

INFO 202 —Project 2: Design Vocabulary for Target User Group

Your names: Nicole Shaw, Joshua Simpson, Alejandra Magallon, Jaelynn Wilson, Susan Widule

Preparation: Target User Description

Insert the description of your target users below (250-300 words).

Our target user group is MLIS graduate students focusing on the academic library career pathway. Graduate students on this pathway are focused on learning about libraries in institutions for higher education. The majority of their study is centered around teaching, collaboration, and emerging technologies. In addition, students have a strong affinity for higher education research in fields ranging from the humanities to STEM. This user group needs to be able to search for information on research methodologies in order to learn about the various ways that patrons of academic libraries want to access and use collections, databases, and archived materials.

Students on the academic library pathway are focused on serving undergraduate, graduate, and professors and their information needs. Graduate students in this field look to build on their foundational knowledge of LIS and apply it to the problems facing communities in academic libraries. Our target user group will need to be able to learn more about specific library constituents and their research and study methods.

Our user group will also need to access literature on information literacy and best practices for how to convey this knowledge and skills to library users. The academic librarianship pathway requires graduate students to develop a grasp of the various skills and methods involved in instructing students and other researchers on how to utilize library resources and information technologies, and how to think critically about those sources and tools.

Students on the academic librarian pathway also need to be able to easily find literature about new and emerging technologies related to databases and web-based reference studies. The mode of education is relying more heavily on web-based instruction and web-based reference help. Graduate students focusing on academic librarianship will focus on learning about these new modes of communication via the web for reference and beyond.

Part 1—Worksheets & Controlled Vocabulary

Worksheet 1: Identify central concepts. (Step 3)

	RECORDS Step 2: Paste in your 9 records.	MOST IMPORTANT CONCEPTS Step 3: identify main concepts
1	Bates, Marcia. (1999). The invisible substrate of information science . <i>Journal of the American Society for Information Science</i> , 50(12), 1043-1050.	research librarianship information science professions

	<p>The explicit, above-the-water-line paradigm of information science is well known and widely discussed. Every disciplinary paradigm, however, contains elements that are less conscious and explicit in the thinking of its practitioners. Elucidates the key elements of the below-the-water-line portion of the information science paradigm. Highlights the role of information science as a meta-science: conducting research and developing theory around the documentary products of other disciplines and activities. Views the mental activities of the professional practice of the field as centering around representation and organization of information, rather than knowing information. Argues that such representation engages fundamentally different talents and skills from those required in other professions and intellectual disciplines. Also considers methodological approaches and values of information science.</p>	<p>history of information science indexing information retrieval research practices methodologies meta-strategies librarian training professional competencies</p>
<p>[copy & paste in the rest of citations with their abstracts from the <i>Supplemental Readings</i> list into the table cells below, one at a time]</p>		
2	<p>Buckland, Michael. (1991). Information as thing. <i>Journal of the American Society of Information Science</i>, 42(5), 351-360.</p> <p>Three meanings of "information" are distinguished: "Information-as-process"; "information-as-knowledge"; and "information-as-thing", the attributive use of "information" to denote things regarded as informative. The nature and characteristics of "information-as-thing" are discussed, using an indirect approach ("What things are informative?"). Varieties of "information-as-thing" include data, text, documents, objects, and events. On this view "information" includes but extends beyond communication. Whatever information storage and retrieval systems store and retrieve is necessarily "information-as-thing". These three meanings of "information", along with "information processing", offer a basis for classifying disparate information-related activities (e.g. rhetoric, bibliographic retrieval, statistical analysis) and, thereby, suggest a topography for "information science".</p>	<p>information knowledge information systems information science information processing evidence data documentation events information resources information storage Information retrieval resource management information technology information theory retrieval systems</p>
3	<p>Bates, Marcia. (1986). Subject access in online catalogs: a design model. <i>Journal of the American Society for Information Science</i>, 37(6), 357-376.</p> <p>A model based on strikingly different philosophical assumptions from those currently popular is proposed for the design of online subject catalog access. Three design principles are presented and discussed: uncertainty (subject indexing is indeterminate and probabilistic beyond a certain point), variety (by Ashby's law of requisite variety, variety of searcher query must equal variety of document indexing), and complexity (the search process, particularly during the entry and orientation phases, is subtler and more complex, on several grounds, than current models assume). Design features presented are an access phase, including entry and orientation, a hunting phase, and a selection phase. An end-user thesaurus and a front-end system mind are presented as</p>	<p>online library catalogs indexing indexing systems indexers psychology libraries subject searchers information retrieval systems information systems index languages subject cataloging cross references</p>

	<p>examples of online catalog system components to improve searcher success during entry and orientation. The proposed model is "wrapped around" existing Library of Congress subject-heading indexing in such a way as to enhance access greatly without requiring reindexing. It is argued that both for cost reasons and in principle this is a superior approach to other design philosophies.</p>	<p>information access</p>
4	<p>Johnson-Eilola, Johndan (2001). Little machines: Understanding users understanding interfaces. <i>ACM Journal of Computer Documentation</i> 25(4), 119-127.</p> <p>This paper questions the ubiquitous practice of supplying minimalist information to users, of making that information functional only, of assuming that the Shannon-Weaver communication model should govern online systems, and of ignoring the social implications of such a stance. Help systems that provide fast, temporary solutions without providing any background information lead to the danger of users completing tasks that they do not understand at all. (Word will help us write a legal pleading, even if we have no idea what one is.) As a result, we have help systems that attempt to be invisible and to provide tool instruction but not conceptual instruction. Such a system presents itself as a neutral tool, but it is actually an incomplete environment, denying both the complexity and alternative (and possibly improved) modes of thinking about the subject at hand.</p>	<p>computer software computer users manuals learning communications technical communications technical writing documentation user interface instructions training</p>
5	<p>Aula, A., Khan, R.M., & Guan, Z. (2010, April). How does search behavior change as search becomes more difficult? <i>CHI '10 Proceedings of the SIGCHI Conference on Human Factors in Computing Systems in Atlanta, GA</i>. New York, NY: AMC.</p> <p>Search engines make it easy to check facts online, but finding some specific kinds of information sometimes proves to be difficult. We studied the behavioral signals that suggest that a user is having trouble in a search task. First, we ran a lab study with 23 users to gain a preliminary understanding on how users' behavior changes when they struggle finding the information they're looking for. The observations were then tested with 179 participants who all completed an average of 22.3 tasks from a pool of 100 tasks. The large-scale study provided quantitative support for our qualitative observations from the lab study. When having difficulty in finding information, users start to formulate more diverse queries, they use advanced operators more, and they spend a longer time on the search result page as compared to the successful tasks. The results complement the existing body of research focusing on successful search strategies.</p>	<p>computer users search strategies user experience complex searching user behavior search queries search operators informational searching user behavior</p>
6	<p>Toms, Elaine.(2012). User-centered design of information systems. In M.J. Bates (Ed.), <i>Understanding Information Retrieval Systems: Management, Types, and Standards</i>. Boca Raton, FL : CRC Press.</p>	<p>design UCD User centered design</p>

	<p>User-Centered Design (UCD) was founded on the premise that knowledge of users and their participation in the way that systems are designed is essential. User-centered design is a “multidisciplinary design approach based on the active involvement of users to improve the understanding of user and task requirements, and the interaction of user design and evaluation.”</p> <p>This entry first provides background on the genesis of UCD, following by a section on the philosophy and theoretical underpinning of UCD, and then a description of the method, as it is generally practiced.</p>	<p>design philosophy multidisciplinary design information systems information design information systems design industrial design systems design design psychology user interfaces usability HCI human-computer interactions</p>
7	<p>Gross, T. & Taylor, A. (2005). What have we got to lose? The effect of controlled vocabulary on keyword searching results. <i>College & Research Libraries</i>, 66(3). Retrieved from http://crl.acrl.org/index.php/crl/article/view/15726 .</p> <p>Using controlled vocabulary in the creation and searching of library catalogs has evoked a great deal of debate because it is expensive to provide. Leading to this study were suggestions that because most users seem to search by keyword, subject headings could be removed from catalog records to save space and cost. This study asked, what proportion of records retrieved by a keyword search has a keyword only in a subject heading field and thus would not be retrieved if there were no subject headings? It was found that more than one-third of records retrieved by successful keyword searches would be lost if subject headings were not present, and many individual cases exist in which 80, 90, and even 100 percent of the retrieved records would not be retrieved in the absence of subject headings.</p>	<p>bibliographic records controlled vocabulary library catalogs catalogs online catalogs subject headings subject indexes subject indices subject searching subject searches subject access keyword searches keyword searching results keyword search results searching title keywords title keywords search natural language search indexing languages OPAC online public access catalogs</p>
8	<p>Bates, Marcia J. (2007, October). What is browsing—really? A model drawing from behavioural science research. <i>Information Research</i>, 12(4). Retrieved from http://www.informationr.net/ir/12-4/paper330.html</p> <p>Introduction. It is argued that the actual elements of typical browsing episodes have not been well captured by common approaches to the concept to date.</p>	<p>browsing information system design empirical research directed browsing semi directed browsing undirected browsing</p>

	<p>Method. Empirical research results reported by previous researchers are presented and closely analysed.</p> <p>Analysis. Based on the issues raised by the above research review, the components of browsing are closely analysed and developed.</p> <p>Browsing is seen to consist of a series of four steps, iterated indefinitely until the end of a browsing episode: 1) glimpsing a field of vision, 2) selecting or sampling a physical or informational object within the field of vision, 3) examining the object, 4) acquiring the object (conceptually and/or physically) or abandoning it. Not all of these elements need be present in every browsing episode, though multiple glimpses are seen to be the minimum to constitute the act.</p> <p>Results. This concept of browsing is then shown to have persuasive support in the psychological and anthropological literature, where research on visual search, curiosity and exploratory behaviour all find harmony with this perspective.</p> <p>Conclusions. It is argued that this conception of browsing is closer to real human behaviour than other approaches. Implications for better information system design are developed.</p>	<p>library user studies information seeking behavior visual scanning scanning information behavior browsing process visual search visual search theory exploratory behavior information system design</p>
<p>9</p>	<p>s, W. H. (2011, October). Comparative recall precision of simple and expert searches in GoogleScholar and eight other databases. <i>portal: Libraries and the Academy</i>, 11(4), 971-1006.</p> <p>This study evaluates the effectiveness of simple and expert searches in Google Scholar (GS), EconLit, GEOBASE, PAIS, POPLINE, PubMed, Social Sciences Citation Index, Social Sciences Full Text, and Sociological Abstracts. It assesses the recall and precision of 32 searches in the field of later-life migration: nine simple keyword searches and 23 expert searches constructed by demography librarians at three top universities. For simple searches, Google Scholar's recall and precision are well above average. For expert searches, the relative effectiveness of GS depends on the number of results users are willing to examine. Although Google Scholar's expert-search performance is just average within the first fifty search results, GS is one of the few databases that retrieve relevant results with reasonably high precision after the fiftieth hit. The results also show that simple searches in GS, GEOBASE, PubMed, and Sociological Abstracts have consistently higher recall and precision than expert searches. This can be attributed not to differences in expert-search effectiveness, but to the unusually strong performance of simple searches in those four databases.</p>	<p>google scholar simple search expert search search search recall information retrieval database bibliographic database research libraries academic libraries university libraries simple versus expert searches search mechanism database coverage search results search effectiveness ineffective search indexing subject searches scholarly literature student search behavior scholar search behavior</p>

10	<p>Marcia J. (1989). The design of browsing and berrypicking techniques for the online search interface. <i>Online Review</i>, 13(5), 407-424.</p> <p>First, a new model of searching in online and other information systems, called "berrypicking", is discussed. This model, it is argued, is much closer to the real behavior of information searchers than the traditional model of information retrieval is, and , consequently, will guide our thinking better in the design of effective interfaces. Second, the research literature of manual information seeking behavior is drawn on for suggestions of capabilities that users might like to have in online systems. Third, based on the new model and research on information seeking, suggestions are made for how new search capabilities could be incorporated into the design of search interfaces. Particular attention is given to the nature and types of browsing that can be facilitated.</p>	<p>online search berrypicking browsing information retrieval information seeking search techniques search environment online systems interface design search interface databanks databases database design</p>
----	--	--

Worksheet 2: Turn concepts into draft terms, then into your vocabulary list. (Steps 4,5,6)
Using your terms in Worksheet 1, group similar/related concepts together in the area below.

Step 4: Group similar/related concepts <i>using the concepts from Worksheet 1</i>		
<p>design</p> <p>UCD User centered design</p> <p>multidisciplinary design industrial design interface design systems design information systems design information design information systems</p> <p>design psychology psychology</p> <p>Google Scholar</p> <p>computer software</p> <p>retrieval systems information retrieval systems information retrieval</p> <p>usability</p>	<p>search queries search recalls search operators visual search visual search theory simple search expert search simple versus expert searches search mechanism search results search effectiveness ineffective search natural language search search strategies online search search techniques search environment search interface</p> <p>indexing languages indexing subject indexes cross references</p> <p>OPAC online public access catalogs online library catalogs online systems</p>	<p>berrypicking browsing browsing process directed browsing semi directed browsing undirected browsing</p> <p>data databanks databases database design</p> <p>information knowledge information science history of information science</p> <p>information seeking information theory</p> <p>information processing information storage information access information technology information theory information retrieval</p>

meta-strategies		libraries
HCI	computer users	research libraries
human-computer interactions	user experience	academic libraries
	user behavior	university libraries
	user interface	
bibliographic records	user interfaces	philosophy
bibliographic database		design philosophy
	communications	
controlled vocabulary	technical communications	evidence
		empirical research
library catalogs	technical writing	scholarly research
catalogs		research
	documentation	methodologies
online catalogs		scholarly literature
online library catalogs	instructions	
	manuals	events
subject headings		
subject cataloging	learning	resource management
subject searching	training	information resources
search	librarian training	
searching	librarianship	
subject search	professional competencies	
subject searches	professions	
complex searching		
subject access	exploratory behavior	
subject searchers	information behavior	
informational searching	information seeking behavior	
	scholar search behavior	
title keywords		
title keywords search	scanning	
	visual scanning	
keyword searching results		
keyword search results		
keyword searches		

Worksheet 2, continued—Controlled vocabulary: DRAFT list of descriptor terms.

Decide on best term for each concept, creating a 1st draft of vocabulary (Step 5)

List here one term you think you may use to express each concept; it's okay to list more than one as long as only one makes it to the final list below.

design
user-centered design
design philosophy
online systems
interface design
information systems
information design
Google scholar
computer software
information retrieval
human-computer interfaces
keyword searching results
title keywords
natural language search
indexing
subject headings
subject cataloging

subject indexes
subject search
bibliographic records
controlled vocabulary
online library catalogs
library catalogs
keyword searches
online searches
search techniques
search environments
searches
library user studies
information seeking behavior
information seeking
user behavior
exploratory behavior
student search behavior
scholar search behavior
empirical research
OPAC
retrieval systems
database design
user interfaces
usability
databases
bibliographic database
documentation
technical writing
librarianship
professional competencies
browsing
scanning
databases
database design
information science
information retrieval
research libraries
academic libraries
research
methodologies

Worksheet 2, continued—Controlled vocabulary: FINAL list of descriptor terms, in alphabetical order. (Step 6)

*Edit the draft list according to the Exercise 2 instructions.
Sort into alphabetical order.*

academic libraries
bibliographic records
browsing
controlled vocabulary
databases
design
design philosophy
documentation
Google Scholar
human-computer interfaces
indexing

information science
 information seeking
 information seeking behavior
 information storage
 information systems
 information theory
 interface design
 keyword search
 library catalogs
 librarianship
 online library catalogs
 online searches
 online systems
 OPAC
 professional competencies
 psychology
 retrieval systems
 scholar search behavior
 search
 search techniques
 subject cataloging
 subject headings
 title keywords
 usability
 user behavior
 user interfaces
 user-centered design

Worksheet 3: Use your controlled vocabulary to index the records. (Step 7)

Assign 3 to 6 subject descriptor terms to each article.

	RECORD	ASSIGNED DESCRIPTORS
1	<p>Bates, Marcia. (1999). The invisible substrate of information science. <i>Journal of the American Society for Information Science</i>, 50(12), 1043-1050.</p> <p>The explicit, above-the-water-line paradigm of information science is well known and widely discussed. Every disciplinary paradigm, however, contains elements that are less conscious and explicit in the thinking of its practitioners. Elucidates the key elements of the below-the-water-line portion of the information science paradigm. Highlights the role of information science as a meta-science: conducting research and developing theory around the documentary products of other disciplines and activities. Views the mental activities of the professional practice of the field as centering around representation and organization of information, rather than knowing information. Argues that such representation engages fundamentally different talents and skills from those required in other professions and intellectual disciplines. Also considers methodological approaches and values of information science.</p>	<p>librarianship information science indexing professional competencies</p>
[copy & paste in the rest of records from Worksheet #1]		
2	<p>Buckland, Michael. (1991). Information as thing. <i>Journal of the American Society of Information Science</i>, 42(5), 351-360.</p> <p>Three meanings of "information" are distinguished: "Information-as-process"; "information-as-knowledge"; and "information-as-thing", the attributive use of</p>	<p>information theory information science documentation</p>

	<p>"information" to denote things regarded as informative. The nature and characteristics of "information-as-thing" are discussed, using an indirect approach ("What things are informative?"). Varieties of "information-as-thing" include data, text, documents, objects, and events. On this view "information" includes but extends beyond communication. Whatever information storage and retrieval systems store and retrieve is necessarily "information-as-thing". These three meanings of "information", along with "information processing", offer a basis for classifying disparate information-related activities (e.g. rhetoric, bibliographic retrieval, statistical analysis) and, thereby, suggest a topography for "information science".</p>	<p>information storage retrieval systems</p>
<p>3</p>	<p>Bates, Marcia. (1986). Subject access in online catalogs: a design model. <i>Journal of the American Society for Information Science</i>, 37(6), 357-376.</p> <p>A model based on strikingly different philosophical assumptions from those currently popular is proposed for the design of online subject catalog access. Three design principles are presented and discussed: uncertainty (subject indexing is indeterminate and probabilistic beyond a certain point), variety (by Ashby's law of requisite variety, variety of searcher query must equal variety of document indexing), and complexity (the search process, particularly during the entry and orientation phases, is subtler and more complex, on several grounds, than current models assume). Design features presented are an access phase, including entry and orientation, a hunting phase, and a selection phase. An end-user thesaurus and a front-end system mind are presented as examples of online catalog system components to improve searcher success during entry and orientation. The proposed model is "wrapped around" existing Library of Congress subject-heading indexing in such a way as to enhance access greatly without requiring reindexing. It is argued that both for cost reasons and in principle this is a superior approach to other design philosophies.</p>	<p>indexing online library catalogs design philosophy subject cataloging</p>
<p>4</p>	<p>Johnson-Eilola, Johndan (2001). Little machines: Understanding users understanding interfaces. <i>ACM Journal of Computer Documentation</i> 25(4), 119-127.</p> <p>This paper questions the ubiquitous practice of supplying minimalist information to users, of making that information functional only, of assuming that the Shannon-Weaver communication model should govern online systems, and of ignoring the social implications of such a stance. Help systems that provide fast, temporary solutions without providing any background information lead to the danger of users completing tasks that they do not understand at all. (Word will help us write a legal pleading, even if we have no idea what one is.) As a result, we have help systems that attempt to be invisible and to provide tool instruction but not conceptual instruction. Such a system presents itself as a neutral tool, but it is actually an incomplete environment, denying both the complexity and alternative (and possibly improved) modes of thinking about the subject at hand.</p>	<p>design documentation user interfaces interface design</p>

5	<p>Aula, A., Khan, R.M., & Guan, Z. (2010, April). How does search behavior change as search becomes more difficult? <i>CHI '10 Proceedings of the SIGCHI Conference on Human Factors in Computing Systems in Atlanta, GA</i>. New York, NY: AMC.</p> <p>Search engines make it easy to check facts online, but finding some specific kinds of information sometimes proves to be difficult. We studied the behavioral signals that suggest that a user is having trouble in a search task. First, we ran a lab study with 23 users to gain a preliminary understanding on how users' behavior changes when they struggle finding the information they're looking for. The observations were then tested with 179 participants who all completed an average of 22.3 tasks from a pool of 100 tasks. The large-scale study provided quantitative support for our qualitative observations from the lab study. When having difficulty in finding information, users start to formulate more diverse queries, they use advanced operators more, and they spend a longer time on the search result page as compared to the successful tasks. The results complement the existing body of research focusing on successful search strategies.</p>	<p>information seeking user behavior online searches search techniques</p>
6	<p>Toms, Elaine.(2012). User-centered design of information systems. In M.J. Bates (Ed.), <i>Understanding Information Retrieval Systems: Management, Types, and Standards</i>. Boca Raton, FL : CRC Press.</p> <p>User-Centered Design (UCD) was founded on the premise that knowledge of users and their participation in the way that systems are designed is essential. User-centered design is a “multidisciplinary design approach based on the active involvement of users to improve the understanding of user and task requirements, and the interaction of user design and evaluation.”</p> <p>This entry first provides background on the genesis of UCD, following by a section on the philosophy and theoretical underpinning of UCD, and then a description of the method, as it is generally practiced.</p>	<p>design human-computer interfaces information systems usability user-centered design</p>
7	<p>Gross, T. & Taylor, A. (2005). What have we got to lose? The effect of controlled vocabulary on keyword searching results. <i>College & Research Libraries</i>, 66(3). Retrieved from http://crl.acrl.org/index.php/crl/article/view/15726 .</p> <p>Using controlled vocabulary in the creation and searching of library catalogs has evoked a great deal of debate because it is expensive to provide. Leading to this study were suggestions that because most users seem to search by keyword, subject headings could be removed from catalog records to save space and cost. This study asked, what proportion of records retrieved by a keyword search has a keyword only in a subject heading field and thus would not be retrieved if there were no subject headings? It was found that more than one-third of records retrieved by successful keyword searches would be lost if</p>	<p>controlled vocabulary keyword search library catalogs search subject headings title keywords</p>

	<p>subject headings were not present, and many individual cases exist in which 80, 90, and even 100 percent of the retrieved records would not be retrieved in the absence of subject headings.</p>	
8	<p>Bates, Marcia J. (2007, October). What is browsing—really? A model drawing from behavioural science research. <i>Information Research</i>, 12(4). Retrieved from http://www.informationr.net/ir/12-4/paper330.html</p> <p>Introduction. It is argued that the actual elements of typical browsing episodes have not been well captured by common approaches to the concept to date.</p> <p>Method. Empirical research results reported by previous researchers are presented and closely analysed.</p> <p>Analysis. Based on the issues raised by the above research review, the components of browsing are closely analysed and developed. Browsing is seen to consist of a series of four steps, iterated indefinitely until the end of a browsing episode: 1) glimpsing a field of vision, 2) selecting or sampling a physical or informational object within the field of vision, 3) examining the object, 4) acquiring the object (conceptually and/or physically) or abandoning it. Not all of these elements need be present in every browsing episode, though multiple glimpses are seen to be the minimum to constitute the act.</p> <p>Results. This concept of browsing is then shown to have persuasive support in the psychological and anthropological literature, where research on visual search, curiosity and exploratory behaviour all find harmony with this perspective.</p> <p>Conclusions. It is argued that this conception of browsing is closer to real human behaviour than other approaches. Implications for better information system design are developed.</p>	<p>browsing design philosophy information seeking behavior information systems retrieval systems</p>
9	<p>s, W. H. (2011, October). Comparative recall precision of simple and expert searches in GoogleScholar and eight other databases. <i>portal: Libraries and the Academy</i>, 11(4), 971-1006.</p> <p>This study evaluates the effectiveness of simple and expert searches in Google Scholar (GS), EconLit, GEOBASE, PAIS, POPLINE, PubMed, Social Sciences Citation Index, Social Sciences Full Text, and Sociological Abstracts. It assesses the recall and precision of 32 searches in the field of later-life migration: nine simple keyword searches and 23 expert searches constructed by demography librarians at three top universities. For simple searches, Google Scholar's recall and precision are well above average. For expert searches, the relative effectiveness of GS depends on the number of results users are willing to examine. Although Google Scholar's expert-search performance is just average within the first fifty search results, GS is one of the few databases that retrieve relevant results with reasonably high precision after the fiftieth hit. The results also show that simple searches in GS, GEOBASE, PubMed, and Sociological Abstracts have consistently higher recall and precision than expert searches. This can be attributed not to</p>	<p>academic libraries bibliographic records databases Google Scholar scholar search behavior search</p>

	differences in expert-search effectiveness, but to the unusually strong performance of simple searches in those four databases.	
10	<p>Marcia J. (1989). The design of browsing and berrypicking techniques for the online search interface. <i>Online Review</i>, 13(5), 407-424.</p> <p>First, a new model of searching in online and other information systems, called "berrypicking", is discussed. This model, it is argued, is much closer to the real behavior of information searchers than the traditional model of information retrieval is, and , consequently, will guide our thinking better in the design of effective interfaces. Second, the research literature of manual information seeking behavior is drawn on for suggestions of capabilities that users might like to have in online systems. Third, based on the new model and research on information seeking, suggestions are made for how new search capabilities could be incorporated into the design of search interfaces. Particular attention is given to the nature and types of browsing that can be facilitated.</p>	<p>online search online systems search techniques interface design</p>