CHAPTER 11

UP THE MOUNTAIN WITHOUT A TRAIL: HELPING STUDENTS USE SOURCE NETWORKS TO FIND THEIR WAY

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The Association of College and Research Libraries (ACRL) has recently replaced their *Information Literacy Competency Standards for Higher Education* (*IL Standards*) (ACRL, 2000) with the *Framework for Information Literacy for Higher Education* (*Framework for IL*) (ACRL, 2015). The *Framework for IL* shifts the focus from information literacy (IL) competency standards as delineated in the *IL Standards* to a series of six threshold concepts (frames), "each consisting of a concept central to information literacy" (*Framework for IL*, p. 2). As noted in its introduction, "Threshold concepts are those ideas in any discipline that are passageways or portals to enlarged understanding or ways of thinking and practicing within that discipline" (p. 2). One of the IL threshold concepts, or frames, is Scholarship as Conversation. Our analysis of Cynthia Haller's students' research papers points to the necessity of helping students recognize that if they can identify a source network and the significant authorities in a discipline or field, they can take advantage of the "scholarly conversation" by using citation trails (i.e., source, or knowledge, networks). Three other threshold concepts relevant to our analysis are Authority Is Constructed and Contextual, Research as Inquiry, and Searching as Strategic Exploration and we will bring these concepts into our discussion as appropriate.

For this chapter, we have examined research papers written by students in Haller's Fall 2012 and Spring 2013 junior-level course, "Research and Writing for the Professions," and will describe these more fully in a later section. We find that students especially have difficulty identifying what we call a "source network"—also known as a citation trail. We define a source network as a web of

interconnected texts within which a particular text occupies a single node. The source networks most important to academic research, on which we are focusing in this chapter, are the "scholarly conversations" described in the new IL frame, Scholarship as Conversation. However, we envision source networks as potentially expanding beyond the "scholarly conversations" central to disciplinary knowledge. For instance, a full source network on the neuroscience topic of memory could potentially include news and magazine articles, fiction and poetry, Internet blogs, etc. related to memory. We believe it important for students, when doing scholarly research, not only to identify the "scholarly conversation" subset of the broader source networks relevant to their chosen research topics, but also to understand how disciplinary knowledge branches out to connect to other genres and modes of text. The problems students have hooking into source networks have not been examined as fully as some of the other major difficulties they encounter in college-level research/writing, nor have source networks' connection to finding an appropriate focus and evaluating sources been fully explored.

To learn more about students' use of source networks, we analyzed nine students' three scaffolded-research writing assignments: a research proposal, an annotated bibliography, and a final, formal research paper of 10–12 pages (see Appendix A). We obtained written permission from these students to use their texts for research under the condition that they be assigned pseudonyms as authors. We discovered that none of the students used source networks, as we are defining them, even those who received the highest grades. While this was a disappointment, it has given us a chance to reflect on the need for disciplinary and library faculty to better understand how students actually search for—and choose—information sources as they do research. We realized, too, that even though it *seems* to be much easier to do research in this age of digital collections (web and databases) because of easy access to a wealth of texts, students are now floundering in an avalanche of sources that potentially obscure rather than reveal knowledge networks that might assist them in their research. Thus, the student research process—always difficult, confusing, even daunting—is complicated by the staggering number of potential sources available at the click of a mouse. Those of us who did research before there were databases and the Internet had a different, time-consuming task: we had to use print sources, and we used indexes, abstracts, and bibliographies at the end of books and journal articles to complete our research. We followed the hallowed "citation trails"—the source networks laid out in our print-based tools.

To enable our students to identify the scholarly conversations in which we expect them to participate, we must introduce them to the value of source networks, but do so in the context of the Internet and electronic research databases. It is worth noting here that students today may never have held a print journal

in their hands. Somehow, we need to enable them to find the scholarly conversations, or "tacit knowledge" (Fister, 2013) that faculty possess but which their students born in 1980 or after may have no clue about because of the sea changes in how we collect, store, and retrieve information in this online, digital world. Fortunately, the tools for identifying such networks are present within electronic tools and venues; however, they must be explicitly brought to students' attention as they engage in research. Here, we suggest several ways teachers in any discipline who include formal research papers in their course curricula can better assist students in identifying and capitalizing on source networks. Students are in need of a digital age strategy for following the citation trail up that mountain of information sources.

As we noted, our study indicates that students can best be served through collaboration between academic librarians and writing faculty. Academic librarians and writing faculty, particularly those involved in writing-across-the-curriculum initiatives and writing centers, describe the problems for students and teachers alike when teaching writing is relegated to first-year writing courses and research is left to academic librarians to deal with as a focus of IL. In fact, though, research and writing should be thought of as part of the same process and not separated. James Elmborg and Sheril Hook (2005) repeatedly emphasize this point in their volume of essays on collaborations between libraries and writing centers. Elmborg correctly describes the research/writing process as recursive and notes that it is related in part to the recurring interplay between writing and information. By segregating the research process from the writing process, we obscure this fact and thereby impoverish both the writing process and the research process (Elmborg & Hook, p. 11). By working together, however, librarians and writing center professionals can enact a "shared practice where research and writing can be treated as a single holistic process" (p. 1).

Several Library and Information Science (LIS) scholars have studied and written about the difficulties undergraduate students face in identifying good sources for their research (Bodi, 2002; Leckie, 1996; Fister, 1992; among others). They make the case for disciplinary faculty becoming more aware of the gulf between being expert researchers and novices, and what those differences are. It is worth quoting Gloria Leckie (1996) from her widely read article "Desperately Seeking Citations . . . " in which she describes faculty who embody the "expert researcher model" (p. 202); they have integrated the research process and know their own fields well. To academic experts, the scholarly conversations supporting "threshold concepts" in their disciplines have become tacit knowledge; they can be so familiar that experts lose consciousness of the explicit learning by which they were originally acquired. On the other hand, their students exemplify the "novice researcher model." They

> . . . have no sense of who might be important in a particular field, and find it difficult to build and follow a citation trail. They do not have the benefit of knowing anyone who actually does research in the discipline (except for their professor) and so do not have a notion of something as intangible as the informal scholarly network. They have never attended a scholarly conference. Because of their level of cognitive development, ambiguity and non-linearity may be quite threatening. They do not think in terms of an information-seeking strategy, but rather in terms of a coping strategy. Research is conceptualized as a fuzzy library-based activity which is required of them to complete their coursework. In other words, the novice is very far from the expert model. (p. 202)

Clearly, students lack what experts have: a sound information-seeking strategy. Without an understanding of the scholarly networks that underlie writing within disciplines, they have difficulty identifying appropriate sources. They are unaware of how sources are interconnected with one another and do not understand how to discover and/or mark appropriate citation trails (our "source networks"). This problem is even more challenging for students today because they do not get the same clues, or cues, about sources when they find them online as their faculty were able to get in the print-only world of research. Unfortunately, disciplinary faculty are not themselves always prepared to help their students with these difficulties. They may have been schooled prior to the digital age and be unfamiliar with the extended tools available in electronic library resources. Their knowledge of source networks relevant to their fields may largely be tacit and thus difficult to explain unless "props" are used (for example, an actual copy of a print journal). Some simply may not have reflected upon the challenges their students encounter and/or have not been prepared to help students with the research/writing process. In her illuminating article, "Information Literacy from the Trenches: How Do Humanities and Social Science Majors Conduct Academic Research," Alison J. Head (2008) describes the results of a Project Information Literacy [PIL] study that included examining teachers' research assignment handouts. The study found

> a lack of detail and guidance in many research assignment handouts. As a whole, the handouts offered little direction about: (1) plotting the course for research, (2) crafting a quality paper, and (3) preparing a paper that adheres to a grading rubric of some kind. *Few of the handouts analyzed mentioned where students were to look for research resources*. (p. 435, italics added)

Head's article also provides insight into many other aspects of students' research and writing processes and is worth reading to enable better faculty understanding of student researchers.

In addition to (and perhaps because of) their difficulty identifying source networks, students often have difficulty evaluating sources, or they do not evaluate them at all (McClure & Clink, 2009). Academic library faculty teach how to critically evaluate information sources, but the focus is usually on evaluating the source *per se* rather than its location within a larger knowledge network. In keeping with the IL frame "Authority Is Constructed and Contextual," they teach how to apply specific criteria to a particular source in order to ascertain whether the author or creator of the source is an authority and whether the content is trustworthy and valuable. However, evaluating sources has also become an issue that should be studied as an integral part of the search process itself. This point is emphasized by Brett Bodemer (2012) in his article, "The Importance of Search as Intertextual Practice for Undergraduate Research." He is interested in the way students search, particularly in the 21st century, when students typically find an overwhelming number of sources of information both on the web and in licensed databases. Bodemer asserts that these searches are not "lower order mental activity" (p. 336) and that "the role of search" itself is part of the teaching and learning matrix, where students should know both how to find "good" sources but also to exclude sources that are not appropriate for their research (p. 337).

Bodemer's article articulates an area of the research process that needs more exploration. As a way of helping students winnow through search results that can literally number in the millions, disciplinary and library faculty have learned to urge their students to create search strategies using keywords to find articles. However, teaching students to narrow searches by manipulating keywords may not be sufficient for helping them identify networks of sources that are truly interconnected within specific knowledge networks. After our examination of Haller's students' reference lists, it is one of our conclusions that her students seem to have relied on keyword searches in a database and then looked at the first 5, 10, or maybe even 20 of the resulting articles, choosing whatever number they felt were sufficient to meet the criteria for the project and to give them enough information to fill the required number of pages. We will discuss more fully why this is a concern and how we propose to supplement teaching search behavior based solely on keyword searches.

The problem of finding and correctly using sources is discussed from a different angle by Sandra Jamieson, Rebecca Moore Howard, and the other scholars who run The Citation Project (http://citationproject.net). They explore the question of why teachers seem more concerned with plagiarism than with other difficulties in the research process. In "Writing from Sources, Writing

from Sentences," Howard, Tricia Serviss, and Tanya K. Rodrigue (2010) note, "Instead of focusing on students' citation of sources, educators should attend to the more fundamental question of how well students understand their sources and whether they are able to write about them without appropriating language from the source" (177). We agree. However, we would add and emphasize that understanding a source requires not simply intratextual cognitive work of comprehension but also intertextual cognitive work that appropriately connects individual sources with one another within knowledge networks. Students' tendency to rely on loosely connected sources on their topics—e.g., that first page of results from a database or Google keyword search—contributes to their writing problems because they lack a true context and understanding of where their source material fits within larger landscapes of knowledge.

OUR RESEARCH GOAL AND METHOD OF ANALYSIS

To explore whether and how well students are able to identify, understand, and capitalize on source networks in their research, we analyzed sources cited in the research proposals, annotated bibliographies, and final research papers of students in an upper-division research writing course taught by Professor Haller. We received permission from students in her fall 2012 and spring 2013 sections to examine and publish findings about their research projects, using pseudonyms so the students would not be identified. We sought to identify where students ran into problems with source choices and incorporation, and how disciplinary faculty and academic librarians can collaborate in order to help students be more successful. We examined nine sets of three interlocking papers that were portions of the scaffolded research assignment: three in each of three grade ranges (low, mid, and high range). We were most interested in discovering aspects of how and whether students were able to find and use a "source network" during the course of their research. Did students indeed discover and use the scholarly networks Leckie speaks of in the course of doing their research? If not, what might have gone wrong?

Haller provided detailed written instructions for each of the interlocking, scaffolded assignments (see Appendix A), which address the IL Framework's threshold concepts, Authority Is Constructed and Contextual, Research as Inquiry and Searching Is Strategic. In her instructions for the 2–3 page proposal, she explained how to start finding a topic and then work on focusing it. She commented on the cyclical (recursive) nature of this stage, where reading in sources during the research process would help to focus the topic and in choosing sub-topics—which in turn would help to organize the contents of the final paper. She also instructed her students what to include in the proposal: why

the topic is of interest, who the audience will be, a description of a few of their sources so far, and what keywords they would use to continue their research. The result was that most of the students' proposals appeared to be adequate or very satisfactory as a starting point for the rest of the project. It seems particularly helpful for students to find subtopics or sub-questions to keep in mind during the research and then the organization of the final paper.

The second part of the project was to compile an annotated bibliography of about 8–10 sources and again, detailed instructions were given. (Web sources were allowed, but scholarly articles needed to be included too.) The papers we examined all had satisfactory annotated bibliographies, though not without errors or problems with the citations themselves. As we mentioned earlier, emphasizing citation formats too much can be counterproductive, leading students to focus on bibliographic formatting at the expense of source understanding. However, these errors point to a problem related to students' understanding of source networks. Students often have difficulty identifying the types of sources they are using, making it nearly impossible for them to find correct bibliographic formatting in their handbooks, which organize this information by source type. Further, students do not have a clear idea of what a journal article is, and how it is different from unsigned articles from magazines, or from articles posted on informational websites and the like. As we have noted, they may never, in fact, have ever held a copy of a journal in their hands.

We are neither pining for nor advocating a return to the old days of print culture; however, it is important to recognize certain limitations electronic formats place on students' understanding of how sources are situated within knowledge networks and to compensate for those limitations. Databases collect articles from all kinds of periodicals and reference books and list them together when a keyword search is performed. In result lists, source items are embodied in a uniform format. This doesn't help students understand how information is created, distributed, and connected; it doesn't help them understand what type of source each listing represents (e.g., scholarly journal or news article); and it doesn't help them evaluate a source that appears on a result list. Bodemer makes an important point on this issue:

> Practice in searching . . . engages students in intertextual skills in the larger framework of the undergraduate paper. It involves complicated acts of evaluation and decision making. Students who learn to read and navigate the multiple points of content representation in databases are engaged in grappling with the structure of texts and the organization of knowledge at large. (p. 340)

Over time, digital copies of articles in databases have come to include visual cues that help students contextualize and evaluate their sources—e.g., actual pictures of publications are sometimes included with the sources, and pdfs reproduce the fonts, features, and visual elements of the original. However, to access these advanced versions of database articles, students must usually move beyond the results list to discover these features. In addition, material cues in electronic texts (that is, in HTML format) are only implied, whereas the embodied character of print publications disallows overlooking such cues as publication covers, size of the overall publication, and paper quality and size. Finally, paratextual cues that might help students better apprehend the knowledge networks within which sources exist are usually entirely absent in electronic formats or require further searching for discovery: editorial boards, contributor information, tables of contents, and other texts that accompany a given source text within a publication are usually absent in the result lists or item record in licensed databases.

As we compared students' annotated bibliographies with their final papers, we discovered that of the nine students' work, only one used *all* of the sources in her annotated bibliography (but added no new sources in her final paper); one student used *none* of the nine sources from his annotated bibliography (he cited 10 new sources in his final paper); and the remaining seven students used anywhere from one-half to three-quarters of their annotated bibliography sources and added from a high of 14 new citations to a low of two new cites in their final papers. This shift in sources used for the final research paper is to be expected and actually is desirable. It indicates that students were not at all finished with the research at the time they had to complete their annotated bibliographies. It also suggests (or at least we would like to hope it suggests) that students were using new sources to construct and reconstruct their understanding of their topics over time.

We analyzed the students' final research papers by noting, first, which of the sources included in the annotated bibliographies were also used in the paper and included in the references cited. We also made it a point to notice when a source was cited in-text but was left out of the references. The reason why some students didn't include some sources used within the paper in their references is not clear, though it may be a function of not knowing how to deal with material in a source that quotes and/or cites material from a prior source. Academic experts encountering this "embedded" material would generally follow up by consulting the original source and citing the original source if the material is used in their publications. Students, however, are likely not going back to the original source. Here is another indication that we are not raising their awareness of how to use citation trails to enhance their knowledge of their topics.

Finally, we moved on to the most critical portion of the analysis, looking at what we call the "intertextual index" for each paper. Specifically, for each

of the sources cited, we determined whether that source cited *any of the other sources* students used. This method makes use of the idea of degrees of separation between sources to see how closely students' sources were connected to one another within knowledge networks. We see the intertextual index as only one measure of intertextuality, but one that can help to determine whether students were tapping into source networks. As research has shown, expert researchers do not simply cite individual sources but also exploit and use entire source ecologies to build their ethos and develop their lines of argument, as research by Shirley Rose (1996, 1999) has shown.

In academics' literature reviews, it is not necessarily a single source cited that identifies the knowledge network an author seeks to enter, but rather the entire constellation of sources and how they are connected to one another within larger systems of meaning—in other words, experts understand the IL frame "Authority Is Constructed and Contextual," while novice researchers have not reached that point in their understanding of the research process. We spent time looking up each citation in the list of references for each paper and, after locating it, we checked whether that source cited other sources as references or works cited at the end of the article. For even the most successful papers, we often had to struggle to locate sources because the students were not citing sources correctly, but we did our best. As we have already noted, not a single student seemed to have found a source network. Interestingly, some of the students did cite authors whom we found through our own research to be experts in their field and much cited by other writers. This finding suggests that students' searches for sources, though less sophisticated than faculty's, can indeed lead them in the direction of key experts in a field, at least in some cases. Provided students can recognize when they have happened on such an expert, they might then be taught to focus more closely on the bibliographies of these authors to lead them deeper into source networks.

One such student was Amal, whose paper on artificial intelligence (AI) was in the high-grade range. He included 10 citations in his reference list, though only one of those was from his annotated bibliography and the rest were new. Amal's reference list included two citations to two peer-reviewed articles by the same two widely published experts on AI, Shane Legg and Marcus Hutter. Upon examining the two articles by Legg and Hutter cited by Amal, we found that they cite two other writers who were also included in Amal's reference list—Ray Kurzweil (perhaps the most widely known and respected authority on AI) and Linda Gottfredson, a sociologist who writes about intelligence but has nothing to say about AI. However, the articles by Kurzweil and Gottfredson that Legg and Hutter cited are not the same articles Amal cited in his own reference list; thus, it seems likely that the apparent intertextual connections visible in Amal's cited sources were coincidental.

Amal also used two articles from a website (http://www.lucidpages.com/) that has no identified owner or creator. It seems to be a repository created in 2008 by someone who wishes to offer a wide range of unpublished pieces by someone only identified as "Dak" whose book (no title offered), it is noted, is now out of print. Thus, though Amal's paper was well-organized, the quality, authority, and reliability of his sources was very mixed: five were written by acknowledged scholars or experts in the field of AI; one was an undated, unsigned reference article on a commercial psychology portal from India; another was from an online magazine devoted to science (*New Scientist*). In addition, most of Amal's sources were published between 1994 and 2008. The only source more recent was the third (2009) edition of a widely used textbook on AI. Because of the constant work being done in AI, we believe he should have been finding more recent materials on AI. A lack of recent source material can be an indication that a student has plagiarized from an older source rather than performed fresh searches, which would likely have turned up more recent sources. The possibility cannot be ruled out; however, we did not identify indications of plagiarism in Amal's paper.

Sources used by Lee for his paper on the software patent wars and their effect on software creation for smart phones makes a good comparison to Amal's sources. Lee's paper was also in the high range, but there were differences in the ways they approached their research and in their source choices. As with Amal, it doesn't seem that Lee tapped into a source network because we couldn't link together any citations from his list of references. However, there is a good possibility that Lee found two key sources that guided his research focus and his subtopics as he described them in his proposal, thereby contributing to the quality of his paper by connecting it to ongoing scholarly conversations. Lee's research project was about U.S. laws regarding software patents, with a focus on how they make the creation of new smart phone software difficult. Two of the sources he describes in his research proposal (and which he did use for his final paper) were by well-respected experts in patent law, business and technology. The first is a book which Lee describes as an overview of the U.S. patent system. He stresses that reading it made him want to do more research on today's problematic patent laws. The second source he names in his proposal is a *New York Times* article, "The Patent, Used as a Sword," by Charles Duhigg and Steve Lohr, both prize-winning journalists and writers. The article was part of a series on the global high tech industry and it won a 2013 Pulitzer Prize. Lee notes in his proposal that reading the article helped him refine his topic to focus on software patents. We have only Lee's proposal and the final paper to use to "prove" that these were key sources and that they helped him to find his focus and refine it, but his own testimony feels like real evidence. We believe that his paper was one

of the best because he found and used two key sources to the best advantage to focus his research topic.

As we examined Lee's final list of references, for instance, we noticed that of the 10 sources in his annotated bibliography, he used only seven in his final paper and added 14 more. These new sources were almost all newspaper articles or articles and reports published online by technology, patent and other relevant organizations, associations or companies. All of these were highly relevant and timely, suggesting that the early focus he achieved from the Duhigg and Lohr article may have helped him perform more focused secondary searches later as he worked on the final report. Lee did, however, go off track and make some strange choices from the web. They didn't hurt his paper, but they make us want to know more about how he actually searched for information on his topic on the web. For example, one of his sources was a Swedish website, from which he took a definition of "software patent." Another strange choice was a personal blog entry from which he got a quote from Ben Franklin's autobiography about how people should not invent new things in order to make money, but rather to do it for the public good. The blog owner describes his underlying focus as "the ineffable nature of life!"—hardly a statement attesting to the blogger's expertise on patents, though his inclusion of Franklin's quote turned out to be fortuitous for Lee. Alternatively, perhaps Lee had heard or seen the quote elsewhere and located it online in an Internet search so he could include the source in his reference list.

WHAT WE LEARNED ABOUT HELPING STUDENTS FIND SOURCE NETWORKS

We learned from our examination of Haller's students' research papers that we—disciplinary faculty and librarians—need to focus our teaching more on the actual search process, and to move beyond simply teaching students to use keywords to find sources. Today's digital world is both a blessing and a curse for researchers, especially undergraduate novices. They think they know how to find information because the entry of a word or two in a rectangular box yields a multitude of results, whether in Google or in electronic databases. However, using keywords to generate a results list is rarely sufficient for identifying how sources are interconnected within knowledge networks. Disciplinary faculty need to collaborate with library instruction faculty to teach students how to find and exploit citation trails. Because finding information in electronic formats has changed so radically from finding information in print formats, we need to use a new, modern approach for researchers, one that concentrates on finding and hooking into digital networks of related sources. The curse of digital information storage and retrieval is, of

course, that many of our students are absolutely overwhelmed by the mountain of information they find from a single keyword. This difficulty has been noted many times by educators who write about the web and the critical skills needed to find the right kind of sources and be able to evaluate them for relevance and authority (Calkins & Kelley, 2007). The same "curse" applies to searching with keywords in research databases. As we have noted, Haller's students' citations seemed only loosely related to one another. They did not find source networks, in all probability because no one has taught them how to find these networks, nor shown them how valuable such networks can be to find the kind of information they need, from acknowledged experts, on their research subjects.

As it turns out, however, there are some simple ways to find intertextual connections—source networks and citation trails—both on the web and in some of the more user-friendly databases. Once a teacher or a student has seen how to do this online or in a database, they will be able to use it and to pass the techniques along to others. There are two kinds of citation trails. One is the "backward" citation trail that is found when one reads a journal article and examines the references at the end. These are citations to the sources that the writer used and because they were written before the article that contains them, we call them "backward citation trails."

In today's digital information environment, it is quite easy to find these trails, and even to find the full-text articles, especially in databases owned by EbscoHost that offer links to "Cited References" and "Times Cited in this Database." Each article record in Ebscohost provides both forward and backward citation trails, many of which are live links leading to the actual articles, making it relatively easy to hook into a source network that will be useful.

The source network we call the "forward citation trail" leads from a given article the researcher likes and plans to use, to articles with more recent publication dates whose authors cited the given article. The best way to find a source network that looks forward, however, is not Ebscohost but Google Scholar. Some students know about Google Scholar, but we think they may be unfamiliar with some of its useful tools, especially those that can connect them to source networks. When Google Scholar is used with a keyword search, the articles in the result list have the following links underneath each citation and the excerpt from the abstract:

Cited by [#] *Related articles* *All [#] versions* *Cite* *More*

Clicking the "Cited by [#]" link yields a new list of results—articles or books that cited that article. In our experience, about half of the results on this list also offer a link to a PDF or HTML version of the article so that the researcher does not even have to spend more time tracking down the item. In case she does, the

"More" link offers a "Library Search." Clicking on it brings up WorldCat and one can choose a nearby library (including the college library if it owns that work) that owns the item sought. There are more "goodies" available as links below Google Scholar citations that we haven't described, but we will let our readers explore them. Katt Blackwell-Starnes (Chapter 7, this collection) also finds that teaching how to use Google Scholar leads to a better understanding of the intertext—the source network—and reveals more clearly for students who the leading experts in a particular subject are, and what the context is for their research topic:

> Teaching students to use the bibliographies of relevant sources and the related research aspects of Google Scholar and the library databases adds another layer that emphasize additional methods for developing effective search strategies and also introduce students to the *Framework for IL*'s threshold concept that scholarship is a conversation. (pp. 155–156)

The writing in Haller's students' papers also indicated other issues that appear to be connected to the students' search for and use of sources. The content and organization of final papers in the middle and low grade ranges tended to veer off from their focus and the sub-questions they named in their proposals, perhaps because they did not identify source networks of related articles that spoke to the same topics and issues. Their references often included articles only loosely (if at all) relevant to their stated central focus. Perhaps they felt they should discuss the ideas in these off-topic sources since they had taken time to read them and/or wanted to include them to achieve the required number of sources, even though the sources did not really belong in the knowledge/source networks most relevant to their chosen topic. In addition, in the same low- and middle-range papers, the students often failed to synthesize, or integrate, the actual ideas and analyses from their source articles. As studies published by the Citation Project have shown, students who have not been able to comprehend an author's work tend to rely on quoting a sentence, or paraphrasing or patchwriting, and they do not summarize—which essentially points to a lack of understanding of the ideas in the sources. Our study suggests that this lack of understanding is further exacerbated by students' inability to contextualize their sources within knowledge networks.

Even assignment instruction handouts that include much helpful advice for students on how to conduct the research and how to organize and format their papers can lack one or two key aids. Instead of instructing students merely to use keywords in their database and web searches, it would be of more use to help them understand how to find the relevant source networks—the citation trails

or the intertextual connections between key sources on their topics. Access to these networks helps them understand where any particular source they use is situated within the networks of knowledge about their chosen topics.

Teaming up with a librarian to show students how to use Google Scholar or a database like EbscoHost's *Academic Search Complete* to uncover the source/knowledge networks, or to see the ongoing "conversation" between scholars and professionals about their chosen field, would be a significant step for disciplinary faculty to take. Two other ways that library faculty can collaborate with their disciplinary faculty colleagues in teaching the research process come to mind. One is to get a librarian's help in teaching students to understand the types of periodicals and the usefulness of peer-reviewed journals, since Haller's students' papers led us to the conclusion that many of them didn't understand the differences in periodical types. That lack of discernment affected, among other things, the errors they made in creating their list of citations. Finally, a joint lesson or two with the teacher and a librarian to teach students why evaluating sources is important—particularly the authority of a source, whether it is a website or a digital article, is a good idea.

Librarians can teach students where to look on websites for information on the author or site owner, as well as how to apply other evaluative criteria. The disciplinary faculty member who wants to help her students focus on authority in sources can require students to include biographical and professional descriptions of authors whose sources they're using in their proposals, annotated bibliographies, or other parts of a scaffolded research project.

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APPENDIX A: HALLER'S RESEARCH ASSIGNMENT INSTRUCTIONS

A. Your Research Proposal (due 8th week of class)

1. Choose a General Research Topic and Read Background Information on the Topic

Your research project should be related to an important issue in your major or professional discipline that is also of interest to you. As you explore possible topics in a preliminary way, I suggest that you move back and forth between:

a) topics that interest you, either because you've encountered them in one of your courses in your major or because you feel a personal connection of some kind; and
b) what you are able to find by exploring library databases and other online sources using keywords derived from your major or professional discipline.

That is, use the topics that you're interested in to drive your initial search strategy, then REVISE AND REFINE that topic based on what you find during the research process. This cyclical process will help you to find a topic that is both of interest to you, relevant to your major, and researchable. It's of no use to have an interesting research question but then find that there are no materials relevant to it—maybe you are years ahead of your field! But it's ALSO pointless to choose a topic that is easily researchable—there are many sources available—but which bores you to tears. Either of these approaches is a recipe for having a

frustrating experience of writing a research paper, either because you can't find sources or because you are working on a topic that does not intellectually interest you. The way to avoid these twin dangers is to keep looping back between your interests and your continuing research. Start with something that intellectually interests you and is related to your major field. . . . This preliminary research process will also help you to find out the current issues in your field, including what is pretty much accepted fact, and which questions remain open and perhaps controversial. Note: An issue for which you can identify clear controversies will work best as a research topic. Remember also that you may consider social, political, economic, philosophical aspects of a particular problem, or the ways in which research is applied in your field.

2. Develop a Research Question

Once you have a general topic, start to narrow it down. To assist you in this narrowing, read some background on your topic in a specialized encyclopedia, which will help you determine possible areas you might focus on. Also consider what materials you are able to find in the databases. Remember that your goal here is to articulate a research question: a specific question which you do not know the answer to, but which can be answered through an inspection of the scholarly literature in your field. This is different from deciding on your general research topic. [Examples given, deleted here for space]

After you've been through the cycle of brainstorming/preliminary research several times, and you're beginning to get a sense of your direction, you're ready to write your research proposal.

3. Write your Research Proposal Using the Following Format

i. **Provide a rationale for your research.** In your first section, provide some background on the topic you are choosing: what is it and why is this an important topic to research (consider social and /or medical needs). What is generally known about this topic? Who might benefit from your work? The rationale paragraph should answer the "so what?" question. Why is your topic of intellectual or social significance, and what issues are unresolved? You've picked a topic that you care about; now make me care!

ii. **Identify your central research question and any subquestions/ related questions you've identified to guide your research.** In this section of the proposal, indicate how you have narrowed your overall research topic and what your main research question currently is (see "From general topic to research question" above). You should also be able to list several sub-questions that will guide you in finding the answer to your central question. These sub-questions will lay the

groundwork for the organization of your paper. To identify sub-questions, think about some specific things you will need to find out in order to answer your big research question. If you have a logically arranged sequence of sub-questions, you are a good distance toward organizing your research paper.

iii. **Describe your audience.** In this section, provide some information about your specific audience and how your paper will help them. Your paper should have a natural audience beyond your classmates: who will be interested in this topic and why? For instance, "My paper will be directed toward a hospital administrator recommending how we can revise our patient literature to incorporate cultural diversity." Or "My paper will make a recommendation for U.S. governmental policy on genetically engineered plants, after considering pros and cons, from ecological, ethical, and economic perspectives, of genetically engineered crops in commercial agriculture. My audience will be my Senator and/or Congressman." Or "My paper will report on psychological factors contributing to overeating and recommend to counselors at a domestic abuse center how to work with overeaters."

iv. **Report of preliminary research:** This section should summarize information from two useful sources you have located that will help you answer your research question. Be very specific: name them, provide specific details about what they say, and tell what each one has contributed to your thinking about your research question. Plan on spending around ½ page summarizing each source.

v. **Explain your search strategy and keywords.** List the specific library and internet sources [e.g., specific databases, specific scholarly and trade journals] that you plan to use to develop your research paper. List the keywords and questions you've already employed to identify potential sources, along with any new keywords you've learned and plan to use. Discuss what you have found out about the types and number of sources available for this topic. Will you be able to select from many sources, or have you found just a few valuable sources so far? What kinds of books and articles are available to you? Remember that you should be researching and reading throughout the entire research process.

B. Annotated Bibliography (3–5 pages) [Due Week 10]

An annotated bibliography is a useful way to capture the essence of the sources you've located. It helps you organize your research as well. In an

annotated bibliography, you summarize each of the sources you have chosen to use, provide evaluative comments on the source, and note any ways it might be useful to you in answering your research question. The annotated bibliography thus serves as both a reference guide to the sources you have collected and a stimulus for how to use those sources in your research paper.

Prepare full APA documentation for each of the items in your annotated bibliography as you would for an APA reference list. For each item, write 3–4 lines summarizing and/or evaluating the source. A sample annotated bibliography entry can be found in Hacker, The Bedford Handbook, 8th edition, p. 479.

You will need to create multiple bibliography entries like the Hacker sample, one for each of your sources. Be sure to put the sources into alphabetical order. Your Annotated Bibliography should include 8–12 good sources.

C. Drafts and Final Research Paper

Outline and Draft Section of Research Paper #1 (2–3 pages) [Due Week 11]

For this assignment, you will submit a full working outline for your paper and the draft of one section of your research paper.

Outline and Draft Section of Research Paper #2 (2–3 pages) [Due Week 12]

For this assignment, you will submit the full working outline for your paper and the draft of a second section of your research paper. After you submit this draft, we will hold the REQUIRED peer review sessions. In these sessions, we'll talk about how to take your draft sections to the next level. How can you develop your ideas further with examples and/or ideas from your sources? Do you need to consider adding an additional section or section? Is there another subquestion you need to address to answer your research question? What information do you still need to answer your research question effectively and what new sources will you use to find that information?

FINAL Research Paper [Due Week 15]

8–10 pages; minimum of 8 sources, not including background information sources (e.g., dictionaries, encyclopedias, superficial websites); sources must include a minimum of three (3) scholarly peer-reviewed journal articles selected from the York library databases, each of which must be a minimum of six (6) pages long.

The research paper is the major course assignment. It should be 8–10 pages long, not including the APA list of references or any figures/tables. While writings in lower division courses encourage students to develop a thesis and appropriately argue its merits by drawing upon appropriate sources, your research paper in Writing 303 is driven by your research question, not by the thesis.

The paper is a written report which synthesizes research findings to answer the intellectual problem you've posed for yourself in your research question. It is not an argument which seeks to persuade readers about a predetermined thesis or viewpoint. Nor should the paper be a technical report. Rather, it should explore a question related to a problem arising from the development, social application, or practice of your major or professional discipline.

The research paper is based primarily on secondary sources (e.g. books and articles). You may and are encouraged to use primary sources (e.g., interviews, etc.), but these may not count toward the 8 required sources required for your paper. While textbooks and encyclopedias (including Wikipedia) may be used to get an overview of a particular problem and can be included in your bibliography, they also may not be counted as one of the 8 required sources for the paper. You should draw on at least 8–10 sources representing a balanced mix of books, journals, both electronic and hard copy, and appropriate, reliable web-based sources. Sources must include a minimum of three scholarly peer-reviewed journal articles selected from the York library database, each of which must be a minimum of 6 pages. The number and exact mix of sources you use will depend on your topic and question. The quality of your research paper will depend to a considerable extent on the quality of your sources. I will provide feedback to you regarding the appropriateness of your sources both informally as you search for sources and also in my comments on your annotated bibliography assignment.

Your final research paper will be 8–10 pages long, not including the title page, the abstract page, and the list of references. You are encouraged to use graphics that can help you communicate what you want to say to your audience, but the graphics also DO NOT count toward the required 8–10 pages.

Your paper should address your research question in an informed, balanced manner, with consideration given to multiple perspectives regarding your question, differences of opinion and controversies, and contradictory information that you've encountered while reading your sources in relation to your question. The best research papers effectively incorporate a broad range of quality sources to support the thesis and provide responses to counterarguments as appropriate.