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Article

The Information Seeking Behavior of Undergraduate Education Majors: Does Library Instruction Play a Role?

Jason Martin
Assistant Librarian, University of Central Florida Libraries
Curriculum Materials Center
Orlando, Florida, United States of America
E-mail: mjmartin@mail.ucf.edu

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Abstract

Objective – This study investigated the information seeking behavior of undergraduate majors to gain a better understanding of where they find their research information (academic vs. non-academic sources) and to determine if library instruction had any impact on the types of sources used.

Methods – The study used a convenience sample of 200 students currently enrolled as undergraduates at the University of Central Florida's College of Education. A chi square test of association was conducted to determine if the proportion of undergraduate Education majors who use academic sources as compared to non-academic sources varied depending on whether the students had attended at least one library instruction session.

Results – The majority of students surveyed find their research information on the freely available Web, even though they admit that academic sources are more credible. At an alpha level of .05, types of sources used for research were not statistically significantly related to whether the student attended library instruction sessions (Pearson χ^2 (1, N = 200) = 1.612, p = .447, Cramer's V = .090).

Conclusion – These results are supported by other studies that indicate that today's college students are using freely available Internet sites much more than

library resources. Little to no association appears to exist between "one-shot" library instruction sessions and the sources used by students in their research. Serious consideration needs to be given to multiple library instruction sessions and to for-credit library courses over one-shot classes.

Introduction

A February 2007 editorial in the Washington Post stated that judges had cited Wikipedia four times as often as the *Encyclopedia Britannica* in their judicial opinions over the previous year. The editorial goes on to praise wikis, YouTube, and other "open-source projects" as an "unstoppable movement toward shared production of knowledge" (Sunstein). While sites such as Wikipedia are valuable for a myriad of reasons, including the community creation of knowledge, librarians, teachers, and other information professionals must wonder at the reasons why judges, extremely learned men and woman, would choose Wikipedia over an esteemed source such as the *Encyclopedia Britannica* for their opinions and what, if any, evaluation techniques they used when selecting this resource. Similar concerns arise regarding the information seeking behavior of students in higher education. College students' strong preference for quickly and easily accessible Web sites is an issue for librarians, college professors, and others in higher education. Opting for information quickly available on the Internet hinders the development of students' research skills and provides them with only a small fraction of the information available on any given topic. Students relying only on Internet resources will not only be deficient in their knowledge of a subject, but also in how to find more information on that subject.

Information seeking can be defined as "the interactions between people, the various forms of data, information, knowledge, and wisdom that fall under the rubric of information, and the diverse contexts in which they interact" (Todd 27). Liao, Finn, and Lu divide information seeking into three broad categories: initiating, searching, and locating (9). Others have argued that information seeking should not be seen in such rigid and linear frames. Instead, they suggest that the process of finding information should be viewed as subjective and influenced by previous experiences, knowledge, and opinions (Weiler 51). However one approaches the concept of information seeking, it is clear that this is an important skill for students to possess. Those individuals who are deficient in information seeking skills have difficulty in knowing when information is needed, the value of libraries in finding information, and how to evaluate the sources they do find (Gross 155). Without these skills, students will perform poorly in the classroom, making the professor's job more difficult and ultimately reflecting poorly upon the university. The problems, however, extend beyond the classroom. These same skills are needed when graduates seek home or small business loans, research options for their retirement plan, or seek to make informed decisions in local or national elections. Research and evaluation skills learned in the classroom are needed throughout life.

The information seeking behavior of "NextGen" or "Millennial" students is a matter of great concern for those in higher education. The difference in credibility between a Web and a print source document is negligible to these college students (Abram and Luther 34). Indeed, Long and Shrikhande report, "Students often simply type terms in Google and scan the results until information on their topic is found. No assessment of quality, reliability, or accuracy

generally occurs" (358). While some have argued that the growth of the Internet should be seen simply as the development of a new research methodology, rather than as a decline of research skills, it appears that more and more students are forsaking the library altogether (O'Brien and Symons 411). Several studies lend legitimacy to these assertions. A study conducted in the United Kingdom in 2005, found that 45% of the students in that study began their academic research with Google, while another 23% used a different commercial search engine such as Yahoo!, Lycos, or AltaVista. Over two-thirds of the students in this study began their research on the Internet rather than in the academic library (Griffiths and Brophy 545). One reason for this may be that students simply find the Internet easier to use than the library. The study further found that students had difficulty using library resources and were willing to sacrifice quality for ease of use (Griffiths and Brophy 548).

Today's college students are definitely at ease with the Internet. A report from the Pew Internet and American Life Project reported that 86% of college students have gone online, and that 20% of today's students began using a computer between the ages of 5 and 8 (Jones 2). The study also found that college students are positive about the Internet, using it for both academic and social/recreational needs. The study found that 78% of the students used the Internet for fun, and 73% of them admitted using the Internet more than they used the library (Jones 2-3). In fact, 80% of the students stated they used the library less than three hours a week. Many remarked that finding information on the Internet was easier than using the library (Jones 12-3).

Ease of use is an important component in the information seeking behavior of Millennial generation college students. Academia is filled with jargon that only the most experienced understand. Added to this difficulty is the archaic and technical language used in library catalogs and database subject headings (Bodi 111). These barriers make it difficult for time-pressed students to find what they need for their classes. While faculty are often ecstatic at not finding much or any information on their research topics, students become frustrated and opt for the Internet because it gives them the quantity they crave (Bodi 111). The preference for the Internet over the library is not limited to inexperienced researchers. One study found no real difference in library usage among freshman, sophomore, junior, and senior college students (Van Scoyoc and Cason 51). Although an OCLC study did find that 7 out of 10 students use the library's site for at least some of their research, 43% of those students who do not use the library's site for research do so because they think they can find better information elsewhere (OCLC 6).

Millennial college students make heavy use of the Web in their class projects and research. A study that examined the bibliographies of student papers found that the number of citations for Web sites rose from an average of 11.3 per bibliography (or 9% of the total number of references per bibliography) in 1996 to 14.4 per bibliography (or 13% of the total number of references per bibliography) in 2001 (Davis 46). Web citations in student bibliographies peaked in 2000, with an average of 22% per bibliography. The decline in percentage is directly attributable to new restrictions placed by professors regarding the type and frequency of Web citations students were permitted to use (Davis 47). Davis found that faculty were not opposed to students using Web sites in their research, but that they now routinely apply restrictions on what and how many Web sources students may use in their papers (45). Most faculty agree that the Internet is an excellent source of information, but they are concerned that

students are not able to properly evaluate the sources they have found (Herring 255). These concerns over Web sites and resource evaluation appear well founded. An OCLC study found that while two-thirds of students polled felt they could determine what sites were best to use, 58% of students believe that sites with advertisements are just as reliable as sites without advertisements (OCLC 4).

A number of authors have attempted to determine the effectiveness of library instruction. In an oft-cited study, Lois Pausch and Mary Popp found that few critical assessments of library instruction exist in the literature. Most of what has been published are informal surveys of students that measure the students' satisfaction with a particular class (Pausch and Popp). Brettle reviewed the research on information skills training in the health sector during the time period 1995-2002 and found that many of the studies were poorly designed, executed, and reported (6). Further, Brettle found that many of the studies reviewed relied on subjective measures to test the efficacy of instruction rather than on validated instruments using objective measures. In 2006 Koufogiannakis and Wiebe undertook a review of the literature on teaching information literacy skills. Their findings report a lack of overall quality in the studies reviewed. Many of the published studies suffered from faulty reporting and failed to use a validated instrument. Twenty percent of the studies performed no statistical analysis (Koufogiannakis and Wiebe 19).

A 2004 study conducted by Beile and Boote attempted to critically assess the effectiveness of library instruction using pre- and post-tests. While they found a statistically significant difference in test scores, the population was small (49 students) and consisted solely of graduate education majors (6). Most other studies, however, show that library instruction has a minimal impact on students' information seeking behavior. In her systematic review of the literature, Brettle wrote, "the results revealed very limited evidence to show that training does improve skills" (7). After reviewing the literature and performing a meta-analysis, Koufogiannakis and Wiebe reported only that library instruction was better than no instruction (19). Andrew Robinson and Karen Schlegl undertook a bibliometric analysis of student research papers. Their study found that library instruction had little impact on the types of sources cited. The students' choice of resources was most influenced by the instructors' directions to the students; when the instructors enforced penalties related to student grades, the students cited more scholarly sources (Robinson and Schlegl 280). In 2002 Emmons and Martin studied the effects of library instruction on an English writing class; they found a statistically significant increase in scholarly journal citations following library instruction (554). Their overall findings indicated that library instruction "made a small difference in the types of materials students chose and how they found them" (557-8).

Aim

The aim of this study was to examine the information seeking skills of undergraduate education majors at the University of Central Florida (UCF). Specifically, this study attempted to discern the types of sources (academic vs. non-academic) undergraduate education majors used to find information for their research. The study also sought to determine whether an association existed between library instruction sessions and the types of sources used. The research was funded with a $1,000 grant sponsored by the UCF Quality Enhancement Plan (<http://www.if.ucf.edu/>).

Sample

The University of Central Florida enrolled almost 49,000 students at the start of the Fall 2007 semester. Of those students, 3,605 were undergraduate education majors. The study used a convenience sample of 200 currently enrolled undergraduate education majors. Participants volunteered after seeing advertisements for the survey or after a Curriculum Materials Center (CMC) employee asked if they would like to take a short, online survey. An incentive of $5 was offered to all participating students. Those who agreed to participate were shown how to access the survey in the CMC. Once the survey was confirmed as complete by the principal investigator, participants each received $5.

The survey consisted of 14 questions (Appendix A). The survey was administered online using Survey Monkey questionnaire software (<http://www.surveymonkey.com/>). The survey asked questions about four areas of information seeking behavior:

- the research habits of students (questions 1,10, and 11);
- the ease of using the library's resources, and how important convenience is to the student in selecting resources. (questions 2, 3, and 9);
- where students find most of their research information (questions 4,5, and 8);
- evaluating sources (questions 6 and 7).

Table 1
Student Information Seeking Behavior

If you were researching a topic for a class project like a paper or presentation, where would you find most of your information?				
Internet	Library Resources	Ask Friends	Ask Experts	Other
72%, n=144	27.5%, n=55	.5%, n=1	0	0
If you were researching a topic for a personal reason, where would you find most of your information?				
Internet	Library Resources	Ask Friends	Ask Experts	Other
88%, n=176	2.5%, n=5	6%, n=12	3.5%, n=7	0

Table 2
Research Resources

Which of the following sources do you use most in your research?				
Internet	Book	Academic Journal	Newspaper or Popular Magazine	All Sources Equally
65%, n=130	8%, n=16	16%, n=32	0	11%, n=22
Which of the following do you think is the most credible source?				
Internet	Book	Academic Journal	Newspaper or Popular Magazine	All Sources are Equally Credible
2%, n=4	20%, n=40	59%, n=118	1%, n=2	18%, n=36

Additional demographic questions asked participants about their class standing, the number of hours per day spent on the Internet, and the number of library instruction sessions attended.

Results

All 200 surveys were deemed usable, and no one from the original sample opted out of the research. Table 1 shows that the Internet was the predominant choice of almost three-fourths of the respondents for class-related research. Nearly 9 out of 10 used the Internet for personal research.

Even though these students realized that library resources were more credible than Internet sources, they still chose to use Internet sources instead of academic library sources for both personal and class work. The question remains as to why these students would make that choice. Ease of access may be an answer, as may the students' high comfort level with the Internet. Table 3 addresses these ideas.

While almost 90% of respondents felt that the library's resources were not hard to use, 78% were still more comfortable using the freely available Internet instead of the library's resources. Dishearteningly, 52% of the respondents based their decisions more on convenient access than on the authority of the resource.

Effects of Library Instruction

Another important question is about the effect of library instruction on the students' choice of resources. A chi-square test of association was conducted to determine whether the proportion of undergraduate education majors who used academic sources in comparison to those who used non-academic sources varied depending on whether the students had taken at least one library instruction session. The null hypothesis (H_0: $x^2 = 0$) states that the proportions are equal, while the alternative hypothesis (H_1: $x^2 \neq$ ◎◎) is that the proportions are not equal.

Table 3
Resource Selection – Library or Internet

I think the library's resources are hard to use.			
Very Much Disagree	Somewhat Disagree	Somewhat Agree	Very Much Agree
43.5%, n=87	45%, n=90	11%, n=22	.5%, n=1
I am more comfortable using the Internet than the library's resources.			
Very Much Disagree	Somewhat Disagree	Somewhat Agree	Very Much Agree
2.5%, n=5	20%, n=40	54%, n=107	24%, n=48
I would use a source because it is convenient to use even though it is not the best source on my topic.			
Very Much Disagree	Somewhat Disagree	Somewhat Agree	Very Much Agree
17%, n=34	31%, n=62	44%, n=88	8%, n=16

Table 4
Chi-square Test of Association

Amount of Library Instruction		Types of Resources Used			
		Academic	All Equally	Internet	Total
Library Instruction	Count	33	13	94	140
	Expected Count	33.6	15.4	91	140
No Library Instruction	Count	15	9	36	60
	Expected Count	14.4	6.6	39	60
Total	Count	48	22	130	200
	Expected Count	48	22	130	200

The independent variable, library instruction, was assessed with question 14: "Not counting CMC tours, how many library instruction sessions have you attended?" Choices ranged from zero sessions to five or more. All the responses of zero (n=61) were grouped into the category "No Library Instruction." All the responses from one session to five or more (n=139) were grouped into the category "Library Instruction." The dependent variable, "Types of Sources Used," was assessed with the question "Which of the following sources do you use most in your research?" All the responses for "Internet Sites" were grouped into the category "Internet." All the responses for "Book and Academic Journal" were used for the category "Academic Sources." The responses for "I Use All These Sources Equally" were grouped together in the category "All Equally." No one selected the response "Newspapers or Popular Magazines." Table 4 illustrates the chi-squared test of association table. All variables were independent of each other, and all cells had at least five expected frequencies, so all assumptions for the chi-square test of association were met.

At an alpha level of .05, the type of information resource used for research was not statistically significantly related to whether the student attended library instruction sessions (Pearson χ^2 (1, N = 200) = 1.612, p = .447, Cramer's V = .090). Students who had attended a library instruction session were proportionally just as likely to use academic and non-academic sources as those students who had not attended a library instruction session.

The measure known as 'effect size' evaluates the strength of the association being tested (Morgan, Reichert, and Harrison 15). It may be seen as the practical significance of a test result. In this study the Cramer's V value of .090 indicates a small effect size. Tables 5 and 6 illustrate the findings. Since the effect size is small, it can be thought of as having less practical significance to the field of

information literacy and library instruction. Effect size considered with sample size determines power, which is the probability that a test will reject a false null hypothesis. A test with a small effect size might not generate enough power to detect statistical significance (Morgan, Reichert, and Harrison 16).

(Jones). Moreover, 79% of students surveyed stated that academic sources (e.g., books and journals) are more credible than the Internet, yet they still rely heavily on Internet sources for their research. Griffiths and Brophy concluded that students have difficulty using library resources, so they turn to the Internet with which they are

Table 5
Chi-square Test Results

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.612[a]	2	.447
Likelihood Ratio	1.548	2	.461
N of Valid Cases	200		

[a]. 0 cells (.0%) have expected count less than 5. The minimum expected count is 6.60.

Table 6
Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.090	.447
	Cramer's V	.090	.447
	N of Valid Cases	200	

Discussion

Although this study is limited in that without a true random sample and larger sample size the results cannot be generalized to the entire population, the results are nonetheless disappointing, if not surprising, for those interested in library instruction. The fact that students surveyed here performed most of their research, whether for class or personal reasons, on the freely available Web is supported by the findings of Griffiths and Brophy, Davis, and the Pew Internet report on the use of the library and the Internet by college students

much more comfortable. This study found that while students did not find the library difficult to use, they were more comfortable using the freely available Internet.

Some might argue that with so many library resources being online, the distinction between the Internet and library resources is blurred, and that students may have difficulty differentiating between the two. This may have been the case in this study, since definitions of "Internet resources" and "library resources" were not provided in the survey. However, personal experience at the library's reference desk and in library

instruction sessions suggests that students do make the distinction between resources on the library's site and those available freely through a search engine such as Google. Additionally, while Google Scholar further erodes the separation of academic sources and the freely available Web, personal experience again suggests that undergraduate students are not using Google Scholar. Again, this may be due to students being unaware not only of the differences between academic and non-academic sources, but also the appropriateness of using those sources.

This study found no association between library instruction and the types of sources used by students. This is supported by the findings of Emmons and Martin and Robinson and Schlegl. Furthermore, the studies by Davis and Robinson and Schlegl found that instructor guidelines played a more significant role in student citations than did library instruction. This raises a crucial question as to how much students are learning about research from simply following the rules written in their class syllabi. If students are not citing Internet sources simply because they are told to use more academic sources, it is possible that they will revert to using the Internet when they are not specifically instructed to do so, and they would not have gained a deeper understanding of the critical importance of using academic sources. This is important, since almost 90% of the students in this study said they use the Internet as a primary tool for personal research.

However, Beile and Boote found that the greatest increases in post-test scores occurred among students who had previous library instruction (6). A 2006 bibliometric study conducted by Wang found a statistically significant difference in the citations of students who had taken a for-credit library course as compared to citations listed by those students who had not taken the course. Those who had taken the course cited more scholarly sources (Wang 85). Further, Wang reviewed the guidelines set forth by the professors and found that none of them specified an academic penalty for having too many non-academic citations (Wang 87). This suggests that for-credit library classes or multiple library instruction sessions may prove more effective in changing students' information seeking behavior than the traditional "one-shot" library instruction class.

These studies could have an important impact on how academic libraries approach library instruction. Libraries have long used the "one-shot" library instruction session where a professor brings his/her class to the library for a session on how to use the library. While this approach does have some value as an introduction to the library for new students, perhaps it is time for libraries to seriously consider alternative practices. Academic libraries might be better served to invest their limited resources in for-credit library classes, mandatory multiple library instruction sessions, or in integrating librarians into the class curriculum. These changes in practice will not be easy. Not only would these approaches require more time and effort, but the devaluing or possible eradication of one-shot library instruction classes strikes at a core belief of academic librarians.

While the vast majority of library instruction at the University of Central Florida Libraries consists of one-shot classes aimed mainly at freshman composition students, the library has made efforts to enhance the instruction program. In conjunction with Course Development and Web Services (CDWS), the library has created online information literacy modules that can be used by the teaching faculty in their online or face-to-face classes (<http://infolit.ucf.edu/faculty/>). These modules focus on different areas of research,

and more are forthcoming. They include content, practice, and assessment, so an instructor can see how well students understand the information. The UCF Libraries also offer "embedded librarians" as an integral part of online classes. They answer questions, create tutorials, and work with the instructors on creating proper research assignments. During the seven academic years in which this service has been offered, UCF Librarians have been embedded in 187 classes reaching almost 5,600 students. Although no formal assessment of library skills has been made of students in classes with embedded librarians, further investigation is planned.

Conclusion

This study found no association between library instruction and the use of traditional academic library resources in student research. Academic libraries are currently investing staff and time to order to teach information literacy, and yet the truly important question of how to effectively change students' perception of research methodology remains unanswered. Is information literacy and its generic offshoot library instruction truly effective? Perhaps the solution lies outside the library in the types of assignments students are given and how they are graded. Do libraries need to rethink and redesign how they organize and allow access to information? Or have we truly entered a new age of research where quantity, easy access, and keyword searching are more important than controlled vocabulary and peer-review? This study makes no claims to answering these questions, no one study alone can, but it is important that as the library profession moves forward it develop a research agenda and theoretical foundation which will eventually answer these questions.

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Appendix A

1.) I enjoy researching.

1 Very Much Disagree	2 Somewhat Disagree	3 Neither Agree Nor Disagree	4 Somewhat Agree	5 Very Much Agree

2.) I think the library's resources are hard to use.

1 Very Much Disagree	2 Somewhat Disagree	3 Neither Agree Nor Disagree	4 Somewhat Agree	5 Very Much Agree

3.) I am more comfortable using the Internet than the library's resources.

1 Very Much Disagree	2 Somewhat Disagree	3 Neither Agree Nor Disagree	4 Somewhat Agree	5 Very Much Agree

4.) If you were researching a topic for a CLASS project such as a paper or presentation, where would you find MOST of your information? (Check only one.)

On the Internet	Using Library Resources	Asking Friends	Asking Experts	Other

5.) If you were researching a topic for a PERSONAL reason, where would you find MOST of your information? (Check only one.)

On the Internet	Using Library Resources	Asking Friends	Asking Experts	Other

6.) Which criteria do you use to evaluate Web sites? (Check all that apply.)

Accuracy	Authority	Objectivity	Currency	I do not evaluate Web sites

7.) Which of the following do you think is the most credible source?

Internet Site	Book	Academic Journal	Newspaper or Popular Magazine	All are Equally Credible

8.) Which of the following sources do you use most in your research? (Check only one.)

Internet Sites	Books	Academic Journals	Newspapers or Popular Magazines	I Use all these Sources Equally

9.) I would use a source because it is convenient to use even though it is not the best source on my topic.

1	2	3	4	5
Very Much Disagree	Somewhat Disagree	Neither Agree Nor Disagree	Somewhat Agree	Very Much Agree

10.) I perform a good deal of research for my classes.

1	2	3	4	5
Very Much Disagree	Somewhat Disagree	Neither Agree Nor Disagree	Somewhat Agree	Very Much Agree

11.) I am required to write research papers for my classes.

1	2	3	4	5
Very Much Disagree	Somewhat Disagree	Neither Agree Nor Disagree	Somewhat Agree	Very Much Agree

12.) What is your UCF student status?

Freshman	Sophomore	Junior	Senior

13.) How many hours a day do you spend on the Internet on average?

0	1-3	4-6	7 or More

14.) Not counting CMC Tours, how many library instruction sessions have you attended while a student at UCF?

0	1	2	3	4	5 or More