



The SHU Research Logs: Student Online Search Behaviors Trans-scripted



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ARTICLE INFO

Article history:

Received 17 December 2014

Accepted 1 July 2015

Available online 5 August 2015

Keywords:

Information literacy
Undergraduate research
Library instruction

ABSTRACT

This paper examines students' online research behaviors as well as emotive and affective responses as they conducted online research for their undergraduate courses. It looks at data obtained during the 2011–2012 academic year, drawn from over 42 hours of recordings and includes a brief questionnaire that measured students' research history and feelings about their own research competence.

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INTRODUCTION

Before the onset of the World Wide Web, doing academic research meant understanding how print materials were organized within the confines of a physical space, the library. It meant looking through a card catalog and locating books that were organized according to whichever classification scheme the library used, the most common being the Library of Congress and the Dewey Decimal System. It was easy to identify books by their color and size and by the fact that they were located in different parts of the library. Any kind of discovery was done by browsing the shelves and examining the tables of contents and indexes of books.

Today, because of the success of search engines like Google, which can interpret natural language requests and which rely on the robotic indexing and retrieval of Web documents, the way we do research has changed significantly. The researcher now has the ability to scan and sift through vast amounts of information quickly. Physical format no longer matters, since on a computer screen all material is now flat and one dimensional. In high school, students have learned to do the latter kind of research. They bring the skills and strategies they've developed as online searchers with them to college.

Like many instructional librarians, we had observed the disconnect between the kinds of research being done by undergraduates and the type of research that is rewarded at the university level. Our interest in this process led us to apply for and receive a Google Faculty Research Award (http://research.google.com/university/research_awards.html). Our grant proposal was straightforward and relatively simple: we would recruit upperclassmen who were already working on a substantial academic assignment to

document their search strategy, using a cloud-based screen-recording and voice-capture tool called OpenHallway. Although we did not realize it at the time, this commercial product provided us with a unique vantage point in which to view our students' research habits. Unlike other methods such as log analysis, surveys, and lab observations, which require that the researcher participate in the process, OpenHallway enabled our students to conduct research as they normally would, without our being present. This makes the transcripts of these tapes an enormously rich source of information about how students actually do research—not how they tell us how they do research.

LITERATURE REVIEW

There are many studies that examine undergraduate information-seeking behavior. This literature review focuses on two issues: an examination of the research design of earlier studies, and similarities among the findings. After surveying the literature, we did not find any study that actually matched our research design. However, we found that many of the studies did mirror our conclusions about student online research behaviors.

Several studies were similar to ours in that they recorded students' comments and keystrokes, but always in a controlled environment. Cockrell & Jayne (2002) used the library as the testing site. A test giver explained that the usability of their Website was being tested, not the participants, and asked them to “think aloud” as they performed tasks on the computer. Currie, Devlin, Emde and Graves (2010) used Morae software, which recorded students' mouse clicks, tracked the Web pages they visited, and recorded their verbal comments as they did on-line research; the authors viewed the searches on a projector screen. L. Holman (2011) also used Morae software to survey 21 students. She videotaped each session as the students “thought aloud” and then met with her to discuss their reflections and draw concept diagrams.

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Some used log analysis: A. Broder (2002) used this technique to study 3190 random AltaVista users. Judd and Kennedy (2010) employed Internet usage logs in a large open-access computer lab to study how biomedical students searched the Internet. Lorigo, Pan, Hembrooke, et al. (2006) used eye tracking and log file analysis to study how users evaluate Google results.

Many relied on such self-reporting methods as focus or discussion groups, in addition to direct observation of participants. Foster and Gibbons (2007) interviewed faculty. Gross and Latham (2009) used a semi-structured interview and an information IL test. In the Project Information Literacy (PIL) study, Head and Eisenberg (2009) worked with 11 discussion groups of 86 students from seven colleges. Head, in her 2013 update of PIL, performed a series of studies of more than 11,000 students carried out by interview or survey. Zhang (2008) used an instrument that consisted of four sequential parts: a demographic questionnaire asking students' experience with the Web, an interview to solicit students' points of view about the Web, a request to draw a picture or diagram of their perceptions about the Web and provide descriptions for the drawings, and two search tasks. Suarez (2007) employed participant observation, unobtrusive observation, and interviews. Kolowich (2011) describes the ERIAL (Ethnographic Research in Illinois Academic Libraries) project, which enlisted two anthropologists at Illinois Wesleyan, DePaul University, and Northeastern Illinois University and the University of Illinois's Chicago and Springfield campuses, along with their own staff members, and which collected data using open-ended interviews and direct observation, in addition to other methods.

Several studies relied heavily on survey results: Shanahan (2007) surveyed 37 second-year graduate students, whose results indicated a need for IL training. Sorensen and Dahl (2008) distributed a Web-based survey to all instruction librarians in the humanities and social sciences at the Council of Prairie and Pacific University Libraries. Taylor (2012) surveyed millennial undergraduates who sought information as part of an assigned research project. Lee, Paik, & Joo (2012) used a self-generated diary method with 233 undergraduate students.

Others applied source citation analysis methods to their research results. Hearst, Elliott, English, et al. (2002) created Flamenco, "a search engine that addresses many desired functions...". McClure & Clink (2009) paired an examination of source citations with deeper analysis of source use and discussed both methods in relation to responses in student and teacher focus groups. Rempel (2010) researched how graduate students carry out literature reviews and followed it with a library workshop. Walraven, Brand-Gruwel, & Boshuizen (2009) studied secondary school students after giving them 12 Internet searching problems in three areas: geography, physics, and language/culture. Although the above-mentioned studies varied from ours in terms of research design, the conclusions the authors drew very closely resembled our own. The literature reflected almost unanimously the observation that students showed a lack of understanding of how databases worked. They tried to find the shortest path to finishing their research project. They did not take time to read directions or helpful clues offered by the databases, and they were confident that they would be able to solve their research problems by continuing with their search strategies without reevaluating their success or lack of success. For example see Cockrell and Jayne (2002).

Many students' behaviors indicated that they did not want to take the time to learn or process new information. Foster and Gibbons (2007) surmised that their students tend to summarize readings instead of reflecting upon them and writing critical, thoughtful papers. Moreover, they found that a student who cannot find resources for her/his paper assumes that the library simply does not have the resources. Gross and Latham (2009) found that students wanted to learn a skill they might need rather than to gain knowledge. Head and Eisenberg (2009) found that the longest part of the information-seeking process was getting to the question to ask. Holman's 2011

study indicated that students assumed that any retrieval problems were connected with their choice of terms rather than search strategy. Hur-Li Lee (2008) noted: "the students preferred Google and keyword searching; then they would check each link from the top or view all items in first couple of pages." If at that point they didn't find what they needed they would go to library sources or change topic.

Supporting our own research findings, Shanahan (2007) found that "Whilst students have a very positive perception of their ability to search databases the survey results show low skill levels in constructing structured search statements for nearly all students at the pre-intervention survey." In 2008, she asserted: "Students' dependency on the Google search engine coupled with often non-critical evaluation of the Internet information sources limits the quality of the information resources they will retrieve."

In 2012, Taylor proved that "millennial generation Web searchers proceed erratically through an information search process, make only a limited attempt to evaluate the quality or validity of information gathered, and may perform some level of 'backfilling' or adding sources to a research project before final submission of the work."

Finally, Wallraven, Brand-Gruwel, & Boshuizen (2009) found that "While solving information problems students spent most of their time on searching and scanning and only a small amount of time on processing and organizing information." "Most striking was the fact that students expected to find an answer on one single Website, preferably in the first couple of sentences.... If the author of the site was not mentioned they did not try to find out who the author was. Students wanted the information served on a silver platter and did not want to do a lot of work them." (Wallraven, p. 245).

METHODOLOGY

Upon receiving the grant, we applied for IRB approval, which we received in 2011. We conducted a preliminary study during that summer with six students, but rolled out the official project during the 2011–2012 academic year.

For each of the two semesters, we sent a request, through our Blackboard course management system, for sophomores, juniors, and seniors enrolled in courses that required a sizable research project. Students who did not meet these requirements were not selected. Student participants received training in how to use OpenHallway and signed subject informed consent and video release forms. We encouraged them to log in at their convenience in order to record their online class research. OpenHallway records in 20-minute increments; we required three 20-minute research sessions per student. We also required that they "think aloud" while they were researching. In each instance, after we received their completed research tasks, we sent them a brief survey that probed their own perceptions of their research history and level of success. The students could request help from the university librarians at any time, but would have no prearranged contact with them. After they finished their video-recordings, we asked the students to fill out a survey that measured their feelings about and experience doing scholarly research. Over the two semesters, 42 students participated; each received \$125 for their efforts (please see Appendix for survey questions).

After collecting 42 video recordings that students completed over the seven-month period, we analyzed the 42 hours of data using Atlas.ti, a qualitative data analysis and research software. We coded the students' responses according to the criteria indicated in Fig. 1.

Fig. 1 displays the eight criteria used for coding the research results. By *destination* we were looking to see where the students would begin their search and what degree of specificity they sought in order to orient themselves to their research. *Source evaluation* refers to their online behaviors as the results of their searches manifested. We wanted to know if they immediately read the results or changed their search strategies. We listened to expressions of

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