

KAREN M. DRABENSTOTT

Associate Professor
School of Information and Library Studies
University of Michigan
Ann Arbor, Michigan

PAULINE A. COCHRANE

Visiting Professor
Graduate School of Library and Information Science
University of Illinois at Urbana-Champaign

Improvements Needed for Better Subject Access to Library Catalogs via the Internet

INTRODUCTION

It would appear from all we have heard and read that Internet access to library catalogs is at best a mixed blessing. It will be difficult if not impossible for Internet access to improve online catalog use unless the catalogs are each improved on site. That at least is our contention, and a group gathered at ALA Midwinter, January 11-12, 1991, agreed that the picture is not rosy. In the proceedings of their deliberations entitled *Think Tank on the Present and Future of the Online Catalog*, the group concluded that "the number of apparent search failures, or of search results that fall far short of what a knowledgeable and experienced searcher could uncover given the same search quest, is appalling" (Hodges, 1991, p. 106).

Another gloomy report for Internet users of catalogs around the world is a 1991 survey of subject access to academic library catalogs in Great Britain (Crawford, Thom, & Powles, 1992). The Glasgow group found that almost half the online catalogs studied had no separate subject searching option based on subject terms.

Charles Hildreth, in his landmark study on online catalogs, laid out the obstacles systems designers had put in place along the online catalog access path (Hildreth, 1982, p. 114). Although his figure is 10 years old, we can easily see how catalog access via the Internet can *complicate but not improve* access because many catalogs still contain the following obstacles:

1. nonuniform input/display terminal devices;
2. differing search and retrieval functions;
3. differing command entry techniques;

4. differing database access points;
5. irregular entry vocabulary;
6. differing index construction;
7. differing system-to-user dialogue;
8. differing results display, manipulation, and interpretation.

Instead of being a stairway to a retrieval goal as Hildreth presents it, online library catalogs (and other information retrieval databases on the Internet, we might add) present an obstacle course which Ed Krol (1992) in *The Whole Internet: User's Guide & Catalog* has aptly called "Stalking the Wild Resource." Krol thinks that "friends, network news and mailing lists, and the Archie, Gopher, WAIS, and World-Wide Web services . . . [will help you] find the resource of your dreams" (p. 279). We are not so optimistic. The rest of this paper documents why optimism is in short supply. We are not usually so pessimistic, but until the library and information professions confront these obstacles head on and become determined to correct them across the board, the Internet will be no more than direct access to the Library of Babel. We will end this paper with some messages to the systems designers of online library catalogs and Internet services like WAIS (Wide Area Information Servers) and Gopher. But first let's consider the users and uses of online catalogs via the Internet.

USERS AND USES OF INTERNET-ACCESSIBLE ONLINE CATALOGS

To the authors' knowledge, no research singles out remote users who connect to online catalogs through the Internet and discusses their characteristics, behavior, and needs separately from other remote users. The closest is a study of the University of California's (UC) MELVYL online union catalog. It separates respondents to an online questionnaire into two categories for UC-affiliated and non-UC-affiliated remote users. Respondents' non-UC affiliation does not necessarily mean they are accessing MELVYL through the Internet. Such respondents could have connected to MELVYL through a phone line, local area network, or one of many wide area networks besides the Internet. However, the MELVYL researchers admit that remote MELVYL users access "the system through more than 460 uniquely identifiable networks, most of them employing the Internet as their main highway" (Ferl & Millsap, 1992, p. 285).

The MELVYL study notes a gradual increase in the percentage of "find" commands issued by remote MELVYL users from 1988 (9%) to 1991 (25%) (Ferl & Millsap, 1992, p. 285). Of the 1,317 completed online questionnaires, 34.5% were submitted by non-UC-affiliated respondents. Another 30.7% of non-UC users are outside California, and 6.5% of them are outside the United States. Large percentages of non-UC users are librarians (28.4%), faculty (15.1%), and the general public (14.6%). High percentages of remote users report that they need no help connecting to MELVYL or searching MELVYL, and that they do not use on-screen help.

In a follow-up study, the MELVYL researchers examined the transaction logs of user activity accompanying completed questionnaires to determine what

types of indexes non-UC users accessed and what searching difficulties they encountered (Millsap & Ferl, 1993). Of the 616 search sessions conducted by non-UC users in the full MELVYL online catalog, 60% of sessions included a search of the title index, 46% included a search of the author index, and 30% included a search of the subject index. For searches conducted in the 10-year MELVYL online catalog, the percentage of search sessions that included a search of the subject index is higher (48%) than the full MELVYL catalog. The MELVYL researchers describe frequently occurring errors connected with constructing commands, spelling, finding the right subject search terms, and retrieving high numbers of records or none at all. Although they give several examples of search sessions containing many errors in which users did not call for some on-screen help, the researchers recommend that online catalogs need more on-screen help, a computer initiated/guided mode, and more heuristics—"design elements that guide or lead the user toward the discovery of desired information" (Millsap & Ferl, 1993, p. 336).

An informal study of nonconsortium patron use of the TRIPOD online catalog at Swarthmore College reports that 470 patrons used the Internet to search TRIPOD during a seven-week period in fall 1992 (Sowards, 1992). Internet users of TRIPOD came from 78 different Internet sites with two sites representing 50% of their Internet activity. The number of Internet users ranged from 59 to 77 over the seven-week period but did not show any appreciable increase from week to week. Interestingly, Internet use followed the same patterns as use on campus and in campus libraries; that is, use is higher on weekdays than on weekends, and peak times are the same as for campus users.

We can also learn about users and uses of online catalogs on the Internet from studies of remote users like Kalin's (1991b) research on users of Pennsylvania State University's (PSU) LIAS online catalog. She places them into one of three categories: dial-access users, users connecting through the university's network, or users accessing terminals in PSU libraries. Dial-access and network users were more likely than in-library users to enter known-item searches for author names. Her findings about known-item searches are echoed by a study of remote users of the ILLINET online catalog who are "over 30% more likely to search the OPAC by author or title than are system users as a whole" (Sloan, 1991, p. 136).

In the LIAS study in Pennsylvania, the percentage of searches that failed due to errors ranged between 8% and 13% for the three groups. This finding contrasts with Sloan's study, which reports more error messages for remote than in-library ILLINET users (Sloan, 1986, p. LC4). In her studies of collection failure, Kalin (1991a, 1991b) finds that 21.4% of dial-access users' searches fail because the library does not have the requested material.

Other published accounts address remote users, but they are not based on research findings. Several papers discuss Internet capabilities and resources and offer reasons why individuals would want to search online catalogs through the Internet:

1. To find material that may not be available through the local library (Raeder & Andrews, 1990, p. 16; Engel, 1991, p. 153; Engle, 1991, p. 8; Kalin, 1991a, p. 198). (To obtain such material more traditionally, the user would have to submit citations to interlibrary loan staff or travel to the institution themselves.)

2. To access cataloging records through additional access points that the local library's online catalog may not feature (Engel, 1991, p. 153; Engle, 1991, p. 8).
3. To take advantage of searching capabilities absent in a local catalog (Kalin, 1991a, p. 198).

Library staff search online catalogs on the Internet for the reasons mentioned above and for additional ones:

1. To evaluate online catalogs for purchase (Raeder & Andrews, 1990, p. 16; Kalin, 1991a, p. 198).
2. To determine how other online catalog systems operate in the course of profiling one's own system (Raeder & Andrews, 1990, p. 16; Engle, 1991, p. 8).
3. To answer specific reference questions (Engel, 1991, p. 154; Engle, 1991, p. 8).
4. To develop and assess collections (Raeder & Andrews, 1990, p. 16; Kalin, 1991a, p. 198).
5. To obtain cataloging copy (Kalin, 1991a, p. 198).

TODAY'S SCENARIO OF SUBJECT SEARCHING

Today's users of Internet-accessible online catalogs are pioneers in every sense of the word. Although they may be frequent searchers of their local online catalog, they are likely to search Internet-accessible online catalogs with unfamiliar interfaces, different subject searching capabilities, and cataloging records in formats unlike those of the local catalog. All the obstacles Hildreth recorded—plus one more—are there in a variety of guises. Subject searching on the Internet is truly as Krol described—stalking the wild resource. At Lund University, for example, the popularity of WAIS, campus-wide information systems (CWIS), and the Internet Gopher is growing steadily because connectivity is good, but “they all suffer from a lack of consistent structure of the information offerings as well as good tools for finding relevant information sources” (Ardo & Koch, 1993, p. 207).

Determining Which Online Catalog to Search

Having mastered the equipment and telecommunications software to connect to a computer across the network, the next step for our adventurous pioneer user is to determine the domain name of a remote computer that features an online catalog. General books on Internet use, e.g., Krol's (1992) *The Whole Internet* and Kehoe's (1993) *Zen and the Art of the Internet*, describe how users can access the electronic directories of Internet-accessible online catalogs produced by Billy Barron (1992) and Art St. George and Ron Larsen (1992). Their directories give domain names and detail the sign-on procedures to hundreds of Internet-accessible online catalogs in the United States and abroad.

Entries in directories of Internet-accessible online catalogs are generally restricted to sign-on procedures and hours of availability; however, a few describe unique characteristics of a particular library's collection. To identify unique

collections or subject areas before connecting to an online catalog, users could consult traditional printed sources such as the *American Library Directory* (1991) or *Subject Collections* (Ash & Miller, 1985), but who has either of those handy while searching?

Up to the late 1980s, a blank screen was not an unusual greeting to remote users of online library catalogs. Fortunate were users who had printed user guides to these catalogs, because without them users had to guess at command names, search and display options, and help capabilities. Today we are seeing an increasing number of online catalogs greet users with introductory screen(s) that include information on how to exit the system and how to get help, and a definition of paragraph labels corresponding to valid search options.

The remote user of Internet-accessible library catalogs faces a bewildering variety of user-system interfaces. There are subtle differences even among online catalogs that libraries purchase from the same vendor. For example, the labels for search options may differ and options associated with one catalog may be absent in another. We are a long way from the uniformity that would come with the adoption of Z39.58-1992.

At the time of Hildreth's analysis of the first online catalogs, there were so few operational online catalogs that one could classify all of their interfaces. Today this would be a monumental task owing to the hundreds of online catalogs available through the Internet. Based on our experiences with many of these catalogs, we see a trend toward the design and development of interfaces under the computer initiated/guided classification. To demonstrate this claim, let us look at the responses of two online catalogs—MIRLYN, the NOTIS-based online catalog at the University of Michigan (Figure 1), and URSUS, the Innovative Interfaces catalog at the University of Maine (Figure 2)—to the display of the first screen of a two-screen cataloging record.

At the bottom of the screen, both catalogs give prompts to tell the user possible next actions. Action names are different (e.g., IND to browse the subject headings index in MIRLYN and R or RETURN to browse the subject headings index in URSUS); however, many of the same possible next actions in MIRLYN are also possible in URSUS and vice versa. Ten years ago, few, if any, online catalogs displayed prompts or gave suggestions to users about possible next actions. The only problem now is that each online catalog has an array of synonyms for the same functions or commands.

Now that systems give users guidance as to their next action, this does not mean that users will always choose the one or two prompted actions that will further their search in a fruitful way. Users could also choose the wrong action because they have confused the action for a similarly worded action in another system. Generally, we feel the trend toward computer initiated/guided interfaces is good news for users of Internet-accessible online catalogs. These interfaces have freed users from the burden of memorizing commands or consulting a printed user guide to find desired commands, but a better solution would be a common command language for all Internet-accessible catalogs. The Think Tank on the future of the online catalog came to this same conclusion (Van Pulis, 1991).

catalogs listed in *Internet-Accessible Library Catalogs & Databases* dated May 21, 1992, except for those requiring tn-3270 emulation (St. George & Larsen, 1992). This represents 27 different systems in 100 different institutions. Thirteen systems are unique to a particular library. Fourteen systems are available for purchase from a vendor. Table 1, in outline form, describes the many different subject searching approaches these catalogs offer and gives some examples of how users enter their queries using these approaches. The authors used information in help screens as much as possible to determine how a particular subject search approach handled their queries. In the absence of such information, the authors entered a set of queries repeatedly and compared results to determine what was going on.

TABLE 1
OUTLINE OF SUBJECT SEARCHING APPROACHES IN
OPERATIONAL ONLINE CATALOGS

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1. Alphabetical approaches: results in a list of subject headings in the alphabetical neighborhood of the user-entered term
 - a. Finds matches of exact and/or longer subject headings; includes names and subjects; no backward/forward browsing to the beginning (a) or end (z) of the file.
 - Examples: browse subject [term]*
s=[term]
find su [term]
 - b. Finds matches of exact and/or longer subject headings; includes names and subjects; unlimited forward browsing to the end (z) of the file.
 - Examples: s=[term]
s [term]
 - c. Default response regardless of extent of match; includes names and subjects; unlimited backward/forward browsing to the beginning (a) or end (z) of the file.
 - Examples: sub/[term]
br su [term]
f s [term]
choose SUBJECT; enter term(s) separated by spaces;
hit CTRL-W
s=[term]
 - d. Finds matches of exact and/or longer subject headings; limited to subjects only; no backward/forward browsing to the beginning (a) or end (z) of the file.
 - Example: fi su [term]
 - e. Finds matches of exact and/or longer subject headings; limited to personal names only; no backward/forward browsing to the beginning (a) or end (z) of the file.
 - Example: fi pn [term]
 2. Keyword-in-heading approaches: results in a list of subject headings bearing word(s) in the user-entered term
 - a. Finds subject headings in which the words of the user-entered term are adjacent to one another
 - Examples: f su [term1 term2]†
su [term1 term2]
 - b. Finds subject headings bearing the word(s) in the user-entered term
 - Examples: s=[term1 term2]
sws/[term1][term2]
bro su [term1 term2]
f su [term1] and [term2]
su [term1] and [term2]

3. Keyword in record approaches: retrieves records bearing the word(s) in the user-entered term
- Title keyword search; if more than one term entered, the system performs an implied Boolean "and" combination
 - Examples: find ti [term1 term2]
 choose TITLE; enter terms separated by spaces;
 hit CTRL-K
 find kti [term1 term2]
 tws/[term1 term2]
 t=[term1 term2]
 fin tw [term1 term2]
 f ti [term1] and [term2]
 tt [term1 term2]
 - Finds the word(s) of the user-entered term in single subject headings
 - Examples: fin su [term1 term2]
 f s [term1 term2]
 - Finds the word(s) of the user-entered term in subject heading fields
 - Examples: find su [term1 term2]
 fi su [term1] and [term2]
 find ksh [term1 term2]
 s=[term1].su. and [term2].su.
 st [term1 term2]
 - Finds the word(s) of the user-entered term in subject-bearing fields
 - Examples: w [term1 term2]
 find top [term1 term2]
 find kw [term1 term2]
 te [term1 term2]
 - Finds the word(s) of the user-entered term in all fields
 - Examples: k=[term1] and [term2]
 find gen [term1 term2]
 fin [term1] and [term2]

*[term] represents a one- or multiple-word query.

f[term1] and [term2] represent single words of a two-word query.

The outline demonstrates the wide variety of subject searching approaches in operational online catalogs. Basic approaches are the alphabetical, keyword-in-heading, and keyword-in-record searches. There are several different implementations of these three basic approaches.

The outline also shows that command names for the same approaches are different from catalog to catalog. Furthermore, a command that initiates a particular search approach in one system might perform a totally different approach in another system. Had the authors tagged the examples by system, one would realize that a subtle change in the syntax of a search statement produces an entirely different result. For example, the statements "f su [term1 term2]" and "f su [term1] and [term2]" are valid in one particular system; the first statement finds subject headings in which the words of the user-entered term are adjacent to one another (2a), and the second statement performs the same operation but disregards word adjacency (2b).

Within a particular approach, the outline does not show differences between catalogs that arise due to differences in indexing. This is another serious obstacle to retrieval that Hildreth noted in the early historical development of online

catalogs. We can speculate that such differences exist not only between different "brands" of catalogs but between different implementations of the same catalog "brand" at different institutions. This could mislead a user into thinking that a query resulting in zero retrievals means that the institution does not own the desired item, when, in fact, the fields and subfields indexed for the particular subject search option chosen by the user do not include the one(s) that would have produced the desired result.

Many of the 100 online catalogs we examined to prepare the outline in Table 1 feature subject searching approaches that are not publicized in introductory screens. For example, the introductory screen of Michigan's MIRLYN system offers the alphabetical approach ($s=[term]$) and keyword-in-record approach ($k=[term1]$ and $[term2]$). It also has a title keyword search ($k=[term1].ti.$ and $[term2].ti.$) and keyword search of subject heading fields ($k=[term1].su.$ and $[term2].su.$). To find out about these searches, users must read online documentation available through the system's help capability. Judging from our knowledge of how seldom users access help capabilities (Slack, 1991), we can speculate that users probably do not know about these subject search approaches. Even if they knew about these approaches, would users know which approach would provide the most useful results for their subject query?

Studying transaction logs, we see that some users enter their queries using *every* approach—even approaches for author searches. For example, a user might enter the query "guatemala weddings" using all the search options that the system provides on its introductory screen even if some of them (e.g., "a=guatemala weddings" for an author search) do not look logical. Perhaps such actions indicate users' attempts to determine for themselves which of the catalog's several search options will yield the most useful results.

TOOLS FOR IMPROVING SUBJECT SEARCHING ON THE INTERNET

We recommend four tools to improve subject searching on Internet-accessible library catalogs. These tools would help those users whose failed subject searches of the local catalog are the impetus for their searches of online catalogs on the Internet.

Tool #1. Search Trees

The designers of the OKAPI experimental online catalog in the United Kingdom first defined search trees as "a set of paths with branches or choices, which enables the system to carry out the most sensible search function at each stage of the search" (Mitev, Venner, & Walker, 1985, p. 94). Search trees were also developed and reported in a recent empirical study of the subject terms that users enter into online catalogs (Drabenstott & Vizine-Goetz, 1990). These latter search trees emphasize subject headings because the vast majority of cataloging records created by American libraries are assigned subject headings based on the Library of Congress Subject Headings (LCSH) (O'Neill & Aluri, 1979, p. 5).

Search trees invoke searching approaches that look for matches of user queries in subject heading fields of cataloging records before enlisting keyword search approaches that look for matches in title fields or in a combination of title and subject heading fields.

Some online catalogs have subject searching routines that resemble search trees. For example, the online catalog of the University of Illinois at Urbana-Champaign responds to user queries for subjects with keyword searches of assigned subject headings. When users terminate searches, the system prompts them to continue and gives the results of a title keyword search (Hildreth, 1989, pp. 86-87). The Illinois online catalog always performs keyword searches of subject heading fields before title keyword searches because the former consumes fewer system resources than the latter.

Search trees require that online catalogs feature a wide range of subject searching functionality: (a) exact approach, (b) alphabetical approach, (c) keyword-in-heading approaches for searching main headings and subdivided headings, and (d) keyword-in-record approaches for searching titles, subject heading fields, and all subject-bearing fields of cataloging records (Drabenstott & Vizine-Goetz, 1990). Integrated into exact, alphabetical, and keyword-in-main-heading approaches are references and notes from the machine-readable Library of Congress Subject Headings (LCSH-mr) to increase the catalog's entry vocabulary and give users ideas for synonyms and related terms for the subject queries they enter. Search trees also require systems to prompt users to indicate whether their queries contain personal names because search trees for subject searches for personal names are different from search trees for subject searches generally.

Within the context of searching online catalogs through the Internet, search trees have three important benefits:

1. Search trees place the responsibility of determining which approach produces useful results on the system.
2. Except for singling out queries bearing personal names from queries for subject generally, search trees do not require users to enter commands associated with a particular subject searching approach.
3. Search trees guarantee a comprehensive search of the online catalog's database.

Tool #2. An Online Directory of Collection Strengths of Internet-Accessible Library Collections

Of the hundreds of online catalogs accessible through the Internet, how do searchers select the online catalog that will satisfy their information needs? In the absence of solid research findings about such searchers, we can only speculate about their selection methods. Searchers, no doubt, would prefer searching online catalogs with interfaces that are familiar to them. To accomplish this, at the University of Michigan, for example, users enlist the library's Gopher client that has an option to search the text of Billy Barron's online catalog directory for keywords. Since the university's MIRLYN online catalog is based on the NOTIS system, users could enter the keyword "notis" to retrieve a list of NOTIS-based online catalogs, then use the Gopher to connect

to these systems. Would that be the best way to get to other collections stronger than those at the University of Michigan in the user's subject area? We don't know. Another approach might be what is now offered by the SIRSI Corporation's Retrieval Interface Manager (RIM) that can be programmed to make other online catalogs look and perform like SIRSI's Unicorn-based online catalog (Johnson, 1990). But here again the user must know which are the collections that are stronger than the library being searched.

At the present time, electronic tools like Gopher and WAIS are limited in their ability to pinpoint a particular online catalog that would satisfy users' subject queries. No one has as yet mounted on the Internet the electronic version of the printed subject indexes to library collections such as the *American Library Directory* or *Subject Collections*, but DIALOG offers online searching to the former at a cost of \$75 per connect hour and \$.40 per record displayed or printed.

Featuring a directory/database of collection strengths and special collections could be an intermediary service to libraries when they allow access to their online catalogs through the Internet. Users could then start their searches in this database and then be switched to the online catalog(s) with the greatest potential for their subject interests. We can look to the Research Libraries Group's *Conspectus-Online* as a model of documenting collection strengths (Ferguson, Grant, & Rutstein, 1988). The Library of Congress Classification (LCC) serves as a subject outline for librarians to rate the strength of their existing collection and current collecting intensity. Librarians can search the *Conspectus-Online* on the RLIN (Research Libraries Information Network) by subject, LCC class, collection level, participating institution, and other criteria.

LCC outlines and Dewey Decimal Classification (DDC) summaries could serve as the framework for such a directory, or we could revive and use the Broad System of Ordering developed several years ago (Coates, Lloyd, & Simandl, 1978). Some people have also suggested using LCSH, but in its present state this would be a little unwieldy (Lynch & Preston, 1992).

Tool #3. Aids to "Find This Record or Similar Records"

Nearly all online catalogs have a capability for exporting cataloging records in USMARC (United States Machine-Readable Cataloging) format. This capability might not be available to public catalog users, but it is probably in the staff mode that library staff enlist to search the catalog. This capability should be extended to public users. When users find cataloging records of interest in a library catalog that they are searching through the Internet, they should be able to download these records to their hard or floppy disk. A computer program resident on the user's microcomputer could then manipulate the downloaded records to "find the actual records or similar records" in the local online catalog by creating search statements using the tagged USMARC data in the downloaded records. Such a function might also be in the locally available Gopher client. When users reconnect to the local online catalog, the program would formulate search statements to search and find the same or similar cataloging records in the local catalog.

Let's say that the system is unable to find the same record in the local catalog. It could use data in several fields—author, classification number, subject headings, title—to find similar records. One approach could feature searches of the author fields. If too many records are retrieved, the system could limit retrievals using the first two or three digits of DDC numbers or letter(s) of LCC numbers. If the original records come with DDC numbers and LCC is used locally, the system could consult the subject headings on the originating records and use the LCC numbers printed with the same subject headings in LCSH-mr. Another approach could feature searches of the subject heading fields. If too few records are retrieved, the system could consult LCSH-mr to find related terms for the main headings in the record and formulate subject searches using the related terms and subdivisions from the subject headings in the original record. Many more scenarios are possible including ones that involve the user in related term selection.

Tool #4. Common Command Language for Every Internet-Accessible Library Catalog or Bibliographic Database

We have all heard of developments like Z39.50, but how many know about Z39.58-1992 or ISO 8777 (Common command language, 1992)? This later standard could remove one of Hildreth's obstacles (Hildreth, 1982, p. 114) from every catalog on the Internet and would meet a requirement of the ideal catalog that was described by the Think Tank at an RASD/ALA session in 1991 (Van Pulis, 1991). Attention to it is important because it will help services like WAIS or Gopher and the various library catalog command languages become one common command language for the itinerant and remote user. Consideration of either the U.S. or International standard would help with several problems that Internet library catalog users experience, namely, "now that I'm into this system, how do I view previously displayed data, how do I print results remotely, how do I review my search, and last but not least, how do I end a session?" The command names in the Z39.58-1992 standard covering these situations are BACK, PRINT, REVIEW, and STOP. Other command names in the standard are CHOOSE, DEFINE, DELETE, DISPLAY, EXPLAIN, FIND, HELP, MORE, RELATE, SAME, SCAN, SET, SEE, SORT, and START. The standard also includes several command operators (AND, NOT, OR, DESC, GT, LT, NE, GE, LE, ALL), symbols, and punctuation (for character masking, expressing a range of values, separators, and restoration marks). The ISO 8777 differs in only a few respects, so a truly international standard that conforms to an American standard is at hand. It must be remembered that this would be a minimum set of common commands, and system designers could have functions and commands that go beyond the minimum, but in the Internet collection of "wild resources," the adoption of such a common command language could help tame the environment.

SUMMARY AND CONCLUSION

This paper focuses on general difficulties that challenge users of Internet-accessible online catalogs and specific ones connected with subject searching.

Solid research findings on reasons why people search Internet-accessible online catalogs are very much needed. Future research studies could be designed along the lines of the MELVYL study that features an online questionnaire and logs system user responses. The MELVYL studies reveal that remote usage of online catalogs represents a significant component of system usage. In view of this finding, it is important for librarians and systems staff to gain a better understanding of remote users and use this knowledge to build efficient and useful tools to improve their searches of online catalogs on the Internet. Even before such a study of Internet users of online catalogs, the authors recommend four tools to improve subject searching on the Internet because of the known failed subject searches in local catalogs.

Maybe, just maybe, this conference will serve as the catalyst to form public opinion about this issue. Daniel Yankelovich, one of America's premier pollsters (according to Al Cole [1993] in *Modern Maturity*), said that the formation of public opinion on important issues resembles a biological process, evolving slowly through clearly defined stages: "1, Dawning awareness; 2, Sense of urgency; 3, Discovery of choices; 4, Wishful thinking; 5, Weighing choices; 6, Intellectual stand; and 7, Responsible judgment" (p. 10). Regarding improvements in online catalogs, we think we are now at stage 4, wishful thinking, where we hope that WAIS, Gopher, and other "front-ends" will improve access to the information in library catalogs. Maybe, we can move on to stage 5 and weigh some of the choices suggested by us and others at this conference.

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