

Toward Rhetorical Source Use: Three Student Journeys

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ABSTRACT

This case study investigates how three students in an upper-division research writing course incorporated sources in their research papers. The student who used source material to perform a variety of argumentative functions established a more rhetorical argument than the two who used source material solely as data, or evidence. Differences in students' argument structures paralleled differences in their formulation of research questions, the nature of the sources they selected, and their engagement with their sources. Findings suggests that disciplinary sources can facilitate construction of rhetorical argument but may interfere with argument development. when unfamiliar or difficult enough to hinder comprehension. Results provide direction for how faculty and writing program administrators can facilitate more rhetorical use of sources, especially as students begin to engage disciplinary discourses. Additionally, findings indicate that further research on academic reading and student source use can enhance theories of academic literacy development.

INTRODUCTION

As students develop academic literacy, they learn to read and respond to texts as authored, contingent knowledge situated within various academic disciplines and communities. When they initially encounter unfamiliar disciplinary discourses, however, they may suffer slowdowns and setbacks in their writing. For many students, even learning to use written academic English can be like acquiring a new language (Horning). Accessing and using disciplinary texts, as Jamieson has described it, is like learning a second academic language. To be successful, students must move beyond competence in the academy's "home language"—summarizing, understanding and responding to prior arguments; developing and stating claims; and

using evidence to support claims—toward competence in the “second languages” of their disciplines (89-90).

What does it mean to construct an academic argument using disciplinary discourse? What challenges do students face as they begin developing this capability? How can faculty and writing program administrators help them meet these challenges? To address these questions, I investigated how three students taking a junior-level research writing course incorporated sources in their arguments. Analysis using a Toulminian framework revealed differences in their handling of sources. The two students who used source material solely as data, relying on self-evident warrants to establish their conclusions, failed to establish a new knowledge claim supported by rhetorical argument. By contrast, the student who used source material to perform a variety of argumentative functions established a new knowledge claim with a rhetorical argument. Differences in students’ incorporation of sources paralleled differences in their development of research questions, selection of sources, and strategies for engaging sources. Findings provide guidance for how faculty across the curriculum and writing program administrators can scaffold the rhetorical use of sources, especially as students encounter unfamiliar, specialized texts. In addition, results suggest that further research on academic reading and student source use can help composition scholars build more robust theories of academic literacy development.

RHETORICAL ARGUMENT AND DISCIPLINARY DISCOURSE: DEVELOPMENTAL DILEMMAS

In preliminary stages of academic reading development, students tend to focus on textual content, structure and function of texts, paying little attention, if any, to rhetorical contexts (Haas and Flower). Additionally, they view the texts they read as autonomous and authoritative rather than authored and contingent. Successful upper-division students, however, begin to approximate the more rhetorical reading and writing practices of professional academics, including the rhetorical use of sources—that is, the use of sources to enhance authorial status and support contingent knowledge claims (Geisler, *Academic Literacy*; Penrose and Geisler). To build authorial status, or *ethos*, expert writers use sources to construct and display relationships with members of their fields (Rose, “What’s Love Got to Do with It?”). Additionally, they construct narratives of disciplinary knowledge that make a place for their own work, thereby generating authorial capital in the “disciplinary economy” (Rose, “The Role of Scholarly Citations”).

But how do academic writers use sources for *logos*, to construct arguments that support their knowledge claims?

In assessing the *logos* of academic arguments, two criteria are particularly important: reasonability (Thaiss and Zawacki) and novelty (Kaufer and Geisler). For understanding how reasonability is constructed, Stephen Toulmin's argument framework is particularly useful, especially regarding assessment of field-specific, or disciplinary, argument.¹

Toulmin maintains that practical reasoning, since it involves contingent knowledge, follows a jurisprudence rather than mathematical model. In this jurisprudence model, *claims* are supported by *data* (evidence). The justification for using data to authorize claims is supplied by *warrants*, or assumptions, which are often implicit rather than explicitly stated. Toulmin's sample argument on citizenship is instructive here. Say that we know for a fact that Harry was born in Bermuda (*data*). Based on the *warrant* or assumption that people born in Bermuda are generally British citizens, the *claim* that Harry is a British subject is reasonable.

On its surface, this data-warrant-claim framework is consistent with a mathematical model of argument, with the warrant serving as the middle term of a logical syllogism. But practical reasoning, because it involves contingent knowledge claims, often requires additional structural elements. To convince audiences unfamiliar with the ins and outs of citizenship in Bermuda, the arguer might need to supply *backing* for the warrant—for instance, specific statutes and legal provisions showing that people born in Bermuda are generally British subjects. To pre-empt potential objections to the argument, the arguer might also need to acknowledge potential *exceptions*, or conditions which would make the data-claim connection untrue—for instance, if Harry has become a naturalized U.S. citizen. Finally, *qualifications* might be needed to identify the force, or probable validity, of the claim—for instance, what is the likelihood of Harry being a British citizen, given the constraints that hedge the claim? (Toulmin 92-97; see also Kneupper). As students begin to recognize the contingencies of their knowledge claims, they should begin to see the need for backing, exceptions, and qualifications in supporting those claims. Presumably, material from their sources will appear within all of Toulmin's argument components.

In addition to being reasonable, academic arguments are expected to be novel. They should establish new knowledge claims, not simply reiterate what is already known (Kaufer and Geisler). Regarding the ability to generate new knowledge, Kellogg, a cognitive psychologist, identifies three stages of writing development. In the first stage, knowledge-telling, writers' working memories are capable of generating only a mental representation of the ideas and knowledge that are in their minds; hence, such writers are

limited to directly recording, or “tell[ing],” those representations. Writers in the knowledge transformation stage, however, are able to hold two mental representations in working memory at once: a representation of their ideas and a representation of the text they are writing. As they compare these representations, they adjust both, which results in knowledge transformation. The knowledge-crafting stage, in which new knowledge is created, is usually achieved only by those who write extensively as part of their profession. It requires that writers hold three concurrent knowledge representations within working memory: their ideas, the emerging text, and an anticipated reader’s likely response.

As students learn to construct the novel rhetorical knowledge claims that characterize academic discourse, their engagement with disciplinary texts can be helpful. Reading disciplinary sources models rhetorical argument and supplies the field-specific content necessary to construct disciplinary arguments (Haas, “Learning to Read Biology”). Additionally, as students achieve higher levels of domain knowledge, their knowledge becomes more highly organized, which translates into the ability to respond more effectively to writing assignments (Langer).

On the other hand, disciplinary discourse can also, at least initially, hamper students in their writing. For one thing, early encounters with discipline-based writing confuse students’ understanding of writing criteria. Thaiss and Zawacki found that students who had limited experience with writing assignments and courses tended to believe the criteria for good academic writing to be consistent across disciplines. Those who had taken more courses and done more assignments, however, became aware that generalized writing criteria could not account for the diversity of new forms, genres, and styles they were encountering. This second group mistakenly ascribed the criteria for good writing to the idiosyncrasies of professors and/or courses. Only students who had had extensive experience with reading and writing within their disciplines and across a range of disciplinary contexts were able to successfully identify, explain, and engage discipline-based criteria for writing (109-10).

Unfamiliarity with disciplinary language can also disrupt student writing at the level of sentence generation, precipitating regression to overdependence on source vocabulary and syntax. Students frequently patchwrite when they first encounter unfamiliar discourses, using words and syntax that very closely resemble their source text. Whereas Howard originally characterized patchwriting as a kind of “first step” toward academic literacy (Howard, *Standing in the Shadow of Giants*), her later work has refined that view. Students, as it turns out, patch-write throughout their academic careers, even at the graduate level (Howard, “Plagiarizing (from) Graduate

Students”; Pecorari). Citing her own initial difficulties in grappling with Foucault’s “What Is an Author,” Howard argues that all writers, expert and novice alike, engage in patch-writing when they experience “cognitive difficulty” in dealing with “wildly unfamiliar material” (Howard, “The New Abolitionism” 90). The difficult discourses and domain knowledge of disciplinary texts, then, can affect students’ ability to make sense of and use those texts as sources.

Finally, unfamiliar disciplinary sources can have a negative effect on writers’ ability to build the multiple mental representations necessary to transform and craft knowledge. Since working memory is finite, a “knowledge-crafter’s” ability to hold three different mental representations at once is not achieved by an increase in working memory capacity. Rather, it is achieved by reductions in the cognitive demands of writing, which frees up working memory to handle multiple representations. According to Kellogg, cognitive demands of writing can be reduced in two ways: first, by writing practice, which routinizes procedural writing strategies such as planning, generating sentences, and reviewing one’s writing; and second, by an increase in domain expertise, which facilitates more efficient retrieval of content from long-term memory. Students’ lack of domain expertise, by contrast, increases their difficulty in accessing and using disciplinary texts. This increased cognitive demand interferes with their ability to use that content to construct the mental representations that enable knowledge transformation and knowledge crafting.

In the study reported here, funded in part by the Council of Writing Program Administrators, I investigate the challenges students face in using sources to construct arguments, especially as they encounter the unfamiliar, specialized discourse of their disciplines. Specifically, I explore how three students taking a junior-level research writing course incorporated source materials into their major project, a research paper.

STUDY CONTEXT

Academic research and writing, a required upper-division course at my institution, aims to initiate students into academic research writing within their chosen majors; accordingly, students are expected to develop a research question related to their majors; use reliable and relevant disciplinary sources to address the question; and write a report of their research using the genre of the academic research essay. Because the course is designed to be taken mid-career and specifically focuses on disciplinary discourse, it provides a good site for exploring source use during the transi-

tion between the “first language” of academic writing and the “second languages” of disciplines.

Research subjects for the study were solicited through course professors’ distribution of a flyer describing the project. Students were offered a stipend of \$100.00 for their participation, and interested students were asked to return their contact information to me. I had originally hoped to be able to choose subjects randomly from a large number of volunteers, but only seven potential subjects responded. To ensure sufficient data collection, I therefore engaged the students I considered most likely to complete the course and the research study, based on a review of their previous course completion records. Maria, a first-semester junior, was a new transfer student from one of the community colleges in our university system. A Russian immigrant for whom English was a second language, she planned to major in occupational therapy, but she first needed to complete the pre-requisite research writing course. Maria had 16.5 credits of community-college level occupational therapy courses and was working part-time in a nursing home, where she was able to observe occupational therapists at work. Tasha was also a first-semester junior transfer student interested in occupational therapy, but she had not taken any preliminary courses at her community college, nor did she have relevant work experience. Marvin, the third student, was a first-semester senior from Nigeria majoring in information systems management. He had previously done some development of an Internet grocery ordering system while working at a supermarket.

The students submitted copies of all source material they had used for their papers, as well as all drafts of their papers. I interviewed each student twice, once during the early development of the research paper and once after completion of the paper. For the portion of the research study reported here, I analyzed the structure of three students’ arguments and how the students appropriated source material within those arguments. I then considered how the origins of the students’ research questions, the nature of the sources they consulted, and their approaches to source use compared with the quality of their arguments.

ARGUMENTATIVE STRUCTURE AND SOURCE USE

Using Toulmin’s model as a framework, I first determined the structure of each student’s argument, identifying the central claim, the data and warrants that supported the claim, and any backing, claim qualifiers, or exceptions the students included in their arguments. Guided by their in-text citations and my own examination of their sources and papers, I then analyzed how they had incorporated material from their sources relative to

these components. The argumentative structure of the student papers, along with boldface indication of where source material is embedded, is presented in Figures 1, 2, and 3. The analysis revealed differences among the students not only in the structure of the arguments they made, but also in how they incorporated source material into their arguments.

Maria's Argument: Knowledge-Telling, Integrated Sources

Maria's research question was, "How can people with memory problems improve their memories?" As shown in Figure 1, her central claim was that memory can be improved by engaging in certain practices, such as sufficient sleep, healthful eating, cognitive compensatory techniques, etc.

Analysis of the structure of the argument revealed that Maria used her sources exclusively as data. She selected and organized material from her sources into two groups: the first group identified causes of memory loss and the second described techniques proven effective in remediating memory. Two warrants authorize her claim. A first warrant, "Addressing the causes of a condition [memory loss] can improve that condition [memory loss]," readily justifies using the data on the causes of memory loss to support her claim. A second, "Techniques effective for remediating [memory loss] in one situation are likely to be effective in comparable situations," justifies connecting her data about remediating techniques to her claim. Maria did not articulate these warrants within her paper. She didn't have to; they are so self-evident they require no backing and can remain implicit. Both are based on generic, widely accepted commonplaces. Indeed, I have bracketed the words [memory loss] in the warrants to highlight the wide range of conditions and/or problems that might be easily substituted: water pollution, child abuse, poor grades, overheated engines, war, etc.

Maria integrated her sources successfully in her argument. Apart from a nursing dictionary entry she used to define memory early in the paper, all of the source material she included related to and supported the argument itself. In terms of argumentative function, however, her source use was limited: she used sources solely as repositories of data and evidence. Maria's argument fails to rise above the level of knowledge-telling. All of the solutions to memory loss stated in her claim can easily be found in her source material.

Tasha's Argument: Knowledge-Telling, Non-integrated Sources

Tasha's research question was "How are Occupational Therapists using technology to help individuals compensate for cognitive and functional mobility limitations?" As shown in Figure 2, her claim was that therapeutic technologies can remediate physical and cognitive limitations.

Research Question: How can people with memory problems improve their memories?

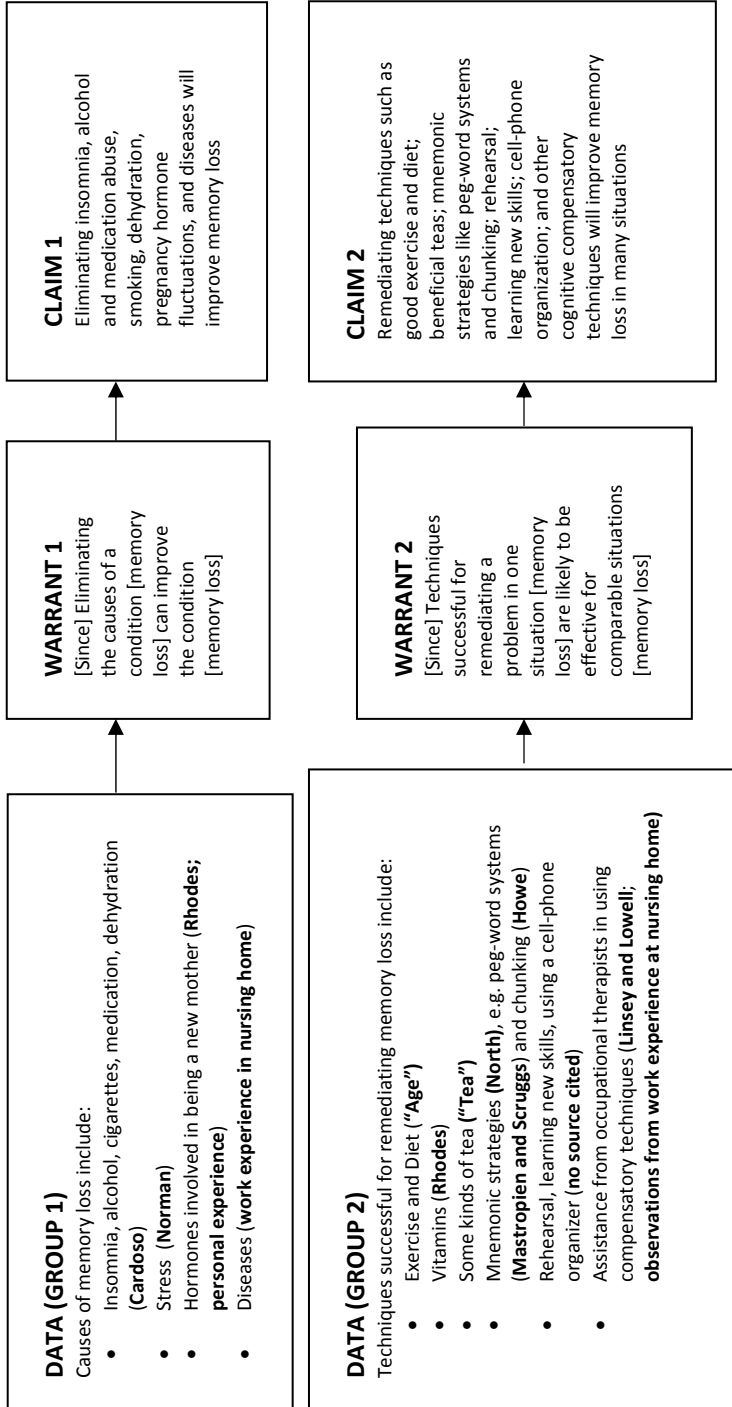


Figure 1 Maria's Argument Structure

Research Question: How can occupational therapists use new technologies to help individuals compensate for physical and mental limitations?

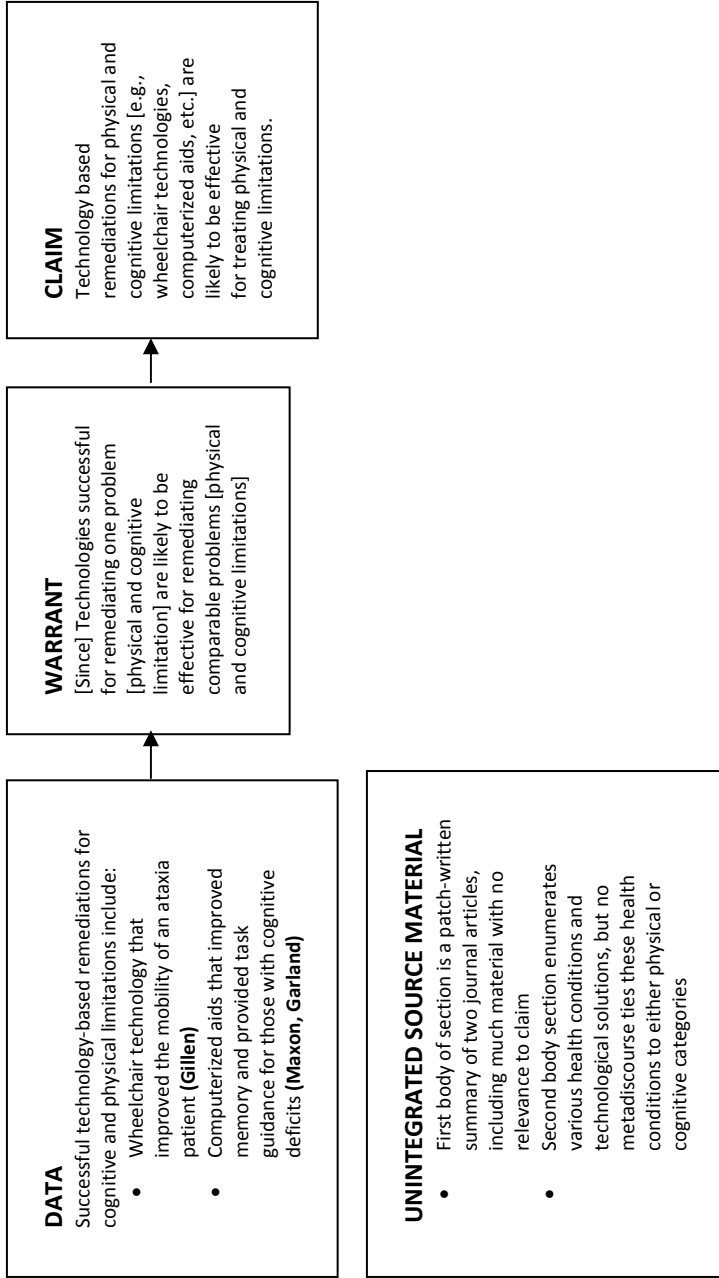


Figure 2 Tasha's Argument Structure

Like Maria, Tasha used her source material solely as data. She organized the source data into two groups, mirroring the two types of limitation she articulated in her claim: physical and cognitive. Tasha's warrant, like Maria's, is generic. It could be applied to any topic and it would still be self-evident. Her argument also remains at the level of knowledge-telling.

Tasha, however, was far less successful than Maria at integrating sources into her argument. She included much "loose," unintegrated source material—that is, source material whose purpose within the argument is difficult or impossible to decipher. Specifically, the first two pages of the body of her paper are a patch-written summary of two journal articles. The next two contained some potentially relevant source material about how technologies have been used to treat client conditions, but Tasha did not tie this material to her claim; that is, she supplied no metadiscourse to guide the reader in understanding the material's argumentative function. Thus, these four pages come across as outside of rather than integrated into her argument, interrupting its logic. Additionally, because Tasha used patch-writing extensively, strong echoes of external voices interfere with the strength and clarity of her own.

Marvin: Rhetorical Argument, Integrated Sources

Marvin asked "What role does information technology play in widespread obesity and the breakdown of traditional food culture?" (Figure 3). His argument was more rhetorically sophisticated than either Maria's or Tasha's.

For one thing, he showed a rhetorical awareness that knowledge claims are subject to dispute, explicitly positioning his own claim (that information technology contributes to obesity and the breakdown of traditional food culture) against what he presented as a rival claim (that McDonaldization is the primary cause of these breakdowns). For another thing, the nature of his warrants differs from that of Maria's and Tasha's. Marvin's first warrant, that increased inactivity contributes to increased obesity, is not self-evident; but it would likely be widely accepted in U.S. society, where the public is currently inundated with messages about obesity prevention. Marvin, however, cites the warrant as located in two of his sources, which increases the credibility of the warrant even further. The second warrant, that the automations information technology is introducing into the food industry disrupt traditional food culture, is field-specific, that is, dependent on disciplinary knowledge—in this case from both information systems and food culture studies. Marvin treats this second warrant as one for which his readers will need backing, which he supplies from his sources. Finally, Marvin adds an exception to his claim, which neither Maria nor

Research Question: What role does information technology play in the widespread obesity and breakdown of traditional food cultures generally blamed on McDonaldization and the fast-food industry?

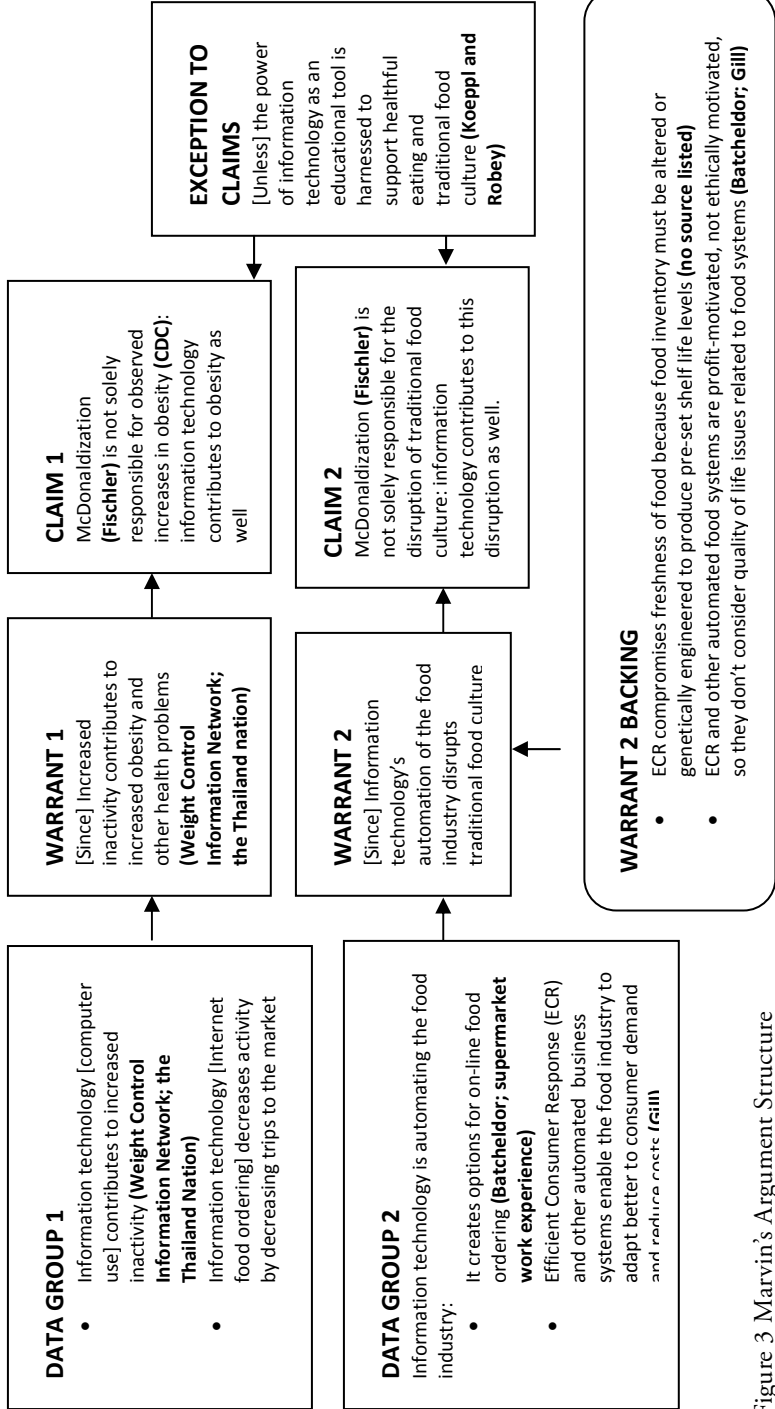


Figure 3 Marvin's Argument Structure

Tasha did. Specifically, he acknowledges that information technology can contribute to healthful eating and positive food culture when it is used for education about nutrition, exercise, and health.

Marvin fully integrated the sources he used into his argument. Additionally, his claim transformed the knowledge in his sources. The source material he cited as data demonstrated that information technology increases inactivity and automates the food culture; to get from there to his claim, he established and backed two field-specific warrants, the first connecting inactivity to obesity and the second connecting information technology's automation of food systems to disruptions in traditional food culture. There's little new in the data or warrants themselves, most of which are taken directly from sources; however, Marvin's functional use of some of his source material as warrants transforms the data taken from other sources into a new knowledge claim.

Marvin's argument stands out from Maria's and Tasha's in three ways. First, it makes a new knowledge claim. Second, it is structurally more complex, requiring employment of almost the full range of Toulmin's argument components (only a qualifier is missing from the argument). The third difference, however, is perhaps the most intriguing. Functionally, Marvin incorporated his source material within a wider range of argument components than either Tasha or Maria. This broad dispersion tightened the bonds between his sources and his argument. His source material is embedded more completely into his argument; but one might also say that his argument is embedded more deeply into his sources. In other words, Marvin, unlike Maria and Tasha, inhabits his sources as a rhetorical partner, rather than simply sampling them for facts and evidence.

RESEARCH PROCESSES: QUESTIONS, SOURCE SELECTION, AND SOURCE ENGAGEMENT

How did these differences in the students' arguments correlate with differences in their research writing processes? While it's impossible to ascertain causal relationships between writing processes and products, it can be helpful to compare the two to identify how specific writing processes are implicated in product characteristics. Since framing a research question, selecting source materials, and reading and analyzing sources can all be expected to influence the development of a research argument (and also vice versa, given that writing is a recursive process), I analyzed what students said about how they performed these processes.²

Research Question Formation

In the interviews, I asked students about how they had arrived at their research questions. Maria tracked the origin of her research question, (“How can people with memory problems improve their memories?”) to a personal issue: her own memory problems after the birth of her son. She also cited the pragmatic goal of improving her own memory as a primary motivator of her interest:

Well, um, at the time when I gave birth to my son, like, before and after my pregnancy, I saw symptoms of a loss of memory, such as, you know, I couldn't remember my appointments... And I noticed for the first time, that I'm doing bad in my classes, and I'm weak, my brain is very weak, and I'm like, what's the problem with me, you know? ... I want to go to do research on this, so, *before* I did research on this, and then, all of a sudden, I had Writing 303, she's like, you can use any topic. So I was like, I want to go deeper into this, you know, cause it's a very interesting topic.

Tasha became interested in her research topic through a newsletter for prospective occupational therapy students, which she had picked up in the department office while looking for information about the major:

And one of the questions that [the newsletter] asked, or answered...was how OT overcomes, coming into new technology, and how, you know, it's such a great benefit to the OT practice. So that made me curious and made me want to know what some of the new technologies advancements... and then when [the teacher] said well, your career would be a good choice and she gave examples, well, it brought me back to that letter that had puzzled me, because, you know, the letter was brief and short, it didn't go into detail what these new technology [sic] was, and then I remembered, oh, I would like to know more...

Marvin described his research question as emerging from classroom discussions of teacher-assigned readings and the teacher's specific directives for topic choice. Marvin's instructor, unlike Maria's and Tasha's, assigned three thematic readings about food at the outset of the course. She asked students to relate their own research in some way to the issues that emerged from class discussion of the readings. Marvin attributed his question to an amalgam of the class discussion on food and culture and his own knowledge of his academic major:

From the class, well, the main discussion was on food and culture, how they are interconnected, so then eventually we had to come up with our own research, the professor just said you might try to incorporate your major, so I just said come up with, you know, try and see how information technology contributes to food culture.

Maria described her question, then, as originating outside the academy; Tasha, within the academy but outside the context of the course; and Marvin, from within the context of the course itself—even, more specifically, the context of the course readings.

Source Selection and Engagement

Maria. Maria limited her source material primarily to items located through an Internet search rather than through library databases, even though students are expected to use those databases to locate discipline-based sources for their projects. When I asked Maria how she had located her sources, her response clearly indicated her desire to keep her workload to a minimum and her sources as simple and accessible as possible:

M: OK. I went on the Internet. Uh, the database, see because I don't want to go to libraries here and there, you know, it's a big thing. Then, what else? Uh...

INT: You mean, wait, you didn't want to go to like, too many libraries?

M: OK, yeah, I didn't want to go because me, I don't have time, I have a family, it's too much for me, and what else? York College, I went on the computer and I found the codes for the books for memories. So I went down and I saw some books here and there, some of them were not useful at all. Some of them were too deep, you know? But I want something in general, for personal [garbled] to read and understand them you know?...like, for example, I read this book, it's about all types of memory, oratory memory, verbal memory, and then its says how the brain conducts it into this and this and that. This, I don't think a person should know how the brain is connected, because there's too much hard words in there.

Maria's decision to limit herself to easily understood sources simplified the cognitive demands of her writing task. She did end up citing two scholarly journal articles and a nursing dictionary in addition to her lay

sources; but she primarily relied on lay sources, which meant she did not have to labor to interpret specialized source material. By avoiding the scholarly literature, however, she missed rhetorical debates of specialists regarding the causes and best treatments for memory loss, debates that might have increased her awareness of claims and counterclaims about improving memory loss. Though her resistance to specialized sources kept her sources more understandable, it kept her from becoming acquainted with disciplinary, rhetorical arguments. In her paper, Maria neither questioned nor criticized any of her source information on the causes and treatments of memory loss. She viewed and employed the content she gleaned from her sources as statements of fact, not propositions subject to debate.

Tasha used far more specialized sources than did Maria, moving beyond sources intended for a public audience to sources that were deeply embedded within narrower discourse communities. Ferreting out the rhetorical contexts in which her articles were embedded would have required a great deal of reader sophistication. For example, the first article she happened upon, “Rehabilitation Robotics in Europe,” was written neither for a public audience nor directly for occupational therapists, but primarily for engineers and politicians (Dallaway, Jackson, and Timmers). Published in an IEEE journal and co-written by two Belgian robotics engineers and the “Directorate General XIII of the European Commission,” the article is a long report summarizing European technological research in rehabilitation robotics. In particular, the authors performed work funded by a specific initiative, TIDE. TIDE is an acronym for “Telematics for Improving the quality of life for Disabled and Elderly people;” however, the authors don’t bother to unpack what the acronym means when they bring it up. Instead, the reader has to either know the acronym already or know to look in the Appendix, which glosses all of the acronyms in the article. The TIDE initiative, according to the authors, was designed as “a precompetitive technology research and development initiative specifically aimed at stimulating the creation of a single market in rehabilitation technology in Europe” (2). Understanding this explanation requires the reader to know what is meant by both “a precompetitive initiative” and “a single market.”

Tasha told me this was the first source she located. Her introduction to rehabilitative robotics, then, was a 20-page techno-political article targeted at tracking technology development in Europe, with an eye to marketing concerns. The article does not address how such robotic technologies might be integrated into occupational therapy practice. Though Tasha did use material from the article in her research paper, she did not integrate it into her argument (see Figure 2). The first section in the body of her paper

includes what is essentially a patch-written attempt at sequential summary of the article, not a selection from it of material relevant to her claim.

Unlike Maria's lay choices, Tasha's specialized sources forced her to work her way through a complex web of rhetorical contexts threaded with highly specialized vocabularies and insider references. Even the sources from journals within her own field, that of occupational therapy, were complicated by differences in purpose and audience. One of the occupational therapy articles she examined, a case study of an ataxia patient's use of powered mobility published in the *American Journal of Occupational Therapy*, was relatively accessible and included pragmatically useful treatment information. Another of her occupational therapy articles, however, a specialized research report published in the *Journal of Rehabilitation Research & Development*, paid little attention to practical application.

The highly specialized discourses of Tasha's sources may at least partially account for her tendency to patch-write throughout much of her paper. Even patch-writing was hard for her to do successfully, as shown by the following comparison of a passage from Dijkers and deBear to Tasha's patch-written version (patch-written words and phrases are bold-faced in both):

Source passage:

Therapeutic applications were actually **developed by Khalili and Zomlefer (7)** who **constructed a continuous passive motion robot**; the Cambridge group which built a manipulator **to assist in the developmental education of young children with severe physical impairments (6)** and Engelhardt and colleagues, who **piloted robots for range of motion of wrists and ankles**. (Dijkers and deBear 2)

Tasha's patch-written version:

The **therapeutic application developed by Khalili and Zomlefer, constructed a motion robot to assist in the developmental education of young children with severe physical impairments**, such as the use of **robot [sic] for range of motion of wrists and ankles**.

Tasha clearly did not recognize that the source passage summarizes discrete work reported by three separate author groups. In her patch-written version, she conflates the three independent research studies; and her text-splicing invented an imaginary technological device that does not exist. Her source's dense citation of other sources appears to have confused her, and her passage reveals a writer at sea in an alien discourse. She attempted to

preserve her source's meaning by patch-writing the author's actual words, but her patch-writing actually distorts that source's meaning.

This lack of success in incorporating sources is somewhat ironic. Unlike Maria, Tasha followed the teacher's direction, choosing and using peer-reviewed, discipline-based articles as sources for her research. At one point during her initial interview, Tasha proudly explained to me that she had not only used the college's library databases to find her sources, as instructed, but had also visited a nearby public, research-based library, where she worked closely with a reference librarian to locate specialized sources in medical and government databases. Doing what she was asked to do, however, may have hampered her research writing. Unlike Maria, who successfully musters material from lay sources to support her claims, Tasha is not able to control her sources in relation to her argument. Instead, she patch-writes extensively, producing a paper that is an intellectual quilt of disparate passages from her sources.

Marvin. Marvin consulted a variety of source types, both lay and disciplinary: general reference works such as *American Economic History*, trade magazines such as *Information Week*, and websites such as the Centers for Disease Control and Prevention (CDC) and the National Institutes of Health (NIH). He also reported a sequential approach to his selection of sources that parallels Ballenger's description of productive research process. Ballenger recommends that students begin research on a subject by reading general or specialized encyclopedias to get the big picture, which he calls "surveying the landscape" (42). The purpose of this survey is to understand where one's own eventual research topic and question will be located within that landscape. When I asked Marvin how he had decided what sources to use for his research, he pulled out the stack of sources he had brought to the interview, pointing first to a general reference book, *American Economic History*:

Once again, I just, I was actually looking for if they [American Economic History] had any thing, economic history definitely IT would be included there, so my main interest was to find out if there was anything about food within economic history.

Interestingly, Marvin did not include the *American Economic History* in his final "Works Cited" list, which suggests that he did indeed use it as a means of locating his question rather than as a basis for his eventual argument.

Ballenger advises students to next “survey the electronic landscape,” doing Web searches and consulting search results sufficiently to develop “enough working knowledge to talk for a minute about it [one’s subject] without repeating yourself” (44). Marvin’s second step was similar, except that he surveyed the library databases rather than the Web:

Then, the rest of these [Marvin points to his collection of articles] from the databases, you actually access those, you know, websites, the database will give you a little abstract, just to describe what is included in that source, so I would just from that little summary, if that goes into the key word search that I’m actually looking into, then I would open the website.

Marvin described how this “survey” helped him progressively narrow his topic and question (Ballenger 50-55). His first database search resulted in thousands of hits; after playing around with multiple search terms, he eventually narrowed those hits down to a workable number of articles for possible use. To identify the articles he expected to be most useful, he looked for a concurrence of two terms in the article: information technology and inactivity. His method finally brought him to a focused, coherent body of work:

so eventually that led to my, you know, focus, like they, if all the sources played along with the same lines, I would just say, this is something I could use, this is something I could use. So, that’s how I eventually decided to focus my research on [computers and their contribution to inactivity].

Marvin also described principles he used for excluding some sources from consideration. He had focused primarily on the EBSCO database in his search, but had also experimented with some science and health databases. Though these databases had brought up interesting information about food and technology, his awareness of time constraints had led him to focus on the more relevant EBSCO search findings:

EBSCO was the best, and yet the science and the health-related website, they had good information, but they, I guess my time was low, I didn’t have much time to really dig deep, but most of them I mean, the best sites would just come up with basic information specific to you know, biology, or things like that.

Marvin’s approach to selecting his sources was more consonant with the productive approach described by Ballenger than were either Maria’s or Tasha’s. Marvin first sought to understand the “big picture” of the food and information technology landscape; he then zeroed in on more specific

sources as he narrowed and reshaped his original research question, eliminating tangentially related sources from consideration. Maria based her selection of sources primarily on accessibility, abandoning early her search for potentially accessible scholarly sources that might speak to her question. Tasha lacked discrimination regarding the specialized sources she found, trusting to the single criteria of “found in a database” rather than considering how her sources spoke to one another and “played along with the same lines.”

DISCUSSION

Though findings of this case study cannot be generalized, they do suggest that academic literacy can be indexed to certain patterns of argumentation and source use. Accepted models of academic literacy development indicate that amount and range of experience with disciplinary sources enhances students’ ability to view sources as rhetorical and to incorporate those sources into rhetorical, discipline-based arguments (Geisler, *Academic Literacy*; Haas and Flower; Penrose and Geisler; Haas). My findings support that indication, and further suggest that how students develop research questions, select sources, and engage sources are implicated in their construction of arguments.

A complex argument like Marvin’s, which employs several of Toulmin’s structural components, is by its very nature likely to be more rhetorical than a simple data-warrant-claim argument. Backing, qualifiers, and exceptions are all structural elements that address the contingencies of knowledge claims. The presence of backing in an argument indicates the arguer is aware that a warrant is not self-evident; thus, he/she provides backing to buttress the warrant. The presence of exceptions shows the arguer is aware that a knowledge claim is valid only under certain conditions and/or in certain contexts. Finally, the presence of qualifiers indicates the arguer’s awareness of the force, or probability, of the claim. Presumably, students new to academic literacy would be less likely than more advanced students to see a need for and include backing, exceptions, and warrants in their arguments, since they view knowledge as authoritative and autonomous. Structurally, their source material will wind up primarily as data by default. As did Maria and Tasha, they will use sources primarily as repositories of what they view as factual information and use generic commonplaces as warrants. Students with increased academic reading experience, however, are exposed to disciplinary authors’ use of field-specific warrants, as well as their inclusion of backing, exceptions, and qualifiers to address the contingencies of their claims. They are also exposed to rhetorical debates within

the discipline, which reinforces the contingency of knowledge claims. With the dawning of rhetorical awareness, source texts begin to become useful not only as repositories of data, but also as fodder for more rhetorical components of argument.

As students learn to incorporate sources within a full range of argument components, they create a tighter, more complex weave between their source material and argument. If the sources are primarily discipline-based, distributing source use across argument components will embed the argument deeply within a matrix of disciplinary discourse. Such an argument is difficult, if not impossible, to disentangle from its matrix of sources, since elements of that matrix comprise part of the argument itself. The student who constructs this kind of argument is more likely to be viewed as having a legitimate home in a discipline than a student who simply gleans bits of knowledge from the field, using stray pieces of information as data in generic arguments.

Engagement with disciplinary texts, however, also can complicate the construction of rhetorical arguments. As Kellogg has pointed out, domain content in long-term memory is readily accessible to writers steeped in domain knowledge. This quick access frees up space in working memory, making it more likely that they can maintain the multiple mental representations necessary for knowledge transformation and/or knowledge-crafting. Students' immature level of domain knowledge, by contrast, will place increased cognitive demand on their working memories, adversely affecting their ability to generate and maintain multiple mental representations. In the case of student research papers, the "domain knowledge" needed for constructing a field-specific argument is also at a far remove, generally located less in their own long-term memories than in the "long-term memory" housed in their textual sources. Maria was probably able to tap into the "long-term memory" of her sources more efficiently than was Tasha because of the accessibility of her readings. Her Internet-based articles were accessible to a lay audience, whereas Tasha's sources, predominantly specialized research articles, were more opaque. Neither Maria nor Tasha achieved knowledge transformation in their arguments, but it may have been for different reasons. In Maria's case, the use of lay sources insulated her from rhetorical contingencies regarding the causes and treatments of memory loss. In Tasha's case, insufficient domain knowledge may have compromised her ability even to "tell" knowledge.

In contrast to Tasha and Maria, Marvin's access to disciplinary domain content and his rhetorical awareness were enhanced. First, class discussions of the readings on food and culture, by increasing Marvin's familiarity with the articles' content, increased the efficiency of his access to domain knowl-

edge relevant to his argument. Second, the “knowledge of the landscape” Marvin procured by reading background references enhanced his ability to contextualize his sources and his own writing within the fields of information technology and food studies. From the perspective of Kellogg’s model, Marvin’s more ready access to the domain knowledge in his sources would have freed up working memory, which could then be used to generate the multiple representations of knowledge necessary to structure a rhetorical, knowledge-transforming argument. His understanding of the overall landscape would have contributed to his understanding of how his claim fit into a field of alternative claims.

STUDY IMPLICATIONS

Findings of this study have implications for pedagogy, writing program administration, and composition research. Given the finite capacity of working memory, teachers must consider and address differences between the level of students’ disciplinary knowledge and the level needed to incorporate sources effectively in rhetorical arguments. With respect to writing in the disciplines, teachers need to be made aware that students’ observed inability to work effectively with disciplinary sources may be as much a function of domain expertise as writing capability. Faculty across the curriculum and writing program administrators can then collaborate to design programs that facilitate progression from using lay sources to engagement with disciplinary sources. Last, given the close relationship between source use and reading comprehension, theories of academic writing development need to be more fully informed by theories of academic reading development.

IMPLICATIONS FOR PEDAGOGY

Study findings suggest that the complexity of source readings should be taken into account when structuring writing assignments. The more deeply that readings are embedded in disciplinary networks and/or depend on prior domain knowledge, the more that instructors will need to provide scaffolding. Students, for instance, could be asked to summarize two difficult readings before being asked to write an essay comparing them. Class and group discussion work could be used to enhance understanding of the readings. Instructors might also consider conscious reduction of other cognitive demands of writing assignments to offset the difficulty of the readings. An assignment that asks students to evaluate and critique a reading, for example, is likely to be more cognitively taxing than one that asks them to write an abstract. Balancing cognitive demands of reading with cogni-

tive demands of writing doesn't mean that instructors must "dumb down" course reading and writing. As Langer has pointed out, different types of writing assignments call upon different types of topic, or domain, knowledge: for some assignments, a broad knowledge of domain facts may be sufficient, whereas others require more hierarchical organization of domain knowledge. Readings that may seem out of reach because of students' inability to incorporate them effectively into a cognitively difficult writing assignment may be workable with less difficult writing tasks. Similarly, students may be more adept at difficult writing tasks when using more accessible readings. Too little cognitive demand in reading or writing tasks may actually slow students' progress toward academic literacy, since exposure to disciplinary discourse provides an essential basis for rhetorical reading and writing.

The study also underscores the complexity of rhetorical source use, providing direction for source use pedagogy. As others have already pointed out, rhetorical source use involves far more than teaching formatting and documentation conventions for quotation, summary, and paraphrase. Rose has successfully made a case for teaching the *ethos* of source use (in both "The Role" and "What's Love"). This study suggests that teaching the *logos* of source may be in order as well. Some attention in composition courses to argument construction, and especially to the variety of ways sources can be incorporated into arguments, can help students understand how to position their claims against the claims in their sources; how to look out in their sources for material that indicates exceptions and/or qualifiers to their claims; and (though this may be more difficult to teach) how to employ some of the material in their sources as warrants, and/or as backing for warrants. Classroom discussion of how authors of course readings embed sources in their arguments can sensitize students to the full range of options for source use, thereby enhancing their ability to transform, rather than simply tell, knowledge.³

Changes in source use pedagogy, to be fully effective, need to be matched by changes in source use assessment. Assessments of student source use should consider not simply students' adherence to or deviation from conventional forms of reference formatting, but also their skill in incorporating source materials into rhetorical arguments embedded in disciplinary discourse. Correcting formatting errors, without providing feedback on the relationship between students' use of sources and their arguments, leaves the impression that good source use depends primarily on the placement of commas and periods.

IMPLICATIONS FOR WRITING PROGRAM ADMINISTRATION

Writing program administrators should search for programmatic ways to articulate what students do with sources in first-year composition with what they do in advanced composition courses, other general education courses, and disciplinary coursework. Advanced composition courses can be designed to build on source use work in first-year composition. Additionally, though first-year composition courses and WAC/WID programs are often separately administered, WAC directors and first-year writing directors can collaborate closely on curricular and pedagogical issues relevant to source use.

With respect to general education courses, WAC directors have been highly successful in promoting writing-to-learn exercises. Promoting activities that support students' development in rhetorical source use might be a next step. Many general education courses rely exclusively on textbooks, which usually present a discipline's knowledge as if it were unilateral, authoritative, and noncontestible (Geisler, *Academic Literacy*; Angelil-Carter). Professors, however, could structure general education courses to wean students from exclusive consumption of textbooks, deliberately giving them a taste of disciplinary discourse. Toward the end of the course, for example, students could be asked to read, discuss, and compare two accessible scholarly articles that offer diverging perspectives on a topic covered earlier in the course. This approach would give students exposure to the rhetorical discourse of the discipline while providing adequate scaffolding and classroom support.

Some might argue that such work would be a waste of both teachers' and students' time, since most students taking in a general education course will not be going on to study further in that discipline. Thaiss and Zawacki found, however, that students with high levels of disciplinary writing competence, however, can articulate not only the criteria for good writing in their own fields, but also how those criteria differ from criteria in other fields. Exposure to a variety of disciplinary discourses in general education courses, then, may actually further the development of students' writing competence in their own disciplines.

Writing program administrators also need to be involved in discussions with faculty across the various disciplines to better ascertain their expectations regarding student source use. Contributors to Haviland and Mullin's volume *Who Owns This Writing?* interviewed faculty and administrators in various disciplines to explore how views of intellectual property informed pedagogies of source use, source attribution, and plagiarism. Writing pro-

gram administrators can profit from similar conversations, both formal and informal, with colleagues across the disciplines.

IMPLICATIONS FOR COMPOSITION RESEARCH

The ability to incorporate source material effectively is intertwined with the ability to write rhetorically, and vice versa. Composition scholars would do well, therefore, to consider how research on academic reading speaks to theories of academic writing development. Some researchers in the field have made good headway relating students' reading practices to their development of academic writing expertise (Geisler, *Academic Literacy*; Penrose and Geisler; Haas and Flower; Haas), but the bulk of reading research is currently housed in educational literature. Greater cross-fertilization of composition literature with educational literature may increase the robustness of theories of academic writing development. Additionally, when designing projects on academic writing, composition scholars can incorporate questions that deliberately extend knowledge about source use. Studies investigating discipline-based writing assignments might examine the types of sources and source uses called for. Studies of academic genres might examine the different stances toward and uptakes of sources common within the genre, and how students negotiate those differences. Projects on student research writing can include investigations of students' source search and selection processes. Those examining the impact of preprofessional experiences (such as internships) on students' academic writing ability can look specifically at how such experience may affect their ability to understand and use disciplinary sources.⁴

More work needs to be done to understand fully the *logos* of source use in academic writing. A continuum of development in rhetorical source use might be established. Expert use of sources in argument need to be explored further and compared with that of students, using not only Toulmin's framework but other approaches to *logos* as well. Of high importance is investigating the impact of 21st-century literacies on argumentation and source use, both within and outside the academy. How are sources used by students and experts for multimodal arguments? Have new forms of discourse changed the rules of argumentation and therefore the rules of source use? Cultural critics have noted that electronic communication, with its new modalities, is not well suited to the reading and writing of long, complex arguments (Carr). Have current shifts in communication practices altered the very fabric of academic argument? If so, how have source use practices been affected? And how should college faculty teach source use,

given that the character of academic, disciplinary discourses may be undergoing a sea change?

Addressing these and other questions about source use is foundational to informed pedagogies for reading and writing in the academy. To a large extent, successful academic writing depends on mining sources for knowledge and using that knowledge flexibly to construct new knowledge claims. Faculty, writing program administrators, and composition researchers can profit from a fuller understanding of these processes.

NOTES

¹ Toulmin's is neither the only possible nor the definitive model of argumentation, but it is generally considered by rhetoric and composition scholars to be robust and well-suited for the analysis of rhetorical arguments. Its extensive use in first-year composition curricula and textbooks testifies to its relevance to academic discourse; it has also been set forth as a useful heuristic for constructing research reports (Booth, Colomb and Williams).

² Self-reporting is always suspect, but I was not looking for accuracy concerning specific cognitive operations. Rather, I was interested in how students described their research process. To increase the likelihood that students would not deliberately mis-represent what they had done, I was careful not to signal which answers might be more "acceptable" than others. Responses that specifically went against what teachers had recommended, such as Maria's admission that she didn't use the library databases, suggest students were being honest about how they recollected their processes.

³ Students may even achieve a level of knowledge-crafting in their arguments; however, as Kellogg points out, this level is usually reached only by people who write extensively as part of their profession.

⁴ It is worth noting that two students in this study, Maria and Marvin, were able to use their work experience as knowledge sources in their arguments. Maria knew about the diseases that could cause memory losses from her work in a nursing home, and had observed occupational therapists using memory remediation techniques. Marvin's supermarket experience with Internet-based grocery ordering helped him understand the implications of that form of information technology for grocery shopping.

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