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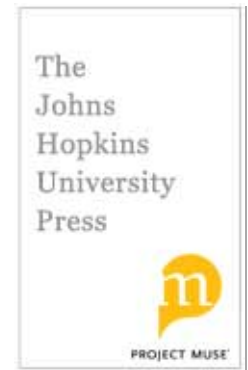
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portal: Libraries and the Academy, Volume 9, Number 1, January 2009, pp.
115-132 (Article)

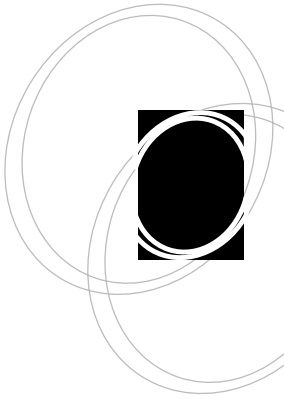
Published by Johns Hopkins University Press

DOI: [10.1353/pla.0.0033](https://doi.org/10.1353/pla.0.0033)



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How Do You Know That? An Investigation of Student Research Practices in the Digital Age

Randall McClure and Kellian Clink

abstract: This study investigates the types of sources that English composition students use in their research essays. Unlike previous studies, this project pairs an examination of source citations with deeper analysis of source use, and both are discussed in relation to responses gathered in focus groups with participating students and teachers. The researchers examine how students negotiate locating and using source material, particularly online sources, in terms of timeliness, authority, and bias. The researchers report on how teachers struggle to introduce these concepts and how students fail to perceive authority and bias in their sources.

Introduction

How do students evaluate the sources they use? What value do students place on the quality of the sources they use? When it is so easy to conduct research using search engines on the Internet, is it inevitable that students will use non-refereed resources that are common to these search engines instead of traditional print resources, such as journal articles, books, and government documents that are refereed by academic peers or editors? Does it matter? These questions frame this study of English composition (EC) student research essays in light of today's standards for information literacy.

This study focuses on the sources students actually use and what students and teachers say about this source use. The researchers examined 100 student essays to determine the amount of attention students give to analyzing and crediting the sources of their information. The authors also conducted focus groups with participating students

portal: Libraries and the Academy, Vol. 9, No. 1 (2009), pp. 115–132.

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and their teachers about the use of sources in these essays and as well as the instruction given to students on source use. The results indicate that students, although they value good information, value more highly the ease and convenience of the Internet, a finding common in recent studies on student research behavior.¹ The study determined that students will use more traditional scholarly sources if required to do so, which is another common finding. Most importantly, we found that students struggle with understanding

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College students are most often introduced to the concepts of information analysis in English composition, a stalwart of the general education curriculum today. In fact, the EC curriculum stands not only on the front lines of written and academic literacy in this age of a rapidly

evolving computerization of culture but also on the front lines of information and critical literacy, with its rapidly growing set of skills and practices for the digital age. Colleges and universities simply rely on EC courses and, where available, concurrent library sessions to introduce students to effective critical thinking skills for analyzing information resources. To this end, most EC courses have clearly defined goals related to the analysis of both electronic and print sources of information. Minnesota State University—Mankato, for example, defines information literacy competencies for its EC course in the following terms: “Students will be able to become experienced in computer-assisted writing and research, will locate and evaluate material, using PALS [an online catalog], the Internet, and other sources...[and] be able to analyze and synthesize source material, making appropriate use of paraphrase, summary, quotation, and citation conventions.”² The Association of College and Research Libraries (ACRL) has also composed student learning outcomes for information literacy. The ACRL articulates a literate student’s practices in like terms: “The information literate student examines and compares information from various sources in order to evaluate reliability, validity, accuracy, authority, timeliness, and point of view or bias.”³ Since librarians and EC teachers occasionally join forces to educate students about research and information analysis practices and since their information analysis goals are consistent, studies of students’ research practices conducted collaboratively between librarians and EC teachers can be carried out within a stable, defined, and mutually beneficial context.

Literature Review

It has been 10 years since Mary Ann Gillette and Carol Videon published their study on the presence of Web sites in bibliographies of EC students at one community college. In their study, the researchers examined 48 Internet citations and found that 50 percent of the verifiable citations were links to research papers composed by other students. Based on this and other findings, Gillette and Videon offered guidelines for librarians and teachers to assist students in finding “quality” Web sites.⁴



Gillette and Videon also noted their surprise over the very limited amount of scholarship regarding students' research practices prior to 1998: "While we found several reports on research habits of published academics and doctoral candidates, we located only one aimed at the undergraduate level."⁵ In this way, Gillette and Videon's work is significant. Many other studies that investigate students' research behaviors and practices in the digital age have since been published,⁶ including at least one other study that looks specifically at the sources students use in EC courses.⁷

Vicki Tolar-Burton and Scott Chadwick conducted an extensive study of more than 500 students writing in a variety of disciplines. They ask and answer this question: "What makes a source most desirable to student researchers? Access, access, access."⁸ According to Tolar-Burton and Chadwick, students want sources that are easy to find, easy to understand, and readily available, indicating that accessibility—both physical and cognitive—is the primary concern for today's students. In another recent investigation of student research habits, Anna Scoyoc and Caroline Cason point out that all recent studies on "undergraduate research behavior at both the national and individual institutional level have unanimously found that the vast majority of students turn to the Internet first for academic research."⁹

All of the latest scholarship confirms students' heavy use of the Internet for conducting research in college courses. Despite this finding, few studies have examined how effectively students evaluate and use information, including online sources. In perhaps the only extensive study of students' research practices in the digital age, Wendy Austin surveys writing center staff at several higher education institutions as part of her dissertation research and notes that her respondents comment time and time again that students need better understanding of the criteria related for source analysis: bias, authorship, or sponsorship; reliability and documentation; credibility and accuracy; coverage and scope; purpose; timeliness; and verifiability.¹⁰ Based on these responses, Austin concludes that "[c]ritical thinking skills, applied to Web sites, are by far the greatest single area of concern...the most pressing issue facing students now."¹¹ In the end though, the research by Austin and others leaves us with these questions: Are students being taught the criteria for analyzing sources? If so, then how are they applying these criteria? What can college librarians and EC teachers do to improve students' information analysis skills?

Methodology

Closer examination of recent studies reveals that most rely on three pieces of information to draw their conclusions: bibliographic information taken from students' research papers; perceptions of students gathered from interviews, surveys, and focus groups; and observations from teachers and academic librarians. We use these approaches as well; however, our study extends beyond previous research to examine the frequency and effectiveness of sources within students' essays as well as tying this examination to teacher and student perceptions.

We replicate previous studies by examining the citations listed in the bibliographies of 100 EC student research essays as well as conduct focus groups with student and teacher participants, the conversations of which have been recorded and transcribed.



We also replicate the starting point used in Gillette and Videon's 1998 study—a library instruction session in which the librarian focuses on the concepts of timeliness, authority, and bias before students start research for their essays.¹² Unlike previous studies, however, we extend our study beyond the frequency of citation types (Web site, book, journal, and so on) to examine source use as well as student and teacher perception of source selection and use, particularly with online sources as they relate to the criteria of timeliness, authority, and bias. Taken together, we believe the rhetorical and ethnographic analyses offered by this design paint a more complete picture of students' research practices in the digital age. In a sense, however, this project is organic. For example, we do not pose and query a set of hypotheses as is often the case. Instead, we study the source citations themselves and consider the sources in the context of the EC students' research essays in an attempt to identify source use patterns. We then connect this research with student and teacher feedback on this use as it relates to the criteria of timeliness, authority, and bias.

Findings

Table 1 provides a raw count of bibliographic entries based on source type. This count, with 48 percent of all 633 citations being Web sites, indicates that students are becoming increasingly reliant on the Internet for their information. Only a few years ago, Paul Jenkins found that 24 percent of more than 850 citations in his study of 116 student essays from multiple disciplines were Web sites.¹³ Before that, Philip Davis found in a study of more than 60 essays written for a 100-level economics course that the number of Web sites cited doubled from less than 10 percent in 1996 to more than 20 percent in 2000.¹⁴ Most recently, Scoyoc and Cason reported that 70 percent to 80 percent of students use the Internet to find their sources for college-level research projects.¹⁵ College student Carie Windham confirms in her 2006 EDUCAUSE white paper that "in a world where virtually everything is found online, it's not surprising that more and more college students are turning to the Web to navigate their academic lives."¹⁶ The numbers, though, do not reveal much beyond what previous research has confirmed—that there is heavy student use of the Internet for conducting research. The analysis needs to go deeper.

We developed categories, therefore, to describe the kinds of Web sites students choose for the sources of their information. Some are more authoritative resources, many of them less so. Although traditional print sources like books, articles, and documents can carry the bias of the writer and publisher, they are typically less problematic as information sources than information found through the Internet. In this study, however, traditional print sources are only referenced half of the time, thus indicating students' heavy use of information acquired through the Internet. Table 2 organizes the 302 Web sites cited by students in this study into several categories. Many of the Web sites used by those students are from resources easily recognized as authoritative, such as the United States Conference of Mayors, the British Royal Society of Chemistry, and the American Psychological Association. A significant yet unexpected finding of this study is the heavy use of Web sites produced by groups who serve as advocates for a range of issues, such as the Never Hit a Child Organization, the Catholic Educator's Resource Center, and the Parent's Television Council, which is devoted to "promote and

Table 1

Bibliographic entries based on source type

Source Type	Count	Percentage of Total
Websites	302	48%
Books	184	29%
Articles (<i>incl. those retrieved electronic databases</i>)	105	16%
Pamphlets & Other Print Documents	30	5%
Personal Interviews	12	2%

Table 2

Count of Website Types Used as Sources

Website Type	Count*
Advocacy Group	53
News (CNN, MSNBC, ABC, etc.)	49
Informational	45
Personal (web pages, blogs, etc.)	38
Company or Commercial	34
Encyclopedia	17
Government	16
Other	15
Dictionary	6
Online Journal	2

* The total number is less than 302, as some students referenced the same websites.

restore responsibility and decency to the entertainment industry in answer to America's demand for positive, family-oriented television programming."¹⁷ Advocacy Web sites and company or commercial Web sites have a growing presence on the Internet and a significant presence in student research writing. In fact, it seems further research on this trend is warranted in terms of both the presence and student understanding of Web sites that are advocating or advertising.

On the surface, it appears that EC students in this study are identifying a range of appropriate print- and Internet-based sources of information, yet their analysis of them seems limited. With access to the Internet so easy and routine for most college students,



it is critical that they learn to understand the nuanced nature of information from the entirely biased to the intentionally objective, and this literacy need is critical to future

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work in library and EC instruction. This finding also points to the importance of increased collaboration between librarians and teachers in addressing this need.¹⁸

Timeliness, Authority, and Bias

What follows is an exploration of student use of source information, looking particularly at the evaluative criteria of timeliness, authority, and bias. Timeliness is considered in relation to the entire source set in this study. The discussion of authority is segmented; an analysis of the sources themselves is followed by an analysis of the student writers' articulation of the authority of their sources within the text of their essays. Lastly, bias is explored using student essays

that clearly involve topics that hinge on belief.

There is no attempt to argue that simply using authoritative, unbiased, and timely sources always results in writing effective college research essays. In fact, it is noted that

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some of the essays studied in this context contain references to authoritative information, yet the students fail to use the source information in clear or coherent ways. In such cases, the essays often become stymied rather than propelled by the source information. For example, one student essay on abortion contains references to four books, but the writer relies almost exclusively, as evidenced from the essay's in-text citations, on information taken from one Web site, *abortionfacts.com*, whose mission statement reads: "We are committed to the sanctity of life at all stages."¹⁹ The reference lists

from student essays examined in this study initially look quite authoritative, but the essays themselves tend to reveal student reliance on questionable information. In fact, the regular use of information from advocacy groups such as "I Want Clean Air," "GunCite" and "Bush Lies" is evidenced. Such Web sites probably do initially appear credible, but they also have an agenda, limited point of view, or bias. Therefore, more attention to helping students distinguish and articulate the difference between information presented to inform and information presented to advocate or advertise seems warranted.

Timeliness

The vast majority of the essays studied use timely sources as appropriate—an essay on the history of the telephone appropriately references some relevant older materials, as do essays on the Cold War and the Manhattan Project. Likewise, an essay on kenaf (plant) for paper manufacture references older materials without having an impact on the essay's effectiveness. Contemporary topics are also referenced with contemporary



resources. In fact, only five essays in this study were identified as somewhat problematic in their consideration of using timely sources: an essay on gay parenting used sources mainly from the 1980s; an essay on bankruptcy referenced sources no newer than seven years ago; an essay about genetically modified foods primarily referenced two sources from a book published in 1989; an essay on global warming relied on sources from the mid-1990s; and an essay on accounting ethics used source information primarily from the early 1990s. Obviously, these students could have easily located more timely materials appropriate to the topics of their research.

Authority

The evaluation of authority is ultimately subjective. However, what constitutes an authoritative source was determined at the outset of this study to facilitate this exploration of the 633 bibliographic entries in the 100 student essays. The following source types were noted and tallied as authoritative, whether in print or electronic form: journal, newspaper, and magazine articles; books or government documents; personal interviews; and other resources easily identified as authoritative. Forty-nine essays were assigned a score of “1” for containing sources of which at least two-thirds were identified as authoritative (66–100 percent), 31 received a score of “2” for containing at least one-third to less than two-thirds of authoritative sources (33–66 percent), and 20 essays were given a score of “3” for containing fewer than one-third of sources deemed to be authoritative (0–33 percent).

Most essays that scored a 1 are heavily reliant on journal articles, books, and similar documents. For example, one essay on the treatment for methamphetamine addiction relies on information from one dictionary, four journal articles, one federal document, and an educational pamphlet from a treatment and support group. Another essay on the Cold War relies exclusively on books, and another essay on the media’s influence on crime cites two books, several articles, and a few Web sites, including one produced by a media awareness network. Another essay on teen plastic surgery references several journal and newspaper articles. Finally, an essay on smoking bans cites several newspaper articles along with a state health department document and a federal document. Overall, essays assigned a score of 1 for authority show reliance on traditional materials: books, government documents, and journal articles, with only an occasional Web site or other reference.

An example of an essay typical of a 2 rating is one on the topic of homelessness that uses two books, one academic article, and three Web sites—all with clear advocacy roles. As another example, an essay on bullying references a dictionary along with some advocacy Web sites, and an essay on *Title IX* references newspaper articles, journal articles, and advocacy Web sites such as savetitleix.com. A final example of an essay scored a 2 for its use of authoritative sources is one on gay parenting that references many newspaper articles, two books, and several advocacy Web sites including gayparentingpage.com.

A typical 3 essay is one written on animal cruelty and vegetarianism in which the student writer references only advocacy sites: one on vegetarianism, one on humane farming, and one personal Web page on the eating habits of vegans. Another essay about



UFOs uses all advocacy and personal Web sites such as “Ellie Crystal’s Metaphysics and Science Web Site” and “Lovely Clara on Crop Circles.” A final example of an essay with little to no authoritative source information is one written on the television show *Desperate Housewives* that cites only the show’s Web page, a pop culture wiki, and a personal Web site.

Again, this analysis is subjective. However, studying these essays has reminded us of the individual character of each piece of source information. Some information sources are clearly advocacy sources, but others are not so clear in their intent or authority. For example, the Web site for the American Association of Retired Persons (AARP), while an advocacy site in many respects, contains research from the AARP’s respected Public Policy Institute. Web sites for television networks and programs along with many other online sources maintain this mixed presence relative to the authority of information.

Articulation of Authority

Determining the authority of a source is difficult even for experienced researchers. As it is readily apparent in this study, students need instruction in identifying the credentials

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of the sources or the “authorities” they tend to cite. Moving from an examination of the sources listed on students’ bibliographies to their use in students’ essays, we found that 39 out of 100 student writers consistently failed to discuss or even name the authors of their sources, except in parenthetical references. This finding alone suggests that students need more instruction about how to identify, think through, and

articulate the credentials and research methodology of their sources. It is true that authors, even in scholarly journals, do not necessarily articulate their own or others’ credentials, and it is also true that these credentials are not otherwise identifiable or available. It is also possible that students do not believe they need to discuss authority, that a source’s authority is a given based on its availability, selection, or both. Despite these obstacles, 61 students in this study do discuss the authority of their sources to a limited extent in their essays. Although we concede that 61 percent is a surprisingly high percentage given the other findings of this study, the fact remains that nearly all student essays in this study contain serious omissions or inconsistencies in this area, thus limiting the overall effectiveness of their research and, more importantly, the writing. In these 61 essays, two trends in student reporting of source authority have been identified— indefinite claims and a reliance on names—and illustrations of these and other articulations of authority are detailed below.

First, essays written by 24 of the 61 students contain indefinite claims of authority similar to this example from an essay on euthanasia: “Dr. Dolan from the University of Minnesota states that...” The reader does not know why Dr. Dolan has any legitimate authority to make assertions about euthanasia. If the reader follows the in-text reference to the end citation to the source itself, Dr. Dolan is merely quoted in a Web site article on euthanasia that makes no mention of his credentials. Furthermore, this Web site is sponsored by the “Catholic Tradition,” an organization that “exhorts the wicked who



leave the traditions of the Catholic Church and believes that they should be expelled from the community."²⁰ Also typical of this kind of unclear or indefinite authority are unanchored references such as the following phrase: "Cynthia Walker, a Seattle pharmacist." Walker is cited by one student for her opinions regarding steroid use among baseball players but with no more discussion of her credentials. In fact, the corresponding end citation for this source leads not to a medical journal, Walker, or her lab but to a brief college newspaper editorial. Another example of the indefinite nature of source authority comes from an essay on the atomic bomb. In this, the student writer attributes the decision to drop bombs on Japan to part of the effort to stem the spread of Communism, and the student bases this idea on information from a mechanical engineering student at the University of Texas, whose opinions were posted to a now defunct Web site. The assertion has limited authority, at best, since it appears the student is nothing close to a recognized historian or expert ethicist. In the preceding example and throughout this group of essays, there exists a failure to adequately discuss or document a source's expertise or authority. For a final example, in a student essay on the treatment for methamphetamine addiction, a professor with apparent professional experience in treating such addictions is cited, but the source is neither named nor identified by credentials that make the professor an authoritative source.

Second, another 24 of the 61 students attempt to articulate authority by relying on the names of their sources. A student essay arguing that Wal-Mart destroys small town life in America, for example, cites Larry Mishel. Examining the source, it is learned that Mishel is an economist with the Economic Policy Institute. Clearly, the student's essay would have benefited from identifying Mishel more completely and also from describing his research methodology. Another example comes from a student essay on the adverse impact of tanning beds. The student writer references Dr. Horlick and repudiates his claims with other "experts," all of whom are only identified by name.

Only the remaining 13 students name their sources and detail their authority consistently. Some examples include student articulations that their sources are basing their information on things like a "15-year follow-up study," a description of "a poll of 400 respondents," a study sponsored by "the National Cancer Institute," and a study of "29 area high schools." In the end, the students who articulate not only the names and affiliations of their sources but also how the sources arrive at their opinions and information tend to write more effective research essays.

Bias

As with authority, the criterion of bias is difficult to gauge in many sources of information today; therefore, the researchers explore if and how students identify bias in their essays. Rather than study all of the essays for bias, since many essay topics in this study are not particularly dependent on opinion, the investigation into bias focuses on essays that center on belief, for example the topics of abortion, near-death experiences, UFOs, euthanasia, creationism, reincarnation, prayer, evolution, and ESP. For example, one essay on abortion uses sources in such a way as to reveal that the writer understands the need to address bias. The student writer's sources include some "Opposing Viewpoint" book references and two other textbook references. The writer also references

abortionfacts.com, a pro-life advocacy Web site, yet attention to bias is clear throughout the discussions of this source. Similarly, a student writing about near-death experiences clearly understands the importance of negotiating bias. The writer conveys in the text of her essay that the sources she uses might be biased, but they are the perspectives of the “believers” of such experiences. Further, the writer includes sources that readers might see as less biased, such as historical and religious documents discussing near-death experiences.

Most essays written on topics of belief demonstrate an awareness of the need to address bias but fail to adequately address it, such as a reference in an essay on UFOs to “a very trustworthy and reliable citizen.” Another such example comes from a student essay on creationism. In it, the student writer does an excellent job of giving the basic credentials of the experts cited such as paleontologists, a Harvard faculty member, and a Johns Hopkins faculty member. She never articulates the potential bias of her sources, however, particularly given the belief element critical to her topic. Additionally, other essays simply fail to acknowledge bias, such as a student essay on euthanasia that only names the sources and never questions the authority of the statistics and other information quoted, as well as never mentioning the possible bias of the sources used to provide support for points in the essay. Overall, students’ mixed demonstration of understanding and addressing bias suggests that librarians and EC teachers need to find ways to better explain this criterion and model its role in research-based writing.

Introduction to Teacher Perspectives

The following sections describe how teachers in this study approach teaching the information analysis concepts of timeliness, authority, and bias and how they perceive whether students negotiate them. It is clear from received feedback that teachers are overwhelmed by the intricacies and demands of information analysis in the digital age, and they see their students as generally unconcerned with evaluating sources, even for use in academic essays.

The sense of ineffectiveness or inadequacy is evident in many of the following participating teachers’ comments. One teacher commented on her frustrations in even setting up a research writing assignment for her EC class: “I tried requiring a certain amount of sources last semester, and this semester I didn’t require a certain number. I still don’t know how I feel about it. Last semester, I felt that they were putting [source information] in [their essays] just to make the requirement, and it didn’t fit.” Another teacher sees inadequacy in her ability to teach students ways to conduct effective academic research. Her comments echo her colleague’s frustration:

I will say to [my students], check with the reference librarian. You don’t even have to have a specific question like “Where are the government documents?” You can go to librarians and say, “I’m doing a paper on gun control, can you help me?” And they will. I trust that the reference librarians are more well versed in [conducting academic research] than I am, so they’ll just take it from there.

It is clear from these two comments and others that increased collaboration between librarians and EC teachers is needed, and suggestions for collaboration will be noted.



Teachers' Perspectives on Timeliness

Students' essays in this study reveal few issues with regard to timeliness of source information, yet participating teachers still perceive it to be an issue. One teacher noted that students seem to understand that the information they cite needs to be timely: "When we talk about currency, we talk about just making sure that it wasn't written in the [19]60s or something. They can use some of that but then they have to realize the context of when it was written. Currency they get." Despite this teacher's claim, two others clearly find teaching the concept of timeliness to be troubling. One teacher noted that she emphasizes timeliness in her requirements, yet students "are bringing in point, counterpoint stuff from 1967." Another teacher found the issue even more troublesome, "Currency is a problem that I find, and it's something that I don't [teach] well. I don't spend enough time with that."

It is interesting to note that teachers' perceptions of this criterion differ significantly from what is evidenced in student writing. This finding suggests that EC teachers struggle with teaching concepts of information analysis, although it can be assumed they are confident researchers in their own right. Just like chemistry teachers might be stepping out of their comfort zones when teaching math or other concepts important to chemistry, it appears EC teachers might not be comfortable stepping away from teaching writing to teach information analysis.

Teachers' Perspectives on Authority

From the perspective of teachers in this study, students struggle with the issue of authority in identifying and articulating effective sources of information. Take, for example, the following comment from one participating teacher:

It's so easy to use the Internet [to locate sources of information], and it's not easy to evaluate those sources. Students ask me, "How do I know if [the source's author is] an expert in the field?" Then, we'll talk about ways that we can find out more about these people. With that being said, no matter what kind of song and dance I have done, I am still seeing Google hits.

And another:

I made [the teaching of source authority] more of a lecture kind of thing, an active lecture where I wrote on the board what makes a good and bad source. I don't think it's new knowledge as much as bringing it to the forefront because it's common sense. Look for authority, bias, that sort of a thing. ...I don't think [students] have directly thought of it before.

A third teacher holds a similar view on her role in the instruction of source authority:

I just do my own little activity. I have them look at their topic and then they have to find one credible Web site and one non-credible Web site and then write a paper contrasting the two...using these questions to consider when they evaluate their resources: How relevant is the Web site to my topic? How current is it? Do the links still work? And how scholarly or reliable is the source?



Finally, two teachers comment that students respond negatively to coursework on determining authority. They say students act bored and indicate that they already “know this stuff.” However, one adds:

Obviously, from what we have seen in [students’ research essays], they don’t really know. ... So when you tell them to look for “dot org” or “dot gov,” they kind of roll their eyes and are like—well, of course. But then you get their [essays, and] they don’t usually get it.

Clearly, more attention to the concept of source authority is needed despite students’ attitudes.

Teachers’ Perspectives on Bias

As with the concept of source authority, teachers in this study admittedly struggle with the teaching of bias. For example, one teacher who spends several class sessions reviewing journals and comparing them with magazines, as well as studying credible Web sites and comparing those to less credible ones, admits that bias is a difficult concept for students: “[Regarding the] notion of bias, the issue of bias, I don’t think [EC students] can really determine that.” Another teacher thinks students understand bias, yet she suggests that students fail to apply it: “I think they have a good idea [of the notion of bias]. As far as applying it, I think sometimes they are so happy to find a source that they don’t really take the time to determine bias.” In fact, teachers in this study agree that bias is the most difficult for students to grasp. One teacher summarizes this point:

I think bias would probably be the [criterion] that students don’t get as much. They seem to act like they get it, but when you see the sources that they use, they don’t. They only look for things that support their opinion,...so they ignore bias if they find it.

This comment suggests that students not only struggle with understanding bias but also find it unimportant or perhaps detrimental to the effectiveness of their writing, all of which should be studied further.

Introduction to Student Perspectives

Students also participated in exit interviews and focus groups to discuss their research writing processes, including how they identify and analyze timeliness, authority, and bias in their sources. In terms of their processes, students fail to see the need for or value in searching for information anywhere but through search engines on the Internet. In fact, student responses suggest that students use common search engines for conducting nearly all of their academic and other research not only for their ease but also since other search options, including library research databases, seem overly time-consuming, unnecessarily advanced, cumbersome, and complicated. One student commented, “There are all those [text-entry] boxes. ...I think that is why some people are just more apt to go to Google and put in [one word like] ‘meth’ [in one text box] and search it.” It is interesting and perhaps ironic that this student and several others in this study negatively critique the extended usability of library research databases, since it is assumed by most EC teachers and librarians that these databases are designed expressly to allow



users to aim for greater recall or greater precision, depending on need. Instead, student comments suggest that they perceive several barriers to the use of the library. For example, one student writing an essay on the impact of illegal and prescription drugs on pregnancy and another writing on reincarnation both assumed the print and electronic sources that the college library offers would not support their topics.

The perceived barriers and general resistance to using either the print or digital resources of the library as voiced by students in this study are interesting findings in light of the fact these students have participated in and mention the value of their library instruction session. Students comment this session takes the mystery out of the college library and shows the importance of database research. However, it is clear from this study that this instruction is too limited and not convincing to students already quite comfortable in their search engine-driven research practices.

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Student Perspectives on Timeliness

Student comments regarding the criterion of timeliness do not reveal any noteworthy trends, just as their essays do not reveal any consistent use of inappropriately dated sources. Some students do not seem to care about the issue of timeliness, such as this one: "I didn't really care it was current because I did pick some articles from the 1980s and 70s." Many others do care, though. One student mentions that he tends to choose articles over books because "I figured that those would probably be more recent." Another student states she uses articles from research databases because she believes them to be the most current.

Student Perspectives on Authority

Students have some understanding of authority. This comment is an example: "If you get journal articles, they are obviously more credible than if you just Google-search something." Starting from the premise that students understand some sources are more credible than others, it is natural that students would have a range of responses in terms of evaluating a source's authority. For example, one student stated, "If they didn't have an author, it's kind of not relevant...like the author didn't write it, so I usually didn't pick them." Although having an author is a good starting point for evaluation, some students are not as particular: "I did have some [sources] that didn't have authors, they just had the title, but they had some really good quotes, so I just took them. I really didn't care about the author because they were good quotes." Another student indicated the same dilemma, but she decided not to use a source due to its questionable authority: "I found one [source], and it was on the Internet all by itself, and it was pretty weak. ...I agree with this [author] because he's right [; however,] it didn't give any supporting evidence."

Student responses on the evaluation of Internet-based sources most often focus on a source's domain, name, or topic. "I determined the relevancy and the authority of my

sources by...what type of organization they were, like the ending. We learned about the ending of the Web sites like "dot org" or "dot gov" as being more credible," noted one student. In fact, most students seem aware that they should critically evaluate Internet sites. Consider this comment on the matters of authorship and sponsorship:

Determining whether or not Internet sources are valid...has a lot to do with the author... looking at his credentials and when it's from [an organization]...if anybody sponsors it. To look for any bias was really helpful because, especially in high school, I was pretty lazy, and I was just like, oh, it's a source and it has my topic in it. I didn't really care too much if it was [sic] valid.

Students also note Web site design is a possible indicator of the authority of that source: "I found one that had a purple background with blue writing and it was...a fun font, so I didn't feel that it was too good...a Web site to use as a reference." Another refers to an obviously bad site because it is too "flashy." All of these comments indicate students are considering the authority of sources including online ones; however, the lack of depth in student comments is a concern.

Student Perspectives on Bias

Much like their responses to other criteria, students do not seem to have a strong concern for examining bias in their sources: "Mostly, I just picked whatever interested me. If they had a bias, I didn't really care. I just picked out the stuff that I wanted, and that's how I found most of my resources." Most students do not indicate a concern for considering bias, and others simply do not appear to understand the concept, though it was an explicit focus in the library session that students participated in as part of this study. For example, one student, writing about nontraditional means of treating cancer, decided not to use information from a mainstream medical organization's Web site, thinking that the organization might have a bias against alternative treatments. The student explains her concern over her reading of the information on the organization's Web site as such: "I guess their bias is that you don't get cancer." The student chooses to go with only print journal articles, instead, based on this apparent misreading or misunderstanding of bias in this one Internet source. This lack of concern and understanding of bias mirrors teachers' articulation of this concept presented earlier.

Recommendations

Are there any practical solutions for these information analysis problems? The authors think so. First, students seem to understand the timeliness issue. Teachers talk about this being the easiest concept to explain, and student essays reveal few problems on this front. Nevertheless, EC teachers and librarians should always make it a point to demonstrate year-limiting features of research databases and information update posts offered on many Web sites as other ways of bringing attention to this concept.

Second, students need to learn how to more routinely and clearly evaluate an information source by the author's credentials or the host, sponsor, or affiliation; and several activities and approaches to examining source authority are viable for students researching in the digital age. These include, but are not limited to, comparing and



contrasting authoritative and less authoritative sources; assigning Internet-free or print-only research writing assignments; emphasizing the biographical information or links to the writer that accompany most articles; limiting or directing students to specific, more authoritative databases, Web sites, and search engines; and grading student research essays on whether students' bibliographies reflect their in-text citations.

Third, students need more practice and instruction in articulating the authority of the source for the benefit of their readers. It is a limitation of this study that students have not been interviewed about the ways in which they tried to articulate authority, and the teachers were not interviewed regarding their instruction on audience. Nevertheless, students rarely discuss the credentials and methodologies of their sources. Unless students articulate in the texts of their essays both the credentials and the means by which sources gain their information and reach conclusions, it is difficult to ascertain whether or not they have considered authority.

Fourth, more instruction on bias is needed, since it seems that it is the most difficult element for teachers to instruct and the most difficult for students to identify. Perhaps this is due to the fact that electronic articles and resources do not give the subtle clues like most print ones do. Students appear comfortable picking up subtle cues about the potential biases in print sources from their advertising, design, use of images, and other features; however, students seem much less comfortable or adept in identifying these subtleties of bias in the

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digital world of ideas. Therefore, an exercise that attempts to address bias might rely on a compare-and-contrast methodology. Three areas for such analysis, although there are more, include: magazine versus journal bias, right- versus left-leaning bias, and audience bias. For example, a selection of online sources whose audiences are different from that of the mainstream press could be examined in relation to popular news Web sites. This example is one activity that gets at the elusive concept of bias, yet more discussion on how best to inform students on bias is needed.

Conclusion

This study focuses on the sources students actually use and what students and teachers say about this source use. The findings suggest college students rely on source information retrieved through search engines on the Internet, finding online versions of traditional resources as well as personal, advocacy, and commercial Web sites. Students include rich and varied information sources in their works cited pages, yet they often rely on one (often less than authoritative) source in the texts of their essays.

In terms of the criteria under examination, students largely understand that their sources should be current but are less agile in thinking through or presenting the authority of their sources in their essays. Students often do not articulate the authority of their sources, such as detailing the appropriate credentials, research methodologies, or even just the names of the sources. Students are perhaps least able to recognize or articulate bias. Teachers seem to struggle with teaching all of these concepts.



It is also clear from teacher and student responses in the study that the library is seen as an intimidating and inconvenient place, especially and interestingly in its primary purpose—supporting student research and often assisting students in the identification, location, and evaluation of sources. This finding should be of interest to library directors, given that most college and university libraries are increasing electronic access to traditional print sources, the ones seen as more appropriate to academic writing. At the library in question, for example, expenditures for electronic journals grew from \$170,496 in 2000 to a staggering \$488,609 in 2005.²¹ Many of these same libraries have also developed learning spaces, often called learning or information commons, to “accommodate the full spectrum of information literacy” as they allow students to “complete their entire research and composition process in one academic building.”²² Even with easy and convenient access to library resources in a learning commons, it has been reported that students still prefer other Internet sources instead of traditional print ones accessed online.²³

Time will tell if developments such as library learning spaces mitigate the problems discussed here. We must concede that there is a lot to learn about both using the digital library and evaluating sources. Many students apparently do not find these skills necessary to learn. Perhaps, historically, this has been true; but it is especially true now in the search engine-driven digital research age. Although teachers and librarians continue to emphasize to students the value of accessing print resources and ease in accessing them electronically, student research today is guided by one question for which we have failed to provide a convincing response: “Why not just Google it?” Librarians and teachers are committed to improving students’ research practices through providing library information sessions and individualized instruction and by directing students to a wide range of full-text electronic research databases. Students find that using search engines on the Internet, however, simply fulfills the great majority of their research needs.

We also concede it is understandable that students are drawn to using search engines on the Internet to conduct academic research. These engines are easy to use, available to anyone with an Internet connection, and quick and bountiful in their returns. Furthermore, the recent development of academic search engines by Microsoft and Google, particularly Google Scholar, that attempt to filter out questionable sources and return peer-reviewed or established sources along with the addition of online academic encyclopedias such as Citizendium and Scholarpedia suggest search engine-based approaches to research will become the norm for students if they have not already.²⁴ Since Google Scholar, for example, typically filters out non-library sources, it is likely that other advancements in search engine technology will soon unify library and non-library sources to allow for “seamless searching,” an approach Scoyoc and Cason claim “creates a greater need to educate students about properly identifying the sources of their information.”²⁵

What are the implications of this conclusion? Many have used this finding to suggest the impending death of the college or research library. This suggestion—while provocative for writers, journal editors, and educational administrators—still seems over the top. Instead, it seems that there is little collaborative energy directed at improving students’ information analysis practices, and whatever energy is directed falls far short of making college students information literate and research savvy.



Is this information literacy problem a significant one for higher education and especially for the course most responsible for it—English composition? The authors think it is. Without going into an extended argument, one goal of most college EC courses is to help students find and evaluate sources of information, to help them understand the relative value of source material. It is, therefore, possible to argue that the information literacy problem stems from flaws in EC course design and shortcomings in teacher preparation. It seems more fruitful, though, to suggest that these are problems caused by too many people working in isolation and are best solved through collaborations between the information experts (librarians) and writing experts (EC teachers) in order to develop alternative approaches to information literacy instruction. These approaches might include interactive Web-based supplements, co-requisite information literacy courses, and co-taught writing courses.

In conclusion, the authors return to three questions offered in the introduction to this essay: (1) Are students learning the criteria for analyzing information? (2) If so, then how are they applying these criteria? (3) Furthermore, what can college/university librarians and EC teachers do to improve students' information literacy practices? At this point in the digital information age, it seems that the respective answers are (1) somewhat, (2) inconsistently, and (3) a lot more.

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