

# A Study of the Impact of Introducing an Online Subject Catalog at the New York State Library

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## Introduction

THE COMPUTERIZATION OF catalog services in research libraries is generally regarded as both inevitable and desirable. Many major research and academic libraries have already installed computerized public catalog systems to replace more traditional catalog systems such as card, book, and microform catalogs; in most libraries where such changes have not yet been made, active planning for them is in progress.

The administrative imperatives for computerizing a library's public catalog are usually quite clear—the prospect of providing catalog service with fewer staff members, lower unit costs for cataloging, faster input of new catalog data, faster reorganization or modification when required; the ability, in principle, to interact with broader computer networks and consortia; and the ability to extend catalog access opportunities beyond the physical confines of the library building. A host of online public catalog systems are emerging that, to different degrees and in somewhat different ways, address these very important goals of computerization.<sup>1</sup>

But another important administrative consideration—beyond trying to hold down the costs of catalogs and increase their accessibility—is that of maintaining the quality of the catalog service provided to

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patrons. It is usually assumed as obvious that a new, computerized catalog system will serve the library's users at least as well as the traditional catalog it supplants, and probably better. But not much research has been done as yet to determine the accuracy of such assumptions nor the circumstances under which they may be true or false. Indeed, much of the evaluative research that has been performed on the online catalog systems to date has been, in a sense, marketing research—intended to identify the various product configurations that are available and to determine their acceptance by purchasers and initial users. The measurement and comparisons of actual performance of alternative catalog systems are much more difficult to achieve; such objectives have tended to be secondary at best.

What research has been done to determine the service quality of computerized public catalogs has usually involved questionnaire surveys or interview surveys of catalog users undertaken only *after* installation of the new systems. Studies of this kind that relate to online subject catalogs in particular have been conducted and also reviewed by Markey.<sup>2</sup> They have established several interesting findings. For example, there is wide agreement that users tend to accept the new online catalogs easily or enthusiastically. There is much evidence that online catalogs are used somewhat differently from traditional catalogs. In particular, the proportion of searches that are subject searches (as opposed to author or title searches) seems to be much higher in general for online catalogs than for traditional catalogs although wide ranges have been observed for both types.

But on the whole there is still very little knowledge available about the qualitative and, especially, the quantitative performance of online catalogs. There is a dearth of information on such vital questions as: whether and how computerization of the catalog system affects the success rate of catalog searches, duration of catalog searches, user tendencies to utilize or avoid the catalog; and how changes in specific features of the catalog system are reflected in the use and users of the system.

Probably the best approach to these unanswered questions is the impact study—i.e., research in which the use of a system or service is investigated before the system is changed as well as after it has been changed, in order to identify as directly as possible whatever impacts the change may produce. The work reported here is believed to be the first impact study of the introduction of online subject searching capability in the public catalog of a large research library.

The opportunity to undertake a potentially significant impact study of computerization of a public catalog presented itself in 1982 at

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the New York State Library (NYSL). The NYSL is a major research library and is the largest of the state libraries in the United States.<sup>3</sup> Its rich collections and its many information services serve not only state governmental agencies but also various state and national library networks and individual visitors of all kinds.<sup>4</sup> The NYSL's public catalog is a hybrid system—i.e., it is partially on computer and partially on microfiche. A computerized author/title search system using truncated keys has been available since 1978 when NYSL moved to new quarters in the Cultural Education Center at Albany's Empire State Plaza. The NYSL's 3.2 million card catalog was not moved to the new building and ceased to be the public catalog. In its place a microfiche catalog was provided for public use which can be accessed by subject headings as well as by author and title terms; the microfiche catalog consists of separate microfiche series and supplements for general monographs, government documents, and serials. Numerous online terminals and microfiche viewers are in place for visitors' use throughout the public areas of NYSL.

A lengthy in-house effort to design and develop a computerized subject access system reached its objectives in 1982. The NYSL scheduled installation of the new system for public use in mid-1983. The existing microfiche catalog would be maintained in parallel with the online system at least for some length of time. Thus there was an opportunity for a before-and-after impact study; and there would also be the opportunity to compare uses of two different subject catalog systems that would be available simultaneously to NYSL visitors.

The authors had worked together previously in connection with a series of research investigations of the visitor population at NYSL.<sup>5</sup> It was apparent that the same kind of research method that had been used to study NYSL's general visitor population could be adapted readily for application in a more focused study of NYSL's catalog users. Partial support for this new study was provided by the Council on Library Resources through a grant from its program to assist faculty/librarian cooperative research. Information collection activity extended from January 1983 through May 1984. A project report was submitted in late 1984.<sup>6</sup> Data analysis activity has continued since that time.

### **Objectives**

The aim of this research was to detect and to measure such impact on use and users at NYSL as might result from the addition to the NYSL public catalog of a new online subject searching capability. A number

of particular aspects of catalog use were selected *a priori* to be observed for possible indications of impact and included:

- the amount and distribution of catalog use instances;
- the proportion of catalog searches that are subject searches;
- the duration of catalog searches;
- the success rate of catalog searches;
- the use of librarian assistance with catalog searches by visitors;
- user preferences for online *v.* microfiche subject catalogs;
- motivation of catalog searches; and
- user status or affiliation.

The research involved collecting relevant information at NYSL during several week-long sampling periods that both preceded and followed the mid-1983 change in the public catalog and then comparing data from the different periods for indications of impact and for indications of the magnitude and permanence of the impacts detected.

## Methodology

### *Research Design*

The research plan is very simple in concept: First, establish a “baseline” profile of catalog use factors by studying catalog use before the system is changed. Next, repeat the same measurements shortly after the new catalog system has been introduced, and repeat them once more several months later. Finally, compare data in the three sets of measurements to determine whether there have been apparent impacts from the catalog change, and also to determine for each impact whether it has persisted or diminished with the passage of time. A discussion of the features of this research plan was presented shortly after the project got underway.<sup>7</sup>

The period of time selected for the baseline study and the two follow-up studies was one week for each. Care was exercised to try to select normal weeks, without holidays and without unusual scheduled events that would be expected to perturb the level or nature of NYSL use by visitors. The NYSL is open from 9 A.M. to 5 P.M. on weekdays only; a week of study thus requires observation only during normal business hours.

The data collection activity was basically the same in each study week. It was a coordinated blend of two research techniques: (1) the counting of total visitor traffic by unobtrusive observation, and (2) the interviewing of a sample of visitors at frequent preset intervals through-

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out the test period. This coordinated method was used very successfully in the earlier studies of the NYSL user population.<sup>8</sup> In the previous studies, visitors were counted by an observer as they were leaving NYSL (there is only one portal for visitors), and the interviews were conducted by a second researcher with the visitors who happened to exit immediately after each fifteen-minute interval on the clock. Since staff members often use the same portal as visitors but were not to be counted by the traffic observer, the interviewing served as an important check on the accuracy of the observer's discrimination and provided the basis for adjusting the observer's tally to make it more accurate. Interviewing also provided quantitative data about characteristics of the visitor population and their use of NYSL. The traffic data provided a profile that served as the basis for normalizing the quantitative interview summaries with weighting factors to adjust for mismatches in the relative numbers of visitors and numbers of interviews throughout the day, so that no activities peculiar to any particular time of day would be over- or underemphasized in the results.

In the present study, the same coordinated blend of traffic counting and interviewing was employed; but it was applied this time to *two* different populations:

1. The NYSL visitor population—exactly the same population addressed in previous NYSL studies. This was considered necessary because the day-to-day or week-to-week volume and composition of visitor traffic may fluctuate a good deal, and one should be able to screen out the effects of such “irrelevant” fluctuations when seeking impacts that are attributable to the change in the catalog system.
2. The users of the NYSL public catalog were the second population studied. This is not the same as the visitor population since not all visitors are catalog users nor is it exactly a subset of the visitor population, since a substantial portion of the public catalog use at NYSL is by members of the NYSL staff. Staff members also have online catalog terminals and microfiche catalogs and viewers for their exclusive use at work stations in nonpublic areas; this use was not studied.

The observation and recording of traffic is a rather simple matter in the case of the visitor population but more difficult for the public catalog user population. For the counting of visitor traffic, an observer was stationed just outside the single exit portal from NYSL's public area; from that point all exiting visitors could be observed. Traffic was registered on two hand-held counters, one for females, one for males. Counter readings were entered on a tally sheet at fifteen-minute inter-

vals. The traffic observer also recorded for every fifteen-minute interval the number of visitor interviews that had been attempted by his or her research teammate, the number of refusals (if any), and the number of staff members mistakenly approached for interviews (if any).

In the case of observing public catalog user traffic, the observer's task was to keep a minute-by-minute record of any occupancy of each public catalog access device—that is, of each of the microfiche viewers and online catalog terminals provided for use by visitors. At NYSL, most of these public access devices are grouped in close proximity in the north wing, and the few remaining devices are grouped in the south wing. To minimize personnel needs for the research, it was decided to observe catalog traffic and use at only the larger of these two groupings. Thus one traffic observer kept track, in the baseline study, of eight microfiche viewers and four online terminals; this configuration was changed to six microfiche viewers and ten online terminals during the follow-up studies. Using a simple form with separate columns for the individual access machines and rows for each minute of the hour, the observer mapped each use session by drawing a vertical trace for each minute the machine was in use and by adding code symbols to indicate if the user was a female visitor, a male visitor, or a staff member, or to indicate whether there was staff-visitor interaction during the use session, and to flag the sessions that resulted in catalog user interviews.

The preset quota of library exit interviews to be attempted was one interview during each fifteen-minute interval before noon, then two per interval until the final half hour of the day, then three in the final two intervals. This schedule was chosen to correspond more or less to the hourly variations in visitor exit traffic that had been clearly established in earlier research at NYSL. On the other hand, the quota of catalog user interviews to be attempted was set at a constant one interview per fifteen-minute interval because there was no previously determined basis for a more complex sampling pattern. For consistency, this simplistic quota was maintained in the follow-up study weeks. The person to be interviewed was thus the first person to leave a catalog access device after the start of a fifteen-minute interval.

Interviews for both populations usually took only one or two minutes to complete. A single-page questionnaire designed to fit into a clipboard was used for recording the results of the interview. The questionnaires—different for the two populations to be interviewed—were designed with the help of comments and suggestions from NYSL staff members. The exit interview questions elicited information about the frequency of the visitor's use of NYSL; about the length, motivation, and success of the visit just ended; about the use or nonuse of the public

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catalog during the visit, the wing of the library in which any catalog use occurred; about the use or nonuse of staff assistance; and about the visitor's affiliation or status. The catalog user interview questions were chosen to gain information about previous use of the library and the catalog system; about the motivation of the search just ended and the approach used; about the perceived success of the search; and about the user's affiliation.

### *Implementation*

The new online subject catalog was made available for public use during the late summer of 1983. Two microfiche viewers were removed and six new online terminals were installed in the observed public area. All of the online terminals are of identical manufacture. While all are capable of being switched by knowledgeable NYSL staff members to function as either a subject terminal or an author/title terminal, NYSL chose not to instruct visitors on this switching capability; instead, each online terminal was designated and labeled as either a subject or an author/title terminal. The usual configuration during the follow-up study weeks was five subject terminals and five author/title terminals. The research team kept careful track of the designation of each terminal under observation since there were occasional changes from day to day or within a day.

The NYSL's online catalog system was designed for two levels of search sophistication,<sup>9</sup> but only the menu-driven level 1 was made available through the public catalog online search terminals during the period of this research. At this level, a subject search is performed in a series of steps that are prompted by messages on the screen. The subject search may be the specification of one or more words that are presumed to be in a subject heading (multiple words are automatically AND-combined), or the specification may be the registry number of a desired subject heading. The response to the first is a list of subject headings that match the input terms, with the number of items cataloged under each heading. A list of titles under any of these headings may then be called up. The response to the second type of subject search is the list of titles cataloged under that subject heading. In either case, when there is only a single title in the list, the full record is displayed; otherwise the full bibliographic records may be called up one at a time from the title list. Bound printouts of the full list of NYSL subject headings, in alphabetical order, are kept on a table in the center of the public catalog area for use in identifying valid headings and their associated registry numbers. (It should be added that the NYSL online system has more

recently been upgraded to permit subject searching for words in the titles of cataloged materials, as well as for words in subject headings.)

Printed multipage flip displays containing instructions on the use of NYSL's catalog system are provided on the table close to each access device. Visitors may ask for librarian assistance at an information desk or at any of the three (originally four during the baseline study) work stations for specialized parts of the collection that surround the public catalog area and are manned through much or all of each day.

The baseline study week began on Monday, 18 April 1983. A sudden snowstorm disrupted the region the next day making the Tuesday and Wednesday data unusable. As a result, data were collected for Tuesday and Wednesday of the following week and used instead. The first follow-up study began on November 28th and was uninterrupted. The second follow-up was also uninterrupted—it began on 30 April 1984 which was close to the anniversary of the baseline study. In total, thirty-six people were involved in the data-collection activities at one time or another during this research. Most of these people were master's program students from the School of Information Science and Policy of the State University of New York at Albany. A substantial proportion were already aware of both the objectives and the research methodology from assigned reading and class discussions in some of their school courses. Participants received both written instructions and initial close supervision; there were no problems with performance in data collection. Aside from the snowstorm already mentioned there were no major occurrences that would affect the comparability of the three study weeks. The few minor incidents that occurred were duly noted but were considered negligible and not warranting any special adjustments in data analysis. Such incidents, few and randomly distributed, included episodes of computer slowdown or stoppage and a fire drill that emptied the library for several minutes. During the first follow-up week, there was one afternoon when no data collectors were available to count and interview the exiting library visitors. This was handled in the data analysis by assuming that the afternoon traffic count had remained in the same proportion to the weekly average as had the morning count for the day and by treating the interview results from the other four days as though they represented the entire week.

### *Analysis*

The initial analysis of traffic data and interview data for the visitor population was carried out in the manner described in previous studies of NYSL users. It thus included the adjustment of traffic counts to correct for miscounting of some staff members as visitors, and included

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the weighting of interview results in order to reflect the relative amount of library use at the time of interviewing. The adjusted average counts of visits per day during the three study weeks were 344.8, 316.6, and 315.6 respectively. The numbers of exit interviews with visitors completed during the respective study weeks were 264, 218, and 273 (see table 1, no. 1).

In analyzing the data on public catalog use, it was judged unnecessary to weight the interviews on the basis of an hourly traffic pattern. No well-defined pattern of catalog use traffic could be discerned other than sparse traffic at the extremes of the day (when interviews were correspondingly sparse). During the baseline week and the first follow-up week it was noticed that use of the catalog surged immediately after the lunch hour, but this surge was not observed in the second follow-up week. Average daily catalog use instances observed during the three study weeks were 221.6, 201.8, and 162.2. The numbers of interviews with catalog users completed in these weeks were 158, 147, and 150 (see table 1, no. 2).

The mapping technique that was employed for recording minute-by-minute use of each of the public catalog access devices (microfiche viewers and online terminals) was devised in part to permit analysis of queuing problems in the public catalog area. As it turned out, no queuing problems developed. There were enough devices available to accommodate all would-be users and uses during all hours of each study week. Another purpose of the mapping was to permit determination of the lengths of the catalog use sessions. This was accomplished by noting the number of minutes of occupancy in the demarcation of each use session as mapped for each access device observed.

Some results of analysis of data from this research are given in the accompanying tables. These results are discussed later as they relate to specific questions regarding the impact of the online subject catalog on public catalog use.

### **Impact Questions Investigated**

It is not possible in an impact study to investigate all of the consequences of a system change that can be conjectured—the conceivable impacts of a change are infinite. In this study, the many types of data collected will, in theory, allow for the investigation of hundreds, even thousands, of impact possibilities—all of the combinations of data types that may be examined and compared from one study week to the next. But even this subset of possibilities will probably never be examined fully because of the large and unreasonable effort that would be needed.

TABLE 1  
MEASUREMENTS OF LIBRARY AND  
CATALOG USE, AND SAMPLING LEVELS

<i>Measurements</i>	<i>Survey Weeks</i>		
	<i>Baseline</i>	<i>First</i>	<i>Follow-up Second</i>
1. Library visits and exit interviews			
a. Library visits during survey week	1724	1583	1578
b. Average library visits per day	344.8	316.6	315.6
c. Exit interviews during survey week	264	218	273
d. Average exit interviews per day	52.8	43.6	54.6
e. Percentage of library visits in which exit interviews were conducted	15.3%	13.8%	17.3%
f. Percentage of library visits in which there was use of the catalog	28%	33%	38%
2. Public catalog uses and interviews			
a. Public catalog uses observed during survey week <sup>1</sup>	1108	1009	811
b. Average public catalog uses observed per day	221.6	201.8	162.2
c. Catalog user interviews during survey week	158	147	150
d. Average catalog user interviews per day	31.6	29.4	30
e. Percentage of catalog users interviewed	14.2%	14.6%	18.5%
3. Visits to library observed areas			
a. During survey week	1425	1242	1223
b. Average per day	285	248.4	244.6
c. Percentage of observed-area visits in which exit interviews were conducted	18.5	17.6	22.3

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TABLE 1 (cont.)

<i>Measurements</i>	<i>Survey Weeks</i>		
	<i>Baseline</i>	<i>First</i>	<i>Follow-up Second</i>
4. Public catalog uses in observed area during survey week			
a. By visitors	590 (53%)	627 (62%)	584 (72%)
b. By staff	518 (47%)	382 (38%)	227 (28%)
c. Total	1108	1009	811
5. Public catalog uses per observed area visit			
a. By visitors	0.414	0.505	0.478
b. By staff	0.364	0.308	0.186
c. Total	0.778	0.813	0.663

<sup>1</sup>Observed area did not include all points of public catalog access.

In order to reduce the data analysis task in this research to reasonable proportions, it was necessary to establish priorities. These took the form of questions that seemed most worth answering regarding possible impacts of the catalog change. Seven high-priority questions were formulated and then answered on the basis of the data collected. Other questions may be addressed in the future. The impact questions that are dealt with here are:

1. After the new online subject searching capability was introduced in the NYSL public catalog did it attract much use?
2. After the introduction of the online subject searching capability, was there a change in the overall volume of use of the public catalog by visitors?
3. Was the introduction of online subject searching capability followed by a change in the proportion of public catalog use instances that are subject searches?
4. Has the availability of online catalog access for subject searches as well as author/title searches resulted in the rejection of the older microfiche catalog by public catalog users?
5. Following introduction of the online subject catalog, was there a marked change in the average amount of time spent per instance of use of the public catalog?
6. Was there a change in the success rate of public catalog searches after introduction of the online subject catalog?
7. After introduction of the online subject catalog was there a change in the extent to which visitors made use of librarian assistance in conducting their catalog searches?

## Findings

### *Acceptance of the New Online Subject Catalog*

In the sense of attracting use, the impact of the catalog change has been immediate, substantial, and apparently enduring. In the first follow-up study after its introduction, the online subject catalog's use was 22.9 percent of all instances of public catalog use (see table 2). In the second follow-up study its use had risen to 28.6 percent. In other words, despite the continued availability of the previous catalog alternatives, the online subject catalog attracted and has held about one-fourth of the public catalog traffic.

TABLE 2  
USE OF ALTERNATIVE CATALOGS AS  
PERCENT OF ALL PUBLIC CATALOG USE

Catalog Used	Survey Weeks		
	Baseline	First	Second
Online catalog			
Author/Title access,			
visitor use	18.1	20.0	21.6
staff use	23.3	21.6	15.6
total use	41.4	41.6	37.2
Subject access,			
visitor use	—	16.2	23.9
staff use	—	6.7	4.7
total use	—	22.9	28.6
Microfiche catalog,			
visitor use	35.0	26.0	26.6
staff use	23.6	9.5	7.6
total use	58.6	35.5	34.2
total, subject searches	25.8	16.3	16.4
	(44%)	(46%)	(48%)
total, author/title search	32.8	19.2	17.8
	(56%)	(54%)	(52%)

### *Volume of Use of the Public Catalog*

The introduction of online subject searching capability apparently had an impact on the overall volume of use of the public catalog. This impact seems fairly complex. The most obvious, but probably least significant, change was that the number of instances of public catalog use was lower in the first follow-up week than in the baseline week, and lower still in the second follow-up week (see table 1, no. 2). However, this can be accounted for by obvious factors other than the catalog

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change. There was a decline in visitor traffic from one study period to the next that would be expected to cause a corresponding decline in use of the public catalog (see table 1, no. 1). Also there was a decline in the use of the public catalog by members of the library staff that must be adjusted for in order to determine whether there was an impact on visitors' use of the public catalog (see table 1, no. 4).

A preferred measure of the volume of catalog use would be the ratio of instances of use to the number of visits made to the area of the library that was studied. The number of visits to the observed area (see table 1, no. 3) was calculated using both direct measures (exit traffic counts) and indirect measures (information on the library area used as obtained from exit interviews). When the count of visitors' use of the catalog is related to this measure of visitor traffic, it is found that the number of visitors' catalog use instances per visit rose from 0.414 in the baseline week to 0.505 in the first follow-up and then dropped a little to 0.478 in the second follow-up. This suggests that the impact of introduction of the online subject catalog was to produce a substantial and lasting increase in the degree that visitors use the public catalog.

Further analysis reveals that the increased public catalog use by visitors resulted from the involvement of a larger proportion of visitors in catalog use, rather than from more frequent catalog use by the original proportion of users. The percentage of library visits in which there was any catalog use rose from the baseline figure of 28 percent to 33 percent and then to 38 percent (see table 1, no. 1), while the average of the number of catalog uses observed per visit involving any catalog use was practically unchanged from baseline to first follow-up (1.46 and 1.52), and actually dropped (to 1.26) in the second follow-up.

The use of the public catalog by library staff dropped precipitously and increasingly after the introduction of online subject search capability. This drop is clear from the absolute number of staff uses of the public catalog observed in the study weeks (518, 382, and 227 respectively) and also in the ratio of staff searches to library visits (0.364, 0.308, and 0.186 respectively). The reason for this drop has not been established. It may reflect a shift in staff assignments (one of the four manned service stations in the observed wing was closed in mid-project and several staff members were shifted to the other wing); or it may reflect a shift in choice of access points for staff searches, with increased use of staff workstation terminals and viewers instead of the public catalog access devices; or it may reflect a genuine drop in use of the catalog by staff for some unknown reason. The data seem to rule out the further possibility that staff use of the public catalog decreased after the catalog change because visitors were now doing searches for themselves that had for-

merly been done for them by the staff. Measured as the change after the baseline study in instances of use per visit, the increase in the first follow-up of visitor use (0.091) is enough to explain the staff use decrease (0.056), but this explanation fails in the second follow-up (0.064 net increase *v.* 0.178 net decrease).

#### *Proportion of Subject Searches*

Another impact of the introduction of online subject searching capability was to increase the proportion of subject searches performed at the public catalog. In the baseline week, 27 percent of all instances of public catalog use—as determined from interviews with catalog users—were subject searches; in the first follow-up the subject search percentage was 41 percent; in the second follow-up it was 49 percent (see table 3). This affirms or supports previous findings reported and cited by Markey.<sup>10</sup>

TABLE 3  
DISTRIBUTION OF CATALOG USE BETWEEN SUBJECT SEARCHES  
AND AUTHOR/TITLE SEARCHES

<i>Public Catalog Users</i>	<i>Survey Weeks</i>					
	<i>Baseline</i>		<i>Follow-up</i>			
	<i>Subj.</i>	<i>A/T</i>	<i>Subj.</i>	<i>A/T</i>	<i>Subj.</i>	<i>A/T</i>
All public catalog users	27%	73%	41%	59%	49%	51%
Visitors	31.5%	68.5%	49.5%	50.5%	49.5%	50.5%
Staff	21%	79%	17.5%	82.5%	45%	55%

As in the case of impact on the volume of catalog use, the impact on proportion of subject searching is more complex than the gross figures suggest. These figures do not reflect the increasingly heavy representation of visitors (as opposed to staff) in the use of the public catalog after the catalog change. Looking at public catalog use by visitors only, about one-third of their use instances in the baseline week were subject searches; this increased to one-half in the first follow-up and remained at that new level. For staff the baseline proportion of subject searches at the public catalog was about one-fifth. It remained almost the same (decreased very slightly) in the first follow-up, and then more than doubled to about 45 percent in the second follow-up. These separate analyses for visitors and staff (particularly) should be regarded as only approximate because of the relatively small numbers of interviews on which they are based.

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From figures provided in tables 1 and 3, one can calculate that the average number of subject searches performed per day in the observed area was sixty during the baseline study and then rose to eighty-three and seventy-nine in the two follow-up weeks. Considering that this absolute increase in the number of subject searches occurred despite decreases in the number of library visits and catalog users present, this is perhaps the most dramatic indication of the substantial and lasting impact of the introduction of online subject searching capability on the proportion or frequency of subject searching.

### *Use of Alternative Catalogs*

Introduction of the online subject catalog had the impact of diminishing the use of the older microfiche catalog but not an impact on its displacement as an acceptable public catalog. The percentage of catalog use instances involving the microfiche catalog was 58.6 percent in the baseline week and diminished to 35.5 percent and 34.2 percent in the follow-up weeks (see table 2). This drop in microfiche catalog use was substantial and enduring. It reversed the prechange dominance of microfiche over online (author/title only) use. On the other hand, it is clear that the microfiche catalog was not rejected. It retained one-third of total public catalog use, which is a greater share than the new online subject catalog attracted during the impact study.

The introduction of the new online subject catalog did not affect the proportional division of searches of the microfiche catalog between subject searches and author/title searches. Subject searches accounted for 44 percent of microfiche catalog uses in the baseline study and for 46 percent and 48 percent in the follow-up studies (see table 2). Thus the impact of the catalog change in reducing use of the microfiche catalog was about equal for both types of microfiche catalog searches. A possible explanation for this finding that warrants further exploration is that there had formerly been a substantial number of intended subject searches that users of the microfiche catalog were "sublimating" by searching instead for known works by author/title access, and that such searches now tend to be conducted as proper subject searches on the new online catalog. The tendency of catalog users to sublimate subject searches in a catalog that is inhospitable was established by Lipetz in previous research on use of a large university card catalog.<sup>11</sup>

It is important to qualify the findings given earlier by noting that there is not 100 percent correspondence between the online and microfiche catalogs at NYSL with respect to scope, information content, and access terms. There can be legitimate reasons for favoring one catalog over the other for particular types of literature interests. During this

research, many NYSL staff members who used the public catalog remarked on differences between the catalogs for special purposes. Some of the visitors who were interviewed after catalog searches also remarked on differences in the catalog, but many of these persons seemed to be misinformed about the relative strong and weak points of the two catalog systems.

#### *Duration of Catalog Use Instances*

The data collected on minute-by-minute occupancy of the various catalog access devices were analyzed to determine whether introduction of the online subject catalog had an impact on the amount of time that users require in using the public catalog. No such impact was found. The average duration of an instance of public catalog use—including both the online and microfiche catalogs and all types of searches—remained remarkably constant—i.e., 7.57 minutes in the baseline study, 7.59 minutes in each follow-up (see table 4). The median time for catalog uses changed very little. It increased from 4.46 minutes in the baseline study to 4.74 and 4.68 minutes in the follow-ups. The change in median time resulted because there was a decrease in the relative proportion of extremely short searches and also an even more significant decrease in the relative proportion of extremely long searches. It is noteworthy that most of the long catalog searches are subject searches.

#### *Catalog Search Success and User Satisfaction*

Because there was such ready acceptance of the new online subject catalog by library visitors, one might expect this acceptance to be associated with an improved level of service to catalog users. However, the results of interviews with catalog users showed that the change in the catalog brought no improvement in the user-determined success rate for public catalog searches. There was, rather, a small decrease in the success rate—from 74 percent in the baseline study to 72 percent and 69 percent in the two follow-ups (see table 4). Curiously, the percentage of searches judged to be unsuccessful did not increase correspondingly. Rather, there was a substantial increase in that small group of searchers whose success or failure could not be judged immediately after catalog use by the persons who were interviewed.

Similarly, there was no indication that introduction of the online subject catalog had any clear impact on the general satisfaction of visitors with their visits to the library. Data from the exit interviews with visitors (see table 4) showed that the percentage of visits judged to be successful remained about the same (88 percent, 86 percent, 89 percent) even though the proportion of visits in which there was catalog use increased greatly during this period (see table 1) and overall catalog preference shifted from microfiche to online (see table 2).

## *Impact of an Online Subject Catalog*

TABLE 4  
SEARCH DURATION, SEARCH SUCCESS, VISIT  
SUCCESS, LIBRARIAN ASSISTANCE

<i>Factor</i>	<i>Survey Weeks</i>		
	<i>Baseline</i>	<i>First</i>	<i>Follow-up Second</i>
Duration of public catalog use instance, average	7.57 min.	7.59 min.	7.59 min.
median	4.46 min.	4.74 min.	4.68 min.
User appraisal of search success:			
successful	74%	72%	69%
unsuccessful	22%	18%	21%
cannot judge	4%	10%	10%
Success rate of library visits	88%	86%	89%
Visitor catalog uses involving librarian assistance	7.8%	10%	7.4%

### **Demand for Librarian Assistance in Catalog Use**

For library administrators and staff, a much desired impact of an automated catalog would be a reduction in visitors' need for help or instruction from librarians when performing their catalog searches. Of course, one would also expect the introduction of any change in the public catalog to cause a temporary increase in demand for librarian assistance, until the population of library users became fairly accustomed to the new system. In this research, observations of visitors' interactions with librarians during catalog use did indeed show the expected temporary increase in demand for assistance from librarians in performing or overseeing visitors' searches. In the baseline week, there was librarian assistance in 7.8 percent of visitor use instances (see table 4). In the first follow-up, the level of assistance rose (to 10 percent), but it then fell back in the second follow-up.

The assistance level in the second follow-up week was 7.4 percent—just about the same as the baseline level. There was little, if any, difference in the librarian assistance levels at the online terminals and the microfiche viewers. In other words the catalog change does not seem to have had any long-term impact on the degree to which catalog users require librarian assistance. One may conjecture, however, that, because this research has established that the catalog change attracted many new catalog users, it is possible that the need for librarian assistance should continue to follow a downward course since the new catalog users, who presumably require the most assistance, will become relatively fewer in the future. This would seem to be worthy of investigation through further limited follow-up studies.

## Discussion of Results

The findings of this impact study tend to confirm and articulate some of the findings or conclusions of previous after-the-fact studies of online public catalogs. However, certain other findings of previous after-the-fact studies—and also certain prevailing assumptions about the effects of online catalogs—are not confirmed.

It is amply confirmed that library users will readily accept an online subject catalog as an alternative to a more traditional type of subject catalog. On the other hand, the traditional (microfiche) catalog continued to receive heavy, albeit much diminished, use. These alternative subject catalogs are not really identical with respect to the amount of information provided and the ways in which they can be accessed and browsed; such considerations would seem to be more important to many catalog users than whether catalog access is achieved through an online terminal or through some other device.

The findings of this research are consistent with three of the four items in Markey's summary of the reasons why library users accept new online catalogs.<sup>12</sup> One reason was the users' perception of computer terminals as being more fun to use than traditional access means. While the truth of this idea was not specifically tested in this study, it was noticed that statements to that effect were made in many of the exit interviews with library users. Two other reasons for acceptance of the new catalogs were that the new catalogs provided either new informational service or else new access approaches not otherwise available; in other words, the perceived attraction in a new system can be in what is provided quite apart from the way it is provided, as discussed in the preceding paragraph. Studies to determine user "preference" among alternative catalog designs must always consider their substantive differences too.

The fourth reason given by Markey for user acceptance of online catalogs is that users believe that using the online catalog saves time. However, the present research did not confirm that belief. The average duration of a public catalog search remained almost eerily constant despite the introduction and acceptance of the new online subject catalog. The search duration profile found at NYSL was in fact quite similar to that reported more than fifteen years ago for searches of the traditional card catalog at Yale University.<sup>13</sup> Also, Tolle<sup>14</sup> found average search durations to be in a similar, quite narrow range when he studied transaction records for searches on a number of online public catalog systems. The averages and means reported by Tolle are about one or two minutes less than those found at NYSL, which is consistent with his use

## *Impact of an Online Subject Catalog*

of computer-interaction time rather than user observation as the measure of search duration; Tolle also found that within one major university, the average search duration ranged from four to nine minutes depending on the library branch being studied. From all of the present and previous findings, one might speculate that the duration of catalog searches is much more dependent on unknown characteristics of the user population, perhaps a mixture of physiological and educational attributes, than on the physical or informational features of catalog systems. If so, this could have important implications for revision of basic assumptions and objectives in catalog design.

In connection with the apparent insensitivity of average search duration to the change in catalog system used, one might speculate that users accomplish more (i.e., search more questions or pursue searches in greater detail) in an average session with an online catalog than with a more traditional catalog. This study does not provide direct evidence to test that hypothesis. However, it does provide indirect evidence that tends to refute the idea that users accomplish more in the average search session with an online catalog. It was determined that acceptance of the new online catalog and increased use of the public catalog by visitors brought no apparent change in the overall rate of visitors' satisfaction with the outcome of their library visits. If visitors had accomplished significantly more during visits because of their use of the new online catalog, one would expect to see the increased accomplishment reflected in a higher satisfaction rate. This indirect evidence suggests that, at most, any increased amount of searching that occurred was only enough to offset, in visitors' minds, their somewhat reduced success rate with online searching. To put it differently, if there was increased searching *activity* in the average search session when using the online catalog, that activity does not appear to translate into increased *accomplishment* as perceived by the users. Direct study to settle this question convincingly would be very desirable.

This research has provided direct evidence confirming that introduction of online subject searching capability increases the proportion of subject searches performed at the public catalog, something already established indirectly through the work of Markey and others.<sup>15</sup> The increased proportion of subject searching appeared quickly among the visitor population, but more slowly among library staff. Overall, the proportion of subject searches almost doubled, from roughly one-fourth to roughly one-half of all public catalog searches.

A new finding from this research was that the introduction of online subject searching capability led to increased use of the public

catalog, in terms of the ratio of searches performed to the number of library visits in a given period. It was further determined that the increased use came from visitors who were previously nonusers of the public catalog, rather than from increased use by previous catalog users. These findings are consistent with the common knowledge of librarians that placing new catalog access terminals in a public area tends to stimulate catalog use.

An unexpected finding of this research was that introduction of the online subject searching capability was followed by a very sharp decrease in the use of the public catalog by staff members. One must be cautious about regarding this as a cause-and-effect observation since there are other plausible reasons for the change in staff use of the public catalog. However, it would seem to deserve further investigation.

Another somewhat unexpected finding was that, despite the shift in visitor use of the public catalog after introduction of the online subject catalog, there was no long-term change in the degree to which visitors made use of librarian assistance in performing their searches.

This research confirmed the observation derived from previous work<sup>16</sup> that use of an online subject catalog tends to result in a somewhat lower rate of search success. It was found also, however, that online subject searching did not actually result in a higher rate of failure but rather in a higher frequency of uncertainty as to whether the search was a success or a failure upon completion of the search.

Obviously, more study at more libraries is desirable to test and clarify the findings of this research and to determine the degree to which they may be generalized. It is hoped that further study will be undertaken at NYSL to identify the impacts of subsequent modifications of the public catalog, building on this study as a baseline, in order to extend our basic understanding of catalog design and use.

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