

# **Catalog Search among Younger Users**

by

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## A. Description of the Project

Sometimes research is all business, sometimes it's personal. For me, this was a very *personal* project. I spent much of this semester student teaching. Particularly in my elementary school placement, I watched young students struggle with our library catalog. In many cases they knew what materials they wanted, and even knew how to find items on the shelf when provided with the call numbers, but they lacked basic skills necessary to use the catalog to find them. For a typical class of 25 students, with 15 minutes of their library period dedicated to finding and checking out books, I was helping with the catalog 90% of the time, one patron at a time. When I didn't have a parent volunteer or the regular media specialist there to help out, this meant that a good portion of the class remained unattended and unassisted while I performed catalog searches for kids who couldn't do it for themselves. Since this *is* a cataloging course, I thought, what better opportunity to examine this problem in greater depth.

The question I first conceptualized as my guiding question was, "how does age affect how people use online catalogs to search for materials?" From my experiences in the classroom, it appeared that there was a significant connection. Older students at the elementary school, and especially students at the middle and high school levels beyond, seemed to have developed strategies for using the library catalog, and met with greater success as a result. I expected to find that searching for information in a catalog is indeed a *learned skill* that evolves as young, novice users gain experience and build broader bases of knowledge. I wanted to identify strategies that I might use in my work as a media specialist to help students learn to use the catalog more effectively. Perhaps by understanding my users, I would better be able to help them succeed.

This seemed to also fit well with the objectives we had set forth for this course at the beginning of the semester. Among those objectives, we included that we wanted to “learn to think critically about the use of these standards [for the organization and characterization of information] in various types of information settings and for various types of users, and to adapt the standards appropriately.” Further, we intended to “learn principles of how people search for information and how cataloging and metadata tools can assist in finding information.” Both of these goals were addressed in the research I carried out for my project.

My initial research indicated that my expectations about catalog searching being a learned behavior were accurate. I found that scholars have studied the relationship between age and online search behavior from multiple perspectives. Those looking at the relationship from an *information technology* perspective found *experience* to be an important factor in determining choice of search terms, navigational patterns, and modifying searches. Researchers looking at the question from a *pedagogical* perspective focused primarily on the stages through which search expertise developed, and the features of search tools that enabled or hindered novice searchers. They wanted to know how to better teach students to become better users of not only the library catalog, but also other online search tools.

I also found some “surprises” in my research that impacted my approach to the topic. Research on how age/experience affected search behavior focused almost exclusively on search engines – not catalogs. As this is a cataloging class, ideally I would have found more research discussing the issues *specific* to searching for information in library catalogs. However, much of the academic discussion regarding search engine

searching appears to be relatively generalizable to catalog searching. This was something I made sure to be aware of as I synthesized material on the topic. Another surprise was how “big” my initial question turned out to be. Age and experience as they relate to search behavior can be considered from multiple perspectives and can spawn a number of associated questions. Limiting my examination by rephrasing my guiding question was necessary to keep my inquiry from being too broad. The question I ultimately chose to research was phrased as, **“in what ways do young people search catalogs differently than more experienced users?”** This eliminated the need to consider older users who might also lack experience, but who raise a different set of issues and generally have a broader knowledge base than younger users.

## **B. Role in the Project**

I treated my topic from the perspective of an educator looking particularly at the behaviors exhibited by young, novice searchers, and the implications of those behaviors for the design of catalogs and other search tools. Like many media specialists, I think of myself as both a “teacher” and a “librarian.” I help students learn to find information and materials. I also evaluate and implement tools (such as the library catalog) that students use to navigate the library collection.

I felt that I was in a particularly good position to carry out a project like the one I chose, because I was often able to see if what I found in the academic literature “played out” in the classroom as predicted. My media center served as a learning laboratory to collect observational data to validate my synthesis of the findings from existing scholarship. Further, I could utilize my findings from the literature to immediately

improve my instruction in the school library. Everyday at school, I could transform theory into practice. This was very rewarding, and made for fruitful data collection for my own research project.

As I move forward in my career, I will almost certainly rely on some form of catalog or other electronic access system to connect users with items in my collection. I will also very likely be working with young people, either as a school media specialist or as a archivist working to design public programming. The knowledge I am taking away from this research project, about how young people use catalogs to search for information will help me become a better *teacher* of how to use catalogs. It will also improve my ability to select and implement appropriate tools for helping young people find things; in short, to become a better librarian. I think those are worthwhile outcomes by any measure.

### **C. Key Points of the Project**

In carrying out the research for this project, I learned a great deal that will be of benefit to me in my career as a media specialist (or otherwise). In any profession where you are designing a product for someone else, understanding the *users* of that product is extremely important. This holds true for those who design learning experiences, and it certainly holds true for those who design library catalogs. My goal for this project was really to learn more about the young people with whom I am likely to work – the young people who will be relying on the catalog in my library. In that regard, the information I learned in this project is most useful.

From my observational data and from the academic literature, I found that novice users of catalogs and other electronic search tools clearly exhibit behaviors that are different from more experienced users. In terms of their interaction with a computer interface, they consistently:

- Make limited use of scrolling, relying on only the top few results in results lists
- Ignore auxiliary tools such as search history that might help them find materials
- Fail to adapt their searches, performing the same ineffective search repeatedly
- Prefer keyword search over browsing
- Prefer visual and graphical representations instead of text-heavy pages
- Lack an understanding of hierarchies and classification
- Think in concrete rather than abstract terms, and conduct searches accordingly
- Commit spelling errors that affect their search results
- Require excessive amounts of time to input text using a keyboard

These findings point to directions for instruction and catalog design of which media specialists should be aware. With regards to catalog design, there are several components which would benefit young and novice users:

- Extensive use of pictures, graphics, and animation in place of text to represent ideas and items – for example, pictures of the cover of books in results lists
- Simple, clear navigational paths to information
- Results lists that place the most relevant items at the top
- Keyword searching that offers suggested terms for further search
- Keyword searching that results in succinct lists of relevant items
- Colorful, attractive, text-light design

- Automatic spell-checking tools built into search boxes
- Alternatives to text-based searching, such as image-based browsing

And in terms of instruction, my findings in this project suggest that young catalog users may benefit from:

- Direct instruction in catalog searching, including Boolean operators
- Increased opportunity for trial and error to find items in the catalog (building experience)
- Training in evaluating results lists

The most important ideas I will take away from this project are that young searchers have unique behaviors and needs, that searching the library catalog is a learned skill, that instruction will benefit from an understanding of the community of novice searchers, and that library catalogs and other interfaces should have certain components to better enable novices searchers to effectively connect with information.

#### **D. Resources Used**

I owe a debt of gratitude to my students at Burns Park Elementary and Greenhills School, as they unknowingly provided a significant amount of observational data for this project. I was able to gain a better understanding of user behavior and the challenges that novice searchers face in using library catalogs, simply by watching and assisting them on a daily basis. Further, my conversations with Jan Toth-Chernin at Greenhills and Rachel Erdstein at Burns Park about how they help students become better searchers shaped my own attitude about the “teachability” of helpful search behaviors. They also equipped me with an enhanced ability to evaluate library catalogs for their effectiveness in helping

students find what they are looking for. I used the aforementioned individuals as resources in conjunction with the academic and professional literature that is detailed below.

**Bilal, Dania. 2000. Children's Use of the Yahoooligans! Web Search Engine: I. Cognitive, physical, and affective behaviors on fact-based search tasks. *Journal of the American Society for Information Science and Technology* 51(7):646-665.**

This is the first in a major 3-part study by Dania Bilal into the search behaviors of young people in the online environment. Bilal's research has implications for catalog design and for the role of the media specialist and teacher in helping kids learn how to search. Here, she observed a group of students as they performed an information-seeking task using the Yahoooligans! search engine. Her findings were informative. Bilal found that although different types of search were available, keyword searching was the preferred method of locating information. Children favored searching for concrete terms over browsing for more abstract concepts. Search strategies tended to be singular, lacking flexibility; attempts to go beyond simple keyword searching were often "chaotic." Kids in the study for the most part did not adapt their searches efficiently when they met with difficulty in achieving their information goals. Their navigational skills were minimal, and featured limited use of hyperlinks and browser buttons like "back," as well as minimal scrolling. They did not record initial searches to benefit them during later searches, and would thus often repeat the same ineffective keyword searches. Further, they failed to make use of available tools for tracking their activity or facilitating their search. Bilal's study was an extremely helpful starting point for me to consider the range of behaviors typical of younger catalog users. Many of her findings, I would later realize, were echoed in the subsequent research of others on search behavior.

**Bilal, Dania. 2001. Children's Use of the Yahoooligans! Web Search Engine: II. cognitive and physical behaviors on research tasks. *Journal of the American Society for Information Science and Technology* 52(2):118-136.**

In part II of her study, Bilal had her subjects perform a task that was more research-based than fact-based (as in Part I). She found generally that young searchers had a lower success rate with this assignment, because their understanding of the information universe was still in a very “concrete” stage – this task required a higher level of abstraction. As such, some of the search behaviors exhibited in Part I proved to be more of a hindrance for the users in accomplishing their information goals. Bilal discovered that when faced with difficulty, novice users employed trial and error to improve their search effectiveness, learning from their mistakes. (This particular finding is at odds with other research I found that indicates novice searchers commit the same mistakes again and again.) Bilal also found that young searchers were often “distracted” by irrelevant search results. As in Part I of the study, students usually preferred keyword searching to browsing subject hierarchies. Boolean operators were never employed – this was a technique the students had not yet learned. Natural language searches were almost entirely absent. Overall, Bilal found that students were becoming more efficient searchers as they spent more time using online tools. This is in keeping with what I expected to find about search – that it is a learned behavior upon which teachers and media specialists can have an impact. Bilal's study proved very helpful to me in my project.

**Bilal, Dania. 2002. Children's Use of the Yahoooligans! Web Search Engine: III. Cognitive and physical behaviors on fully self-generated search tasks. *Journal of the American Society for Information Science and Technology* 53(13):1170-1183.**

In the final part of Bilal's 3-part study, she allowed her subjects to fully generate their own information-seeking tasks. The author used these tasks to gather additional data

regarding search behavior among young users, and to examine the effects of user-generation of tasks on motivation and success. Similar to the first two parts of her study, subjects favored keyword search over subject browsing, a behavior that diminished with increased time spent on task. Natural language search was used more frequently in this final part of the study. Auxiliary search history tools remained unused, and scrolling was still limited. In general, this part of the study supported the findings of the first two parts, and further supported the idea that search is a learned behavior with improvement coming from experience. Bilal's work speaks to the components of catalog design that might be most effective for young users: lots of visual information, reliable results from keyword searches, and limited need for scrolling and navigation, among other facets.

**Byerly, Greg, and Carolyn Brodie. 2006. Search Engines – One More Time with Feeling. *School Library Media Activities Monthly* 23(1):37-39.**

Byerly and Brodie examine a range of currently available search engines for kids from the perspective of the practicing media specialist. While their discussion focuses on search engines, it informs my own inquiry into catalog search and younger users. The authors identified several features that they found particularly helpful for young, novice searchers. Examples include filtering of results, natural language search capability, visually engaging design, and use of graphical representation of information. I didn't find the article to be particularly informative or helpful, except that it indicated that practicing media specialists are also thinking about what constitutes a good online search tool for young patrons.

**Colaric, Susan M., Fine, Bethann, and Hofmann, William. 2004. Pre-Service Teachers and Search Engines: Prior Knowledge and Instructional Implications.**

**Association for Educational Communications and Technology. 27th, Chicago, IL, October 19-23, 2004.**

Colaric, Fine, and Hofmann conducted a study over three semesters investigating the level of knowledge that pre-service teachers (undergraduates in teacher education programs) had about search engines and performing web searches. The results were less than encouraging – like much of the general population, the subjects in the study had misconceptions about electronic searching, demonstrated poor query formulation, and had a lack of understanding about semantics and boolean operators. The authors of the study believed that teachers needed additional training in the use of search tools (such as catalogs). Otherwise, in schools you may have the proverbial “blind leading the blind.” In terms of my own research, this study supports the notion that search is a learned behavior, and that teachers and media specialists may not be entirely aware of the best ways to teach young students to become better searchers. Students rely partly on their teachers and partly on interface design to carry out their catalog searches; if teachers are deficient, this would suggest the importance of catalog interface design that “teaches” students while it helps them find things.

**Cooper, Linda Z. 2002. A Case Study of Information-seeking Behavior in 7-year-old Children in a Semi-structured Situation. *Journal of the American Society for Information Science and Technology* 53(11):904-922.**

Cooper studied the information-seeking habits of 7-year-old-children. She chose this group of subjects in particular because she felt the current research had neglected to focus on the “very young,” likely due to their status as non-readers/early readers. Her subjects were different from library patrons in that they still rely heavily on asking questions directly as opposed to seeking information from abstract, symbolic sources

(like words in a book or on a computer screen). Further, many 7-year-olds are at the point where they are just starting to understand categorization and placement of items into hierarchies. As a result, their interaction with the abstract world of library catalogs presents them with unique issues. Cooper believes that these issues take on added importance at a time when students are increasingly expected to become efficient seekers and users of information resources at an early age. The author wanted to learn how 7-year-olds would cope with the largely text-based environment they were being called upon to navigate in the library. She also sought to find out how adding visual information to text might affect her subjects' information search strategies. She used cameras to monitor the search behavior of students carrying out information-seeking tasks in their school media center. While Cooper's research did not focus on the use of the library catalog, her findings can inform that discussion. She found that when looking for information, young people recognize when their old strategies are inefficient and quickly adopt new methods when they are more efficient. As I interpret her findings, if the media specialist shows young learners new tricks that work, they are quick to adopt them – very encouraging. Cooper also determined that young children favor browsing as an information search strategy, and that they favor visual over textual information when available. Because they lack language and categorization skills, young children choose ineffective browsing strategies over analytical search strategies. Young children tend to avoid strategies with which they are uncomfortable. These findings are consistent with other material I've been reading, which indicates very clearly that young children are visual and prefer text-light interfaces, and speaks well to my own inquiry into the search behavior of very young users. It suggests that not only in online catalogs, but also in

classification schemes, designers (and implementers such as media specialists) should rely heavily on visual representation of information.

**Gunn, Holly. 2007. Searching the Web with Search Engines for Children. *Teacher Librarian* 34(5):66-71.**

Holly Gunn examined several search tools intended for a young audience to find out what kinds of approaches were being used in the design of search engines for kids. She discovered that designers are employing new approaches that recognize the differences between novice and experienced searchers. For example, “Quintura for Kids” employs clickable visual objects in place of text. It also provides related and more specific search terms based on users’ initial searches. “KidsClick!” is another tool that recognizes young users’ difficulty in filtering/evaluating search results, addressing the problem by delivering only “pre-approved” sites for kids in search results. Gunn noted that this approach, which is also used by other search tools for kids, provides limited search results. Visual enhancement and use of graphics, attractive and colorful site design, and limiting results to pre-approved sites are common strategies being used in search engines designed specifically for kids. Gunn’s evaluation is encouraging, as it shows that designers are really thinking about how their younger users are different from adults, and how they are moving away from “one-size-fits-all” search tools. While her inquiry was directed toward search engines, some of the strategies she highlighted might also apply well to catalogs – attractive and colorful design, an emphasis on the visual as opposed to textual, and user supports like recommended search terms and pre-screened search results.

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**Hirsh, Sandra G. 1999. Children's Relevance Criteria and Information Seeking on Electronic Resources. *Journal of the American Society for Information Science and Technology* 50(14):1265-1283.**

Hirsh was interested in looking at the search strategies used by elementary school students in their school library. She recognized that young students are increasingly being required to use electronic tools to satisfy their information needs. She monitored students as they searched in a library catalog, an electronic encyclopedia, and on the web to find information for a report on a sports figure. She identified several patterns of search behavior. Children didn't assign much importance to the authority of the information they found (graphical or textual), placing more value on its "interestingness" or topicality. They devoted a large part of their research time to finding pictures. Young catalog users were frustrated when the results they got from a search weren't what they expected to find. Often, they didn't keep track of or record their searches. They didn't learn from their failed searches, and made the same mistakes repeatedly. They heavily favored searching concrete terms rather than abstract, were willing to accept results rather than look at them critically because they wanted to get the assignment done, and did not make use of advanced search features. They displayed little use of navigation; rather than navigate back to a results list, they would just type the same term in repeatedly. Hirsh concluded that young students would benefit from training in search techniques and navigation. Her findings reflect two of the main ideas I will take away from this research project: young searchers have identifiable habits and techniques that make them different from more experienced users, and it is important for teachers and media specialists to help young users *learn* how to use the library catalog to search for items and information.

**Kuntz, Jerry. 2001. *Teach and They Shall Find. School Library Journal* 47(5):54-56.**

Kuntz suggests several specific techniques for teaching search to novice catalog and internet users. He believes that learning to search is a critical information-seeking skill that teachers and media specialists need to help students develop. To do so, argues Kuntz, they need to focus on a set of skills that will support effective search but that may be lacking in younger users. For example, they need to understand hierarchy in classification systems. They also need to understand basic principles of keyword searching. Like much of the other material I have examined as part of this research project, Kuntz wasn't necessarily talking about searching in library catalogs, but his findings about search behavior in young people are applicable to a discussion about catalog use. Many young users lack an understanding of how to execute keyword searches in library catalogs, and results are meaningless for them without an understanding of how Dewey or other classification schemes work to organize information. Kuntz suggests that young searchers would benefit from tools designed specifically for kids, tools that rely on pre-selection of available results (which is essentially built in to a school library catalog). His work recognizes one of the common themes I have found in carrying out this project: young searchers have difficulty filtering their search results and need a catalog that assumes some of the responsibility for doing that.

**Large, Andrew, Jamshid Beheshti, and Tarjin Rahman. 2002. Design Criteria for Children's Web Portals: The Users Speak Out. *Journal of the American Society for Information Science and Technology* 53(2):72-94.**

Large, Beheshti, and Rahman employed focus groups of young Web users (10-13 years old) to investigate what they felt were the most important, useful, or appealing

design elements of Web portals and access tools. The groups evaluated several existing tools designed for kids, such as the popular Yahoooligans! search engine and Ask Jeeves for Kids. Their findings illuminated my own investigation of how young people search in the library catalog, and were consistent with much of the other literature I examined. The authors found that visual display was important – how an interface appeared was significant to how kids perceived its attractiveness and value. Young users like lots of color and visual information, and dislike text-heavy pages. They prefer to be able to get at information quickly, rather than having to perform significant navigation or multiple searches. They put a premium on getting what they want fast. Keyword searching should provide useful results without augmentation. As I’ve found elsewhere, young users of online search tools *despise* extensive scrolling! Some things that kids did not ask for included auxiliary tools like spell-check or “help” functions. They preferred their online search tools simple, which is also in keeping with information I’ve found elsewhere. I found this article to be very helpful, primarily because it solicited direct feedback from the users in whom I am interested; this was unique among the literature I reviewed. It’s meaningful to see how the features that young searchers value compare with those that researchers deem important.

**Large, Andrew, Jamshid Beheshti, and Charles Cole. 2002. Information architecture for the Web: The IA matrix approach to designing children's portals. *Journal of the American Society for Information and Technology* 53(10):831-838.**

Large, Beheshti, and Cole authored this somewhat technical article in which they looked at how to effectively design web portals for children. They developed a “matrix” for building the information architecture of a web portal for young users. Basically, the designer of the portal considers the user, content, and objective of the system to

determine how it should best function. The authors suggested that designers consider differences between novice and advanced information seekers, such as the capability for abstraction. Young searchers are less likely to be able to perform searches using abstract terms and are more likely to use concrete terms; they will rely heavily on keyword searches; they are “disoriented” by hypertext navigation. Interestingly, Large, Beheshti, and Cole found that young searchers disliked interactivity and preferred search tools that got them to the information they were seeking as quickly and painlessly as possible, with an elevated level of disregard for the value or validity of the information or its source. In terms of my own project, this study is most valuable for what it suggests about the design of web portals like library catalogs – that young users have different needs and strategies and that those needs and strategies must be considered.

**Lazonder, Ard W., Harm J.A. Biemans, and Iwan G.J.H. Wopereis. 2002. Differences Between Novice and Experienced Users in Searching Information on the World Wide Web. *Journal of the American Society of Information Science* 51(6):576-581.**

Lazonder, Biemans, and Wopereis studied fourth-graders and found that searching on the Web is very much a learned skill that requires expertise to be carried out successfully. Searchers have to know what search terms to employ and how to judge lists of results in order for the tools they use (catalogs, search engines) to be meaningful. According to the authors, the school media center is increasingly a place for student learning, and as such, requires the media specialist to spend more time teaching students how to become effective seekers of information on the Web. The authors found that increasing domain expertise (subject knowledge) was the most important factor in enhancing search success, but that this responsibility fell outside the responsibility of the

typical media specialist – their primary responsibility was instead to teach students how to use the tools available to them to find information. Curiously, the study determined that novice and expert users of online search tools were similar in their performance of navigational tasks (hypertext browsing) once resources were located, but that expert searchers were significantly more efficient at locating resources – they knew what kinds of searches to employ and how to utilize the locating tool; this implied to the authors that media specialists should focus on teaching novice users how to locate information. In terms of catalog use, this would imply that media specialists might have the most impact by teaching students how to find what they’re looking for rather than teaching them how to attempt to judge the value of those items. The findings of this particular article were difficult for me to synthesize with other material I’d read as part of my project research.

**Slone, Debra J. 2003. Internet Search Approaches: The Influence of Age, Search Goals, and Experience. *Library & Information Science Research* 25(4): 403-418.**

Slone used observational and interview data to determine how “end-user goals,” user age, and experience affected approaches to searching for information on the Internet. Slone determined that it was experience, not age, that was the critical factor in determining search techniques. However, similar ages often shared similar levels of experience (or inexperience). Less experienced users faced common problems with term generation, spelling, and syntax. They tended to have issues centered around not-yet-developed language skills, which was problematic in a text-based search environment. Understanding search results was another common problem faced by novice searchers, and also among many with experience. Younger users often failed to use tools that were available to facilitate their searches, like drop-down menus, search histories, or other

navigational aids. Younger users in particular gravitated towards “short text and visually stimulating results.” Pictures were important for the youngest searchers in determining relevance, a factor that decreased consistently with age and experience. This has significant implications for my inquiry into catalog search behaviors, pointing once again to the importance of the visual over the textual for younger users. Also, it suggests that catalogs with lots of supplementary search tools may be doing more to confuse young users than to help them. Also, appearance of the interface and the results list is important for helping younger users to evaluate retrieved items.

**Slone, Debra J. 2002. The Influence of Mental Models and Goals on Search Patterns during Web Interaction. *Journal of the American Society for Information Science and Technology* 53(13):1152-69.**

In this study, Slone found that Internet experience played a large part in determining what kind of search approaches would be employed in looking for information online in the library. Inexperienced, novice searchers were more likely to limit their searches to the library catalog, while experienced searchers looked to a variety of tools. Familiarity with the chosen search tool seemed to be important to users with less-developed mental models of the internet. Ease of use was particularly important for novice users, who simply gave up in their information search when it became too difficult or frustrating. This suggests that catalogs for younger users should focus on simplicity and ease of use in order to be most valuable. Slone found that among novice searchers, “linking” (navigating by clicking links) was favored over analytic searching (inputting search terms in multiple iterations). That is, novice users lacked the ability to modify their search based on results and did not like search tools that required interactivity between the interface and the user. The youngest and most inexperienced searchers

studied were also the least likely to be able to navigate effectively using functions like the “back” button, and were least likely to scroll when presented with an extensive list of results – if results weren’t at the top of the list, they were often ignored. This has significant implications for library catalog design for young users. It suggests that results lists ought to be succinct enough to render scrolling less important, or that librarians need to focus on teaching their younger patrons how to scroll effectively (or both!). It also suggests that interfaces designed for younger users should minimize the need to modify text searches by inputting new terms; rather, additional suggested search terms might be “clickable” to offer a navigational strategy that is more comfortable for the youngest users. I found this study to be very useful in thinking about the types of issues that are salient to catalog use by inexperienced library patrons.

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