Rosalyn M. Metz. Conducting Online Research: Undergraduate Preferences of Sources. A Master's Paper for the M.S. in L.S degree. April, 2006. 42 pages. Advisor: Diane Kelly

When students write research papers they use a variety of sources in their paper. These sources range from web pages to research articles. The purpose of this study was to decide whether or not undergraduate students would choose to use scholarly or non-scholarly sources when presented with both types of sources in a set of search results. Twenty Duke University students were recruited for the study. They were given a research topic and asked to perform a search. Both the search results and interface were fabricated by the researcher in order to control the experimental environment. The students were asked to rate the sources found in the results, choose four sources to use for their research scenario, and finally, were asked to explain reasoning behind their choices. The findings concluded that the students in this study were more likely to choose scholarly sources over non-scholarly sources and give these scholarly sources higher ratings.

Headings:

Citation Analysis

Academic Libraries

Full text databases

Students

Scholarly Publications

World Wide Web

CONDUCTING ONLINE RESEARCH: UNDERGRADUATE PREFERENCES OF
SOURCES

by
Rosalyn M. Metz

A Master's paper submitted to the faculty
of the School of Information and Library Science
of the University of North Carolina at Chapel Hill
in partial fulfillment of the requirements
for the degree of Master of Science in
Library Science.

Chapel Hill, North Carolina

April 2006

Approved by

_____

Advisor's Diane Kelly

Introduction

When students write research papers they use a variety of sources in their paper. These sources range from webpages to research articles. Since the inception of the web student use of scholarly sources has decreased dramatically, while their use of webpages has increased dramatically (Davis, 2001). This has left faculty and librarians clamoring for a way to decrease the use of non-scholarly source and increase the use of scholarly sources. According to ALA's 2004 Statistical Summaries, every library has, on average, 949 databases (Association of College and Research Libraries, University of Illinois at Urbana-Champaign, & Library Research Center, 2005). This plethora of online library search tools confuses patrons and they often have a hard time mastering their use (Curtis, 2000). Some librarians feel that students have mastered the research process (Fister, 1999) and that the search tools libraries supply are cumbersome (Wilder, 2005).

Many librarians have undertaken similar research to determine students' use of the Web for research. Davis analyzed student bibliographies to determine what type of sources they were using for research papers (Davis, 2001). He deduced that the best way to reduce the amount of webpages that students use for their research was to increase faculty communication of expectations. Leckie analyzed the student's research process to determine the difference between the research that faculty conducted and the research

that students conducted. She, like Davis, determined that student and faculty communication was lacking.

Many articles advocate for increased communication between faculty and students (Davis, 2001, Leckie, 1996). Each article focuses on student use of the web for their research. They determine, first that the web is non-scholarly and second that students are more likely to use the web instead of library materials. However after reading each article, the reader has to wonder why students choose to use these non-scholarly sources in their research papers instead of scholarly ones.

One student in this study commented, "If I can't readily get the info then I'm not going to use the resource." Is this statement true? The study reported in this paper investigates the following questions: Will students choose to use scholarly sources in their research papers if the information is as accessible as non-scholarly sources? When conducting research and choosing sources, will students choose scholarly sources over non-scholarly ones? The purpose of the study reported in this paper is to investigate students' choices of scholarly or non-scholarly materials when identifying sources for a research paper in a situation where both types of information are equally accessible.

Literature Review

As any library tutorial will tell you, a scholarly source is generally defined as books or articles from peer reviewed journals. The <u>Dictionary for Information and Library Science</u> defines peer review as "The process in which the author of a book, article, software program, etc., submits his or her work to experts in the field for critical evaluation, usually prior to publication, a standard procedure in scholarly publishing" (Reitz, 2004, p. 529). Conversely, non-scholarly sources are defined in this study as anything else. Examples of scholarly sources are articles from the Journal of the American Medical Association or a book published by Duke University Press. Non-scholarly sources can be anything from a magazine article in Time Magazine to a personal website or even newspaper or bulletin.

This literature review takes a look at first the research processes of undergraduate students. Understanding the steps students take when finding information can help librarians and faculty better conceptualize why students make the choices that they do.

In the second half of the literature review, we will take a look at what types of source students choose when doing their research. This practice is commonly referred to as bibliometrics; the Oxford English Dictionary defines bibliometrics as "The branch of library science concerned with the application of mathematical and statistical analysis to bibliography" (Oxford English Dictionary, 2000). This process has been used since the

early seventies to analyze the types of sources researchers use for the papers. This section will also reflect on possible solutions other researchers found for the lack of scholarly sources used in student papers.

The final section of the literature review will take a look at how search tools, the web in particular has changed the way students search for and choose information for their research papers. It will look at research that other librarians have done to determine why students use search engines and full text databases to the extent that they do.

Student Research Process

Gloria J. Leckie surmises that faculty and student communication breakdown is responsible for the lack of scholarly source in student bibliographies. She states, "there is likely to be a large disjuncture between the expectations of the faculty member as the expert researcher, and the capabilities of the undergraduate as the novice researcher" (Leckie, 1996, p. 203). Leckie identifies faculty as expert researchers in a given field. She goes to great lengths to discuss their research habits, and says that faculty research is the "expert model" (Leckie, 1996, p. 202) of research.

Leckie then turns to the research habits of students. She believes that "this expert model does not work well when applied to novices" (Leckie, 1996, p. 202). She supposes that faculty do not take into account student research habits and knowledge levels when designing and assigning research papers for their classes. Leckie believes that faculty members need to rethink assignments and adjust them to the students' level. Her article provides no research to support her arguments; her ideas are anecdotal at best.

Conversely, Barbara Fister's article "The Research Processes of Undergraduate Students" provides facts that demonstrate students' ability to emulate the expert model of research that Leckie outlines. In her article, Fister identifies students that have completed research papers and asks them about their experiences.   Students described the process they went through with special emphasis placed on familiarizing themselves with a topic, finding sources, and evaluating those sources.

Throughout Leckie's article, she discusses how faculty immerse themselves within their particular field of expertise and become familiar with their colleagues and the research they are doing. Leckie believes that students cannot accomplish this same task. Fister however, provides evidence to the contrary. Through her interviews, she identifies one student that quickly became familiar with the research in a particular field by using the library.

> She did a scan of recent literature using an appropriate subject abstract and because she began to see that there was considerable interest in one aspect of the topic, was able to choose a focus that reflected the current interests of the discipline (Fister, 1992, p. 165)

Although this student was not an expert in the field, she was able to quickly discover how to determine important research in the field and narrow her topic.

Fister also discusses how students become part of the scholarly network. She points out that students are often keen to ask their professors about possible paper topics and "for a nudge in the right direction" (Fister, 1992, p. 165). She also discusses how students use bibliographies to become part of that network.

> students in this stage were more likely to tap into the citation network, and often seemed to feel a part of that network, as if they had joined a community of scholars who jointly tackled an area of research. (Fister, 1992, p. 166)

While professors may spend years reading articles within a particular subject determining who the leaders of the field are and who are not, undergraduates do not have this opportunity. Instead they turn to citations to figure this out.

> many of them demonstrated a sophisticated understanding of the relationship between sources, reporting that they saw patterns in citation, that some names were cited frequently, that one work had changed the way the entire field examined an issue, or that some researchers demonstrated one bias or another. (Fister, 1992, p. 166)

Although Leckie presumes that students are unable to emulate the expert researcher model, Fister provides evidence to the contrary. She demonstrates that students can imitate the expert researcher model Leckie outlines.

Student Bibliographies

In his series of articles "The Effect of the Web on Undergraduate Citation Behavior" Phillip Davis analyzes student bibliographies to determine how students are using the web for their research. Davis obtains student bibliographies from research papers that have already been written. By doing this he can only look at the results of students' decisions, not how they made their decisions, or why they chose the sources they did.

Davis argues that, "students prefer electronic resources, lack the ability to distinguish credible academic sources from popular materials on the internet, and have difficulty citing what they find" (Davis, 2003, p. 42). Throughout each article, Davis argues for more communication between faculty members and students. He believes that the problem with student bibliographies is that students don't know the difference between scholarly and non-scholarly sources.

Davis also argues "student research papers have reflected their preference for networked information" (Davis, 2003, p. 41). Davis, however, does not try to understand why students have this predisposition, instead he seeks ways to solve the lack of sustainability that web pages have. He recommends creating an internet archive of web pages. While this is a valid concern and a possible solution, Davis only looks at the end result of student research, not the decisions behind those results.

Mary S. Laskowski also believes that faculty and student communication is deficient. In her study, Laskowski surveyed both students and faculty to determine how faculty expectations were communicated to students and how those students perceived these expectations. She concludes that there is a disconnect between the expectations of faculty and the perceptions of students. Laskowski, like Davis, does not analyze why students choose to make the decisions they do.

Laskowski's results also looked at faculty opinions of students' resource selection:

The comments indicated that though web resources may be more acceptable than they have been in the past, there is still concern on the part of instructors

regarding the student's ability to analyze and to select appropriate sources critically (Laskowski, 2002, p. 313).

Laskowski, like Davis, supposes that better communication between faculty and students may limit students' use of the web for research papers.

faculty members, instructors and librarians all need to understand better the way students approach a research assignment and their use of technology in particular, in order to educate them effectively about the appropriate selection and use of research materials (Laskowski, 2002, p. 307).

Laskowski's research supports the idea that if faculty members instruct students what type of sources to use, then students will use it. Laskowski notes that it is unclear how students and faculty think of web resources "differing perceptions of what it means for information to be available online" (Laskowski, 2002, p. 305); and believes that further inquiry into how faculty members think of web resources is needed (Laskowski, 2002).

Susan Davis Herring also believes there is a disconnect between faculty members and students. In "Faculty Acceptance of the World Wide Web for Student Research", Herring surveys professors about their acceptance of the web in order to determine their attitudes toward student use of the web in research papers. She provides faculty with a questionnaire that measured their attitudes of the web and their policies for web use in class assignments. From her survey, it becomes clear that faculty do not think of online library databases when they think of web resources; instead, they think of websites from organizations, the government, or individuals.

Students' Use of Search Tools

Davis, Herring, Laskowski, and Leckie all believe that the solution to increasing student use of scholarly sources is increasing the communication between faculty and students. In the *2003 OCLC Environmental Scan: Pattern Recognition* one library director offers a different idea. "Instead of wringing our hands over students using the Web for research, we should help them learn to use Web materials and resources more effectively" (De Rosa, Dempsey, & Wilson, 2004, p. 9).

The *OCLC Environmental Scan* presents issues that face today's OCLC libraries. In one section, the authors describe the world in which students live in "Their world is a seamless 'infosphere' where the boundaries between work, play and study are gone. Computers are not technology and multitasking is a way of life" (De Rosa et al., 2004, p. 10). The authors go on to compare the students' world to what they experience in libraries.

> Contrast this seamless world with what students experience at most libraries. Despite the increase in 'information commons' in academic libraries and banks of publicly available computers in public libraries, libraries frequently designate different computers for access to content as they do for e-mail and writing papers. And even if this is not the case, there are almost always separate spheres of information presented: 'Web resources,' 'article databases,' 'online catalog.' And once inside these spheres, the information seeker is often presented with brand names (De Rosa et al., 2004, p. 10)

Libraries have always been organized structures, but today's users are used to the disorganization that the web provides.

Librarians are constantly seeking information; patrons however just want to use it. Librarians worry that patrons have not found the correct information; patrons rarely consider this, they are content with what they find. In the Pew/Internet report "Search Engine Users" Deborah Fallows reports on internet users' experiences. She declares that "nearly all [search engine users] express confidence in their searching skills. They are happy with the results they find; again nearly all report that they are usually successful in finding what they're looking for" (Fallows, 2005, p. 2). Long gone are the days where librarians were the keepers of the information; today people believe that the internet has everything they could possibly want.

Unfortunately, student use of the internet is often equated with an inability to recognize scholarly sources. In her article "Listening to Generation X", Susan C. Curtis provides a report on a student focus group. Curtis comments that "[students] are unaware of how to distinguish between scholarly and popular sites" (Curtis, 2000, p. 122). But students' interviews declare their inability to understand library tools. One student finds it hard to distinguish between article databases and the catalog. "I don't understand them. What's the difference?" (Curtis, 2000, p. 127) Another student laments about his failure to find what he's looking for within the system, "You'd think you could just type in your word as a subject and get what you want, but it doesn't work that way" (Curtis, 2000, p. 127).

Librarians often point to these problems as usability issues, but perhaps it is an intrinsic flaw within libraries. Patrons are not librarians; they want and need a simple easy to use system that provides them one stop for all of their needs. Curtis' patrons echo this need, "They found the multiple platform arrangement we provided for our various

electronic products to be a nightmare" (Curtis, 2000, p. 129). At the same time, she ponders the "transferability of skills" (Curtis, 2000, p. 129); she contemplates why students are confused when it comes to library databases and catalogs but not the web. However she answers her own question without realizing it, the "multiple platform arrangement" (Curtis, 2000, p. 129) is what confounds students. Students know that whenever they go to Google, Ask.com, or any other search engine; they are searching the web. However, databases are a foreign concept to them. They know that all the different databases provide library sources, but they don't understand why they must search in multiple places to find those sources.

In the article "Full-Text Database Dependency: An Emerging Trend Among Undergraduate Library Users?", Brad Macdonald and Robert Dunkelberger conclude that students "do have a preference for using computer-accessed databases and for using the full-text option" (Macdonald & Dunkelberger, 1998, p. 305). Macdonald and Dunkelberger believe that:

> [This] is a problem that might have to be addressed in the future....This is something that both teaching faculty and librarians will have to guard against in order to ensure that their students' classroom assignments and research do not suffer. (Macdonald & Dunkelberger, 1998, p. 303)

Macdonald and Dunkelberger do not describe what problems making this type of information easily accessible to students will cause.

Stanley Wilder addresses a similar issue in his editorial, "Information Literacy Makes All the Wrong Assumptions". Wilder argues that students should not be

spending hours in library instruction sessions; instead, libraries should be adapting to them. Wilder takes the perspective of the student:

> Indeed, if she were to use her library's Web site, with its dozens of user interfaces, search protocols, and limitations, she might with some justification conclude that it is the library, not her, that needs help understanding the nature of electronic information retrieval. (Wilder, 2005, p. B13)

Libraries make it difficult for students when they provide them with multiple systems, search interfaces, and repositories.

Shawn V. Lombardo and Kristine S. Condic analyze students' ability to retain and use the skills they use in library instruction sessions. They recognize that students' aren't just taking the easy way out; "librarians must remind ourselves that other factors may be shaping our students' research experiences" (Lombardo & Condic, 2001, p. 327). Lombardo and Condic recognize the difficulty patrons have with using print sources. "Full-text database convenience, coupled with the difficulty that students experience in navigating a library collection, has resulted in a significant decline in print periodical use" (Lombardo & Condic, 2001, p. 329). Lombardo and Condic do have a forward-looking conclusion, however they still see the solution centering on user changes, not library changes.

> Until all the information that is contained in the physical library is also available and accessible electronically, with hyperlinked footnotes and references to enable citation-chasing, then students who rely solely on information they glean from full-text resources are cheating themselves, through their preference for

convenience and in their confidence that they can find all that they need online.

(Lombardo & Condic, 2001, p. 335)

Lombardo and Condic believe that user education is needed to change students' habits, however this is in direct conflict with Stanley Wilder's idea that "the library's online presence approach the simplicity and power of the internet" (Wilder, 2005, p. B13)

The research process in Barbara Fister's article can be compared to web search engines to demonstrate possible reasons students are so satisfied with the web. Fister discusses how students familiarize themselves with research in a field in the first part of the research process. Students "browsed widely, scanned abstracts or indexes for interesting titles...and talked with classmates and their instructors about possibilities" (Fister, 1992, p. 166). This process helped students become familiar with the topic and also forced them to narrow their paper's scope.

In the next phase, Fister describes that students identify key sources within the field. Fister states, "that finding a key source was a pivotal point in their research" (Fister, 1992, p. 166). One of the most important things that these key sources do is provide "a gateway into a whole network of information in the form of references" (Fister, 1992, p. 166). These references allow students to get to know the other researchers in the field and become part of a network of researchers.

The final step in student research Fister describes is the evaluation of sources for use in the student's paper. According to Fister, students generally evaluated sources according to relevance, currency, intended audience, and popularity (Fister, 1992). These criteria helped students determine what to use in their paper and what to put to the side.

Today's search technology provides tools that emulate the research process that Fister describes. Web search engines now have the ability to quickly survey and gather information at a moments notice. Hyperlinks provide quick and easy access to cited webpages, which create a network of information. Perhaps the relationship that web search engines have to the research process that Fister describes is the one of the possible reasons students are turning to the likes of Google for their research.

Summary

Many of these articles pointed to the end results of students' research process. They remark that faculty and student communication is lacking and improvements in the communication process would correct this. They do little to analyze why students made the choices they did. Barbara Fister's article describes the research process in depth. Unfortunately this article was done before the plethora of online resources. Prior to this era, students were forced into using sources vetted by libraries and librarians. Now students only need to turn on their computer and point their web browsers to Google to find the information. One thing that every article cited here agrees with is that students like the web because it's easier to use.

The majority of these articles argue that students are ignorant of the differences between scholarly and non-scholarly sources. Perhaps though, like Lombardo and Condic suggest, something else is deterring our students. Perhaps it is the multiple platform system that Curtis discusses, or maybe it's the search technology that Wilder believes is lacking in libraries. However before we can answer any of these questions,

we first must determine if students will choose to use scholarly sources over non-scholarly sources.

Methodology

Participants

A total of twenty students were recruited from Duke University; however, only 15 subjects are included in this report. Five subjects' data were excluded because they failed to follow instructions. Three students were removed for choosing too many or too few results to include in their paper. Two students were removed for not finishing the study or leaving information blank for an entire source or more.

All students were over the age of 18 and undergraduates at Duke University. Their age, race, and gender were not recorded since they were not seen as a factor in the study. Portions of the students were recruited in library instruction sessions and asked to perform the experiment immediately following the session. Other students were recruited during walk-in session at the university's east campus library. Students were self selected into the study and received $5.00 compensation for their participation. The study received approval from the University of North Carolina's Behavioral Institutional Review Board and given a study number of LIBS 05-117.

Instruments

Students were asked to read a consent form, which can be seen in Appendix A. Next, students were redirected to a log in page, where they used predetermined user names and passwords to log in to the experiment. These were distributed randomly to

students; user names and passwords were not linked to student information since this was not collected.

After logging in to the study, students were first asked to fill out a survey regarding their research experiences. This survey can be seen in Figure 1. The first question asked students to provide their year in school: freshmen, sophomore, junior, or senior. Next, they were asked if they had written a research paper since entering college. Finally they were asked what they primarily used to conduct their research: the library, web search engines, other articles, pay services, and other.

Figure 1. Research Experience Survey
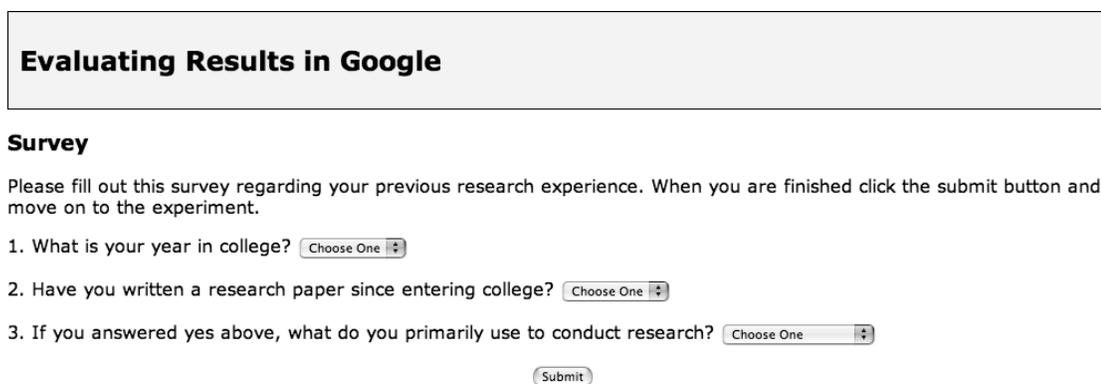
Evaluating Results in Google

Survey

Please fill out this survey regarding your previous research experience. When you are finished click the submit button and move on to the experiment.

1. What is your year in college? [Choose One]

2. Have you written a research paper since entering college? [Choose One]

3. If you answered yes above, what do you primarily use to conduct research? [Choose One]

[Submit]

After finishing the survey, students were directed to the experimental scenario. Students were given general directions and a research scenario. Students were provided with this topic since it was a topic they might already know something about and it would not require them to do much reading of the articles in order to choose what might be best for the paper. The directions and topic can be seen in Figure 2. The topic asked students to find articles related to the causes of underage drinking and the ways to deter it.

Figure 2. Directions and Topic

Evaluating Results in Google

Directions

You will be presented with a topic and a link to Google. When you click on this link it will open in a new window. You will have the opportunity to perform one search using predefined terms. These predefined terms are supplied in the Google search box.

To navigate through the results, click on the title of the result. Only view the websites the results direct you to. To return to the results page, use your browser's back button.

On the experiment page you will be provided with the name of each search result and a link back to Google. First, you will be asked whether you would like to use the result in your paper. Next, you will be asked to rate the item. Then you will be asked to describe why you gave the item the specific rating, and finally why you included or excluded the item.

When you are done with the experiment, click the submit button at the bottom of the page.

Topic: Underage Drinking

You are asked to write a research paper. The paper is ten pages in length. Your topic is underage drinking. You are focusing on the reasons for underage drinking and ways to deter it.

Your professor has asked that you find four resources to cite in your paper. To find them, you have decided to use Google. To begin searching click this link: Google Search Interface

Students searched for articles using Google and predefined terms. When students clicked the link to Google, a new window was opened that displayed the Google interface (Figure 3). This new window contained no address bar so that students could not redirect their browser to another webpage; it ensured that they remained within the confines of the experiment.

The search interface had the search terms underage drinking already entered into the search box. Students were instructed not to modify the query, and leave the terms as is. When students clicked search, they were presented with a results page. The students did not perform a search; instead the search button directed students to a results page that was pre-fabricated by the researcher. The search interface and results page were both mock-ups so that scholarly results and non-scholarly results could appear in the same list. Google was used for the mock interface and results because it is one of the most popular and widely known search engines. Using this interface ensured the

likelihood that students had used the search tool prior to the experiment and little to no direction on how to search was required. The search interface and results can be seen in Figure 3 and 4 respectively. This small bit of deception was necessary to control the results that students received and so the research could control the experimental environment.

Figure 3. Google Search Interface

The researcher handpicked results for the list based on the relevance, quality, and online availability. Google was searched to find non-scholarly sources and Google Scholar was searched to find the scholarly sources. The results appear exactly as they appeared when the researcher originally searched Google and Google Scholar, however, all bolding Google does to search term has been removed to provide consistency throughout the search results.

Figure 4. Google Results List

When choosing which scholarly sources to use in the experiment the researcher checked the results against library databases first to determine whether the source met the standard definition of scholarliness used in the literature, since Google's definition of scholarliness is still not yet known.

Next the researcher tested whether or not the links Google provided were accessible to Duke University. In many cases, the sources linked to inaccessible websites or websites that did not contain the full text of the source. The researcher then searched to see if the item was available full text online to Duke University affiliates. In many cases, it is impossible to link directly to the record for a particular source. University subscription information, IP information, and a variety of other things may be present in the URL for the record. However many library databases now offer a persistent URL which allows users to directly link to an article's record, however the article is only accessible to those persons that have subscribed to the databases. Databases that used persistent URLs were utilized, and the links that Google provides were changed to these persistent URLs.

In Table 1, you will find the list of sources. Included in this table are the sources' locations in the results list, the title of the result, whether the source is scholarly or non-scholarly, a description, and a URL to the source. The sources came from a wide range of places including government websites, associations, organizations, library databases, etc. For the purposes of this study, scholarly sources were given the standard definition, articles from peer-reviewed journals. Non-scholarly sources were given the standard definition as well; these sources came from websites, news articles, etc.; anything that has not gone through the peer review process. The location of the results in the list was randomized in order to deter the researcher's potential biases when creating the results page. Five results were scholarly articles and five were non-scholarly.

Table 1. List of Sources

Place In Results List	Title	Scholarly/Non-Scholarly	Description	URL
1	ADOLESCENTS AND ALCOHOL	Non-Scholarly	A brief article from a family oriented website. Gives brief facts about pre-teens and teenagers' drinking.	http://www.familytlc.net/ preteens_alcohol.html
2	Underage Drinking: A Major Public Health Challenge -- Alcohol	Non-Scholarly	An article from a NIH bulletin. Provides hard numbers from other published studies and provides footnotes as well.	http://pubs.niaaa.nih.gov/ publications/aa59.htm
3	Adverse outcomes of alcohol use in adolescents	Scholarly	Reports the behavior of students under the influence of alcohol	http://search.epnet.com/login.aspx? direct=true&db=aph&an=5203077 &site=ehost&scope=site
4	Diagnosis and Assessment of Alcohol Use Disorders Among Adolescents	Scholarly	Discusses classification and treatment for Alcohol Use Disorders.	http://search.epnet.com/login.aspx?d irect=true&db=aph&an=1558054&s ite=ehost&scope=site
5	Motivations for Alcohol Use Among Adolescents: Development and Validation of a Four-Factor Model	Scholarly	Provides information on motivations for drinking.	http://gateway.ovid.com/ovidweb.cg i?T=JS&NEWS=N&PAGE=fulltext &AN=00012030-199406000- 00005&LSLINK=80&D=ovft
6	CNN.com - Study: Underage drinkers starting at earlier age	Non-Scholarly	A CNN.com story that discusses a study on the onset of underage drinking.	http://archives.cnn.com/2002/HEAL TH/parenting/02/26/teen.drinking/in dex.html

Place In Results List	Title	Scholarly/Non-Scholarly	Description	URL
7	Underage College Students' Drinking Behavior, Access to Alcohol, and the Influence of Deterrence	Scholarly	Analyzes how students under the age of twenty-one find ways to drink. Also examines student attitudes and reasons for drinking.	http://search.epnet.com/login.aspx?direct=true&db=aph&an=6755896&site=ehost&scope=site
8	Alcohol and Teen Drinking	Non-Scholarly	A website that focuses on adolescent services. Provides facts and figures about their alcohol use.	http://www.focusas.com/Alcohol.html
9	Leadership to Keep Children Alcohol Free	Non-Scholarly	Organizational website that focuses on why adolescents use alcohol and ways to deter adolescent's use of alcohol	www.alcoholfreechildren.org/gs/pubs/html/Prev.htm
10	Alcohol Use Among Adolescents	Scholarly	Provides discussion on problems, reasons and trends in alcohol use amongst adolescents.	http://search.epnet.com/login.aspx?direct=true&db=aph&an=1558053&site=ehost&scope=site

Students were asked to evaluate each result. Figure 5 is an example of the analysis instrument for Source 1. The same instrument was used by students to evaluate each source. A link back to the Google search interface was provided at the heading of each result in the event that students closed the Google search window.

Figure 5. Evaluation Instrument

Students were also provided with a space to provide an explanation of why they gave items specific rating and why they included or excluded items from amongst the sources for their research paper. This was done to provide qualitative data to support the quantitative findings.

Procedures

Students were read the directions of the experiment and were provided with a username and password while the directions were read to them. They were asked to read and agree to an online consent form (Appendix A.). If students chose not to take part in the study, they still received the $5.00 compensation. Students that chose to take part in the study were directed to the log in page where they logged in to the experimental application. Students were then directed to the Search Experience Questionnaire.

After completing this, students were again provided with directions to complete the experiment and the research scenario. They were also given a link to the Google Search Interface.   Students clicked this link, a new window opened, they performed their search, and reviewed the results. Some students chose to review the results while they answered the questions; others reviewed the results first and then answered the questions.

Once the students finished answering their questions, they clicked the submit button at the bottom of the page and were redirected to a debriefing page. This page can be seen in Figure 6.   Here students were informed that they had completed the experiment, and that they should see the researcher to receive their $5.00 compensation. Students were also informed that the Google search interface and results were a mock up. They were instructed to talk to the researcher if they had questions or problems with this deception.

Figure 6. Debriefing Page

Evaluating Results in Google

Thank you for participating in this study. Please see the researcher to claim your $5.00 compensation and a copy of the consent form.

Debriefing

At the start of this study, I told you that the purpose of this study is to evaluate search results generated by Google. However, the real purpose of this study is to examine how students evaluate search results. In order to standardize the results, you were presented with a mock version of Google. Instead, the results were predetermined by the researchers involved in the study.

This small bit of deception was necessary to insure that people would not change their natural behaviors and so that all study participants evaluated the same results. Please let me know if you have questions about this or if you experience any discomfort by learning of this deception. You can speak with me now, in person or you can email me at rosalynmetz@gmail.com or Dr. Diane Kelly, the faculty advisor for the research study, at dianek@email.unc.edu.

[Exit the Experiment]

Results and Discussion

Students

Results of the Search Experience Questionnaire were analyzed to characterize participants. Ten students were freshmen, four were seniors, and one was a junior. No sophomores participated in the study. Every student indicated that they had written a research paper prior to participating in the experiment.

Students were also asked about their primary means of finding information. They were given five options: the library website, web search engines, other articles, pay services, and other. Students' responses to this question can be seen in Figure 7.

Figure 7. Where Students Search to Find Materials
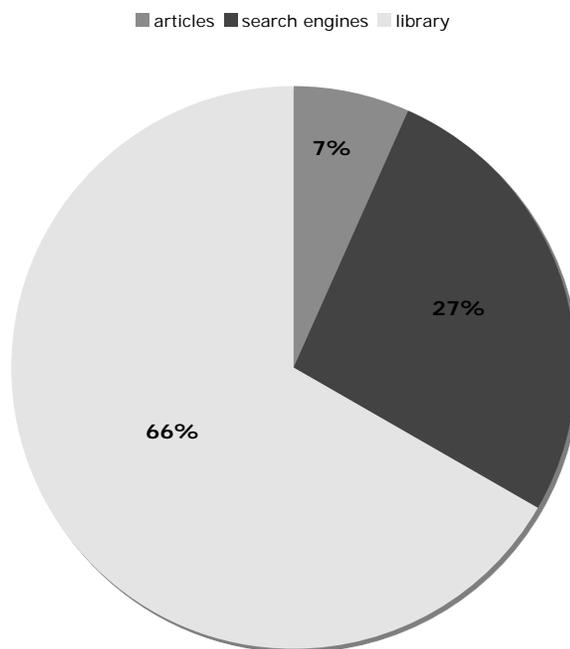
66% of students stated that they primarily used the library website to find information, as opposed to the 27% that stated they used web search engines, and the 7% that indicated articles as the way they searched for information.

Students' surprisingly stated that they chose to use the library more often than they chose to use web search engines when doing research for their papers. This was a departure from the researcher's initial assumptions, which were that students primarily used search engines like Google to find their information. Interestingly enough, during an instruction session prior to conducting the study, students were asked the same question during the natural course of the librarian's lesson plan, and the majority said that Google was their primary method of finding sources.

Choosing Scholarly Sources

After examining the survey, the researcher examined students' answers to the experiment scenario. It should be noted that it was necessary to re-code one subject's data. This subject did not check the include or exclude box provide in the experiment; however in their explanation they clearly stated they wanted to include or exclude the item. This information was used to identify which sources this subject was interested in using in the final paper.

First, choices students made for their fictional research papers were examined. More scholarly sources were included for use in students' papers than non-scholarly sources. Figure 8 clearly shows that the most popular scholarly source used was source number five; 13 students chose to use the item in their research paper. One student commented that they used the resource because it was a "scientific article

gathering evidence…wonderful for a well rounded paper of only 4 sources". Other

students made similar comments, "Lengthy article with a lot of good data."

**Figure 8. Scholarly Sources' Inclusion or Exclusion**
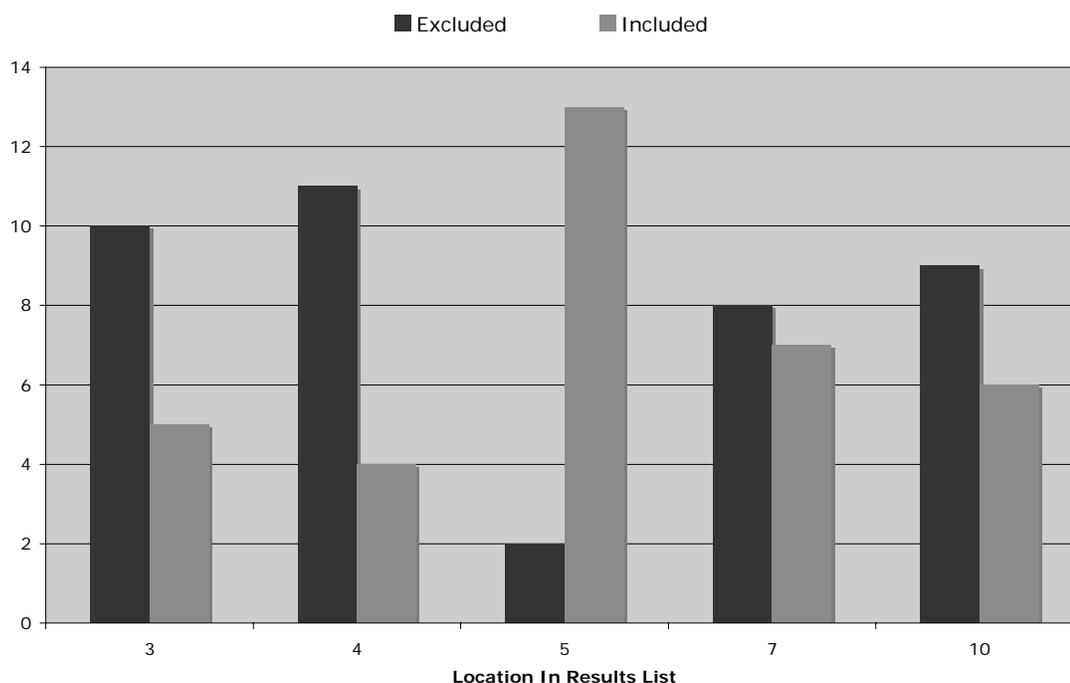
The least popular scholarly source was number four. Even students that did

not include it in the papers still commented on its usefulness: "Great article. Detailed

well-researched and with good references." The same subject commented that they

didn't use the article "because even though it is excellent it is a very clinical psychiatric

article that isn't broken down enough for use of the paper."

Choosing Non-Scholarly Sources

As can be seen in Figure 9, non-scholarly sources were used less frequently in

students' papers, the major exception being resource number two, which 14 students

chose to use for their research papers.

Students chose not to use the remaining sources for a variety of reasons. For source number one, a student stated, "I would exclude this item because most of the information on it can be found elsewhere. There are also no hard statistics being given and it does a poor job of citing its sources." For source number six, a CNN news article, and the only source not chosen to be in any paper, one student commented, "CNN caters to buzz and culture not scholarship". Another student commented, "This article doesn't dig deeper into root causes or anything. It's only a news story." And still another stated: "its a newspaper article versus a research paper. In that sense I don't consider it as academic."

Figure 9. Non-Scholarly Sources' Inclusion or Exclusion
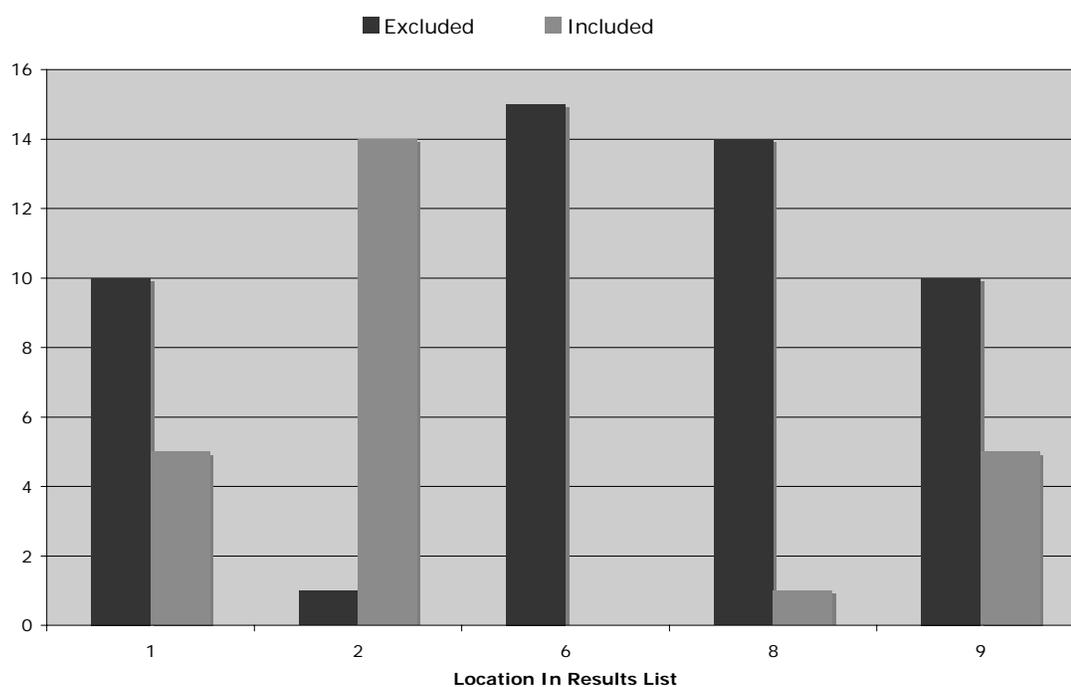
As for source number two, all but one student chose to use it in their papers. One student chose not to use it because "after reading later sources the same information is available there with more." However, fourteen students did choose to use it. One

student commented that the reason he chose to use source number two was because "The paper from one of the National Institutes of Health is based on a lot of other various cited papers which I can also look over. It is based it seems on studied fact." Another student commented that it contained "Hard numbers lots of data." A third stated:

> This result has a great many footnotes and cites a great many other papers and reports on the topic. Perhaps I could also use those reports in my paper. And it has lots of stats. Stats are good.

Still another stated, "it has a large reference list at the end…you want to check there [for more sources]."

Source number two was the most popular source used in students' research papers. Besides the statistics and citations in source number two, students may have chosen it more often because it is closer to the top of the results list; perhaps students believed that this signaled its importance.

This article also contained many of the same elements that scholarly articles did. It provided students with a bibliography, was in a publication with multiple volumes, and provides statistics from research. However the aim of this particular publication is to provide researchers with an overview of scholarly research being done. So while the article may seem scholarly, it is in fact not.

Rating Source

After exploring the data for the sources students chose for their research papers, the ratings students gave each source were analyzed. Overall, students provided higher ratings to scholarly sources than they did to non-scholarly sources. The mean

rating for scholarly sources was 5.527 while the mean for non-scholarly sources was 4.173. The standard deviation for scholarly materials was 1.319, while the standard deviation for non-scholarly materials was 1.639. A t-test confirmed that this difference in means was statistically significant, $t(73) = -5.82$, $p=.000$.

Students also provided comments that supported their ratings of the sources. One student commented that one of the scholarly articles was a "Great article reputable". Another commented that one of the articles "has plenty of statistics and facts that could be potentially quotable".

Figure 10. Mean Rating of Sources
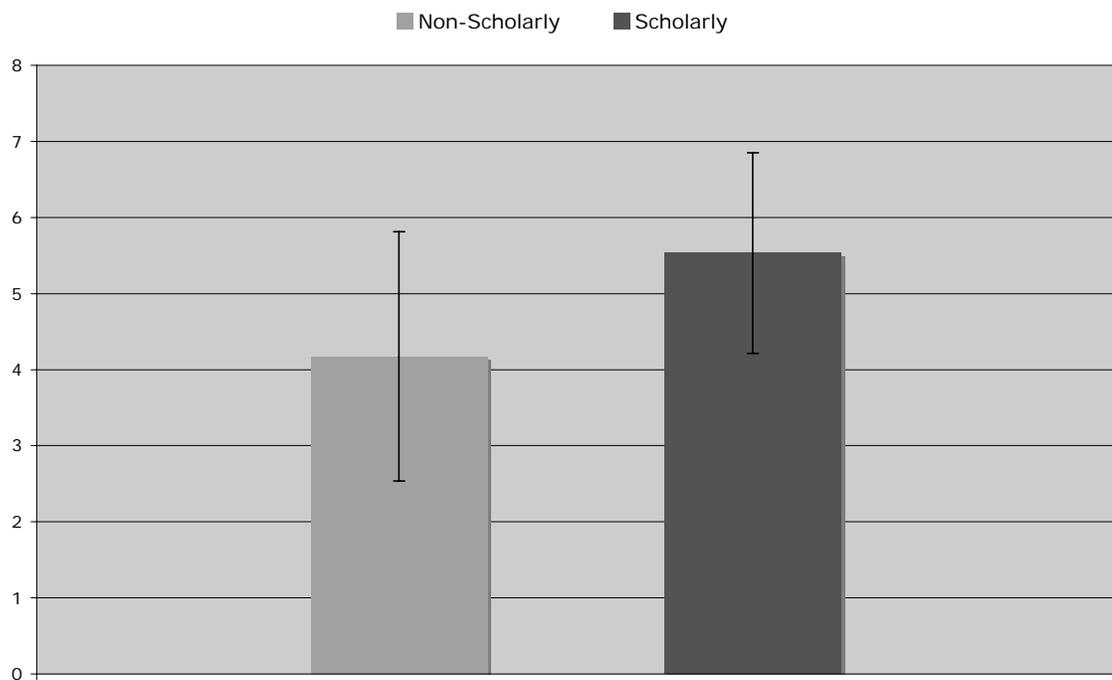
It is also important to mention that while students may not have chosen a particular source to use in their paper they still might have found it to be a significant

piece of research. For example, source number four, a scholarly source, was only used in four students' papers. However it received an average rating of 5.47, which is just below the average for all scholarly sources. Student comments for this particular source included: "Great article. Detailed well-researched and with good references." and "gives a broad range of information". Students recognized its value but many felt that it was a "good primary source but I feel off topic".

General Analysis of Comments Made By Students

Finally, comments were analyzed and categorized. While students' comments focused on specific elements in the sources, the main themes that ran through them could be categorized as follows: whether sources had credibility or not, whether they were quality sources or not, and whether the source was relevant to the topic or not.

Overall, comments for scholarly sources were identified as quality sources, having credibility, and relevance to the topic. Examples of comments for scholarly sources included: "written by a credible source and is scholarly/scientific in nature;" "Detailed well researched and with good references;" and "Legitimate resource very pertinent information."

Comments attached to non-scholarly sources did not receive high praises like their scholarly counterparts did. Comments for non-scholarly sources included statements like "doesn't really have information that most people don't already know;" "doesn't provide any statistical analysis for the findings;" and "does not include reasons or proven solutions."

The comments supported the decisions that students made throughout the experiment. It appears students were more likely to choose scholarly sources, apply high ratings to them, and offer positive comments about these sources.

Study Limitations

This study contained a variety of limitations, which may have had an affect on the results. First, the university that students were recruited from may have an affect on the data. Students at Duke University tend to have higher standardized test scores and have been exposed to higher-level classes than the average college student. Future studies might want to recruit from a diverse sample of colleges and universities.

It is possible that students recruited from library instruction sessions felt an obligation to answer that the library was their primary method of finding information. Students from these sessions may have felt that they would "hurt" the researcher's feelings by stating they do not use the library for the majority of their research needs.

Students that were recruited at the library may have a different reason for choosing the library as their primary method of doing research. These students are most likely regular library users. Students that spend time in the library may be able to glean from the activity around them what library resources are available to them and how to go about using them.

The population came mainly from the freshmen students at Duke University. There were no sophomores represented. In latter studies should attempt to gather a more diverse population of undergraduates.

In future studies it might be pertinent to recruit students from outside the library. Researchers would be able to minimize the issues discussed by recruiting form other locations. Possible recruitment locations might be the dining hall, dorms, or even the campus quad.

Another possible option for future studies is randomizing results specific to each student. This may be able to provide assurance to the researcher that results will not occupy the same place within the list. This will reduce the chance that rankings and choices students make will not be dependent on the sources' location in the results list.

During the initial planning phase, links directly to PDF documents were used. However, this format was radically different than the typical webpage. To adjust for this and reduce any potential bias that students might come across because of these differences, links directly to web database pages were provided. This gave students a similar look and feel to the other results and helped reduce potential bias. However this new format may have created a new bias since the majority of sources were from similar databases. Students seemed to recognize this difference: "another credible source included in an academic database". Perhaps in the future it would be pertinent to find scholarly information that did not follow the general database format of title, author, abstract, and full text. Instead the researcher might consider creating webpages that linked to the full text but do not appear to be from a library database.

Conclusions

This study directed its attention toward what sources students use for their research papers. It also analyzed why students make these choices. It found that students chose to use scholarly sources more often than non-scholarly sources when they were equally available. It also established that students used these sources because they believed that the scholarly sources were better than non-scholarly sources.

Students in this study recognized the difference between scholarly and non-scholarly sources. The high ratings that students provided for scholarly sources, shows that they recognize quality when the see it. Students will also choose to use scholarly sources in their research papers more often than non-scholarly sources when given the choice. When students choose not to use these sources, it is because the source does not meet one of their selection criteria: credibility, relevance, and quality.

Many librarians have done similar research, but they have not focused on the choices that students made about source selection and why the students made these decisions. By directing their attention to other issues, many librarians concluded that if faculty and student communication improved, students would use more scholarly sources in their research papers. While improving communication can force students to use scholarly sources in their paper, it will not address the reasons why students use non-scholarly sources.

Librarians and faculty have assumed that students have not been using scholarly sources because they don't understand the value of these resources—but clearly the students studied in this experiment do. Many librarians believe that faculty student communication is to blame for the lack of scholarly source in student bibliographies. However this study supports the idea that if scholarly source were made more accessible to students, then they would use it for their research papers.

References

Association of College and Research Libraries, University of Illinois at Urbana-Champaign, & Library Research Center. (2005). *ACRL 2004 academic library trends*

Curtis, S. C. (2000). Listening to generation X. *Journal of Educational Media and Library Sciences, 38*(2), 122-132.

Davis, P. M. (2003). Effect of the web on undergraduate citation behavior: Guiding student scholarship in a networked age. *Portal: Libraries and the Academy, 3*(1), 41-51.

Davis, P. M., & Cohen, S. A. (2001). The effect of the web on undergraduate citation behavior 1996-1999. *Journal of the American Society for Information Science, 52*(4), 309-314.

De Rosa, C., Dempsey, L., & Wilson, A. (2004). *The 2003 OCLC environmental scan : Pattern recognition : A report to the OCLC membership*. Dublin, Ohio: OCLC.

Fallows, D. (2005). *Search engine users: Internet searchers are confident, satisfied and trusting--but they are also unaware and naive.* Washington, DC: Pew Internet & American Life Project.

Fister, B. (1992). The research processes of undergraduate students. *Journal of Academic Librarianship, 18*(3), 163-169.

Laskowski, M. S. (2002). The role of technology in research: Perspectives from students and instructors. *Portal: Libraries and the Academy, 2*(2), 305-319.

Leckie, G. J. (1996). Desperately seeking citations: Uncovering faculty assumptions about the undergraduate research process. *Journal of Academic Librarianship, 22*(3), 201.

Lombardo, S. V., & Condic, K. S. (2001). Convenience or content: A study of undergraduate periodical use. *Reference Services Review, 29*(4), 327-337.

Macdonald, B., & Dunkelberger, R. (1998). Full-text database dependency: An emerging trend among undergraduate library users? *Research Strategies, 16*(4), 301.

Oxford University Press. (2000). Oxford english dictionary. Retrieved April 10, 2006 from http://dictionary.oed.com/entrance.dtl; http://dictionary.oed.com/entrance.dtl Note: View Online.

Reitz, J. M. (2004). Dictionary for library and information science. Westport, Conn.: Libraries Unlimited

Wilder, S. (2005), Information literacy makes all the wrong assumptions. [Electronic version]. *Chronicle of Higher Education,* Retrieved 04/28/2005, from Academic Search Premier.

Appendix A

Consent Form

Evaluating Results in Google

University of North Carolina-Chapel Hill
Consent to Participate in a Research Study
Adult Participants
Social Behavioral Form

You are asked to be a part of a study that looks at the different types of resources used in research.

Rosalyn Metz, a Masters' student in the School of Information and Library Science at the University of North Carolina at Chapel Hill is conducting this study.

IRB Study # : LIBS 05-117
Consent Form Version Date: March 2, 2006
Title of Study: Conducting Online Searches: Undergraduate Preferences of Resources
Principal Investigator: Rosalyn Metz
UNC-Chapel Hill Department: Information and Library Science
UNC-Chapel Hill Phone number: 919.966.8065
Email Address: rosy@email.unc.edu
Faculty Advisor: Diane Kelly

Funding Source: None

Study Contact telephone number: 202.421.4922
Study Contact email: rosy@email.unc.edu

What are some general things you should know about research studies?

You are being asked to take part in a research study . To join the study is voluntary.

You may refuse to join, or you may withdraw your consent to be in the study, for any reason, without penalty.

Research studies are designed to obtain new knowledge. This new information may help people in the future. You may not receive any direct benefit from being in the research study. There also may be risks to being in research studies.

Details about this study are discussed below. It is important that you understand this information so that you can make an informed choice about being in this research study.

You will be given a copy of this consent form. You should ask the researchers named above, any questions you have about this study at any time.

What is the purpose of this study?

Identify and evaluate search results in Google.

How many people will take part in this study?

If you decide to be in this study, you will be one of approximately 20 people in this research study.

How long will your part in this study last?

This experiment will take approximately thirty minutes to complete. There will be no follow-up visits or requirements on your part.

What will happen if you take part in the study?

If you participate in this study I will ask you to first fill out a survey regarding your previous research experiences. Once you have finished the survey you will be given a research topic and directions about how to search for information. You will then be asked to evaluate the search results.

If you have any questions or concerns about participating in this study, you should contact Rosalyn Metz at rosy@email.unc.edu.

What are the possible benefits from being in this study?

Research is designed to benefit society by gaining new knowledge. You may not benefit personally from being in this research study.

What are the possible risks or discomforts involved from being in this study?

Although, I do not know of any personal risk or discomfort that you will have from participating in this study, there may be uncommon or previously unknown risks. You should report any problems to the researcher.

How will your privacy be protected?

Your privacy will be closely protected in this study. No identifying information about you will be collected during this study, therefore there will be no link between your answers and any identifying information.

Will you receive anything for being in this study?

You will receive five dollars for taking part in this study.

Will it cost you anything to be in this study?

There will be no costs for being in the study.

What if you have questions about this study?

You have the right to ask, and have answered, any questions you may have about this research. If you have questions, or concerns, you should contact the researcher listed on the first page of this form.

What if you have questions about your rights as a research participant?

All research on human volunteers is reviewed by a committee that works to protect your rights and welfare. If you have questions or concerns about your rights as a research subject you may contact, anonymously if you wish, the Institutional Review Board at 919-966-3113 or by email to IRB_subjects@unc.edu.

[Take Part In the Study]   [Do Not Take Part In the Study]