Author(s) and year	Purpose of Study/ Research Questions	Search Task Description/Study Procedures	Participants	Research method(s)
Agosto (2002)	1. How, if at all, does Simon's theory of bounded rationality relate to young people's Web-based decision making? 2. How, if at all, does Simon's theory of satisficing relate to young people's Web-based decision making? 3. What is the role of personal preference in young people's Web-based decision making?	The project investigator instructed the participants to visit three pre-selected Web sites for as long as they wished and to spend the remainder of the time freely surfing the Web. 1. The Women of NASA (http://quest.arc.nasa.gov/women/intro.html) 2. Hurricane Hunters.com (www.hurricanehunters.com) 3. The Boston Museum of Science site (http://www.mos.org/ home.html)	22 ninth & tenth grade female students (aged 14-16)	Qualitative: Comprised of Web-surfing sessions and group interviews; employing a *discursive strategy* of qualitative research
Becker (2003)	1. To explore student perceptions of the role of the Web in information searching. 2. To collect quantitative and qualitative data on how students seek information on the Web 3. To identify skill gaps that might be addressed in information literacy programmes.	Each subject described two critical incidents (a successful and unsuccessful Web search) during interviews.	20 undergraduate students	Quantitative: Data generated by a background questionnaire was tabulated and frequency distributions were computed. Qualitative: Semi-structured interview; *Content analysis* was used to analyze the qualitative data.
Bilal (2000)	1. What cognitive behavior do children demonstrate to find the answer to the fact-based search task in Yahooligans!? 2. What physical behavior do children demonstrate to find the answer to the fact-based search task in Yahooligans!? 3. Is there a difference in cognitive and physical behaviors between children who succeed in finding the correct answer to the fact-based search task and those who do not? 4. What difference in traversal weighted effectiveness and efficiency scores, as well as quality moves does the "Web Traversal Measure" reveal between children who succeed in finding the correct answer to the fact-based search task and those who do not? 5. What criteria do children use to judge relevance of the hyperlinks they activate and the homepages they visit? 6. To what extent do the following characteristics impact children's success in finding desired information in Yahooligans!: (a) Experience in using the Internet/Web; (b) Knowledge of the Yahooligans! search and retrieval interfaces; (c) Domain knowledge (i.e., science); (d) Topic knowledge (i.e., alligators); (e) Reading ability 7. What affective states do children experience in using Yahooligans!?	How long do alligators live in the wild, and how long in captivity?	22 middle school students from seventh grade science classes (aged 12-13)	Quantitative: Empirical data about the behavior, success and failure, errors committed, and knowledge of Web and Yahooligans! navigation and use. The researcher developed three instruments to collect the empirical data: 1. Internet/Web Quiz 2. Exit interview 3. Teacher Assessment of Student Characteristics Data captured by Lotus ScreenCam provided three additional parameters for measurement: 1. Transcribed Moves 2. Selection Actions 3. Weighted Selection Actions Qualitative: Data from interviews provided understanding of the behavior and processes that resulted from the quantitative data.
Bilal (2001)	1. How successful are children in finding relevant information for the research task in Yahooligans!? (a) Does children's success in using Yahooligans! vary with the type of search task (i.e., research vs. fact based)? 2. What cognitive behavior do children demonstrate to find relevant information for the research task in Yahooligans!? (a) Is there a difference in the cognitive behavior between children who succeed in finding relevant information for the research task and those who do not? (b) Does children's cognitive behavior in using Yahooligans! vary with the type of search task (i.e., research vs. fact based)? 3. What physical behavior do children demonstrate to find relevant information for the research task in Yahooligans!? (a) Is there a difference in the physical behavior between children who succeed in finding relevant information for	Environmentalists are concerned that the ozone layer is being depleted. Search Yahooligans! to learn how the lack of ozone in the earth's atmosphere is affecting our forests.	17 middle school students from seventh grade science classes	Quantitative: Lotus ScreenCam provided empirical data about children's cognitive and physical behaviors. Qualitative: Data from questionnaires and interviews

	the research task and those who do not? (b) Does children's physical behavior in using Yahooligans! vary with the type of search task (i.e., research vs. fact based)? 4. What influence do these factors have on children's success in finding relevant information for the research task in Yahooligans!? (a) Prior experience in using the Internet/Web and knowledge of Yahooligans! interface; (b) domain knowledge (i.e., science); (c) topic knowledge (i.e., ozone layer); (d) reading ability.			
Bilal (2002a)	1. How successful are children in finding information for their fully self-generated tasks, and how does this success compare to their success on the two assigned tasks (fact-finding and research-oriented) that they had performed in the previous studies? 2. What cognitive behavior do children demonstrate in using Yahooligans! to find information for their fully self-generated tasks, and does this behavior vary from the behaviors they exhibited on the two assigned tasks (fact finding and research oriented) that they had performed in the previous studies? 3. What physical behavior do children demonstrate in using Yahooligans! to find information for their fully self-generated tasks, and does this behavior vary from the behaviors they exhibited on the two assigned tasks (fact-finding and research-oriented) that they had performed in the previous studies? 4. What tasks (fully self-generated vs. fully assigned) do children prefer, and why?	Children were asked to select topics of interest to search in Yahooligans! Children's fully self-generated topics: – I want information about Ebola virus – What can dogs do to help out other people? – Information about veterinarians as a career – What is the main threat to panda bears survival? – I want to find information on large oil reserves – I want information about pc cd-rom games – I want to find information about chat rooms – I want to find information about computer games – I want to find information about poetry – Information on endangered species – Information on Michael Jordan – Information about movies – Information about Packers – Information about Looney Tunes – Summer Olympic games – I want to find information on music and movies – I want to find information on the Spice Girls – I want to find ice-skating and acting – I want to find a topic on baseball and gymnastics – I want information about psychology – Information about law – Information about music	22 middle school students from seventh grade science classes (aged 12-13)	Quantitative: Data about children's Web moves were captured using the Lotus ScreenCam software package. Qualitative: Children's task generation and data about task preference were captured using individual interviews that took place at the conclusion of the research experiment.
Bilal (2002b)	1. How successful are children in finding information in yahooligans! on three different types of search tasks (fact-based, research, and fully self-generated)? 2. What information seeking behaviour do children demonstrate in finding information in Yahooligans! on three different types of search tasks (fact-based, research, and fully self-generated)? 3. What type of search task (fact-based, research, and fully self-generated) do children prefer and why? 4. What affective stated do children experience in using Yahooligans!?	Fact-finding task: Children were judged to be fully successful if they found and extracted the correct fact. Research-oriented task: Children were judged to be fully successful if they printed and submitted either the whole text (12 pages) found under Ozone Depletion in Yahooligans! or the four pages that relate to the impact of ozone depletion on forests. Fully self-generated task.	22 middle school students from seventh grade science classes (aged 12-13)	Quantitative: Included empirical data about children's activities in Yahooligans! Qualitative: Children's prior knowledge of using the Internet and Yahooligans!, as well as their affective states, were gathered via a questionnaire and individual exit interviews.
Bond (2004)	This research project was designed to investigate how people approached the task of finding information on the Web.	The UK Department of Health are developing a National Service Framework for diabetes. As part of this they undertook a consultation with users, and produced a report entitled "Listening to diabetes service users". This is available on their Web site.	18 staff of a nursing department in an English university (aged 19-63)	Quantitative: Descriptive statistics included age, years of experience and monthly Internet use Qualitative: Observational data to indicate initial search approach and success/failure
Bowler, Large & Rejskind (2001)	1. What information literacy skills do students need in the early twenty-first century? 2. Are the learning objectives in the classroom reflected in the information literacy skills exhibited by students? 3. Do the learning experiences in the classroom facilitate the acquisition of these skills or, have the learning	Each student was asked to choose one Winter Olympics sport from a list of 14; this sport would form the topic of the assignment. The teacher suggested 13 questions as a guideline for the students' research, from which they could select a few, but the students were not limited to these questions. Suggested questions for project on the 1998 Winter Olympic Games:	3 grade six primary school students	Qualitative: Case study included analysis of videos showing computer screen activity with verbal interactions, observations, oral presentations, and interviews

	experiences simply been repackaged in the new technologies, giving the impression of being up-to-date, while they remain qualitatively the same as learning experiences from thirty years ago?	1. History: Can you find information on the history of your sport and its first introduction in the Olympics? 2. Diet/Nutrition: What special foods do athletes in your sport eat? 3. Accommodations: In what kind of buildings did the athletes live in Nagano? 4. Facilities: How big are ice skating rinks? How long are the speed skating tracks or the cross-country skiing trails? 5. Drug use and performance: Have there been problems of drug use in your sport? 6. Are there competition places for your sport in Quebec? 7. What is your favorite athlete/team in your sport? Why? 8. What were Canada's medals in your sport in the last three Olympics? 9. Why are some countries stronger than others in your sport? 10. What kind of equipment is needed for your sport? Where can you get it? 11. Which organization is in charge of your sport in Canada? Where does it get its funding and how is it run? 12. How do athletes train for your sport? What do their coaches do? 13. What were the results in your sport in the last Olympics in Nagano, Japan?		
Branch (2003)	This study examined nontraditional undergraduates' home, work, and school information seeking and the perceived impact of an information literacy course on their information-seeking behaviors.	Interviews were conducted that asked participants to describe their information needs and the sources of information they had available at home, work and school. They were also asked to describe the information technology to which they had ready access. The final question asked participants to reflect on the impact of [the information literacy course] on their information-seeking behaviors.	5 nontraditional undergraduate students enrolled in the College at Work program (aged 28-56)	Qualitative: Interview transcripts and observation notes were used to determine patterns and common experiences across three settings: home, work and school
Brown (1999)	1. When searchers use one search service regularly, does their use of Booleans take advantage of the way that search service interprets Booleans, or do searchers use Booleans similarly no matter which search service they prefer? 2. Likewise, is there a close fit between the use of capital letters by searchers and the varying ways each search service deals with capitals? 3. And, do searchers' use of truncation symbols accord with the rules the different search services employ to interpret these symbols? 4. Finally, through the use of an exit interview, I studied how people's descriptions of their search service's rules meshed with their understanding of those rules as exemplified in their search strings.	Participants were asked to role-play a librarian at a public information desk, as [the researcher] played the role of patrons asking them questions. The requests are followed by letters indicating the search features they are meant to investigate: B-Boolean operators; C-capitalization and T-truncation. 1. Hello, I'm trying to locate a researcher I heard about and all I know about her is that her last name is Brown and she's interested in invasive species. I think she's in Ohio. Could you help me? (BC) 2. Hello, I'm interested in the history of fluoridation and other ways of kids getting fluoride in Washington state. Could you help me find something on that? (BT) 3. Hello, I'm teaching a fifth-grade class about Homer, the Poet. And I want to find good Web sites about that. But I keep getting sites about Homer Simpson and Mark McGwire's home run record. Can you help me find some good sites about Homer? (BC) 4. Hello, I'd like the names of some wildlife parks in Turkey. Can you help me? (BC) 5. Hello, I'm trying to find information on that tornado they had last June or July in Oklahoma, or just information about how often Oklahoma gets tornadoes in general. Can you help me? (BT) 6. Hello, I'm interested in where I can buy topo maps, you know, like topographical maps of Oregon. Can you help me? (BT) 7. Hello, I'm looking for a mathematics professor named John Wolfe and I'm not sure how to spell the last name. I think he lives somewhere like Texas or Oklahoma. Can you help me? (BCT)	8 master level students from the School of Library and Information Science (SLIS) program at the University of Washington	Quantitative: Descriptive statistics of search strings and the use of Booleans (including the use of capitalization and truncation) Qualitative: Participatory observations and interviews.
Bruce (1999)	The research as a whole was focused on factors that affect satisfaction with information seeking on the Internet. 1. Are there categories of end-user analogy for the Internet? 2. Do particular analogies for the Internet predict the amount of satisfaction that a user will derive from information seeking on the network?	Data were collected from academics in the sample using a structured interview. [Each interview] involved a calibration exercise and the description of two information seeking incidents. The first incident described by each subject was the last time he/she had used the Internet for information seeking. The subject was then asked to choose and describe a second incident where the Internet had been used for this purpose.,	37 university academics	Qualitative: Data were collected from academics in the sample using a structured interview. Transcripts were analyzed through a process of *open coding*
Carroll (1999)	Expert users of the Internet were studied to identify the	1. What is the possible derivation and etymology of the phrase *gave up the*	8 adult expert Internet	The monitor output was recorded

	strategies they used to locate specific information.	*ghost*, as in: Although the plant struggled to survive in the heat, it finally gave up the ghost? 2. What is the definition of the phrase Cognitive Anthropology? 3. What is the name of the train, which is regularly scheduled to go from Seattle to Vancouver, Washington in the late afternoon? 4. Find a street map to show direction to the Chicago Art Institute. 5. What company produced the steel cables for the St. Johns Bridge? 6. When was the last eruption of Mt. Hood and what were the effects of that eruption? 7. Tom Rigney is the lead fiddle player for a group called Sundogs. It is reported that Tom recently released an album. What is the name of that album? 8. Tom's father, Bill Rigney, was the manager of a major league baseball team during the sixties. What team did he manage?	users	during each work session and participants were asked to audibly describe, while they worked, the appropriateness of the information they discovered and strategies they employed to advance their searches. Quantitative: Videotapes were coded and frequency counts calculated for search results success/failure, time in minutes to complete, and actions taken. Qualitative: Audio recordings were only used to clarify ambiguity from the videotapes.
Choo, Detlor & Turnbull (1998)	1. To develop a new behavioral model of information seeking on the Web based on a synthesis of theoretical elements from information science and organization science. 2. To test, in a preliminary way, the viability of the model using a modest set of field-data from a pilot study. 3. To experiment with the use of multiple, complementary methods of collecting qualitative and quantitative data on how individuals seek and use Web-based information in their natural work settings.	Naturally occurring information seeking was captured using WebTracker program. Examples of information seeking episodes include: 1. Starting from news.com page, followed links to items of interest; including clicking on banner ads. 2. Knew of IJC site as good source for info on copper and zinc emissions, viewed site, and showed site to colleagues on intergovernmental committee. 3. From personalized Forrester page, and using Forrester's search engine, retrieved company reports, and printed one. 4. Used search engine to look for formal definition of "model view controller." Found 5 good definitions, discussed them with colleagues, used in technical documentation.	11 adult web users including managers, IT specialists, and information specialists	Quantitative: Questionnaire survey; tabulations of tracker application and/or proxy server log files. Qualitative: Personal interviews with participants
Choo, Detlor & Turnbull (2000)	1. To develop a behavioral model of information seeking on the Web based on modes of browsing and searching differentiated by information needs and information seeking activity. 2. To develop operational methods for measuring information seeking on the Web by analyzing browser-based actions and events. 3. To combine the use of multiple, complementary methods of collecting qualitative and quantitative data on how people seek and use Web-based information in their natural work settings.	A total of 61 naturally occurring "significant" information seeking episodes were captured using WebTracker program.	34 adult web users from seven companies including IT specialists, managers and research/marketing/consulting staff	Quantitative: Questionnaire survey; tabulations of tracker application and/or proxy server log files. Qualitative: Personal interviews with participants and informal conversations during the visit
Choo & Marton (2003)	The study suggests that a behavioral approach that links information seeking modes (goals and reasons for browsing and searching) to moves (actions used to find and view information) may be helpful in understanding Web-based information seeking.	To observe participants' actual information seeking behavior on the Web in an unobtrusive manner, custom-developed WebTracker software was installed on their computers to record two weeks of continuous Web activity.	24 female adult "technically proficient Web users" in IT professions across 20 organizations	Quantitative: A WebTracker application that recorded Web browser actions, history files and bookmark files Qualitative: Personal interviews
Christensen & Bailey (1998)	This paper reports on a study, which sought to ascertain the impact of using the Internet, as compared to a library, for a competitive information acquisition task. 1. Is task performance using these two repositories different? (a) There will be no difference in the amount of task relevant information retrieved in the library and on the Internet; (b) Internet use will result in greater task time to completion than library use.	Twelve unique sequences of three tasks were randomly assigned. For each information need specified on the task sheet participants were asked to write in the requested information (i.e. content) and the specific source of that information. For example, Microsoft's 1995 net revenues of $8.67 billion was acquired from their WWW site at "http://www.microsoft.com/msft/annual/fh.htm" or from the 1996 Million Dollar Directory.	101 undergraduate and graduate business students at a small, private, mid-Atlantic university	Quantitative: Within subjects (repeated measures) experimental design ANOVA was used to test the hypothesis
Colaric (2003)	1. There will be significant differences in semantic knowledge acquisition among participants receiving different instructional treatments. 2. Semantic knowledge will correlate with syntactic knowledge.	The independent variable was the instructional method with three levels (instruction by example, instruction by conceptual models without illustrations, and instruction by conceptual models with illustrations). The dependent variable was posttest scores divided into three sections: (1) Declarative knowledge of search engines,	195 undergraduate students at a major research university	Quantitative: This study was a pretest/treatment/posttest study using print-based materials

	3. There will be significant differences in syntactic knowledge acquisition among participants receiving different instructional treatments.	(2) Syntactic knowledge of search engines, and (3) Semantic knowledge of search engines.		
Cothey (2002)	The aim of this investigation is to detect whether or not there is any change in an individual's Web information-seeking behavior as that individual gains experience. (a) Individuals would increase their active information seeking, for example, by an increased use of search engines; (b) There would be increasing commonality among individuals in the selection of Web sites as more useful sites are revisited and less useful sites ignored.	The study took place in the "real world" context of the user's Web information seeking so that the users' information tasks were not imposed for the purposes of the investigation, rather the information tasks are self-constructed by the users and reflect the users' own particular information needs.	206 students drawn from the general population of students at a Higher Education institution in the UK	Quantitative: Data analysis combined the technique of *Web transaction log analysis* with the conditional *regression model* of longitudinal analysis using a split-half technique.
Dennis, Bruza, McArthur (2002)	1. Our hypothesis is that ordering the refinements according to probability of relevance will reduce cognitive load. 2. Our hypothesis is that such queries would benefit most from query formulation assistance.	After the completion of the six normal (easy) queries, subjects completed an additional four hard queries. <u>Easy Queries</u>: 1. Find pages listing jokes referring to Monica Lewinsky. 2. You are planning to move to Florida. Find pages listing jobs in the Florida area. 3. Find pages containing women's wave surfing competition results over the last 2 years. 4. Find pages about dyslexia. 5. Find pages that discuss clothing sweatshops. 6. Find pages that describe current or planned explorations or scientific investigations of Antarctica. 7. You own a personal computer that runs Windows '95. Find pages describing software that will test if it is Y2K compliant. 8. Find pages from which you can buy a pair of running shoes (online or at an address provided by the page). 9. Find pages that inform you which drugs are used to treat depression. 10. Find pages that discuss the disposal of long-lived radioactive wastes. 11. Find pages that discuss in vitro fertilization. 12. Are there any reliable or consistent predictors of mutual fund performance? 13. Find recipes for different varieties of carrot cake. 14. Find prices of Toshiba notebook computers. 15. You want to go skiing in Europe. Find pages describing a package holiday. 16. Find pages that discuss the concerns of the United States government regarding the export of encryption technology. 17. What makes Deep Blue capable of beating a human chess player? 18. Find pages that provide information regarding traveling in India. <u>Hard Queries</u>: 1. Identify instances of attacks on humans by Africanized (killer) bees. Relevant documents must cite a specific instance of a human attacked by killer bees. Documents that note migration patterns or report attacks on other animals are not relevant unless they also cite an attack on a human. 2. Find accounts of selfless, heroic acts by individuals or small groups for the benefit of others or a cause. Relevant documents will contain a description of specific acts. General statements concerning heroic acts are not relevant. 3. What counterfeiting of money is being done in modern times? Relevant documents must cite actual instances of counterfeiting. Anti-counterfeiting measures by themselves are not relevant. 4. Find information on shipwreck salvaging: the recovery or attempted recovery of treasure from sunken ships. A relevant document will provide information on the actual location and recovery of treasure; on the technology that makes possible the discovery, location, and investigation of wreckages that contain or are suspected of containing treasure; or on the disposition of the recovered treasure.	54 undergraduate psychology students at University of Queensland	Quantitative: A single-factor design was used in the first experiment and single-factor design with search engine as a between subjects factor in the second experiment. *ANOVA* was conducted to ensure there were no significant differences between the subjects assigned to each of the three search engines.

		5. In what ways have quilts been used to generate income? Documents mentioning quilting books, quilting classes, quilted objects, and museum exhibits of quilts are all relevant. Documents that discuss AIDS quilts are irrelevant, unless there is specific mention that the quilts are being used for fundraising. 6. Do any countries other than the United States and China have declining birth rates? To be relevant, a document will name a country other than the United States and China in which the birth rate fell from the previous year. The decline need not have occurred in more than 1 preceding year. 7. Find ways of measuring creativity. Relevant items include definitions of creativity, descriptions of characteristics associated with creativity, and factors linked to creativity. 8. What is the status of the Three Gorges project? A relevant document will provide the projected date of completion of the project, its estimated cost, or the estimated electrical output of the finished project. Discussions of the social, political, or ecological impact of the project are not relevant. 9. What is the impact of poaching on the world's various wildlife preserves? A relevant document must discuss poaching in wildlife preserves not in the wild itself. Also deemed relevant is evidence of preventive measures being taken by local authorities. 10. What are new methods of producing steel? Relevant documents will discuss the processes adapted by entrepreneurs who have organized so-called "minimills," and are producing steel by methods that differ from the old furnace method of production. Documents that identify the new companies, the problems they have encountered, and/or their successes or failures in the national and international markets are also relevant. 11. What legal actions have resulted from the destruction of Pan Am flight 103 over Lockerbie, Scotland, on December 21, 1988? Documents describing any charges, claims, or fines presented to or imposed by any court or tribunal are relevant, but documents that discuss charges made in diplomatic jousting are not relevant. 12. Find information on the use of dogs worldwide for law enforcement purposes. Relevant items include specific information on the use of dogs during an operation. Training of dogs and their handlers are also relevant.		
Ellis, Wilson, Ford, Foster, Lam, Burton & Spink (2002)	The goal of the studies was to study the different types of interactions that take place during the information search and retrieval process.	The purpose of the search was to identify a real problem and define their search problem more closely.	25 researchers at University of Sheffield	Quantitative: Questionnaire results Qualitative: Data analysis of interview transcripts and on-line results; *discourse analysis*
Ford, Miller & Moss (2001a)	The research sought to discover whether there is any statistically based evidence that retrieval effectiveness is affected by the following components of Wilson's model: (1) Activating mechanism--stress/coping theory: reflected by inclusion of fear of failure and time management variables. (2) Actiating mechanism--risk/reward theory and social learning theory (explanation) (3) Intervening variables: including (a) psychological differences between individuals and (b) demographic differences	A technician cuts his finger badly in the Information Studies Departmental office. What are the legal implications of this for the university? Find relevant information on the Web.	69 postgraduate students at University of Sheffield	Quantitative: Questionnaire with items relating to Internet perceptions, levels of experience and cognitive complexity; Riding's (1991) *Cognitive Styles Analysis*; Java-Script front end recorded search data. *Multiple regression* and *factor analysis* were applied to the data.
Ford, Miller & Moss (2001b)	1. Are there any links between high or low relevance scores, and: (a) use of Boolean, best-match and combined approaches; (b) use of advanced search features (not exclusively associated with either Boolean or best-match, e.g. phrase searching); (c) other general features of strategy (e.g. number of terms per query) 2. To what extent is any association between strategies and low relevance scores due to errors in the use of the	(1) A technician cuts his finger badly in the Information Studies Departmental office. What are the legal implications of this for the university? Find relevant information on the Web. (2) You want to learn about the JavaScript programming language but have no previous experience. Find suitable materials--at an appropriate level for people with no experience--on the Web.	69 postgraduate students at University of Sheffield	Quantitative: Java-script front end recorded search data *Multiple regression* and *factor analysis* were applied to the data.

	strategies, as opposed to the strategies themselves?			
Ford, Wilson, Foster, Ellis & Spink (2002)	The aim of the research reported here was to discover the extent to which cognitive styles may affect an information seeker's perceptions of the nature of his or her research problem and of progress in its solution through information seeking. 1. Compared to their field dependent counterparts, relatively field independent individuals will: (a) be more analytic in their behavior; (b) display more active behavior; (c) report less uncertainty in their problem solving; (d) report less valuing of serendipitous information encounters. 2. Compared to their serialist counterparts, relatively holist individuals will: (a) display more exploratory behavior; (b) desire a more comprehensive information search; (c) employ more personalized and/or idiosyncratic forms of explanation; (d) will report greater uncertainty in their problem solving.	Literature searches across four subject disciplines including: (1) Humanities and "pure" social sciences (2) Applied social science (3) Pure science and medicine (4) Engineering	111 postdoctoral researchers at University of Sheffield (aged 22 to 76)	Quantitative: Correlations were sought between the independent variables relating to cognitive style, and the dependent variables relating to information-seeking and problem-solving behavior.
Ford Miller & Moss (2003)	1. Given the same search topics, task instructions, search engine, and search conditions, would different searchers display different search strategies? 2. If so, then to what extent might such differences be attributable to searchers' individual study approaches?	Search task 1: "A technician cuts his finger badly in the Information Studies Departmental office. What are the legal implications of this for the university? Find relevant information on the Web." Search task 2: "You want to learn about the JavaScript programming language but have no previous experience. Find suitable materials at an appropriate level for people with no experience on the Web." Search task 3: "Discover as quickly as possible the answer to this question: Is there (yes or no) any information on the Web of a recent incident in which a famous sportsperson attacked a member of the emergency services?"	69 postgraduate students at University of Sheffield	Quantitative: Entwistle's (1981) *Revised Inventory of Approaches to Studying;* Java-script front end recorded search data; questions regarding levels of experience *Factor analysis* and *Spearman* were employed along with providing descriptive statistics
Ford, Miller & Moss (2005)	1. Given the same search topics, task instructions, and search engine, would different individuals display different search strategies? 2. If so, to what extent would such differences be attributable to the parameters of human individual difference selected for study (study approaches, cognitive and demographic differences, Internet perceptions, and/or task complexity?	Search task 1: "A technician cuts his finger badly in the Information Studies Departmental office. What are the legal implications of this for the university? Find relevant information on the Web." Search task 2: "You want to learn about the JavaScript programming language but have no previous experience. Find suitable materials at an appropriate level for people with no experience on the Web." Search task 3: "Discover as quickly as possible the answer to this question: Is there (yes or no) any information on the Web of a recent incident in which a famous sportsperson attacked a member of the emergency services?"	69 postgraduate students at University of Sheffield	Quantitative: All variables were reduced to numbers and analyzed statistically. The study adopted a controlled laboratory-based experimental design. Java-script front end recorded search data; Riding's (1991) *Cognitive Styles Analysis*; levels of experience of Boolean searching (5-point Likert Scale) *Factor* and *regression analyses* were employed
Gordon (2002)	How did tenth-grade biology students who learned and used concept mapping in the classroom for seven months search for information in the context of a library research assignment? (a) How did student mappers and nonmappers search for information in the context of the same library research assignment? (b) How did concept formation influence search strategies and relate to developing search strategies? (c) How did expert searches of the librarian and teacher compare with each other and with the searching of mappers and nonmappers? (d) How did student searching relate to stages of the Information Search Process? (Kuhlthau, 1993).	Participants searched print and electronic sources for the purpose of completing a research assignment as part of the school's biology curriculum.	10 tenth grade students at a private American school in Europe	Quantitative: *Bayesian statistics* and *Fano method* from information theory were used to triangulate the qualitative data. Qualitative: Data were collected during audiotaped, think-aloud search sessions followed by structured interviews. Stimulated recall was used as an interview method, key informants were provided with written transcriptions of their think-aloud sessions. Participant maintained journals. *Constant comparative* method of analysis.
Gray, Klein, Noyce,	This paper seeks to explore UK and US adolescents' perceptions and experiences of online health information	Focus group discussions included perceptions of how the Internet had changed participants' leisure/work activities, and experiences and	157 English-speaking adolescents (aged 11-	Qualitative: A series of 26 single-gender focus groups; discussions

Sesselberg & Cantrill (2004)	regarding previous experience of use, saliency of the information, and credibility of the medium. A cross-national perspective was sought to better understand universal versus culturally mediated attitudes within English-speaking countries.	perceptions of how the Internet could be use to find health information. A short Internet exercise was undertaken in 20 of the groups. The group was invited to choose a health-related topic and search for information on the Internet.	19) from UK secondary schools and US middle/high schools	were recorded on audiotape and transcribed. Themes identified were discussed, and consensus was reached through an *iterative process*.
Groot, Riet, Khan, & Misso (2001)	Objective: to evaluate the quality of web sites on ankle sprain diagnosis and treatment and to assess the impact of Internet search expertise on quality of retrieved information.	Eight doctors completed a questionnaire on which they provided their search terms to find information on diagnosis and treatment of ankle sprain. The questionnaire provided a query-box resembling the space one would have on a computer screen when using an Internet search engine. Four sets of search terms: 'ankle sprain', 'ankle strain', 'ankle injury' and 'ankle injuries' were used.	8 physicians from orthopaedic medical staff; 1 experienced information officer	Quantitative: Questionnaire and search data that depicts relevant websites *Fisher exact test* was used for comparing proportions and the *Mann-Whitney U* test was used for comparing medians
Gunn & Hepburn (2003)	1. What strategies and techniques do students use that are helpful in information seeking on the Internet? 2. What knowledge do students have of the different World Wide Web search engines? 3. How do students perceive their ability to locate information for school purposes on the Internet? 4. How do students learn how to seek information on the Internet for school-related assignments?	The questionnaire consisted of eighteen questions and contained yes/no, multiple choice, and Likert-type responses, as well as open-ended responses for explanations. The items contained in the questionnaire paralleled the four research questions and was designed to find out what students know about searching for information on the Internet for educational purposes and how they learned what they know.	198 twelfth grade students across four public schools in one Nova Scotia school board	Quantitative: Questionnaire with results reported according to percentages of responses to the various questions
Hargittai (2002a)	The goal is to see whether the level of skill measured by analyzing people's actions online correlates with people's scores on these knowledge variables.	Users are given a list of 17 tasks to perform on the Web to see how they would find certain information online.	54 adult, English-speaking Web users	Quantitative: in-person observations, online questionnaire Qualitative: Interview with questions that draws on the Internet module of the *General Social Survey* (2000)
Hargittai (2002b)	The goal of this study is to empirically investigate such refined understandings of a second-level digital divide by exploring differences in Internet users' online skills.	These tasks were chosen to explore peoples' ability to find information on the Web in different topical domains. 1. Information about local cultural events in the area such as art shows, musical performances, theatre shows or movies 2. Music they could listen to online 3. A web site comparing different presidential candidates' views on abortion 4. Tax forms 5. Art by kids	54 adult, Internet users (aged 18-81) from suburban towns and boroughs of a New Jersey county	Quantitative: Descriptive statistics of independent variables, binary success/failure rate and time on task Qualitative: In-person observations and interviews;
Hembrooke, Granka & Gay (2005)	An overarching goal in the work reported here is to develop a typology of search term query strategies as a function of domain knowledge. 1. Experts will exhibit a greater degree of elaboration throughout their 10 search attempts than will novices. 2. The search attempts of novices will exhibit a greater degree of redundancy than will those of experts. 3. The searching style of Backtracking will be employed to a greater extent in novice rather than in expert conditions. 4. Novice search attempts will be more likely than experts to reflect the strategy of Topic Terms. 5. Experts will be less likely than novices to exhibit the strategy of Plural Making/Taking. 6. Broadening will be more highly associated with intermittent feedback conditions than with the constant conditions. 7. Domain experts receiving intermittent feedback will be more likely than other conditions to use refining as a strategy. 8. The average number of terms per query will be greater for experts than novices. 9. Experts will use a greater number of unique terms	We required participants to generate search queries on the same topic over 10 trials. 1. Antiques: You are lecturing on 18th century antiques 2. Basketball: You are lecturing on play strategies in basketball 3. Butterflies: You are lecturing about the migration patterns of butterflies 4. Comics: You are lecturing on the differences between today's Superheroes and those of the 1960s and 1970s 5. Computers: You are lecturing on history of computers 6. Cooking: You are lecturing on Asian cooking/dishes 7. Native American Traditions: You are lecturing on the Lakota Sundance Ceremony 8. Physics: You are lecturing on quantum theory 9. Plants/gardening: You are lecturing on common garden pests and how to get rid of them	41 undergraduate students in an upstate New York university	Quantitative: Dependent measures of interest in this study were the presence or absence of different strategies, and performance indicators of complexity, unique number of terms used, and the average time per trial. The former were analyzed using *chi square analyses*. The latter were subjected to *univariate ANOVA* tests.

	throughout their queries than will novices. 10. The Expert conditions will exhibit a higher degree of overall "complexity" than will the Novice conditions. 11a. Experts will complete their search trials in a shorter amount of time than will novices. 11b. The searching time for the intermittent feedback conditions will be greater than for the constant feedback conditions.			
Heo & Hirtle (2001)	This study analyzed how different Web visualization techniques influenced users in their performance of information searching tasks and how different sizes of Web space influenced their performance of information searching tasks. 1. How do different web visualization techniques influence a user's performance of information searching tasks? 2. How do different sizes of web spaces influence a user's performance at information searching tasks? 3. Is there an interaction effect between the web visualization technique and the size of the web space?	Two different categories of questions related to tool dependency were asked (tool-strong and tool-neutral). The tool-strong category consisted of two types of questions: (a) questions requiring users' understandability of the Web space (type A), and (b) questions requiring comparisons on the Web pages (type B). The tool-neutral category consisted of questions that required various levels of navigation (or visits to various numbers of Web pages) A. <u>Tool-Strong Questions for the Large Space</u> – Name any two faculty members who have publications accessible online. (type A) – How many abstracts are available from the CIRCLE's seminar page in the list of upcoming events? (type A) – Which faculty node has the most Web pages linked from it? (type B) B. <u>Tool-Strong Questions for the Small Space</u> – How many faculty members in the Intelligent Systems Program (ISP) have Web pages? (type A) – Are there more ISP seminars or ISP colloquiums listed? (type B) – Which link in the ISP homepage contains information about special student status? (type A) – How many research associates in the Intelligent Systems Program have Web pages? (type A) C. <u>Tool-Neutral Questions for the Large Space</u> – How often is the Introduction to Clinical Multimedia and the Internet (ISSP 2040) class offered? (3rd level) – How many journal articles did Dr. Kurt VanLehn publish in 1998? (4th level) – When was the last time that the Intelligent Systems Research Seminar (ISSP 2050) class was offered? (4th level) – Name the ISSP 2040 textbook title authored by Grosky, Jain, and Mehrotra? (5th level) – How amny classes did Dr. Druzdzel teach in Spring 1999? (4th level) – What are the office hours of Dr. Pollack for the Advanced Topics in Artificial Intelligence (ISSP 3565) class? (4th level) – What is the fax number of Dr. Druzdzel? (3rd level) – How many people acquired their Ph.D. degrees under Dr. Daley's mentorship? (4th level) – Who is the teaching assistant in the Evaluation Methods in Medical Informatics (ISSP 2060) class in Spring 1999 (99-2)? (5th level) D. <u>Tool-Neutral Questions for the Small Space</u> – Who do you have to contact for information about Medical Informatics track admission? (2nd level) – What is the ISSP course number of the Introduction to Medical Informatics class? (3rd level) – What is the phone number of Dr. VanLehn's secretary? (2nd level) – Which ISSP course is the prerequisite for the Machine Learning and Communications class (ISSP 2170)? (3rd level) – What is the ISP Department code for the GRE? (2nd level) – Name one of Dr. VanLehn's current projects. (3rd level) – Who is the director of the Intelligent Systems Program? (2nd level) – Name one of the prerequisites of the Human Information Processing	80 students at University of Pittsburgh with a minimum of five hours of web experience	Quantitative: Experimental study with control groups; Two dependent variables of performance (accuracy of the answers and time to accomplish tasks in seconds) in each test (pretest and main test) were extracted from the log file and measured. *ANOVA two-way factorial design* was used to measure the users' performances

		(ISSP 2220) class. (3rd level) – Name one of the research interests of Dr. Lowe. (2nd level) – In addition to 901 CL, where else does research associate Ron Rymon have an office? (3rd level) – When is the deadline for the Mellon Fellowship application? (Specify the date) (2nd level) – Name any two academic departments with which Dr. Moore is associated. (3rd level) – How many core classes are required for MS and Ph.D. degrees/ (2nd level) – For the special student status application, which office do people have to contact? (2nd level) – Who teaches the Machine Learning and Communication (ISSP 2170) class in the Spring 1999 (99-2)? (3rd level)		
Kafai & Bates (1997)	1. Can children effectively use the search engines currently available? 2. Can they find appropriate resources in a directed search? 3. Can they evaluate and use the selected resources?	The "SNAPdragon" project was created to investigate how children can interface with the Internet by asking them to build an annotated directory of web sites for other children. <u>Class #1: Six-Computer Classroom: Grades One/Two</u> Topic(s): airports and the Iditarod Alaskan dog-sled race Searching: In the first session, they (students) were coached to type in the URL, or coded address, of the Big Bear Airport, and then were given a list of other airports with their URLs. In the second session, bookmarks of various airports—different ones for each computer—were put on the computer in advance so that students could simply click on the bookmark, rather than type the URL. <u>Class #2: Second Six-Computer Classroom: Grades One/Two</u> Topic(s): Ocean life Searching: Each student selected one ocean fish or mammal to learn more about. They were to use the Internet to find more information for their sea animal research reports. <u>Class #3: Laboratory Class: Grades Three/Four</u> Topic(s): poetry sites Searching: The teacher provided a specific site most of the time for the students to visit and evaluate. Near the end, he opened the experience and encouraged advanced students to use the search engines to find other types of information. <u>Class #4: One-Computer Class: Grades Three/Four</u> Topic(s): City Building Education, a year long project of building a city of the future. Searching: Internet sessions were focused on critiquing web sites. Sites were selected in advance by an intern and entered for the students. <u>Class #5: Laboratory Class: Fifth Grade</u> Topic(s): national parks Searching: They (students) were asked to find six national parks: two in Europe, two in the United States, one in either Africa or Australia and an additional park not in the United States. <u>Class #6: One-Computer Class: Grade Six</u> Topic(s): Ancient Egypt Searching: Students were divided into teams of five to six members. A team member considered to be an "Internet Expert" became the tutor for the team and guided the other students in their searches. The student teams were able to search on their own, under the guidance of the team's "tutor" and independent of other activities going on in the classroom	196 students from six, grade 1-6 classrooms participating in School Network Action Project (SNAP) in West Los Angeles	Qualitative
Kibirige & DePalo (2000)	The main goal of the studies was to investigate how academic users perceive search engines and subject-oriented databases as sources of topical information. When faced with a topical subject, what is the users'	While subjects sat at the [Internet] terminal, they were requested to complete the questionnaire and return it to the reference/information desk. Exit interviews were conducted with some of the subjects. Four questions were used: 1. How do you find the Internet as an information source?	155 Internet terminal users were selected from four metropolitan New York academic institutions: Borough of	Qualitative: Observations, exit interviews Quantitative: "Internet Use Questionnaire"

	predominant recourse, online databases (which may include CD-ROM, or DVD databases) or search engines? Objectives: (a) Find the frequency of Internet use by end users; (b) Find the most popular search engine; (c) Gauge the use of online and CD-ROM databases in the library; (d) Gauge the use of search engines in libraries and information centers; and (e) Relate the results to pragmatic library and information-center functioning in providing information	2. Did you get what you needed from the Internet? 3. Do you have a favorite search engine? 4. Is there any point when you would seek the assistance of the reference librarian/information specialist?	Manhattan Community College; Iona College; Queens College of the City University of New York, and Wagner College	Descriptive statistics for general group tendencies including frequency of Internet use and preferred sources for topical subject search. For inferential statistics, the non-parametric pairwise two-tailed correlation coefficients, *Kendall's tau_b* and *Spearman's rho* statistics were employed.
Large, Beheshti & Rahman (2002)	The goal of the study was to empirically examine: (a) if groups of boys behaved differently than groups of girls online, and (b) if so, how did they behave differently and in what ways were they similar. 1. Do children perform more effectively in groups or by themselves? 2. To what extent do boys and girls differ when working collaboratively in same-sex groups? 3. Does gender play a role in group-based, collaborative information-seeking behavior?	The students were given a choice of 14 Winter Olympic sporting activities (e.g., hockey, figure skating, bobsled, etc.) to research on the Web, but they were not restricted to using the Web and could supplement their research with CD-ROMs or print sources. The goal was for the students to produce a poster on a single sport, which would be assessed by the teacher for a grade. The students were given a list of 12 possible research topics that dealt with different aspects of their sport, such as training routines, diet, personalities, performance in the Olympics, etc., to give them ideas for topics to present on their posters. They were free to choose which and how many of the topics to research.	53 students from a suburban, middle-class primary school in greater Montreal	Quantitative: frequencies of searching characteristics were calculated Qualitative: case study approach
Lazonder (2000)	The present study examined why novices are less efficient at locating sites and what kind of instructional support is needed to enhance their search performance.	On the Internet site 'www.uittreksels.com' you will find a book report on Snikken en Grimlachjes. Surf to this site and locate this review. [low complexity--URL is given in the task description (www.uittreksels.com)] On the SMC web-site you will find a module on literature comprehension. Surf to this module and locate the page on Piet Paaltjens. Answer the following question: Why are most poems in Snikken en Grimlachjes untitled? [medium complexity--URL can be inferred from the task description (www.smc.nl)] In 1964 Rob Nieuwenhuys wrote a biography of Francois HaverSchmidt (Piet Paaltjens). What is the title of this biography? [high complexity: URL cannot be inferred from the task description (www.internetcollege.nl or www.xs4all.nl/~boekglas/poezie.html)]	14 fourth graders from pre-university education (mean age of 15.3)	Quantitative: Background questionnaire, self-report questionnaire measured perceived proficiency in using browsers and search engines; three search tasks Mean times for strategy selection, execution and monitoring were calculated; frequencies of search strategy use were calculated. Qualitative: Participants were instructed to work individually and to think aloud during task performance.
Lazonder (2005)	The present study explored whether collaboration stimulates self-regulatory activities in students searching for information on the web. It sought to answer this question by comparing pairs of students with individual students in web search tasks. The underlying hypothesis was that peer-to-peer collaboration encourages students to articulate their thoughts, which in turn has a facilitative effect on the regulation of the search process as well as search outcomes.	1. When was the first version of MS Windows released? 2. What extinct species is found in Alice in Wonderland? 3. There have been quite some attempts to circle the earth by hot air balloon. How many tries were needed to become the first man to achieve solo circumnavigation of the earth in a hot air balloon? 4. For what reasons was the European Union established? 5. Most people know that Indians live in tents. Inside and outside these tents, certain traditions and rules should be complied with. To illustrate, Indians do not want "direct" help in taking down their tent. Why is that so? 6. Find the current opinions of three major European countries on a possible war with Iraq.	25 first-year students in social sciences from a Dutch university	Quantitative: *Motivated Strategies for Learning Questionnaire (MSLQ);* Between-subjects design with collaboration (Pair, Single) as independent variable and search outcomes and regulation of search performance as dependent variables. Search outcomes were indicated by performance success and time. *Kolmogorov-Smirnov tests* were performed to test the normality assumption and *univariate ANOVA* to examine effects.
Lazonder, Biemans & Wopereis (2000)	1. The purpose of the present study was to examine whether proficiency in using the WWW affects online search performance. 2. Students with a high level of WWW-experience were predicted to yield more effective and efficient performance than would students with little WWW-experience.	All assignments concerned a nineteenth-century volume of poetry the subjects had to study for their reading list. Each assignment consisted of two tasks: The first task dealt with locating a Web site, and the second task dealt with locating information on that site.	25 fourth graders from pre-university education (mean age of 15.3)	Quantitative: three questionnaires, search task; the study used a quasi-experimental design with WWW-experience as an independent variable with two levels (novice and expert). *Univariate ANOVA* was used to examine effects.
LeBaron, Gibson, Burke	The purpose of this article is to offer a fresh perspective into the independent searching behaviors employed by	Each team developed a problem statement in terms that could involve the Internet as an important component of the solution, and then described	18 postgraduate students enrolled in *Exploring*	Qualitative: e-journal entries, listserv postings

& Scollin (1998)	experienced educators when they seek educational information on the Internet. What happens in actual practice when educators are left to their own devices to seek, find and report on Internet based resource searches?	goals, activities, timelines, resources, obstacles, and limitations related to the solution. The remaining major class assignment asked students to build an ongoing electronic journal of educationally relevant Internet resources.	*the Internet for Educators* course at the University of Massachusetts Lowell, College of Education	
Lin & Belkin (2005)	To what extent can people's experience in the transmuting mode of information seeking be accounted for by Multiple Information Seeking Episodes (MISE)?	The subjects' goal was to search for information to plan a surprise vacation for their significant other. The timeliness of the vacation was limited to one week, which could be considered a task constraint affecting the planning of vacation activities. An additional constraint was to set up a budget of $5,000. The clarity of the goal was low because subjects had no ideas about where they would like to go and where to start the search. Subjects were asked to come up with five different prospective destinations they knew little about and to seek information to compare them and narrow the five candidates down to a final destination over three sessions. 1. The first search task was to identify at least five different vacation destinations that would enhance the subjects' personal relationship within the constraints of the $5,000 budget and available time. 2. The second search task was to compare the different places subjects identified in the first episode in terms of what they offer, how much each will cost, convenience, possibilities for different types of activities, entertainment, restaurants, or other things subjects cared about doing during their vacation. 3. The third search episode was to search for information that would help make a detailed plan for the vacation.	22 students in undergraduate communication course	Qualitative: Initial entry interview and three searches, each accompanied by pre-search and post-search interviews. *Content analysis* was employed
Lucas & Topi (2002)	Our intention is to begin an exploration of the factors that have the most significant impact on subjects' performance in information retrieval tasks.	1. How to make pudding 2. Information on colleges located in Germany 3. Who said: The business of America is business 4. Information about cowboys, but not the Dallas Cowboys 5. Books written by Arthur Gittleman 6. Information on the effects of caffeine on the heart 7. How to make cookies with peanuts but not peanut butter 8. What John Silber does at Boston University	87 students at Bentley College	Quantitative: Seven variables related to operator usage and four variables related to term usage served as independent variables.
Maciuszko (1989)	Are we ready for online searching to replace hardcopy? Or, should not hardcopy coexist with online? Hardcopy searching is a more effective way to search by subject for bibliographic information than is online searching.	Six Baldwin-Wallace College (Berea, Ohio) students furnished 22 test questions: eight questions in biology; seven questions in the field of business; seven questions of popular interest.	12 librarians (6 from academic libraries; 6 from public libraries)	Qualitative: The methodology involved three steps: 1) creating a set of questions; 2) searching them in hardcopy indexes and their online counterparts; and 3) evaluating the results.
Nahl (1998)	This exploratory study attempts to understand the novice searcher's experience in learning to use a search engine without prior instruction and without assistance. There were three main purposes to this research effort: 1. Finding empirical evidence for affective and cognitive operations within four phases of searching: 10 Pre-search formulation; search statement formulation; search strategy; and search evaluation. 2. Empirically capturing the controlling operation of affective over cognitive functions in information behavior. 3. Using ethnographic data to better understand quantitative self-ratings given by searchers at the end of a session. These data included ratings of self-confidence as a searcher, stressfulness of the session, satisfaction with the search engine, usefulness of the results, newly gained understanding of the topic, and expectations of success in future searches.	Without prior searching instruction, undergraduate novices wrote structured self-reports during their first session on a Web search engine. Users chose their own topics and followed written instructions that prompted them to describe thought and feelings during specified stages of the search: pre-search formulation; search statement formulation; search strategy; and evaluation of results.	Undergraduate novice Internet users	Qualitative: Ethnography; Novice Internet learners agreed to write a self-report of their first session using a Web search engine; in-depth case study analysis
Nilan,	This study will examine the situations/purposes users have	The questionnaire asked the respondent to provide a general statement	250 respondents (aged	Qualitative: Questionnaire, interview

Pomerantz & Paling (2001)	for searching the Web and their perceptions of the textual features that assist users in characterizing the documents/texts retrieved in actual Web searches. We expect to develop (a) a range of situations/purposes for which users see the Web as a potential source of information; (b) a range of genres with user-based linguistic labels for those genres that users perceive; and (c) a range of genres for each situation/purpose that are commonly seen as likely candidates for information.	about the purpose or information-seeking situation that motivated the Web search and then directed the respondent to proceed with his/her search. When the respondent looked at a web page that resulted from his/her search, as series of questions were asked that focused on what type of page the respondent was looking at, what characteristics or indicators led them to call the page that kind of page, and indications of the usefulness of the page for the respondent's purpose/situation. The interview went on as long as the respondent continued searching or until the respondent grew tired of the interaction.	10-97)	Employing standard *inductive content analytic procedures*
Spink, Ozmutlu & Ozmutle (2002)	The objective of the studies reported in this article were to: (a) Determine the prevalence of multitasking seeking and searching over multiple studies in different information environments; (b) Analyze the characteristics of the multitasking information seeking and searching processes; (c) Compare the characteristics of the multitasking search sessions with single topic search sessions; and (d) Determine any factors that may indicate a topic change during a user search session.	Users of the Excite Web search service were asked to complete an interactive survey form about their interaction with Excite, including questions to determine users' current search topic, search terms, information seeking stage, and frequency of searching Excite on their current topic.	480 respondents (approximately 7.7% of site visitors) on Saturday, April 12, 1997	The data analyzed in this research was taken from four studies of user behavior during their information-seeking and searching processes. Quantitative: Survey data was tabulated using the ACCESS statistical package Qualitative: Data from each study was analyzed separately using *content analysis*
Palmquist & Kim (2000)	How well does the user manipulate the features of the Web browser to follow the appropriate clues that will advance his effort toward the information that he seeks? What are the human factors affecting an efficient use of the Web? 1. What are the effects of the users' cognitive style and on-line database search experience on their search performance? 2. Among several user factors, which one(s) contribute to the efficiency of the user's search performance? In addition, the effects of cognitive style and on-line experience on the navigational decisions made using various browser tools were also examined.	<u>Factual Information Search Task</u> Your graduation is coming closer. You are thinking of several options for your future, and one of them is to pursue further studies in a UT graduate school. First, you decide to learn more about the requirements for the admission. Find information on requirements for admission, for US graduates applying for UT graduate programs. When you locate the Web page listing the requirements, make a bookmark of it. <u>Topical Information Search Task</u> Before your graduation, you decide to collect information on your future job and career. Find any information that you think useful to prepare for your future career. For example, you might want to search for information on questions like: (1) What kind of jobs are available and/or suitable for a person with a background like yours? (2) Where can you find information on the jobs? (3) Is there any career service available on campus? (4) Is there any job fair on campus? (5) What are you supposed to do for interviews before, during, and after interviews? (6) How should you prepare your resume (curriculum vitae) and/or other documents? (7) Are there any people who are currently employed and want to share their experience? and many others. When you located a useful resource, make a bookmark of it. And go on for the next. Find three to five Web resources that you think useful and bookmark them.	48 undergraduate students at University of Texas, Austin	Quantitative: *Two-way ANOVAs* were performed to determine the effects of cognitive style and on-line search experience on the search performance measures AVTIME and AVNODES. In addition, a *multiple regression* was performed to predict the contribution of different user variables to search performance. To assess the value of the user factor(s) that may be used to predict the efficiency of a Web search, a *step-down multiple regression* was performed. For this regression, user variables such as academic background, age, cognitive style, gender, grade level (Freshman/Sophomore/Junior/Senior), computer experience, on-line search experience, and Web experience were used as predictor variables.
Panko & Arlidge (2003)	This case study examines the online experiences of participants involved in an undergraduate course entitled 'Information, Knowledge and Learning'. This course was designed to enhance teachers' information and teaching skills in a rapidly changing world, using a variety of information sources, particularly those of the Internet and online databases.	Information searching tasks during the face-to-face session took place on computers linked to the Internet and ranged from teacher-led to completely self-directed exploration. These included: – Viewing recommended websites via Blackboard as part of class discussions and group tasks – Guided searches on faculty selected topics (i.e. definitions of information literacy) – Interactive online quizzes – Independent searches focused on assignment topics	9 undergraduates and 2 faculty enrolled in "Information, Knowledge, and Learning" course	Qualitative: Case study; Participants took part in diverse evaluative Internet searches, and were then asked to examine and reflect on these techniques.
Pritchard & Cartwright (2004)	The study was an attempt to discover more about the approaches that might be taken to overcome the difficulties experienced by children when making use of large amounts of factual information.	The children in this mixed-ability group were asked to produce an information sheet about the history of bikes for children of their own age to use. They were then given a 'reminder' sheet of things to take into account when producing their sheet, and a list of ten websites to consult for relevant information.	54 year 6 children (aged 10 and 11) in a middle class area of central England	Qualitative

	The project was carried out as a way of investigating children's responses to the use of the Internet for making use of information.			
Redfern (2004)	This research was an investigation of the need for an online contemporary natural language thesaurus.	The University of Canberra Library survey was designed firstly to evaluate student knowledge and skills in using different search terms, keywords, descriptors and subject headings for the library catalogue and databases. Secondly, it was to evaluate student use of research tools and research methodologies. The final, and major question of the survey was to establish that if a contemporary natural language thesaurus was available and linked to library catalogues, databases and web pages, would students think this would assist their research and why.	20 students at University of Canberra College	Both quantitative and qualitative data were collected through questioning and through numeric ranking. Quantitative: Survey questions that utilized numeric ranking Qualitative: Interview used ethnographic semi-structured questions
Rieh (2000)	1. To what extent do scholars make judgments of information quality and cognitive authority when they interact with information in the Web? 2. What is the nature of judgments of information quality and cognitive authority performed by the scholars? 3. What are the characteristics and factors that influence scholars' judgments of information quality and cognitive authority?	1. For the research project in which you are currently engaged, you would like to find some good papers which are new to you, which you think will be useful. (research task) 2. You are planning for the next conference which you are going to attend, and would like to find useful information about hotels, restaurants, and features of interest in that city. (travel task) 3. A friend of yours has just been diagnosed as having schistosomiasis, and you want to find credible information about the disease itself, and the best methods of treatment. (medicine task) 4. You've decided that you want to buy a new computer to use at home, and now you need to find the best price for it. (computer task)	15 scholars at Rutgers University	Qualitative: *Content analysis* was used as a technique to inductively identify and categorize the type and facets of judgment and the criteria mentioned by the subjects. The basic unit of analysis was a web page viewed by the subjects, and the data from the log, interview and thinking aloud protocol with respect to that page.
Rieh (2004)	The objective of this study was to characterize the home as an information use environment and to identify a range of information seeking and Web-search behaviors at home. 1. What are the environmental factors of the home that influence information seeking and Web searching? 2. What are the goals that make people turn to the Web for seeking information at home? 3. How do people interact with Web information during search sessions at home? 4. How do people formulate search queries when searching for Web information at home?	The researcher contacted each subject 5-7 days before the interview and asked each to make notes on their Web information seeking activities using the 'Search Activities Diary' sent either by post or e-mail. The researcher then asked questions about each activity entered in the diary. At the end of the interview, the subject was asked to describe some difficulties in Web searching and general information seeking at home.	12 residents of Northern California who: 1) lived in San Francisco Bay Area; 2) had high-speed Internet connections in their home; and 3) offered their home as a research site. Candidates who worked in the Internet industry were excluded.	Qualitative: Verificaton of the internal validity of this study can be claimed thorugh triangulation: Search Activities Diary, interviews and observations. The data were analyzed on four levels: home environment, information seeking goals, information retrieval interaction, and search query.
Rieh & Rieh (2005)	The purpose of this study is to identify the implications for designing information retrieval systems that support user interactions with multilingual collections on the Web. 1. To what extent do bilingual Korean scholars conduct multilingual searches on the Web? 2. How do the Korean scholars decide which search engines to use when searching for multilingual information? 3. What preferences do the Korean scholars have for integrated multilingual search tools?	Every interview was conducted at a computer station with a high-speed Internet connection so that the subjects could readily demonstrate their search behaviors from time to time during the interview. Each interview was structured around the following topic areas: – Information-seeking habits on the Web for professional activities and tasks – Web searches for research tasks and personal pursuits (scholars were asked to demonstrate their typical behaviors) – Favorite search engines and reasons for such preference – Web searches when both Korean and English documents were needed – Perceptions of and preferences for multilingual Web searching	28 academic users including faculty members, doctoral students and a post-doctoral fellow from the Science and Engineering Campus of Myongji University in Korea (aged 26 to 51)	Qualitative: The data were collected in natural settings by conducting semi-structured interviews and taking observations from July to August 2001.
Rogers & Swan (2004)	This article reports on a research study that demonstrates that the model of self-regulated learning developed by Corno and Mandinach (1983) relative to traditional classroom activities can be applied to Internet searching behaviors.	1. Jabberwocky: What does a jabberwocky look like? Why should you beware of the bandersnatch? Would you want a Jabberwocky, and why? What literacy or practical use would a Jabberwocky serve? 2. Maritime flag signals: Find the maritime flag system and display your first name in the code. What are the differences between the maritime flag system, the semaphore system, and the Morse code system? Create a new flag as a combination of the maritime and semaphore systems, for signaling between two ships in a non-peaceful situation. Tell the meaning to be interpreted by the flag/position.	80 undergraduate students at a public research university (aged 19 to 25)	Quantitative: The primary methods of data analysis used in this study were *correlational analyses* and *agglomerative cluster analysis*. The purpose of the cluster analysis was to see whether the observed behaviors of subjects searching for information on the Internet would

		3. Acid rain: What is acid rain? Find the acidity for a lake of your choice in upstate New York for any given year in the 1990s, and estimate the acidic value for this lake 10 years from now. Why can't acid rain concerns for Upstate NY be controlled by the New York State legislature? Is there such a thing as ''basic'' rain? 4. Mark Twain: Who was president during this author's lifetime? Find a favorite quotation by Mark Twain, dealing with politics. What advice would Mark Twain have for teenagers today? If Mark Twain had run for the presidency and won, what might his inaugural speech have focused on? 5. Matchbox cars: Who developed them, when, and is there a standard scale? By the same scale as the 1990 cars, how high would be a model for President Clinton? What building materials are used and could be interchanged in model cars today? What would be a scale and use for a larger-than-life model? 6. Olympic games: Find the locations for the 1896 and the 1996 Olympic games. Over the years, the altitude of Olympic sites has had an influence in comparing records to decide if records have been broken. Why? Compare statistics of the winners' time, prizes, countries represented. What was the role of technology for each of the games, and what are some ethical issues of changes in technology? 7. Humor: What is a parody? Find some parodies of ''Twas the Night before Christmas.'' What makes them funny? Give some examples of other perspectives that could be a foundation for additional versions of this parody? When is humor unhealthy or inappropriate? 8. Juggling: What is an early (historically) indication of juggling? Visit sites that describe the motions of juggling, visually and mathematically, and provide an estimate of the level of high school mathematics (algebra, geometry, etc.) needed to analyze the movements? What factors influence the maximum number of objects that can be in a pattern? Devise an instructional technique or mechanical aid to juggle more objects or special objects.		suggest classification into the four forms of self-regulation developed by Corno and Mandinach (1983) from classroom observations.
Saad & Zainab (2004)	Describe the extent of use undergraduates made of the Internet when searching for information in a particular context.	Searching for information in a particular context, so as to be able to write the first four chapters of the final year project report.	360 third year undergraduates enrolled in the Bachelor of Computer Science (CS) and Bachelor of Information Technology (IT) at the University of Malaya completed a questionnaire; 14 undergraduates were used as case studies	Quantitative: Questionnaire; frequencies Qualitative: Case study; analysis of daily diary entries, answers to questions posed by the researcher through emails and from the transcriptions of interview sessions
Schacter, chung & Dorr (1998)	This study is a first attempt at understanding processes elementary school children use when seeking information on the Internet. 1. How does the structure of the information-seeking task affect children's information-seeking process behaviors on the Internet? 2. How does the structure of the information-seeking task affect children's performance outcomes on Internet searching? We propose that task structure will affect children's information-seeking processes on the Internet. We expect to observe more analytic search strategies in the searching than the finding task. 1. Children will show significantly more browsing search behaviors than analytic search behaviors on both the finding and searching tasks, although children will show	What are the three types of crime that happen most in California? Your task is to find information that other people will believe about the three types of crime that happen most in California. You need to find information about the three types of crime that happen most in California. What should be done to reduce crime in California? Find at least three pieces of information on the Internet that will help you develop a plan to reduce crime in California. You need to find information to make a plan that other people will agree is a good, usable, and practical way to reduce crime in California. Find three pieces of information on the Internet that will support your plan.	32 fifth and sixth grade students in California	Quantitative: A *repeated measures MANOVA* with searching process behaviors (i.e., browsing, analytic searching, and scan-and-select) as the dependent variables, task as the repeated measure, and gender as the independent between-subjects variable was run.

	significantly more analytic search behaviors on the searching task than on the finding task. 2. Children will find significantly more information, and significantly more relevant information, on the searching task compared to the finding task. 3. The majority of children will use only one of the many available search engines, thus limiting their ability to identify potentially relevant information. 4. Children's relevance ratings of the information they find will be the same as adult ratings on the finding task, but will be higher than adult ratings on the searching task. 5. The majority of children will rate all documents they bookmark as being true on both tasks.			
Scott & O'Sullivan (2000)	We undertook an action research study designed to examine high school students' use of the Internet, their evaluation of it as a learning tool, and their personal satisfaction at using the Internet for educational research.	Questionnaires were used to determine frequency of Internet use by the students. Each student was assigned a social science topic commonly studied in a world history or global studies curriculum.	309 students (grades 9-12) in social studies and communication classes; 36 students in two eleventh grade social studies classes	Quantitative: Questionnaire Qualitative: *Content analysis* of student generated essays
Shenton & Dixon (2003)	The purpose of the study was to explore the information universes of young people as revealed by their own words and ideas. This paper is devoted to one aspect of these information universes--youngsters' use of CD-ROM and the Internet for information.	There were 121 individual interviews and 67 youngsters participating in focus groups. A life-centered line of questioning was taken in all the dialogues, with informants initially asked to: "Think of a time recently when you needed help, when you needed to decide what to do, when you were worried about something or when you needed to find something out or learn something, either for school or your own interest. It might've been at home, at school or anywhere else. Could you tell me about what you remember of that time?"	188 pupils from fourteen year groups (aged 3-18) from six schools in the town of Whitley Bay, England	Qualitative: Data was coded inductively using the *constant comparative method* of Glaser and Strauss (1967). In comparing youngsters' use of CD-ROM and the Internet, the investigators made observations of two different varieties: *analyst-constructed* and *indigenous* (Patton, 1990).
Slone (2002)	What are the determinants of user searching behavior in an Internet and Internet on-line catalog environment? (a) What search patterns arise from Internet use? (b) How does user understanding of how the system works affect search patterns? (c) How do user goals affect search patterns?	The researcher chose to conduct two audiotaped interviews with each participant and observe their online sessions. The researcher approached users of a stand-alone catalog during a predetermined period of time, introduced herself, and explained the study and procedures. After obtaining consent, she asked participants if they would do their searches on the internet, which provided access to the Wake County on-line catalog. On-line catalog interaction was needed to compare it to other types of Internet interaction. In the end, 15 participants searched the Internet on-line catalog and 16 searched the World Wide Web or both.	31 public library users at Richard B. Harrison library in Raleigh, North Carolina (aged 7-63)	Qualitative: Data were analyzed in a series of initial stages and a final analysis. *Open coding*, Strauss and Corbin's (1990) inductive approach to data analysis, was applied to the data in the following manner: The data were analyzed across participant and categories.
Slone (2003)	The study explored user behaviors in a Web environment, with special attention to Web-based online catalog use. The purpose was to determine the influence of goals and mental models on information seeking on the Web. How do age, goals, and experience influence search approaches during Web and Web online catalog searching?	The researcher chose to conduct two audiotaped interviews with each participant and observe their online sessions. The researcher approached users of a stand-alone catalog during a predetermined period of time, introduced herself, and explained the study and procedures. After obtaining consent, she asked participants if they would do their searches on the internet, which provided access to the Wake County on-line catalog. On-line catalog interaction was needed to compare it to other types of Internet interaction. In the end, 15 participants searched the Internet on-line catalog and 16 searched the World Wide Web or both.	31 public library users at Richard B. Harrison library in Raleigh, North Carolina (aged 7-63)	Qualitative: The data relating to the research questions were coded. Codes were placed into a visual analysis device called the "spectrum" arranged into regions corresponding to assigned codes.
Spink, Greisdorf & Bateman (1998)	1. A specific goal of the research presented in this paper was to examine if partially relevant items selected by initial users are related to: (a) users' level of knowledge about the problem underlying the search; (b) changes in users' information problem during or after the search; and (c) changes in relevance criteria employed. 2. Another objective of this research was to investigate end-users criteria for relevant, partially relevant and not relevant items retrieved.	The data analyzed in this research was taken from four studies of user behavior during interactive online Information Retrieval (IR). Data collection included: (a) Videotaping the interaction between users and searchers; (b) Capture of the search logs in all four studies; (c) Users' judgment of retrieved items on a three-point scale; and (d) End-users' criteria for retrieved items judged relevant, partially relevant and not relevant.	55 graduate students at University of North Texas & Rutgers University	Quantitative: *Correlation analysis* (Williams, 1992) was conducted for selected variables related to: change in users' relevance criteria; changes in a user's personal knowledge; changes in users' problem definition, and changes in a user's specific knowledge of the problem-at-hand.
Tabatabai & Shore (2005)	1. Do expert searchers use different strategies than intermediates and novices?	They [participants] were searching the Web for a definition of ETM. Data were collected using thinking-aloud while searching, thereby	29 undergraduate pre-service teachers at McGill University	Quantitative: *Descriptive analysis* and *analysis of variance* were performed on level 1 data and

	2. Is there a relationship between users' strategies and attributes, on one hand, and timely success of the Web search, on the other (timely meaning as soon as possible within 30 minutes)?	generating verbal protocols.		*Pearson correlation coefficients* were calculated for all three levels of data. In addition to *ANOVA*, in order to determine the strength of the relationships among variables, *Pearson correlation coefficients* were calculated on all three levels of data.
Tsai & Tsai (2003)	The purpose of this study was to explore a group of college students' information searching strategies in Web-based science learning activities and examine the role of students' Internet self-efficacy on these strategies.	1. What is nuclear power? 2. What are the advantages of nuclear power? 3. What are the disadvantages of nuclear power? 4. How many nuclear power plants are there currently in Taiwan? 5. Where are the locations of the nuclear power plants in Taiwan?	73 college students in Taiwan	Qualitative: Multiple-case study followed by *cross-case comparisons*
Ushida & Thomson (2003)	1. How do learners interact with the language learning resources during the learning process? 2. How are the Web-based resources perceived by learners in comparison with other learning resources? 3. What kind of skills/strategies will be required in resource-based learning, using the Web-based resources in particular?	The learners selected one aspect of Japanese society, which was introduced by the textbook. The choices were made from (1) Education, (2) Marriage & Women, (3) Food, and (4) Aging Society. The learners were required to use all types of resources, namely (1) Web sites (preferably Japanese sites), (2) e-mail exchanges with university students in Japan, (3) interviews with Japanese people in Sydney, (4) the course textbook, and (5) references and videos available in the library.	97 undergraduate students in the third year Japanese language course at the University of New South Wales (UNSW)	Qualitative: Three types of data were collected in this study: (1) researchers' observation notes, (2) interview protocols, and (3) teachers' feedback on students' presentation outcomes
Vansickle (2002)	The purpose of my study was to examine what tenth-grade students enrolled in three academic tracks of language arts know about using the Web and how they search for information located on it. 1. I questioned whether high school students who spanned a range of academic abilities would: (a) differ in their knowledge about the Web; and (b) differ in how they search for and use information. 2. I hypothesized that: (a) there is a relationship between academic placement and a student's general knowledge and use of the Web; and (b) there is a relationship between academic placement and a student's Web searching skills.	A search protocol of four hierarchically arranged search tasks was developed for the qualitative portion of this study.	136 students (40 technical students, 52 college preparatory students, and 44 honors students) across seven sections of tenth-grade language arts classes	Quantitative: The major research hypotheses addressed in this study focused on two dependent variable sets, general knowledge (GK) and search knowledge (SK), and their relationship to academic track (the independent variable). *Multivariate analysis of variance (MANOVA) tests* were conducted to determine whether students in the three academic groups varied significantly from one another on the GK and SK dependent variable sets. Qualitative: Search protocol
Walton & Archer (2004)	1. Develop a deeper understanding of our students, their information-seeking practices and what motivated them to learn. 2. Understand more about our own practices as teachers in online classrooms. 3. Design, evaluate and iteratively refine a scaffolded curriculum for exploratory learning, through drawing on our improved understanding of our students and our own practice.	At the start of the course, we provided students with 'canned searches' or pre-planned detective-hunts for information. Prior to beginning of classes, we set up and tested these searches using a range of keywords, eventually presenting students with pre-formulated queries which we knew would lead them to at least one useful source, but where individual students were responsible for interpreting the search results and making selections.	Three cohorts of first year University of Cape Town engineering students from previously disadvantaged schooling backgrounds	Qualitative: online discussions, end-of-term interviews, course evaluations, participatory evaluations, student assignments, web-searching case studies, and web searching exercises
Weideman & Strumpfer (2004)	The purpose of this paper is to report on a literature study and an empirical experiment on retrieval of relevant information from the Internet.	Search for one academic topic of their own choice	1,109 students from three continents and twenty institutes of higher education	Quantitative: A *binary logistic regression* that was fitted to the data to determine which variables used together contributed significantly to the obtaining of results in an Internet search
White & Iivonen (2002)	The purpose of this article is to explore assessing the level of difficulty of search questions for Web searching and to identify the reasoning underlying judgments about the ease or difficulty of questions.	1. What are considered to be the causes of hooliganism or fan violence at World Cup soccer games? 2. What international efforts or projects are underway to handle the Year 2000 computer crisis?	54 students in early stages of their information studies programs (27	Quantitative: The analysis of the relationship between question types and judgments about difficulty is based on quantitative data. It tests

	1. Do Web users' judgments of the level of difficulty of search questions vary on the basis of the type of search questions? 2. What reasons do searchers give for considering a question difficult or easy?	3. What sites are on UNESCO's list of World Heritage sites? 4. Amazon Books is often mentioned as a good example of companies whose business is doing well on the Internet. What information is available on the Internet about the company's history and current status, including the kinds of services it offers to customers? 5. I need a demographic statistic that characterizes Internet users-age, gender, income level, and so on. 6. What is the difference between the European approach and the American approach to protecting privacy on the Web? 7. How is the U.S. Library of Congress resolving copyright issues in connection with its Digital Library project? 8. I am looking for a copy of the multinational treaty banning land mines that was signed shortly after Princess Diana's death, the one that the U.S. and Finland refused to sign. 9. What is the World Health Organization doing to stop river blindness? 10. What does the term "the China Syndrome" refer to? 11. According to the Bible, how old was Methuselah when he died? 12. How do I apply for admission to the medical school at Harvard? 13. What studies are available on the Web about people's knowledge, attitudes, fears, and opinions about virtual reality? 14. Diane Fossey did amazing research studying the habits of gorillas in Africa and became an advocate of maintaining their habitat. She was killed in the course of her research, supposedly by a poacher. Which person or organizations are continuing her work, if any? 15. Who are the current members of NATO, the North Atlantic Treaty Organization? 16. Who is president of the Nokia (Intel in U.S. version) Company in Finland (U.S.)?	Americans and 27 Finns)	the hypothesis that significant differences exist in participants' judgments about difficulty based on type of question, using a *Chi-squared test.*
Wilson, Ford, Ellis & Foster (2002)	1. Is the problem-solving stage model recognized by clients as appropriate for recording their progress on a project? 2. Is the concept of uncertainty recognized by clients? Can they use a presented scale to indicate how certain/ uncertain they are about their problem stage and about the availability of information to assist them in solving their problem? 3. How do the concepts of problem-solving stage and uncertainty relate to other variables identified in the models of information-seeking behavior proposed by researchers such as Ellis, Kuhlthau and Wilson?	The interviews were carried out before the on-line search, to determine the nature of the client's problem and to collect other information, after the search had been carried out, and, in the case of Sheffield only, some two months after the search.	198 researchers (87 in the United States and 111 in the United Kingdom) at the Universities of Sheffield and North Texas	Qualitative: Interviews, online search as part of a longitudinal study
Yang (2001)	Specifically, the objectives for the project were to: (a) provide students with background information about American culture, its states, cities, food, customs, people, history, travel information, etc.; (b) provide students with an information-literate experience of web technology and enhance students' discourse synthesis ability, namely, learning how to search, organize, and compose information for a research project.	The project aimed to help students understand the web with the ultimate goal of using it to create research projects about selected states in the U.S.	55 second-year students majoring in Applied English from one class at a junior college	Quantitative: Included *Pearson product-moment correlation coefficients*, *t-test* and *factor analysis*. Qualitative: Student responses to open-ended questions and researcher's observation.