 and a 89.5 percent success rate with librarian assistance.
7. Includes books, reserve items, and serial articles.
8. Data includes a built-in correction factor for the 4 cases where it was impossible to determine the cause of unavailability.
9. Based on the one day for which complete data was presented of a five-day study.

10. Calculated by the author from Salter's raw data.
11. Includes books and journal articles. Number calculated by author from Chaudhry and Ashoor's raw data.
12. This percentage calculated by the author from Chaudhry and Ashoor's raw data, who erroneously reported 87.4 percent as a result of applying Kantor's branches in reverse order.
13. Calculated by the author from Jacobs' raw data. Jacobs also included items "on order" and declared missing in this branch.
14. Calculated by the author from Jacobs' raw data. Jacobs also included items "on order" and declared missing in this branch.
15. Corrected number calculated by author from raw data of Urs and Dominic.
16. Urs and Dominic reported 87 percent.
17. Journal articles.
18. Data includes a built-in correction factor for 50 failures due to bibliographic error, bad citations, or undetermined reasons.

Appendix F. Availability Rates in Kantor's Library Operations Branch

Authors	Pub. Year	Number of Searches	Successes	Percent Available
Abduljalil, Cleveland Heights	1985	346	243	70.2
Abduljalil, Shaker Heights	1985	359	268	74.7
Ajlan, King Saud U.	1985	343[1]	315	91.8
Ajlan, Petroleum and Minerals U.	1985	336	286	85.1
Kolner and Welch, Illinois-Chicago	1985	596.5	491.5	82.4
Kolner and Welch, Illinois-Peoria	1985	44.33	37	83.5
Kolner and Welch, Illinois-Rockford	1985	47	46	97.9
Ferl and Robinson	1986	284	259	91.2
Ciliberti et al.	1987	155	115	74.2
Revill	1987	1,187	1,122.5	94.6
Revill	1988	Not Reported	Not Reported	97
Bachmann-Derthick and Spurlock[2]	1989	343.9	297.1[3]	86.4
Roberts[4]	1989	197	183	92.9
Rashid	1990	692[5]	643[6]	92.9
Boekhorst	1992	323	315	97.5
Harris and Garner	1992	342[7]	283	82.7
Lieshout	1992	229.8	227.3	98.9
Rehman and Bashir	1993	229	150.5[8]	65.7
Salter	1993	102[9]	92	90.2[10]
Chaudhry and Ashoor	1994	493[11]	438	88.8[12]
Mitchell, Radford, Hegg	1994	53	46	86.8
Rehman, Arif, and Chaudhry	1994	309	300	97.1
Jacobs, spring 1994 survey	1995	3,260[13]	2,939	90.2[14]
Jacobs, fall 1994 survey	1995	1,341[15]	1,257	93.7[16]
Ciliberti et al.	1998	139	127	91.4
Ciliberti et al., journal articles	1998	67	57	85.1
Urs and Dominic, Anna U.	1999	1,049	956	91.1
Urs and Dominic, Bharathiar U.	1999	550	511	92.9
Urs and Dominic, Bharathidasan U.	1999	616	594	96.4
Urs and Dominic, Tamilnadu U.	1999	962	865	89.9[17]
Shaw-Kokot and Varre[18]	2001	1,894.2	1,721.7[19]	90.9

Notes

1. Ajlan reported 315 successes in 340 searches, but analysis of the raw data and reported percentages indicates the correct figures are 315 successes in 343 searches.
2. Journal articles.
3. Data includes a built-in correction factor for the 31 cases where it was impossible to determine the cause of unavailability.
4. Journal articles.
5. 692 attempts without librarian assistance, 706 with assistance.
6. There were 643 successes and a 92.9 percent success rate without librarian assistance increasing to 657 and a 93.1 percent success rate with librarian assistance.
7. Includes books, reserve items, and serial articles.
8. Data includes a built-in correction factor for the four cases where it was impossible to determine the cause of unavailability.
9. Based on the one day for which complete data was presented of a five-day study.
10. Calculated by the author from Salter's raw data.

11. Includes books and journal articles. Number calculated by author from Chaudhry and Ashoor's raw data.
12. This percentage calculated by the author from Chaudhry and Ashoor's raw data, who erroneously reported 89.9 percent as a result of applying Kantor's branches in reverse order.
13. Calculated by the author from Jacobs' raw data. Jacobs created separate branches for "mislaid," temporarily absent," and "slightly misfiled."
14. Calculated by the author from Jacobs' raw data.
15. Calculated by the author from Jacobs' raw data. Jacobs created separate branches for "mislaid," temporarily absent," and "slightly misfiled."
16. Calculated by the author from Jacobs' raw data.
17. Urs and Dominic reported 89 percent.
18. Journal articles.
19. Data includes a built-in correction factor for 50 failures due to bibliographic error, bad citations, or undetermined reasons.

Appendix G. Availability Rates in Kantor's User Branch as Defined and Reported by Original Investigators

Authors	Pub. Year	Number of Searches	Successes	Percent Available
Wood, Bremer, and Saraidaridis	1980	144.5	132	91.3
Kuraim	1983	291[1]	262[2]	90.0
Abduljalil, Cleveland Heights	1985	243	203	83.5
Abduljalil, Shaker Heights	1985	268	236	88.1
Ajlan, King Saud U.	1985	315	265	84.1
Ajlan, Petroleum and Minerals U.	1985	286	268	93.7
Kolner and Welch, Illinois-Chicago	1985	491.5	447	90.9
Kolner and Welch, Illinois-Peoria	1985	37	35	94.6
Kolner and Welch, Illinois-Rockford	1985	46	44	95.7
Ferl and Robinson	1986	259	250	96.5
Ciliberti et al.	1987	115	107	93.0
Revill	1987	1,122.5	1,003	89.4
Revill	1988	Not Reported	Not Reported	92
Bachmann-Derthick and Spurlock[3]	1989	297.1	269[4]	90.5
Roberts[5]	1989	183	162	88.5
Rashid	1990	643[6]	596[7]	92.7
Boekhorst	1992	315	254	80.6[8]
Harris and Garner	1992	283[9]	259	91.5
Rehman and Bashir	1993	150.5	124[10]	82.4
Salter	1993	92[11]	86	93.5[12]
Chaudhry and Ashoor	1994	438[13]	381	87.0[14]
Mitchell, Radford, and Hegg[15]	1994	46	40	87.0
Rehman, Arif, and Chaudhry	1994	300	233	77.7
Jacobs, spring 1994 survey	1995	2,939[16]	2,566	87.3
Jacobs, fall 1994 survey	1995	1,257[17]	1,136	90.4
Ciliberti et al.[18]	1998	127	119	93.7
Ciliberti et al., journal articles[19]	1998	77	68	88.3
Urs and Dominic, Anna U.	1999	956	855	89.4
Urs and Dominic, Bharathiar U.	1999	511	460	90.0
Urs and Dominic, Bharathidasan U.	1999	594	544	91.6[20]
Urs and Dominic 1999, Tamilnadu U.	1999	865	766	88.6[21]
Shaw-Kokot and Varre[22]	2001	1,721.7	1,663[23]	96.6

Notes

1. 291 without librarian assistance, 311 with assistance.
2. There were 262 successes and a 90.0 percent success rate without librarian assistance increasing to 304 and a 97.7 percent success rate with librarian assistance.
3. Journal articles.
4. Data includes a built-in correction factor for the 31 cases where it was impossible to determine the cause of unavailability.
5. Journal articles.
6. 643 attempts without librarian assistance; 657 with assistance.
7. There were 596 successes and a 92.7 percent success rate without librarian assistance increasing to 657 and a 96.7 percent success rate with librarian assistance.
8. Calculated by author from the original researcher's raw data, who reported 86.2 percent.
9. Includes books, reserve items, and serial articles.
10. Data includes a built-in correction factor for the four cases where it was impossible to determine the cause of unavailability.
11. Based on the one day for which complete data was presented of a five-day study.
12. Calculated by the author from Salter's raw data.
13. Includes books and journal articles. Number calculated by author from Chaudhry and Ashoor's raw data.
14. This percentage calculated by the author from Chaudhry and Ashoor's raw data, who erroneously reported 90.6 percent as a result of applying Kantor's branches in reverse order.
15. The term "retrieval" was used for the user at the shelf branch.
16. Calculated by the author from Jacobs' raw data.
17. Calculated by the author from Jacobs' raw data.
18. Used term "retrieval" for this branch.
19. Used term "patron retrieval" for this branch.
20. Urs and Dominic reported 91 percent.
21. Urs and Dominic reported 88 percent.
22. Journal articles.
23. Data includes a built-in correction factor for 50 failures due to bibliographic error, bad citations, or undetermined reasons.

Appendix H. Analysis of Failures in Kantor's Branches (All User Failures Combined)

(The percentage of total failures in the study attributed to each branch is indicated in parentheses)

Authors	Pub. Year	Acquisitions	Circulation	Library	User	Total
Wood, Bremer, and Saraidaridis	1980	63 (28.9%)	[1]		34.8 (16.0%)	218
Kuraim	1983	14 (5.9%)	[2]		61 (25.6%)	238
Tamura and Sakai	1983	5 (35.7%)[3]	[3]			14
Abduljalil, Cleveland Heights	1985	43 (18.8%)	19 (8.3%)	103 (45.0%)	64 (27.9%)	229
Abduljalil, Shaker Heights	1985	39 (19.9%)	16 (8.2%)	91 (46.4%)	50 (25.5%)	196
Ajlan, King Saud U.	1985	77 (32.8%)	34 (14.5%)	28 (11.9%)	96 (40.9%)	235
Ajlan, Petroleum and Minerals U.	1985	26 (11.2%)	94 (40.5%)	50 (21.6%)	62 (26.7%)	232
Kolner and Welch, Illinois-Chicago	1985	48.5 (15.5%)	115 (36.7%)	105 (33.5%)	44.5 (14.2%)	313
Kolner and Welch, Illinois-Peoria	1985	9 (30.0%)	11.67 (38.9%)	7.33 (24.4%)	2 (6.7%)	30
Kolner and Welch, Illinois-Rockford	1985	5 (31.3%)	8 (50.0%)	1 (6.25%)	2 (12.5%)	16
Ferl and Robinson	1986	40 (25.3%)	62 (39.2%)	25 (15.8%)	31 (19.6%)	158
Ciliberti et al.	1987	21 (20.2%)	15 (14.4%)	40 (38.5%)	28 (26.9%)	104
Revill	1987	110.5 (24.3%)	160.5 (35.3%)	64.5 (14.2%)	119.5 (26.3%)	455
Bachmann-Derthick and Spurlock	1989	71.4 (33.4%)	11.7 (5.5%)	46.8 (21.9%)	84.3 (39.4%)	214[4]
Roberts	1989	95 (70.4%)	5 (3.7%)	14 (10.4%)	21 (15.6%)	135
Rashid	1990	149[5] (36.9%)	83 (20.5%)	49 (12.1%)	123 (30.4%)	404
Boekhorst	1992	238 (47.9%)[6]	165 (33.2%)	8 (1.6%)	86 (17.3%)	497
Harris and Garner	1992	111 (33.6%)	91 (27.6%)	59 (17.9%)	69 (20.9%)	330
Lieshout	1992	107.5 (61.9%)	42.5 (24.5%)	2.5 (1.4%)	21.2 (12.2%)	173.7
Rehman and Bashir	1993	49 (27.8%)	20.4 (11.6%)	78.5 (44.6%)	27.5 (15.6%)	176[7]
Salter	1993	7 (18.4%)	15 (39.5%)	10 (26.3%)	6 (15.8%)	38
Chaudhry and Ashoor	1994	51 (22.6%)	62 (27.4%)	55 (24.3%)	57 (25.2%)	226[8]
Mitchell, Radford, and Hegg	1994	4 (19.0%)	1 (4.8%)	7 (33.3%)	9 (42.9%)	21
Rehman, Arif, and Chaudhry	1994	51 (24.5%)	66 (31.7%)	9 (4.3%)	82 (39.4%)	208
Jacobs, spring 1994 survey	1995	117 (7.6%)	621 (40.4%)	321 (20.9%)	478 (31.1%)	1,537
Jacobs, fall 1994 survey	1995	[9]	176 (39.2%)	84 (18.7%)	133 (29.6%)	449
Ciliberti et al.	1998	20 (26.3%)	19 (25.0%)	12 (15.8%)	25 (32.9%)	76
Ciliberti et al., Journal articles	1998	43 (61.4%)	0 (0%)	10 (14.3%)	16 (22.9%)	70[10]
Urs and Dominic, Anna U.	1999	59 (14.8%)	146 (36.6%)	93 (23.3%)	101 (25.3%)	399
Urs and Dominic, Bharathiar U.	1999	210 (51.2%)	110 (26.8%)	39 (9.5%)	51 (12.4%)	410
Urs and Dominic, Bharathidasan U.	1999	206 (49.9%)	135 (32.7%)	22 (5.3%)	50 (12.1%)	413
Urs and Dominic, Tamilnadu U.	1999	72 (18.8%)	116 (30.2%)	97 (25.3%)	99 (25.8%)	384
Shaw-Kokot and Varre	2001	116 (29.5%)	17.2 (4.4%)	172.5 (43.9%)	88.6 (22.5%)	393[11]
Total Number		**2,277.9**	**2,437.97**	**1,704.13**	**2,222.4**	**8991.7[12]**
Total Percentage		**25.3%**	**27.1%**	**19.0%**	**24.7%**	

Notes

1. Circulation and library operations were combined into a single branch accounting for 120.2 failures, 55.1 percent of total.
2. Circulation and library operations were combined into a single branch accounting for 163 failures, 68.5 percent of total.
3. Circulation, library operations, and the user were combined into a single branch accounting for 9 failures, 64.3 percent of the total.
4. This row adds to 214.2 due to the correction factor used by Bachmann-Derthick and Spurlock, but the actual number of failed searches was 214.
5. Total for collection development and acquisitions branches combined.
6. Includes titles received but not cataloged, which Boekhorst used as a separate branch.
7. This row adds to 175.4 due to the correction factor used by Rehman and Bashir, but the actual number of failed searches was 176.

8. This row adds to 225 because the cause of 1 unsuccessful search could not be determined, but the actual number of failed searches was 226.
9. The bibliographic and acquisitions branches were combined, accounting for 56 failures, 12.5 percent of the total.
10. The row adds to 69 because 1 failure at a "library retrieval" branch is included in this total.
11. This row adds to 394.3 due to the correction factor used by Shaw-Kokot and Varre, but the actual number of failed searches was 393.
12. There were 8,991.7 failures, including 350.2 (3.9 percent of total failures) that could not be directly attributed to one of the four main branches (usually due to combining branches).

Appendix I. Availability Rates in Simulated Studies Not Involving Actual Patrons

Authors	Pub. Yr	Library	Number of Searches	Successes	Percent Available
Kuraim	1983	Cleveland Heights-University Heights Main Public Library	500[1]	65	13.0
Kuraim	1983	Cleveland Heights-University Heights Main Public Library	500[2]	321	64.2
Stelk and Lancaster	1990	University of Illinois, Undergrad. Library	450[3]	360	80.0
Stelk and Lancaster	1990	University of Illinois, Undergrad. Library	450[4]	316	70.2
Steynberg and Rossouw	1993	University of Cape Town, South Africa	307[5]	213	69.4
Chaudhry and Ashoor	1994	King Fahd University of Petroleum and Minerals, Saudi Arabia	300[6]	138	46.0
Chaudhry and Ashoor	1994	King Fahd University of Petroleum and Minerals, Saudi Arabia	300[7]	252	84.0
Chandler	1998	Cameron Village Regional Library[8]	508[9]	345	67.9

Notes

1. Sample from the last five volumes of the *American Book Publishing Record*.
2. A shelf list sample.
3. A shelf list sample.
4. A sample of items previously charged out.
5. Citations to journal articles published by South African biomedical researchers.
6. 200 books from *Scientific and Technical Books* and 100 serials from *Magazines for Libraries*.
7. A shelf list sample.
8. In the Wake County Public Library system in North Carolina.
9. A sample of recently circulating materials.