

The Research Processes of Undergraduate Students

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Abstract: Fourteen undergraduates who had completed successful research projects were interviewed in an effort to discover how their research processes compare to the search strategies frequently taught in bibliographic instruction sessions. Students described how they found a focus for their research, how they found and used evidence, and how they articulated their work in writing. Differences between the students' approaches and standard search strategies are described, and their implications for library instruction are explored.

A few years ago Stephen Stoa argued that librarians approach research from a very different angle than do researchers.(n1) He asserted that the steps that librarians, as generalists and tool specialists, go through in pursuing the answer to a reference question are very different than the processes scholars go through when they do research. Yet the process we tend to teach in library instruction--the "search strategy" described to students--most often resembles the librarian's approach: making a systematic, tool-based series of searches that takes the student from a general background source through monographic and periodical literature.(n2) This instruction may be embedded in a discussion of the larger research process, which includes analysis of research topics and evaluation of materials found, and it may be introduced in the context of the growth of a discipline or the structure of its literature. Regardless of its context, however, the portion of library instruction that deals with finding materials tends to emphasize a sequential, tool-oriented search technique.

Library Instruction Critics

Granted, students who are initiates in disciplines, not experts, do not go about research the same way that their professors do. They cannot make the connections and the critical judgments that are second nature to specialists, nor are they familiar enough with the discipline to easily recognize a valid or useful research question. Given these limitations, some librarians suggest we can't really teach undergraduates to do research. Stoa suggests that we should "keep in mind the very limited purposes of instruction in bibliographic resources" and should "be careful not to equate library skills with research skills.(n3) Richard Feinberg and Christine King warn against the hubris of equating library instruction with the development of students into life-long learners, and recommend we stick with short-term library skills.(n4) And recently Tom Eadie suggested that library instruction, however we teach it, is simply a waste of time.(n5) He contends that it presumptuously "provides the answer before the question has arisen"(n6) and suggests that the questions, once raised, can be more efficiently answered at the reference desk than by library instruction, which he characterizes as a one-size-fits-all lecture, or "a fifty-minute oral bibliography."(n7)

All of these commentators appear to find little connection between research and library skills. The assumption is that we should (at most) teach skills and leave the teaching of research to specialists, if it is to be taught at all. In fact, all of these critics seem to call into question the notion that undergraduates do research at all, and challenge the place of research in an undergraduate curriculum. Eadie even evokes a past when reserve readings satisfied the undergraduate's library needs and the library functioned quite adequately without bibliographic instruction and with

minimal reference service--and, as he remembers it, it worked just fine.(n8)

These critics are selling the goals of our institutions short. Leaving students to flounder on their own--or simply teaching the skills required to find materials for a single library-related assignment--is not doing justice to our students or to the educational aims of our institutions. Furthermore, it doesn't make sense to teach disparate library skills without putting them in the context of the research process. The students in our classrooms want to see some pattern behind the skills, want to see how the pieces fit together.

A Better Approach

But what process should we teach? On the one hand, if we teach research as a process of systematically working through finding tools, we are misrepresenting the nature of research--it isn't finding bibliographic items that counts, it is the interaction of ideas and the emergence of new ones through that interaction. On the other hand, we can't draw from the expert model because that model assumes a thorough knowledge of the discipline. If we are to describe research as a process, we need to address the special kinds of problems encountered by undergraduates, novices to disciplines, who are striving to see the shape of the discipline, to tap into its interconnections, to determine what might constitute a valid research question and to frame an acceptable response. We need to teach those skills that will facilitate integrating library use into the entire research process.

Constance Mellon and Carol Kuhlthau have both made contributions to understanding the library search component of the research process. Mellon focuses on the way in which the writing process and research are recursive; Kuhlthau examines the cognitive and affective aspects of the research process for high school students.(n9) In both cases the authors have found that research is not a straightforward application of tools in a systematic fashion, but an interplay of a variety of factors in which information collection plays an integrated part. This study attempts to build on their work by developing a more detailed understanding of actual research experiences by students who, by all accounts, performed research successfully.

The Study

To uncover the process students go through when they are engaged in research, faculty in a number of different departments were asked to identify students who had successfully completed research projects of various sorts. Fourteen of these students agreed to participate in in-depth interviews in which they were asked to describe how they found a focus for their research, what the major parts of the process were, how they retrieved, evaluated, and made use of sources, and how the research process related to the writing process. (See Figure 1.) This interview approach was modeled on an important study in the composition field in which Janet Emig asked several students to compose a piece of writing while describing the process aloud.(n10)

Although relying on the students' hindsight decreases the reliability of the results of this study--recalled and self-reported data usually suffer from bias--it was decided that observing students during the research process or recording their comments on the process as it happened would be too intrusive and too lengthy a procedure. Direct observation was thus sacrificed for what hopefully would be the outlines of a picture of undergraduate-level research. The data were not expected to provide definitive answers, but it was thought that it would raise some interesting questions that

could be addressed with more rigorously controlled methods.

The goal was to compare the process described in the classroom as research--either the library model, with its emphasis on tools, or the expert model described by Stoa, with its emphasis on familiarity with the literature--with the research students actually do. The suspicion was that neither model was an accurate one for undergraduate research.

The students interviewed were astonishingly articulate about their research, and were happy to share both successes and dead ends. The students ranged from freshmen to seniors and were engaged in a variety of projects, including:

- planning a high school teaching practicum,
- writing a hypothetical proposal for a sports facility,
- studying the reasons students chose to attend our college,
- writing a short opinion piece on the future of the space program, and
- writing "traditional" research papers on a wide variety of topics, including the Catholic church's response to Liberation Theology, the relationship between an Italian choral musical form and Venetian architecture, a discussion of the origin and purpose of an artifact found at Chitcheen Itza, and a study of the changes in the concept of political tolerance.

The departments involved included political science, physics, art history, music, philosophy, education, and management. None of the assignments were mere reports based on library sources; each required that the student either manipulate original data or provide an original hypothesis.

Formulating a Focus for Research

After having students describe their projects the interviewer asked them questions about their focus, and asked them to draw a time-line of their research to get a sense of how long each stage in the research process lasted. Generally speaking, getting a focus for research was the most challenging and the most time-consuming part of the entire project for the students, even for those who had fairly structured assignments. The focus seemed to be generated in one of a number of ways. For some students, the research project was the culmination of a long-standing interest. As one student put it:

I would have been dead in the water if I hadn't been reading on the subject more or less . . . just sort of working towards it for the last couple of years just out of personal interest . . . so I came with some ideas, I knew this was a problem.

In this case the student was approximating the "expert" status of the expert researcher model--she was able to determine a focus quickly because she already knew the subject well enough to know what a valid question about it would be. A twist on this is the student who, though not an expert in the subject, draws on some expertise to ease into the new territory. One student with a double major chose a focus that involved both majors: "I wanted to tie as many courses together as I possibly could." Though she had never dealt with her subject before, it was a subject that she could approach from the disciplines in which she had some training.

Other students had more spade work to do before they could find a focus. They were truly novices working in fields they knew little about. One student, given a fairly structured assignment, knew

what topic she was to write about, but didn't know how the field itself viewed the topic, which questions were considered interesting and valuable by practitioners in the field. She did a scan of recent literature using an appropriate subject abstract and, because she began to see that there was considerable interest in one aspect of the topic, was able to choose a focus that reflected the current interests of the discipline.

Another student said he "just started nosing around a little bit" by browsing in the book collection and dipping into some of the books he found. He came up with a topic area that looked promising, then took it to his instructor to get her opinion of whether there was research potential in the topic. He did not get a clear focus until much later, but worked toward it by becoming increasingly familiar with the literature covering his topic area. Over time, he recognized valuable material as he encountered ideas and names repeatedly: "At least you know what you should be looking for." His approach was to gradually map the scope and features of the topic by increasing his mastery of its literature.

A number of students reported that their instructors were excellent interpreters of the field; they would ask their instructors for a nudge in the right direction by bringing them a broad topic and asking them about current "hot" questions and authorities in this area. "I got an article.., that was really helpful," said one student. "A lot of times that happens. You go to professors and they tell you a name . . . that's the most helpful." Significantly, it was the subject expertise of instructors that students tapped for sorting out current authorities and major studies; librarians were generally not approached in this stage of becoming familiar with the field.

One student expressed reservations about doing too much reading in secondary sources before finding a focus:

The problem with reading a lot of secondary sources before you get your idea is that you feel like . . . other people have such good ideas, I'll never get a good idea. It's like a losing game . . . so I don't find secondary sources very much of a help in generating ideas.

But one difference between her situation and the other students' was that her teacher had been very explicit in defining what kind of research questions were valid for the field and had given the students a source list to start with. None of the other students had that advantage.

The single factor that most frequently spurred a student's movement from the preliminary, focus-setting phase into a more directed phase was the need to verbalize a focus. Many of the students were required to hand in a written proposal or research design, and all who did reported that this requirement was essential to forming their focus. Either the activity of writing the proposal or the ensuing feedback from the instructor clarified the focus for them. As one student said: "Putting it in words definitely formalizes it It's almost like you have to practice using the words.., it makes more sense that you get your practice and then go back.., where it really counts . . ."

Writing a research proposal can help students define a problem once they are familiar enough with their topic to recognize a legitimately interesting question, and once they realize that definition of the problem helps identify the kinds of information needed. The student moves from being familiar with the topic area to seeking specific kinds of evidence.

Gathering Evidence, Reformulating the Focus

The techniques students used to search for materials changed over time. In the first phase, before students had determined a focus for their work, they browsed widely, scanned abstracts or indexes for interesting titles (or, in one case, scanned indexes to verify a hunch that an area had been neglected by the field), and talked with classmates and their instructors about possibilities. In the second phase, after they had some angle from which to view the material, they often backtracked, returning to things they had looked at briefly, able to interpret them differently. One student reported that he had "run across some things" in his preliminary research that would later prove critical to the success of his research, but "I didn't realize it yet because I wasn't familiar enough with it."

Using key sources. Several students reported that finding a key source was a pivotal point in their research; these sources were useful in a variety of ways, sometimes helping them to clarify their questions, sometimes legitimizing a question for them by illustrating that others were interested in the same idea, and sometimes giving them the appropriate vocabulary used in the field for their questions. Quite often, too, these key sources provided a gateway into a whole network of information in the form of references.

Students in this stage were more likely to tap into the citation network, and often seemed to feel a part of that network, as if they had joined a community of scholars who jointly tackled an area of research. Students were likely to refer to an idea by the name of the researcher responsible for developing it. Many of them demonstrated a sophisticated understanding of the relationship between sources, reporting that they saw patterns in citations, that some names were cited very frequently, that one work had changed the way the entire field examined an issue, or that some researchers demonstrated one bias or another. And, though students made use of finding tools such as the online catalog, indexes, and abstracts, they tended to believe that citations--either those given as references in works or those provided by their instructors--were their most direct and useful route to good material. It is through this web of connected ideas--what Stoan refers to as "the primary literature [indexing] itself"(n11)--that these students could see the shape of the discipline emerge. As one student said:

I started to find the parallels between the sources [through] cross-references between the sources . . . and that's when a lot of the organization of the paper goes on inside my head, too, because I see how things fit together.

Students used the materials they found for a number of different purposes: as sources of information, ammunition for their arguments, and examples of writing within a given discipline. As examples, these sources serve as a kind of template for format, a key to elements that might go into an argument in a given field, and a model of what evidence is used to support such arguments.

Evaluating material. When asked how they evaluated sources, students described a number of criteria. Relevance was typically the first criterion used for screening sources. One student said: "When I got a book I'd flip to the table of contents and start looking.., at headings that were possibly interesting and relevant." Currency was another criterion frequently used for screening. Then, the intended audience of the written work was frequently examined. Students who were given assignments in which they were to synthesize ideas and find major points tended to screen out any works that were too detailed or technical. The others valued sources that demonstrated that the author was working within a given field using the conventions of scholarship for that discipline.

They checked the language of the article to screen out those works addressed to a general audience.

Finally, a number of students described ways in which they assessed the quality of a given work. Several mentioned the importance of finding an article or author cited by others, one saying that he used citations "to take a tally of how often a certain article was used." Some looked at citations to check whether or not a writer had used appropriate evidence and rejected those that did not seem aware of major studies or failed to produce evidence for their assertions. Others mentioned the publishing house or the reputation of a journal as a screening factor. One student, a senior quite familiar with her field, said: "I didn't want to stray into weird journals." But when researching in another field in which she lacked expertise, she relied on relevance as her major criterion for journal quality. "If the title [of an article] sounded good, I read it," even without knowing the reputation of the journal.

Students also relied on their instructors' judgments in evaluating sources: "It's important to keep communication open with your [professors] about that, because they know.., they're in that network."

Dealing with contrast. Many students found sources that contradicted one another or the student's thesis; they tended to look on this experience positively. One student confessed that she sometimes wanted to "throw away that notecard" if the source undermined her argument, but felt it would be unfair to fail to represent both sides of an issue. Another said that opposing pieces helped her formulate her own opinion because they gave her something concrete to refute. A third said contradictory analysis "was exactly what I wanted" because "the basic idea was to present the contrast.., you want contrast."

While one student said "there's a lot of different theories out there, so... I just looked for things that fit what I was thinking," another student used a very different approach:

I've learned now to bring them in and say . . . "this person has stated this, this, this, and this, but I feel my argument is stronger because of this, this, this, and this." If you have a good argument going already, it's easy to pull that stuff in, and you've got to do it because if you're going to present it you've got to be ready for those questions I don't see evidence that sheds light in a different direction as being negative or bad or wrong, I just see it as being different, and also a viable option It's just a dynamic process. If you're going to stick your neck out then you have to be ready for and be able to deal with what you find-and that's the fun of it.

Research Process

For almost all of these students--except for one who had a very brief assignment and another who was preparing a practice-teaching unit--writing was an ongoing process, not a separate and final stage. Students frequently did some writing before getting deeply into research, keeping notes, making analyses, organizing materials, writing proposals to articulate their project, and often writing their first draft in several stages. Few of the students saw any clear distinction between research and writing; they saw them as aspects of a single activity, concurrent and integrated. One student reported using the following techniques to get her ideas flowing.

Usually, just before I write a paper, I sit down and write all the ideas that are coming

out Sometimes I'll end up verbalizing something just sort of off the cuff and if I don't write it down at that point, I'll never capture it again . . . it's not a high-pressure thing, you just generate ideas If you don't understand how something fits together you can work that out.

Another said: "I really like to articulate my idea and get my thesis going because then I keep it with me and I constantly look at it. I have it memorized, so I never get too far away from what I'm supposed to be thinking about."

Many students reported that their instructors demanded some form of written material before the final draft, and they found that very useful in formulating a solid topic and getting essential feedback before it was too late. At least ten of the fourteen students had written work reviewed by their instructor long before the research process was over, and, without exception, found the early feedback--and the early deadline--valuable.

Students used a variety of methods for keeping notes on their material. Some preferred to have verbatim excerpts from sources, either hand-copied or photocopied. Others used a kind of double-entry system: text from sources on one side, analysis on the other. As one student put it: "If I just have this abstract quote--so what? I find that articulating how it relates right away is really important."

Practice varied a great deal, too, in organizing material in preparation for writing a draft of the final product. Fewer than half used outlines, and those were most typically students writing a short paper. Others organized their material using nonlinear structures, one sorting her notecards in a wheel, with her thesis in the middle and all of her major points radiating out from and referring back to the thesis. "Everything, then, becomes like a network or a web instead of like a long rope." Still others, particularly those working on papers of 20 pages or more, wrote their papers in sections at different points in the semester, and in many of these cases weren't exactly sure, at the beginning, where their project was headed. In their experience, an outline would have been impossible because they discovered what they wanted to say as they wrote.

Students used a variety of methods for bringing evidence into their writing. Some had notecards with quotations and analyses that they sorted into logical piles--piles that then became the major sections of their work. Others discovered as they wrote that they needed evidence, and would seek it out at those points. One student had gathered quotations to support sections of her paper about which she felt the least confident, but accumulated supporting information on an as-needed basis for the rest of the paper: "When I needed information [on a specific area]... I would go back and browse through various writers to see how they summarized it."

Another made writing and research an integrated activity.

Ideally they should be simultaneous, I think, and on this [project] it was "I need a fact," and I would leave the computer on and go find it and come back and "oh, I could use this one here, too." . . . All my papers that I have been proud of--that's how I wrote them.

For most students this approach would be too difficult to control, but in his case it seemed to work; he went on to present his paper at a state research conference. There was only one instance in which a student organized her ideas in the form of an outline and followed it for the final written product.

In all other cases the students found composing a process that tended to generate its own direction.

Conclusions and Recommendations

The results of this study suggest fruitful ways to rethink some of the assumptions that underlie teaching students to do research. Two findings were particularly striking: the large proportion of time and energy the students spent formulating a focus, and the diverse tactics students used to successfully negotiate that phase of research. Another surprise was the way in which these students perceived their sources. They had a sophisticated understanding of the nature of research, of the need to construct a response based on evidence rather than merely finding information and reporting on it. The rhetorical aspect of research writing--selecting information to support an argument that will persuade a particular audience, and relating one's own ideas to the wider world of available interpretations--was a constant concern in these students' use of information. And finally, it was interesting to see the variety of ways in which students integrated research and writing, and the various forms in which writing occurred throughout the research process.

More specifically, the study raises questions about the teaching of research, both in terms of assumptions about the place of library skills in the entire research process, and in terms of which skills should be taught in the context of research. As expected, this study generated far more questions than answers. Some tentative conclusions and recommendations for further study follow.

Research comes in many different packages. These students were engaged in a wide variety of assignments involving research. In fact, many of the faculty first contacted for suggestions for student subjects for the study said they didn't give "library research assignments." We persuaded them that we were looking for students engaged in writing more than what they consider a "traditional research paper"--the kind of paper that one faculty member described as an uncritical "cobbling together of secondary sources; an invitation to plagiarism." If we truly want to be involved in teaching research skills, we must not assume that research assignments are driven mainly by locating print materials found in the library; we need to persuade our teaching colleagues that when we propose to help students use the library we aren't going to misrepresent to students what research is all about.

Finding a focus is a major and critical phase in undergraduate research. Unlike expert researchers, students don't know enough about a field to see its holes; they can't latch on to interesting issues without first reviewing the literature to discover which questions are worth pursuing. The methods librarians frequently recommend to students for "narrowing" a topic, however, don't reveal interesting questions. Narrowing by the mechanical means of adding geographical or chronological constraints, or by looking at Library of Congress Subject Headings, will indeed limit a topic--but in ways that are concrete, settled, defined. These methods fail to identify interesting frontier areas for research.

We need to develop strategies that help students become familiar with a topic quickly, and that give them some tactics for seeing the gaps, the places where questions lurk. Otherwise the message we send is that research is a question of mechanically limiting and reporting on a topic that has already been thoroughly defined and explored by others.

We also need to forewarn them that developing a focus takes time and is a creative and somewhat intuitive process. Students tend to view this part of research as frightening and unproductive.(n12)

They often feel that they are spinning wheels or not approaching the problem correctly. We can help reassure them that their feelings are normal and that this phase of research is a necessary and important part of the whole. The tool-based approach that librarians frequently present as a "logical and systematic" process of research may well convince the student who is having difficulty in the focus phase that browsing and scanning are illogical and unsystematic and therefore wrong. Our tool-intensive techniques, introduced in library school bibliography classes and reenforced at the reference desk, work better for finding answers than for identifying questions.

The "overview" needed to get started is rarely found in a reference book. It is significant that students in this study preferred to begin their research by consulting their instructor rather than a librarian, even when their questions were primarily bibliographic in nature: What's being written about my topic? What are the most important studies? Who are the authorities? They did not consult first with a librarian, perhaps feeling 'that a subject specialist would be more likely to connect them with other specialists than a librarian would, and would provide more "inside information" than a reference tool would.

Only two of the students interviewed began research with a reference book. One of these looked up her topic in an encyclopedia because she was synthesizing information to prepare a lesson plan for a high school French class. The other student wanted to compare the ways two different fields defined a word, so she started with specialized dictionaries. None of the other students found reference books helpful as a first step--though many of them used them later in the process to fill gaps in their information. Their topics were too diffuse, too new, or too big to start with a specialized encyclopedia, and in most cases they had as much information from their textbooks or lectures as they would find in a reference source.

Reference books, by and large, are good for locating accepted knowledge from the fields, as places to get quick facts, and as places to get overviews of topics tangential to research; they are less successful at illuminating those interesting gray areas that are the best place to develop a research project. We need to reexamine the use of reference books as step one--finding an overview of a topic--and instead study the process researchers go through when focusing on a question, to learn ways to make that part of the research process more rewarding and less frustrating for students.

Finding tools are not always the best route to good evidence. Our search strategies quite often describe the information-seeking process as one in which tools--reference works, bibliographies, catalogs, indexes--are used successively and systematically to locate information, with the implication that most of the information used in research is located through finding tools. In fact, students (and other researchers) find the most direct and efficient route to sources through the citation network. The students interviewed used finding tools, browsing, and the citation network all to good purpose. They used finding tools chiefly as a method of browsing the field in the first phase of research, but relied more on citations in the later phase, once the research question was thoroughly defined. If students find much of their material through the citation network and through serendipitous browsing of shelves, we should point those out as factors in the search strategy rather than emphasizing the use of privilege bibliographic tools as the correct way to locate information.

Generating an idea, gathering information, and writing are parts of a single process. The students interviewed did not begin with choosing a topic, go on to seek information, and end up by composing a paper. These students described a much more integrated process. None of them came into the library with a chosen topic; the topic, or their particular angle on their topic, developed as

their research progressed. Writing, too, was something they did throughout their research, not merely at the end of the information-gathering phase. Relevant questions to ask ourselves are: How much do we integrate "search strategies" into a larger picture of research? Should we connect the information search with the other simultaneous parts of the research process? Should we help prepare students for research, not merely for search?

While it falls to librarians to prepare students with the necessary skills to use the library--and to the instructor to train the student to do research--we must put the search skills into context and connect them accurately with other aspects of research to make them useful to the students we teach. It does not take a lot of class time to forge those connections, and it makes the details of searching for information more meaningful for students when seen in the larger context of research.

We need to know more about the research process. Further work needs to be done if we are to accurately construct a map for our students to use in negotiating a research project. When we tell students the steps they should take, we are describing a process we know little about. (Our approach could be likened to that of the experts in Hilaire Belloc's *Microbe*: "Oh! Let us never never doubt what nobody is sure about!") The following questions are particularly pressing.

- How are ideas for research generated? How can we represent that process to our students most effectively? How does the average student perform research? Assuming the students in this study were representative of what happens when student research is successful (they were A students), how does their experience differ from that of the students who get Bs and Cs on their work?
- When students fail in their research, what goes wrong? What can we learn from the mistakes they make? Are they failures of interpretation, of tool use, of comprehension? Do they suffer from a lack of critical-thinking skills, or are they failures caused by making logical assumptions about a sometimes less than logical system?(n13)
- What can we learn from related fields, such as composition theory and the cognitive sciences, about research and writing and how they interact?
- Are there aspects of cognitive development in undergraduates that should be taken into account when teaching the research process? Just how does the cognitive development of undergraduates affect their ability to do research?

We will, no doubt, uncover more questions as we examine the research process of undergraduates. But if we are to represent the process in a way that accurately mirrors the circularity, the uncertainty, and the creativity involved in research, we need to reexamine our tool-based, "systematic" search model--and develop a new model that better addresses the special needs of undergraduate researchers.

Interview Questions

Focus:

Tell me about your project. What was it about?

About your idea for the project--

How did you settle on this particular focus?

Was there a moment when the focus clicked for you, when you knew what the focus would be, or did it gradually evolve?

Did you get a question in mind first and then look for answers, or did the problem and its solution occur to you at the same time as an idea to write about?

What factors played the most important role in developing your theme? People? Things you read? Previous research?

Process:

Let's draw a time line or chronology of the project so we can talk about things you did in sequence. I'm interested in steps you took that didn't work out, as well as in the things that did. How did you get started? Then what? When and how did your focus change in the course of the work? How did you wrap up the project?

Can you identify any pivotal points in the project, times when you made a choice or when your research took a sudden turn?

What were the most productive parts of your research? The parts that didn't go so well? Why?

Sources:

Let's look at your list of sources. How did you find the sources you listed here?

- faculty recommendations?
- student recommendations?
- using the catalog by subject?
- using indexes?
- using citations?
- browsing?

How do you like using the computerized catalog?

- What method do you use most?
- What do you find difficult or confusing or frustrating about it?

Did you use particular indexes? Were they helpful?

How did you decide which sources were good for this project? What criteria did you use for choosing sources?

Did the teacher make her or his criteria explicit?

Are the criteria you used for choosing sources for this project different from those for other kinds of research you have done?

Did you come across sources you disagreed with or two sources that contradicted each other? How did you handle that?

Which of these sources played the most important role in your research? In what specific ways did they make a contribution?

- used as evidence to make a particular point?
- used to get ideas, as inspiration?
- used for rhetorical reasons, to convince the reader you knew what you were talking about?

7. When did you discover these sources? Place them on the timeline.

8. Based on your research for this project, did you begin to see different schools of thought or different factions among the writers whose work you used?

Writing and Research

When on the timeline did you begin to write your paper?

Did you do any writing before actually starting the paper? What kind of writing?

How did you use the sources as you wrote the paper? Did you read through them all and mark relevant passages first or did you look for evidence as you wrote?

As you wrote, did you ever see the need to return to the library (even if you didn't because of lack of time) to find responses to questions that emerged in the course of writing up the paper?

References

(n1) Stephen K. Stoan, "Research and Library Skills: An Analysis and Interpretation," *College & Research Libraries* 45 (March 1984): 99-109.

(n2) There are many published discussions of search strategies. Anne K. Beaubien et al. define it as "the ordered arrangement of types of finding tools appropriate for the collection of material on a particular analyzed topic," in *Learning the Library: Concepts and Methods for Effective Bibliographic Instruction* (New York: Bowker, 1982), p. 92.

(n3) Stoan, "Research and Library Skills," p. 106.

(n4) Richard Feinberg and Christine King, "Short-Term Library Skill Competencies: Arguing for the Achievable," *College & Research Libraries* 49 (January 1988): 24-28.

(n5) Tom Eadie, "Immodest Proposals: Library Instruction for Students Does Not Work," *Library Journal* 115 (October 15,1990): 42-45.

(n6) *Ibid.*, p. 45.

(n7) *Ibid.*

(n8) *Ibid.*, p. 42.

(n9) Constance A. Mellon, "Process Not Product in Course-Integrated Instruction: A Generic Model of Library Research," *College & Research Libraries* 45 (November 1984): 471-478; and Carol Collier Kuhlthau, "Developing a Model of the Library Search Process: Cognitive and Affective Aspects," *RQ* 28 (Winter 1988): 232-242.

(n10) Janet Emig, *The Composing Processes of Twelfth Graders* (Urbana, IL: National Council of Teachers of English, 1971).

(n11) Stoen, "Research and Library Skills," p. 103.

(n12) Kuhlthau's study bears out the high level of anxiety students feel during the topic formulation stage of research.

(n13) Mina P. Shaughnessy studied the problems experienced by basic writers in her book *Errors and Expectations: A Guide for the Teacher of Basic Writing* (New York: Oxford, 1977), and makes the case that their errors aren't due to stupidity or lack of application, but rather to unfamiliar and misunderstood expectations. A similar study of errors made by library users would be invaluable.

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