Subject Searching Success

Transaction Logs, Patron Perceptions, and Implications for Library Instruction

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Subject searching in the OPAC is the most problematic of all search types, causing far greater difficulty for patrons than keyword searching and known-item searching. This study combines two methodologies—transaction log analysis and user observation interviews—to examine the reasons for patrons' failure to use subject searching effectively. The transaction log analysis shows that patrons rarely utilize correct and complete subject terms and that they retrieve zero results in almost half of their searches. Furthermore, the user observation interviews reveal that users generally are unaware of the many tools and services that librarians have created to assist them with subject searching, and that asking a librarian for help simply does not occur to them. Even when searchers do locate and employ subject terms, the subject terms appear not to help them very much: Analysis of observed searches reveals almost no correlation between finding a subject term and judging a subject search to be successful. The authors discuss the potential for further research on "just-in-time" instruction, online instruction, and "tagging" as possible strategies to improve patrons' searching success.

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The question is inescapable in librarians' professional reading: will the rise of keyword searching spell the end of controlled vocabulary? A recent article in *American Libraries* coined the phrase "search fatigue" to describe the "feeling of frustration and dissatisfaction" that users suffer when they spend hours looking in databases for information that they know ought to be there, but that they cannot find.[1] According to the author, Jeffrey Beall, "The chief cause of search fatigue is a reliance on keyword searching" as opposed to controlled vocabulary searching.[2] In the same issue of *American Libraries*, ALA President Leslie Burger comments on Yahoo! Answers, a virtual reference service in which anyone can answer any question posed. As Burger notes, "There is no way to determine if [sic] the information is accurate, reliable, or authoritative, but people seem not to care. . . . These days, everyone can be an information expert."[3]

Yet reference librarians are aware that patrons doing keyword searches in online catalogs do not find the best results. In fact, they frequently retrieve unhelpful result sets of zero, or they retrieve far too many results to be useful. Some of these patrons then consult librarians and are guided to subject terms and relevant materials. But others, surely, simply give up, concluding that the library catalog contains nothing relevant to their search. For academic librarians, patrons' poor search skills

are particularly worrisome because academic librarians are charged with developing students' information literacy. According to the Association of College and Research Libraries' (ACRL) information literacy standards, the "information literate student . . . selects controlled vocabulary specific to the discipline or information retrieval source."[4] In the case of the OPAC, this means that the information-literate student should be able to select appropriate subject terms. But anecdotal evidence from front-line reference librarians suggests that most students are unaware of the existence of subject terms, let alone capable of using them effectively. As librarians know, "the great advantage of metadata is that it compensates for all the weaknesses of keyword searching."[5] Therefore, teaching students about controlled vocabularies is an important job for academic libraries. Yet this kind of instruction is increasingly challenging in an environment in which keyword searching is so pervasive that "everyone can be an information expert"—or at least think that he or she is an expert.[6]

This study investigates patrons' subject catalog searching behaviors at the University of Oklahoma Libraries. Two methods were used to gauge the success of subject searches: an analysis of the OPAC's transaction logs and a series of observation interviews in which students were asked to perform a series of subject searches on the OPAC. The transaction log analysis enabled the authors to study a large number of subject searches and evaluate their success by asking questions such as

- How many subject searches yielded zero results?
- How many subject searches yielded an unhelpfully large number of results?
- How many subject searches used correct and complete subject terms?

The observation interviews, on the other hand, allowed the authors to ask students qualitative questions about their searching, such as

- Are you satisfied with these results?
- If not, how would you change your search strategy?
- Would you use these results, or would you look elsewhere for the information you need?

By combining these two methods, the authors were able to gather information that would be impossible to obtain by using either method alone.

LITERATURE REVIEW

Keyword searching is on the rise, thanks to the popularity of resources such as Google, Yahoo!, and Wikipedia. "Keyword searching is extremely popular and is essentially beginning the process of replacing metadata-enabled searching, such as online catalogs."[7] Some librarians are even questioning whether it is cost-effective to do subject cataloging at all, given that most patrons do not seem to use subject searching. As early as 1995, the Association for Library Collections and Technical Services addressed this issue in a program titled "Crisis in Subject Cataloging and Retrieval."[8] During this program, Arlene Taylor identified several elements of the coming crisis, including "an administrative push to cut back or eliminate subject cataloging . . . [due to] the availability of keyword searching, which many people think is sufficient."[9] These elements of "crisis" have only intensified in the intervening thirteen years, during which the availability of keyword searching resources has increased exponentially due to the ubiquitousness of the Internet and its many freely available search tools.

It is well documented in the research literature that patrons "do not understand the complexities of bibliographic structures" and that "users are normally more successful in conducting known item [author or title] searches than subject searches."[10] Many studies have employed OPAC transaction log analysis to examine the "success" of users' subject searches.[11] Larson's 1991 analysis shows a decline in the frequency of subject searching and a concomitant increase in known-item searching over the time period 1982–1988. More recently, Yu and Young also report a decline in the success of subject searching over the time period 2000–2002 and attribute this to the increasing prevalence of Web-based search engines and users' expectations that OPACs will perform like Web-based search engines.[12]

Researchers apply various criteria to transaction log data to judge the success or failure of patrons' subject searches. Although researchers generally agree that most searches retrieving zero results are unsuccessful, the upper limit varies tremendously. For Larson, a "successful" search retrieves between one and twenty records; for Hildreth, the upper limit is ninety, and for Yu and Young, the upper limit is one hundred.[13] When success is defined in this "numeric" way, analysis of transaction logs is a simple way to determine the frequency of successful subject searching.

However, transaction logs cannot answer questions about OPAC users' satisfaction with subject searching. Searches generating hundreds or even thousands of results might be judged "successful" by the user, if two or three highly relevant records are found in the first page of results. To determine users' subjective evaluation of the success of subject searching, it is necessary to employ a different method, such as a survey or observation interview. Because these kinds of studies are more costly and time-consuming than transaction log analysis, they are undertaken less frequently. However, a variety of qualitative studies have been conducted, and the results are generally unsurprising: subject searching is problematic for patrons because they are unfamiliar with Library of Congress (LC) subject headings, because the catalog interface does not give them adequate guidance in finding and using LC terms or in revising their searches, and because catalog design "does not incorporate sufficient understanding of searching behavior."[14]

Overall, the research from both transaction log analysis and user-response studies shows that subject searching is dif-

ficult for patrons, unlikely to be very successful, and becoming less frequent as patrons' behavior is shaped by keyword search engines such as Google. Moreover, subject cataloging is expensive: it requires a great investment of professional time and resources. Therefore, it is not unreasonable to question whether it is cost-effective to do subject cataloging at all. However, one interesting study performed by Gross and Taylor shows that keyword searching would become much less successful if subject terms were absent from the catalog.[15] Overall, "35.9 percent of hits would not be found" if subject terms were removed from the catalog, and for 4 percent of searches, more than 70 percent of the results would not be found.[16] This means that patrons' increasing preference for keyword searching is not, in itself, a compelling reason to do away with subject cataloging.

METHODOLOGY

Transaction Log Analysis

The authors obtained transaction logs from the OPAC for sixteen time period samples from the fall 2005 academic semester. Each time period sample was three to five hours long, and the sixteen samples included morning, afternoon, evening, and late-night hours as well as weekday and weekend hours. The total number of transactions from all sixteen samples was 28,302. Of these, 14,234 were useable "search" transactions. The others were either "login" transactions or search transactions that did not include a search term, so they were ignored in performing the data analysis.

The useable transactions were analyzed by type of search (keyword, title, subject, etc.) to determine how frequently patrons used the various types of search. In addition, the transactions were analyzed by the number of results produced by the search. Although it is impossible to determine simply from transaction log analysis whether a search was considered by the *patron* to be successful or unsuccessful, the authors divided the searches into "successful" and "unsuccessful" categories as follows: searches that yielded either zero results or more than five hundred results were considered to be "unsuccessful," and searches that yielded between 1 and 499 results were considered to be "successful."

The authors are aware of the many limitations of this categorization. Certainly, many searches with between 1 and 499 results are considered unsuccessful because no relevant items are retrieved, or because the user sees no relevant items on the first page or two of results. Conversely, many searches with five hundred or more results may be considered successful because the patron finds one or more relevant results among the first twenty results shown and does not have to look at all five hundred or more results. It is even possible that some searches that yield zero results are considered by the patron to be successful; for instance, a researcher who wants to demonstrate that a certain topic has not been adequately addressed in the literature might be satisfied with a subject search yielding zero results, indicating that the library has no holdings on that topic. Nonetheless, most librarians would consider most result sets of zero or greater than five hundred to be unsuccessful and would help the patron refine the search terms to produce a more useful set of results.

For each subject search, the authors used *Library of Congress Subject Headings* to determine whether a correct subject term was used. Searches that did not include a correct subject term were analyzed further to determine whether they used a "keyword in subject" (for example, "shortwave" rather than "shortwave radio"), a typographical error, or simply a wrong term.

Observation Interviews

For the qualitative part of this research, sixty students were selected at random from the University of Oklahoma student directory, which lists both graduate and undergraduate students. Selected students were contacted via e-mail and asked to participate in the study. A gift card worth $10 was offered as an incentive. The first twenty students to respond to the e-mail were interviewed during the fall 2006 semester.

During the interview, the student was seated at a computer and asked to perform a series of three subject searches on topics of his or her choice. The authors showed the student how to select the "subject" field when beginning the search and told the student that the topics could be something studied in a class, something he or she had already written a paper about, or simply something of personal interest. The students were given up to five attempts to find relevant information about each topic; that is, they were free to change their search terms if they were not satisfied with their initial results. Both authors observed each interview and took notes recording each student's search terms, the number of results for each search, and the student's level of satisfaction with the results. If the student made five attempts to search for a given topic and was not successful, the authors asked what the student would do next if he or she were actually looking for this information. Would he or she retrieve some of the books even though they did not appear to be promising? Would the student continue to search the OPAC, hoping to find the "right" search terms? Would he or she give up and search elsewhere? If so, where?

The results from the observation interviews were analyzed to determine how often the students were satisfied with their results and how often they were able to find the correct subject terms.

RESULTS

Transaction Log Analysis

The transaction log analysis revealed that, of the 14,234 search transactions, just 650, or 4.6 percent, were subject searches (see figure 1). This was the lowest percentage of any category: author (AU), keyword (KW), periodical title (PER), subject (SU), or title (TI). The most frequently used category

by far was keyword searching. At 64.8 percent, keyword searching was employed more than five times as frequently as the next most frequently used category, author searching. However, this is not surprising because the University of Oklahoma Libraries OPAC defaults to keyword searching, so a patron who does not choose a search category automatically searches by keyword.

Of the 650 subject searches, 317 (48.8 percent) yielded zero results (see figure 2), and an additional 69 (10.6 percent) yielded more than five hundred results (see figure 3). Thus, only 40.6 percent of all subject searches were "successful," according to the authors' very rough characterization of "success" as "a search that retrieves between one and 499 records" (see figure 4).

However, another possible definition of a successful subject search is "a search that employs a correct and complete subject term." If this definition of "success" is used, only 28.6 percent of the 650 subject searches were successful. A similar, but broader, definition of success might include searches that employ a "keyword in subject term" as well as those that employ "a correct and complete search term." For example, a subject search on the term "shortwave" might retrieve many results even though "shortwave" itself is not a subject term. "Shortwave" is a keyword in several subject terms, such as "shortwave algorithms," "shortwave radio," "shortwave radio antennas," and so forth. In this study, 24.2 percent of all subject searches employed a "keyword in subject" term. Thus, if this broader definition of "success" were employed, a total of 54.8 percent of subject searches would be said to have achieved success.

Observation Interviews

During the observation interviews, each of the twenty students chose three topics and was allowed up to five attempts to find information on each topic using subject searching. Therefore, the maximum possible number of search transactions from all interviews was 300 (20 students times three topics times five attempts). However, because not every student used all five attempts for each search, the total number of search transactions is 218 rather than 300.

The observation interviews enabled the authors to gather information that is simply not available through transaction log analysis. For instance, it was possible to analyze the searches' success or failure at the topic level rather than the transaction level. In looking at transaction logs, it is not possible to know when a search is a "revised attempt" to find

Figure 1. Frequency of Each Search Type (n = 14,234)

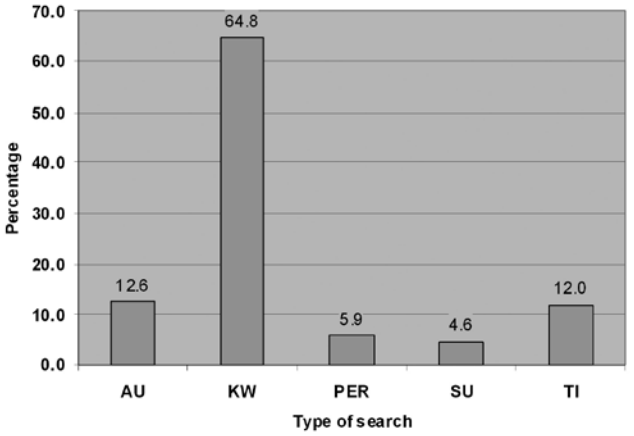


Figure 2. Percentage of Searches Yielding Zero Results

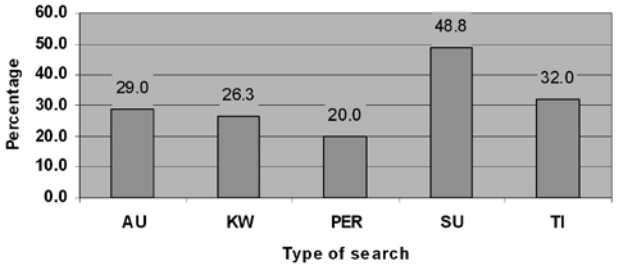


Figure 3. Searches Yielding 500 or More Results

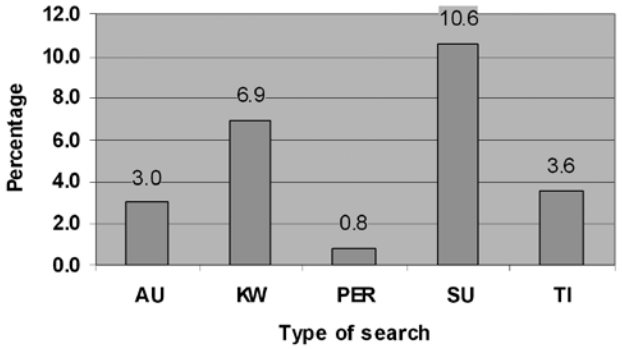
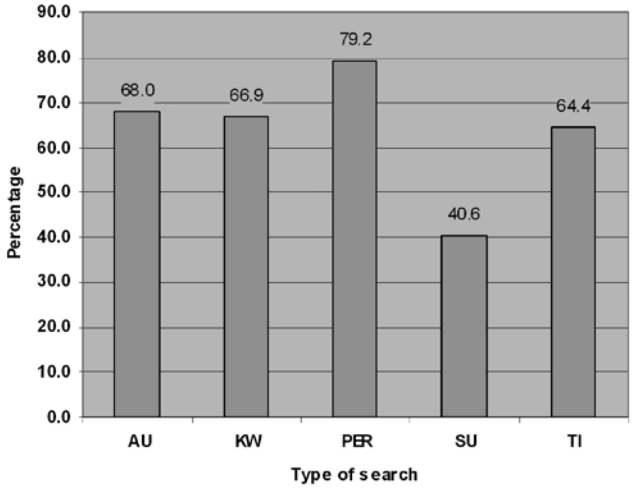


Figure 4. Percentage of Searches Yielding "Successful" Searches (1–499 Results)



information that a previous search failed to find. Researchers cannot look at a set of five or six consecutive searches in the transaction log and conclude, "This patron was looking for information about Great Britain. Her first few attempts were unsuccessful because she used the wrong terms, and then she misspelled the word 'Britain,' but after four tries, she found exactly what she was looking for, so this topic search was a success." However, the observation interviews enabled the authors to ask students whether they were satisfied with their search results and whether they considered their topic searches to be successful, so it was possible to determine success or failure at the topic level.

Thirty-one of the 218 search transactions, or 14.2 percent, were judged by the searcher to be successful. This success rate might seem dismally low. However, when viewed from the "topic" perspective, the thirty-one successful searches equate to a success rate of 52 percent, because thirty-one of the sixty topic searches were successful in the end, after up to five revisions. For the twenty-nine unsuccessful topic searches, students were asked what they would do next if they were actually looking for this information. In twelve cases, students said they would simply stop looking or give up, assuming that no information on their topic was available. Other responses included "go to Google," "go to a database," "browse books on the shelf," "go to the law library," and "get advice from my professor." In three cases, the student was unsure what he or she would do next (see figure 5). Notably, not one student mentioned asking a library staff member for assistance.

The observation interview method also allowed the authors to take note of the methods students used to modify their topic searches. Not surprisingly, it was rare for a student to enter a correct subject term on the first attempt. Of the sixty first attempts, eleven employed a correct subject term, and fourteen employed a "keyword in subject term." The remaining thirty-five first attempts retrieved zero results. When subject searches retrieve zero results, the University of Oklahoma Libraries OPAC displays an alphabetical list of correct subject terms (see figure 6). During the interviews, many students made comments indicating that this list was unhelpful. They generally seemed to think that the alphabetical list of subject terms was a list of "suggested" subject terms, and seemed frustrated by the fact that a term like "energetic particles" was "suggested" for a search on "enemy combatants."

During the observation interviews, sixty of the searches were first attempts to find information on a topic, but 158 searches were modifications of previous searches. The majority (78.5 percent) of these modifications consisted simply of trying different search terms. In most cases, students' modifications demonstrated that they were unaware of basic search principles. For instance, following a search on the phrase "Spanish baroque" that yielded zero hits, one student tried "Spanish baroque composers," clearly not understanding that adding words to a search always results in fewer, not more, results. However, some students did demonstrate more sophisticated methods of modifying their searches: in twenty-four cases (15.2 percent), students selected terms from the alphabetical list (shown in figure 6), and in ten cases (6.3 percent), they examined the record of one retrieved item and selected one of the item's subject terms (see figure 7).

Of the 218 individual searches, 108, or 49.6 percent, produced zero results. This figure is remarkably similar to the results from the transaction log analysis, in which 48.8 percent of all subject searches produced zero results.

Of the sixty topic searches, thirty-eight (63 percent) located at least one subject term, either on the first try or in one of the revisions. Perhaps the most noteworthy result of the observation interviews is the fact that many topic searches

Figure 5. Responses to the Question "What Would You Do Next?" After an Unsuccessful Topic Search (n = 29)

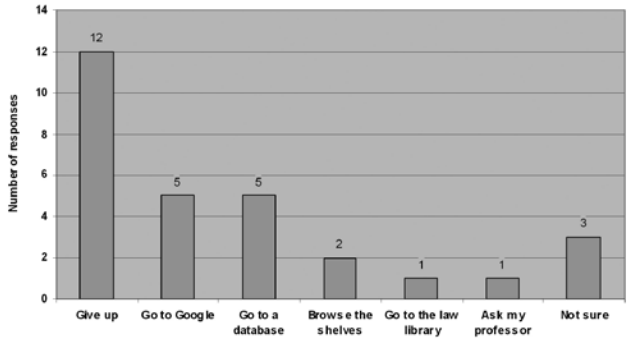


Figure 6. Display of Subject Terms in OPAC

Subject "enemy combatants" found no matching titles.

You may change your search, or select a new search from the closest matches below.

see related headings for:
ENEMY ALIENS

ENEMY IN THE BIBLE 2

ENEMY IN THE BIBLE HISTORY OF DOCTRINES 16TH CENTURY 1

ENEMY PROPERTY 17

see related headings for:
ENEMY PROPERTY

ENEMY PROPERTY CASES 1

ENEMY PROPERTY GREAT BRITAIN CONFISCATIONS AND CONTRIBUTIONS 5

see related headings for:
ENEMY TO HUMAN DISEASES

see related headings for:
ENEOLITHIC AGE

ENERGETIC PARTICLES 18

Figure 7. Frequency of Types of Search Modifications (n = 158)

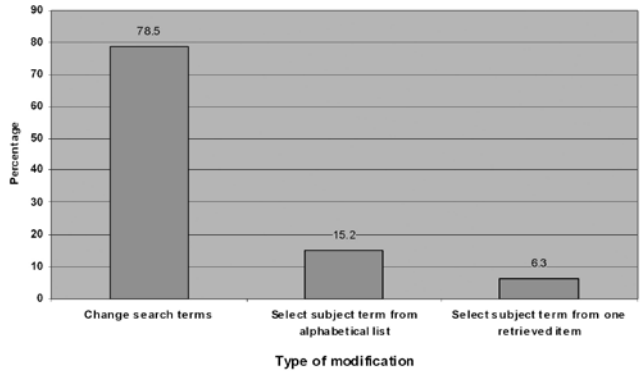
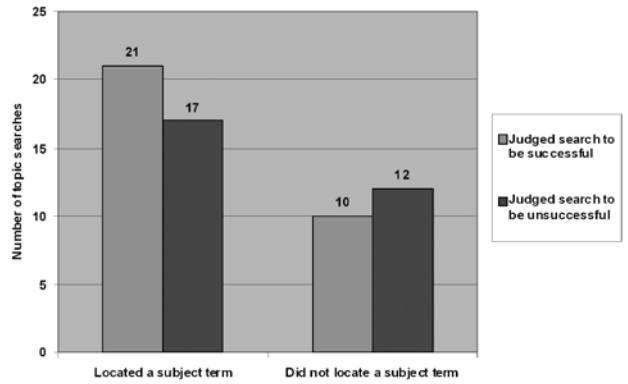


Figure 8. Relationship between Finding a Subject Term and Judging a Topic Search to be Successful



were judged to be successful even though the student never located a subject term in any of the five iterations, and many searches were judged unsuccessful even though the student did locate and use a subject term. In fact, in nearly two-thirds of the unsuccessful searches, students located and used a subject term but found it to be unhelpful (see figure 8). Although the sample size is too small for statistical testing to be valid, it appears that there is almost no correlation between finding a subject term and judging a subject search to be successful.

DISCUSSION

Teaching students to locate and use subject terms correctly is an important part of academic reference librarians' jobs. The appropriate use of subject searching is a powerful tool that enables users to extract relevant information from the OPAC. This is why the ACRL information literacy standards include a section on the use of controlled vocabulary: "The information literate student . . . selects controlled vocabulary specific to the discipline or information retrieval source."[17]

But this study suggests that the "information literate student" is hard to find. The transactions logs show that subject searching is used very infrequently. Keyword searching is employed fourteen times as often as subject searching, and subject searches are very likely to use incorrect search terms and to result in zero results or unhelpfully large numbers of results. Moreover, the observation interviews show that even when students do locate correct subject terms, it is in a haphazard way—they stumble upon them rather than employing a search strategy to locate them. The subject terms that they locate are rarely the most appropriate ones for their search needs. But perhaps most disturbing is the fact that, during the observation interviews, so many students simply gave up when the OPAC search did not meet their needs. They assumed that the library—with its millions of volumes—did not have any relevant materials for their needs. Several students indicated that they would check a database or Google next, but not one mentioned asking a library staff member for help.

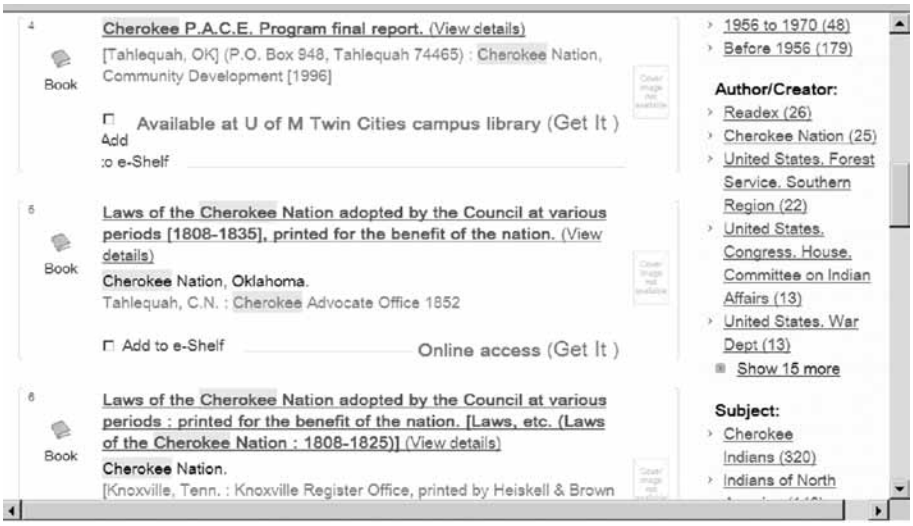
At the University of Oklahoma, approximately one-third of each year's freshman class enrolls in a course called "Gateway to College Learning" that includes a library tour and an instruction session. The instruction session covers many topics—library services, OPAC searching, and database searching—in the course of fifty minutes, so it is not surprising that students might forget the specifics of subject searching, especially if months or even years go by before they use the OPAC again. However, one point always emphasized in instruction is that students are not expected to remember every detail or to do every search on their own; librarians can help when students are having trouble searching, and they are available in person, on the phone, and via e-mail. This message, too, seems to go mostly unheeded, if the twenty students in the observation interviews are at all typical.

A topic of interest in the recent education literature is "just in time" instruction. In brief, the "just in time" instruction philosophy emphasizes making instruction available to learners when they need it, because people learn best when they have a pressing need.[18] "Just in time" instruction is different from the more traditional "just in case" instruction, which is epitomized by the freshman orientation sessions that seem to be largely forgotten by the time the student has a research paper due and actually needs to employ search skills. Course-integrated library instruction, on the other hand, is usually an example of "just in time" instruction, because students participate in instruction at the time when they have assignments due, and the session usually covers the specific materials that they need to use or topics that they need to search. Therefore, it is likely to be more effective to teach subject searching skills during course-integrated instruction rather than freshman orientation sessions. However, additional research on this topic is needed.

Online instruction is conceptually closely related to "just in time" instruction. Librarians cannot anticipate each patron's information needs and step in to provide instruction at just the right moment, but they can develop online instruction modules so that patrons can "help themselves" to instruction at the point of need. Although it can be a challenge to design effective online tutorials and to make patrons aware

of them, evidence shows that well-designed online instruction is often as effective as in-person instruction.[19] Reports from disciplines as varied as computer science, medicine, education, and economics indicate the success of online instruction in these fields, but again, more research is needed to ascertain the effectiveness of online instruction in the use of subject searching.[20] The University of Oklahoma Libraries, like many academic libraries, has developed online instruction modules that cover, among other topics, controlled vocabulary searching.[21] These tutorials could form the basis for research on learner outcomes that could help librarians focus their future efforts at teaching subject search skills.

Figure 9. Faceted browsing—here, a screen shot from the University of Minnesota's online catalog, using Ex Libris's "Primo" interface (currently in beta testing). See http://prime2.oit.umn.edu:1701/primo_library/libweb/action/search.do.



"Better instruction" is, of course, just one possible response to the data indicating students' problems with subject searching. Many researchers and commentators have suggested that the true problem is not a lack of adequate instruction but the nature of the subject headings themselves; that is, controlled vocabulary itself is problematic for several reasons:

- Subject headings are "skimpy": they fail to capture many relevant aspects of a given work. For instance, searching on "holocaust" and "autobiography" will not retrieve *The Diary of Anne Frank.*[22]
- Subject headings are inflexible: it is a slow and laborious process to update subject headings to reflect newly emerging "categories" or changes in political reality. For instance, "East Germany" and "Soviet Union" and "Yugoslavia" are subjects that became obsolete overnight, but replacing them has led to some unfortunate interim measures, such as "Former Soviet Union. The best [that catalogers] were able to do was just tack 'former' onto that entire zone that they'd previously categorized as the Soviet Union. Not because that's what they thought was true about the world, but because they don't have the staff to reshelve all the books."[23]
- Subject headings reflect the assumptions and needs of professional catalogers, not of typical catalog users. "Users performing unknown-item searches have a different level of knowledge from the indexers describing the objects for retrieval."[24]

One very recent alternative, or addition, to subject cataloging is the phenomenon known as "tagging." Websites such as Delicious (http://del.icio.us), Flickr (http://flickr.com), and LibraryThing (www.librarything.com) are some of the most popular examples of tagging services. Tagging allows users to create and apply their own "tags" to websites, pictures, books, or citations, enabling them to find their own favorite items more easily. Tagging is gaining popularity even alongside traditional controlled vocabulary schemes, as, for instance, in the University of Pennsylvania OPAC, where users can create "PennTags" for their own use and explore PennTags created by others.[25] Interestingly, although research shows that people engage in tagging "primarily for their own benefit," the aggregate of many users' tags can also "constitute a useful public good. . . . By browsing specific people and tags, users can find websites that are of interest to them and can find people who have common interests. This . . . is touted as a main feature of Delicious."[26] This "social" aspect of tagging, especially as it is adopted by large numbers of people, provides a possible alternative to traditional controlled vocabulary.

Clay Shirky asserts that controlled vocabulary is a relic of the print world. In his view, we use controlled vocabulary as a "binary" operator because, in the print world, every book must sit in precisely one place on a shelf; a given book is either about history (and thus shelved in the "D" call number area) or it is not. But in the electronic world, the binary "either/or" operator gives way to "probabilistic" categorization: If ninety people tag the book as "History" while five tag it as "Philosophy" and another five tag it as "Music" or "Anthropology" or "Engineering," it might be reasonable to conclude that the book is mainly about history while also encompassing elements of other disciplines—which is both a more robust and a more chaotic categorization scheme than the binary "either/or" scheme, and, according to Shirky, a more appropriate method for the electronic world.[27]

Integrated library system vendors are embracing the "tagging" trend by offering new OPAC interfaces that support tagging, suggesting that controlled vocabulary and user-defined

classification might continue to coexist for the foreseeable future. Ex Libris's Primo and Innovative Interfaces' Encore are both examples of new products that incorporate tagging capability into online catalogs that are able to search not only traditional library collections but also databases, open-access collections, and the Web itself. These newer interfaces also support "faceted browsing," shown in figure 9, which brings controlled vocabulary to the user's attention even when he or she has performed a simple keyword search (in this case, on the word "Cherokee"). In a sense, faceted browsing is another method of "just-in-time" instruction in the use of controlled vocabulary, and the fact that faceted browsing and tagging are featured side by side in the latest OPAC products suggests that tagging might complement controlled vocabulary, but it is not about to replace it.

CONCLUSIONS

This study's results corroborate the findings of previous research showing that OPAC users experience great difficulty with subject searching. Both the transaction log data and the observation interviews show low rates of success in subject searching. However, because this study combined transaction log analysis with user observation interviews, it was possible to glean information about users' perceptions of search success. Although the students participating in the observation interviews did not obtain results that most librarians would consider to be "successful," more than half of the topic searches were judged by the students to be satisfactory—despite the fact that very few searchers found an appropriate subject term, even after up to five iterations.

The observation interviews also showed that students generally do not make use of the various tools and services that librarians have developed to assist them in subject searching. Very few students used the alphabetical lists of subject terms (provided when a subject search produces zero results) or the clickable subject terms included in item records. In addition, when asked "what would you do next" after an unsuccessful topic search, not one student indicated that he or she would consult a librarian for assistance or use one of the available online tutorials.

People learn and retain information most readily at the "point of need"—when the information is most relevant to them. "Just in time" instruction and online instruction have been demonstrated to be effective at delivering training in many different disciplines, and these methods might well be useful in teaching patrons about controlled vocabulary searching. In addition, introducing features such as tagging and faceted browsing into the OPAC could provide "just in time" assistance with controlled vocabulary while also allowing users to categorize items more flexibly and perhaps even to benefit from other users' categorization schemes. Because patrons' use of subject searching is so overwhelmingly problematic, it would be worthwhile to perform additional research on both effective controlled vocabulary instruction and complementary, user-centered methods of classification.

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