**Education Information Retrieval Articles**

**Bar-Ilan, J., & Belous, Y. (2007). Children as architects of Web directories: An exploratory study. *Journal of the American Society for Information Science and Technology*, 58(6), 895-907.**

Keywords: Web directories, information retrieval, web search tools, consensus

structure, web design

 Contemporary web-searching keyword tools do not reliably help children with web-searches. Whether it is children’s lack of vocabulary skills or separation from the design process, children have difficulties using keyword search engines. Bar-Ilan and Belous (2007) believe that children have a better search experience when they have menus, categories and hierarchies of information.

 The purpose of this study was to investigate ways in which children categorize

information. Bar-Ilan and Belous (2007) used a categorizing activity for 48 children that

involved separating subject cards into subject groups. The categories of information

focused on leisure and entertainment topics that were familiar to the Israeli children.

 Of greatest potential interest in this article were Web directories as an information retrieval method and the creation of hierarchical structures. Web directories provide children with a graphic organizer that is an alternative to keyword searching. The

children in this study accurately categorized topics into groups similar to those of Web

directories.

 By using the sorting method in creating their hierarchical structures, the children readily eliminated cards that did not pertain to their groups and “consensus structure.’” The children used envelopes to classify their categories into sub-groups, groups and top-

level groups. Although there were problems with concentration and impatience, the

children succeeded in organizing their information effectively (Bar-Ilan & Belous, 2007).

 Future research should examine other studies that have worked with children in

classifying and sorting information for Web directories. Studies should also be conducted

on the effects of children’s inputs into search engines and other juvenile computer

applications. These studies will provide program developers and designers with a true

representation of the interests and ability levels of young computer users for future

search engine design.

**Choi, S. (2008). Implementation of an ontology-based information retrieval model in the classroom setting. *Proceedings of World Conference on Educational Multimedia*, *Hypermedia and Telecommunications*, USA, 6265-6272.**

Keywords: Information retrieval, ontology-based information retrieval, children

 Choi (2008) explains that the Internet has afforded students the opportunity to search and retrieve pertinent information. Nevertheless, Choi contends that students sometimes receive irrelevant information that may overwhelm and frustrate them. However, the author contends that many documents containing the desired semantic information are not retrieved, as they do not contain keywords specified by the user.

 To this end, the author proposes the use of better searching techniques for effective search and retrieval. Choi (2008) purports that users would greatly benefit from a Semantic Web to express information in a form that would allow software agents to understand and process what the terms describing the data mean.

The author maintains that ontology plays a crucial role by providing a source of shared and specific terms that can be understood and processed by machines, effectively allowing computers and people to work together. The author posits that this would effectively improve the students’ information-seeking performance compared with the existing information searching model. Consequently, the author proposes a study to analyze the effect of the ontology-based information retrieval model as a learning supplementary tool.

 The author compares and contrasts the amount of relevant information sought by the ontology-based and the existing information retrieval models. Choi (2008) also examines the extent to which there is a significant difference between the relevance rate of the bookmarked documents sought by ontology-based and the existing information retrieval method. Additionally, the perceived usefulness of the ontology-based information retrieval model in assisting students to search for information was examined. Finally, the relationship between information-searching using the ontology-based information model and students’ project products was explored. Choi concludes that the ontology-based information retrieval model helps students to effectively find information and thus better perform their projects.

**Khribi, M. K., Jemni, M., & Nasraoui, O. (2007). Toward a hybrid recommender system for e-learning personalization based on web usage mining techniques and information retrieval. Paper presented at the *World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education 2007,* Quebec City, Canada.**

Keywords: Information retrieval, online learning.

E-learning has become a very wide-spread phenomenon. While there are many benefits to online learning, it is very difficult to teach a varied group of online learners who all have different levels of knowledge, interest and needs. Additionally, educational resources are generally designed with the “one size fits all” model. They are not customized to each individual student. The various online learners are continuously in need of support and guidance to use these generic resources.

While other fields have begun to take advantage of automatic personalization and

recommendation, e-learning has not yet done so. The goal of web personalization is to

give a user information that is tailored to his or her specific preferences and interests.

This is done by collecting user data implicitly through web access logs or explicitly through user ratings. Today’s web personalization systems strive to accomplish this goal automatically without having to explicitly ask users to provide the necessary information. An automatic web personalization system could be used to guide individual learner’s activities and recommends links or actions that are specific to that learner’s needs.

Various different methods are available to gather the user information necessary to provide personalized service. This is done by collecting user data implicitly through web access logs or explicitly through user ratings. Various approaches can then be

applied in determining what data to return to the users. Content based filtering recommends items that are similar to those viewed by the user in the past. Only one user profile is used in each case. Collaborative based filtering recommends items that have been like by other users with similar interests. The entire community of users comes into play here. For example, if 70% of users who accessed web page A also accessed web page B, the system will recommend web site B. Hybrid systems combine both approaches and use them all together.

**Lawrence, J. C. (2007).** [**Techniques for searching the CINAHL Database using the EBSCO interface.**](../Documents/NOVA/DCTE%20750/Techniques%20for%20Searching.pdf) ***AORN Journal,* 85 (4), 779-791.**

Keywords: Information retrieval, nursing students, retrieval training, retrieval process steps

The steps for performing a search using the Cumulative Index to Nursing and Allied Health Literature (CINAHL) are detailed with many steps being transposable to other interfaces. The first step is to understand that a specialist that links the article to specific subject headings indexes all articles in this database. The subject headings are the searchable words not the entire article and keywords as in other databases. Each subject heading is further broken into sub-headings that are readily accessible in the database’s search engine. Clicking on a simple key assists in exploding this subject heading to its broadest search capability to include not only the subject heading, but also all of the sub-headings that may be related to the topic. Steps to limit the search to specific filters such as dates, peer reviewed or full text are outlined.

 The key points of conducting, combining and saving searches could also be used to teach details regarding information retrieval from research databases. Each interface may have some nuances that may need to be refined, but the general steps could be incorporated into any search engine. Learning the uniqueness of research interfaces is an important skill for the novice as well as the experienced researcher.

**Lee, C. , & Chen, H. (2000). A new efficient retrieval interface for primary school students. *Proceedings from the International Conference on Mathematics/Science Education and Technology,* 250-255.**

Keywords: Information retrieval, leading-question retrieval interface

The authors state that there is a wealth of information available on the Internet, and contend that users are able to conveniently get their desired data online. Nevertheless, they maintain that primary school students find it challenging to efficiently find the exact information they need by using some keywords to do conventionally searching.

To this end, they propose a new retrieval interface, called leading-question retrieval interface as a solution for the aforementioned problem. They state that this system will present questions to students, and analyze their answers in a bid to understand

their queries. They contend that this will omit the difficult task of choosing proper keywords.

The authors conducted a study using vertebrates as the subject, and propose that: (a) primary school students who use the leading-question retrieval interface to retrieve information online will have a better computer attitude than those who use the full-text retrieval interface, (b) the retrieval precision of the retrieved data for the primary school

students who use the leading-question retrieval interface will be better than the one for those who use the full-text retrieval interface, (c) the retrieval recall of the retrieved data for the primary school students who use the leading-question retrieval interface will be better than the one for those who use the full-text retrieval interface.

The authors report that the computer attitude of primary school students who use the leading-question retrieval interface is better than that of students who use the full-text retrieval interface. They also found that the retrieval precision of leading-question retrieval interface for the primary school student is better than that of full-text retrieval interface. In addition, the retrieval recall of the primary school students who use the leading-question retrieval interface to retrieve information is better than that of those who use the full-text retrieval interface.

**Macpherson, K. (2004). Undergraduate information literacy: a teaching framework. *Australian Academic & Research Libraries*, 35(3), 226-242.**

Keywords: Information retrieval, information literacy.

As the amount of information and the channels available to access that information increase, today’s graduates need to be able to navigate these channels. Information that cannot be retrieved is useless. It is, therefore, critical that students be able to locate, analyze, and evaluate the value of information. Macpherson (2004) found that many second year undergraduate students were unable to conduct a simple search.

Information retrieval and information literacy go hand in hand. In order for the retrieval process to be effective, critical thinking and analysis should be involved. An appropriate model of the information needed and an understanding of the ways through which it can be retrieved, are essential to successful information retrieval. As new information is retrieved, critical thinking skills come into play and are used to modify the search procedures and strategies.

There are three components to information retrieval: the ability to locate, analyze and articulate the significance of the information found as it relates to the information needs. A student, who can successfully interpret a question and formulate a search strategy, will not locate the appropriate information if the ability to analyze is not there.

Macpherson (2004) found that teaching strategies were effective in improving both question interpretation and search strategy formulation. When a concept based

approach to teaching information retrieval was used and critical thinking was taught,

search success also improved.

Information retrieval is no longer the domain of the expert searcher. The end-user is now expected to do the searching. Teaching strategies aimed at the end user, which can

have many varied characteristics, need to be designed.

**Miura, A., Fujihara, N., & Yamashita, K. (2005). Retrieving information on the World Wide Web: effects of domain specific knowledge. *AI& Society*, 20(2), 221-231.**

Keywords: Information retrieval, World Wide Web, retrieval behaviors, World Wide Web literacy, behavioral performance, retrieval performance measures, human aspects of information retrieval

By completing a simple study of 12 students, the researchers demonstrate that knowledge in a particular domain, defined as “domain specific knowledge,” hastens the retrieval process using the World Wide Web in specific cases. The study sample was instructed to search the World Wide Web, a huge database that is not particular organized or classified, and to solve two particular problems. The first problem required no domain specific knowledge to solve and the second was solved easier with domain specific knowledge. Through the use of a behavioral process where the students spoke aloud about their actions and their thought processes, the authors were able to track the patterns used to retrieve information.

Retrieval methods have two standards for performance measures that are computed as follows: 1. Precision – number of relevant documents/total number of documents retrieved. 2. Recall – number of relevant documents/total number of relevant documents in the collection. In this study, Miura and colleagues reviewed the human aspect of these two standards and completed a detailed analysis of the retrieval process. Their focus was this human process by comparing two groups, one with and one without pre-existing knowledge in the content area of the searches. Two key elements for successful information retrieval emerged - domain specific knowledge and knowledge of search engines/web browsing.

Limitations of this study were first its small sample size, and also the limits of the responses regarding the thought process as many of the students did not verbalize their thoughts only the action when completing the searches. This limitation may be related to a cultural difference, lack of understanding of the instructions, or uneasiness of stating thoughts aloud. The researchers note various possible solutions for this important research data to be collected and incorporated more effectively in future studies. The solutions include ice-breaking interactions and practicing the method after being formally taught prior to the actual experiment.

Future research focus on this behavioral phenomenon is crucial if the author’s long term solution of developing a support system to make information retrieval using the World Wide Web more efficient is ever a possibility. Repeating this same study in a different cultural using the same methods would either dispute or corroborate the cultural concerns presented. A replicate study using a larger sample size would also validate the researchers findings, thus enabling the use of this information in developing a simple interface to make searching the World Wide Web more effective and efficient for users.

**Morgan, P. D., Fogel, J., Hicks, P., Wright, L., & Tyler, I. (2007).** [**Strategic enhancement of nursing student’s information literacy skills: Interdisciplinary perspectives.**](../Documents/NOVA/DCTE%20750/Strategic%20Enhancement.pdf) **ABNF Journal, Spring 2007, 40-45.**

Keywords: Information retrieval, nursing students, training, qualitative research

Information retrieval processes are incorporated into nursing curriculums. This skill is one that nurses need to become not only familiar with, but need to master to complete research assignments while in school and more importantly to use throughout their future careers. The template for the course is a collaborative approach to teach nursing students at historically black colleges or minority institutions how to search using specific databases. The approach includes searching for peer-reviewed full text qualitative and quantitative research.

Qualitative research concepts are often difficult for nursing students to understand. Three specific tools are proposed by Morgan and colleagues to include interviewing a qualitative researcher, critiquing qualitative peer-reviewed articles and inviting a research librarian to the nursing class and showing how to conduct a search focusing on qualitative research.

Information retrieval is needed for nursing students to maintain their skills as well as a method to continue to obtain evidence based criteria for practice and research. Where to conduct the information retrieval process as well as the ultimate time to include the process in the nursing curriculum varies between programs in the United States; however, three processes are utilized at different points in nursing programs. The first is a stand-alone class that is offered for credit to students. Secondly, is an approach that incorporates the process throughout the curriculum. Lastly, a course that is combined with other core curricula skills taught early in the first year of the curriculum The collaborative approach with faculty and librarians working together to develop and teach the course is chosen as a valid method without clear evidence-based research to demonstrate that this is the best method. Further research to determine the best effective and efficient method would valid this conclusion.

**Nakaoka, M. , Shirota, Y., & Tanaka, K. (2005). Web information retrieval using ontology for children based on their lifestyles. *21st International Conference on Data Engineering Workshops (ICDEW'05),* 1260 .**

Keywords: Information retrieval, helping children search the web, easy retrieval, dynamic ontology, kid’s lifestyle ontology.

There is a need for young students to be able to search the Web without having to weed through all of the wild information that is obtained in a typical search. Nakaoka, Shirota, and Tanaka (2005) suggest the development of a Kid’s Ontology Retrieval System to help students narrow their search to only retrieve relevant information. Nakaoka et al.

(2005) would like to create a dynamic database of information about each student. This dynamic database would include demographics, personalities, likes, dislikes, strengths and weaknesses. The database would have the capability of being updated by parents directly or via blogs and wiki.

This dynamic database would also be capable of updating itself by conducting keyword searches through blogs and wikis as well as through other databases found on the Web which keep statistics about what is currently popular with young children. The Kids Lifestyle Ontology database would store individual students past searches along with

student ontology’s so that based on all of these factors it could more accurately predict what a student may be searching for.

The Kids Lifestyle Ontology database offers more opportunities for further research. For example, research could be done to help find ways to assist blog search engines in looking for idea phrases instead of only nouns. Advanced research could be done on using pictures in search engines that are connected to ontology databases to help children search more effectively. Also, research could be done on using a multitude of

databases to update children’s ontology’s based on current trends in youth purchases, popular entertainment choices, popular music, favorite games, etc.

**Praveen, K., Kashyap, S., Mittal, A., & Gupta, S. (2005). A fully automatic question answering system for intelligent search in e-learning documents. *International Journal on E-Learning*, 4(1), 149-167.**

Keyword: Information retrieval, e-learning, academia, natural language processing, business

A vast amount of information is available that can be useful in e-learning. E-learning is practiced not only by universities, but by businesses as well. Businesses are turning towards online learning as a convenient means of employee training and education. Much of the available online information, however, is untapped due to a lack of an effective information retrieval system. Search engines used for web searching are not effective tools for searching e-learning documents such as PowerPoint slides, digital text, and FAQs. The online learner often does not know where the topics covered in class can be found. Table of contents or indexes are often not sufficient to find the information either.

Praveen, Kashyap, Mittal, and Gupta (2005) describe an automatic Question-Answering (QA) System through which students can ask a question in a natural language and receive an answer quickly and efficiently. Natural Language Processing (NLP) techniques are used to identify the structure of the question. The system then consults its knowledge base to find the answers to the questions. Specialized QA system that answer natural language question by consulting a repository of documents have been developed and can be used in this case.

**Puustjärvi, J., & Pöyry, P. (2006). Information retrieval in virtual universities. *International Journal of Distance Education Technologies,* 4(3), 36-47.**

Key words: One stop e-learning portals, Boolean model, vector model, information retrieval, fuzzy queries, e-learning, metadata

Puustjärvi and Pöyry (2006) compare vector information retrieval against traditional

Boolean keyword-based query models to determine which is best suited in an e-learning

environment. When comparing the study data, Puustjärvi and Pöyry (2006) propose a

shared one stop e-learning portal (ONES) for virtual universities.

Puustjärvi and Pöyry (2006) determined three issues with Boolean retrieval in learning environments:

1. Boolean retrieval relies on singular criteria ( e.g., a result is related or is unrelated)

2. It is difficult to determine educational object requirements in a Boolean setting

3. Search engines based on Boolean logic provide either too many or too few learning objects related to the query

Puustjärvi and Pöyry (2006) yielded superior results utilizing vector model information retrieval. Vector model information retrieval incorporates a “similarity measure” integrating keywords, algorithms and fuzzy queries. Puustjärvi and Pöyry (2006) use algorithms to assign weights to metadata items within a document and fuzzy queries

rank data by degree of compatibility meeting its search criteria. Combining algorithms,

fuzzy queries and key words, the vector model yielded relevant learning objects while

filtering out those unrelated.

Virtual universities use information and communication technologies to facilitate

core-learning functions. Currently, virtual universities operate separate portals that

hamper a learner’s ability to access resources at other virtual universities. Puustjärvi

and Pöyry (2006) propose ONES-project as an approach to integrate resources at virtual

universities that is easily accessible to learners. Application of the vector model within

virtual universities will necessitate an understanding of the vector information retrieval

model. Further study is necessary to evaluate vector model effectiveness in a variety of

e-learning settings. In conclusion, the ONES project must undergo further research and

analysis into the effectiveness in having a central repository for virtual universities.

**Sacchanand, C., & Jaroenpuntaruk, V. (2006). Development of a web-based self-training package for information retrieval using the distance education approach. *The Electronic Library*, 24(4), 501-516.**

Keywords: Information retrieval, education, distance education, course development, librarian education

A distance education module for both online and off-line was developed for training young librarians in foreign nations regarding information retrieval. The module was initially developed to be an online format, but technology issues only allowed a CD-ROM version to be finalized. The focus of the training was to introduce the information retrieval process to students that had limited English and little basic knowledge regarding the process. The module was evaluated formatively and summatively throughout the process of development and included a detailed revision after the initial prototype was tested.

The module was self-directed and required no faculty interaction. The five steps of the project included identifying the population, designing the module, producing the module, configuring the delivery format and assessment of the module. The system was developed using the technological method of the system development lifecycle using waterfall, phased and prototyping approaches. The developers of the online module do not discuss an educational approach.

**Sandieson, R. (2006). Pathfinding in the research forest: The pearl harvesting method for effective information retrieval. *Education and Training in Developmental Disabilities,* 41(4), 401-409.**

Keywords: Pearl building, pearl growing, pearl harvesting, research, search strategy,

key terms, educational research, evidence-based research

Educators, particularly those involved in special education, have increasingly been

turning towards evidence-based research for decisions and policy making. It is often

necessary to actually locate the original research and not rely on a textbook quoting that

research to obtain an unbiased view. Despite this trend, there has been little guidance

to enable educators to properly search and locate pertinent, quality research. With the

proliferation of information available over the Internet, it has actually become more

difficult for educators without research training to weed out that which is appropriate,

relevant, scholarly research. They also do not know how to do a comprehensive search

that will result in the best findings. Much of this problem stems from an inability to

formulate the proper keywords to use in searching.

Pearl building or growing is a search strategy that has become popular in the

information science field. Once a relevant article is located, its descriptor keywords are

then used to search for other articles. As subsequent articles are located, the

descriptors keywords are in turn taken from those articles until no new, relevant

keywords are found. This method, however, may involve many iterations of searching

and can often continue ad infinitum without complete confidence that every possible

article has been located. It is often very haphazard.

The goal of the researchers was to develop a method of devising an exhaustive list of key terms that can be used to search databases precisely and comprehensively. This

approach is known as the pearl harvesting method. It differs from pearl building in that

rather than building a list of key terms as research progresses, the list is prepared

before commencing the research. The first step of the pearl harvesting method is

deriving the list of key terms. This is accomplished by taking the key terms from a

sampling of articles taken from either a meta-analyses or a major journal in the field.

The second step involves using the list of key terms to search the appropriate databases

to determine the number of relevant citations found. Different terms yielded resulted in

varying degrees of precision that often depended on the database being searched. The

third step was to check for comprehensiveness. The results were compared with those

found by an expert in the field to determine this. (An actual expert was not used,

instead a comprehensive literature review was located) The key terms used by this

method and by the expert were also compared. The pearl harvesting method had

actually found more appropriate results than the expert.

The article used the pearl harvesting method to find articles relating to teaching

mathematics to the mentally disabled. The terms used to refer to the mentally disabled

population were actually taken from another study and proved not to be comprehensive. Future research would focus on determining the appropriate wording to use to refer to various different populations. Additional research could also focus on informing researchers and educators which journals could be used to compose the list of key words in the varying different fields. Educators, specifically, who are not research oriented might not even know where to start looking for key terms.

**Speck, H., Thiele, F. P., & Wagenhöfer, S. (2004). A big leap forward – the next step of educational information retrieval. Paper presented at the *World Conference on***

***Educational Multimedia, Hypermedia and Telecommunications 2004*, Lugano, Switzerland.**

Keywords: Information retrieval, world wide web, Lycos, Altavista, HotBot, Excite, Google,

With the creation of the World Wide Web based on the concepts of Bush Vannemar, ARPANET, and Tim Berners-Lee an information explosion took place. The release of Mosaic, the first browser, by Marc Andreesen, made this vast amount of knowledge accessible to the average citizen. No method of searching and retrieving this information, however, existed until the development of the first search engine- Lycos. Infoseek, Altavista, HotBot, and Excite soon followed. Yahoo then burst onto the scene moreover, grabbed a fifty percent market share with its well-indexed web catalogue. Microsoft MSN was soon to follow, until Google came onto the scene.

Today’s students turn straight to the Internet when researching assignments. They no longer read newspapers, encyclopedias, books and the like. The proliferation of e-learning opportunities has increased this trend by using the web as the contact point between students and teachers. Search engines have become a crucial part of education, knowledge and research. The algorithm used by a particular search engine will define how it retrieves the information we seek and allows us to access it. Algorithms based on popularity may fail to find new material since that material is not yet popular. Search engines, therefore, tend to focus on known material and the innovative knowledge is often not retrieved. Popularity based retrieval systems are not ideal for research purposes.

Speck and Wagenhofer (2004) propose the use of a decentralized, open source engine to be used in educational information retrieval. The algorithm is publicly known and can be customized by each academic institution. In fact, each institution could build their own repository of knowledge based on its unique needs.

**Wang, H., Ouyang, J., & Yao, J. (2003). Information resources and retrieval ---The**

**ways technology can enhance preparing tomorrow’s teachers. Paper presented at the *Society for Information Technology and Teacher Education International Conference 2003,* Albuquerque, New Mexico, USA.**

Keywords: Information retrieval, educators, World Wide Web

Knowing how to retrieve information and having the knowledge and skills necessary to evaluate that information are essential to today’s researcher. Teaching future teachers how to properly retrieve information is a very important task. Information retrieval has grown from a discipline in Information and Library Science, to an everyday experience for billions of people. For the most part, The World Wide Web has been the driving force behind this change.

Current information retrieval systems tend to be distributed, have huge storage needs, and complex functional requirements. With the increase in recent years in the number of text databases available on-line, and the consequent need for better techniques to access this information, there has been a strong resurgence of interest in the research done in the area of information retrieval. Today, retrieval techniques have found their way into major information services and the World Wide Web. The emergence of new applications such as "digital libraries" is both an opportunity and a challenge. We now feel that too much information is around, and retrieval techniques and skills become very necessary.

Information retrieval can promote active student engagement. Students move from passive recipients of information, to active participants in the construction of knowledge. Instead of passively absorbing knowledge disseminated by their professors and textbooks, students are actually being involved in the creation of that knowledge

themselves. It also helps them relate classroom-gained knowledge to the real world.

Retrieval technology is expanding our ability to express, understand, and use ideas in other symbol systems. It helps progress from coverage to mastery. It helps from

isolation to interconnection. Retrieval technology has helped us move from a view of

learning as an individual act done in isolation toward learning as a collaborative activity.

We have also moved from the consideration of ideas in isolation to an examination of

their meaning in the context of other ideas and events. Finally, it helps from products to

processes. With retrieval technology, we are moving past a concern with the products of

academic work to the processes that create knowledge. Students learn how to use tools

that facilitate the process of scholarship.

Information retrieval technology has many other advantages in terms of repetition, transportability, and increased equity of access. In addition, although the research evidence is sparse, the cost-effectiveness of technology may be of great benefit under certain conditions.

**Zhong, Y., Gilbert, J., & Hu, W. (2003). Voice information retrieval for course**

**resources. Paper presented at the *World Conference on Educational Multimedia,***

***Hypermedia and Telecommunications 2003*, Honolulu, Hawaii, USA.**

Keywords: Voice information retrieval, information retrieval

The advances in speech recognition technology provide students an alternate way to search for course resources via mobile devices such as telephones instead of a computer. When a user issues a query that returns a large set of results, the system would perform an intelligent summarization of those results and present the information to the user verbally.

Zhong, Gilbert, and Hu (2003) introduced a voice information retrieval system that could be used to retrieve database course resources. Students can access their course

resources via telephone at any place and at any time. This type of system also gives those with visual or physical disabilities an easy way to retrieve the course information. Articles can also be retrieved using this method. The result list will be read one by one until the user selects a document. If a result list is too large, it will be divided by topic and the user will first be presented with one article on each topic. Once a topic is selected, similar documents will be presented. The user can then request to have the article emailed or delivered to a local library.