

What Do Students Think and Feel About Research?

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## Introduction

Instruction librarians at the University of Minnesota Duluth work with individual instructors to provide information literacy instruction. Information literacy is defined as: “the set of integrated abilities encompassing the reflective discovery of information, the understanding of how information is produced and valued, and the use of information in creating new knowledge and participating ethically in communities of learning” (Association of College & Research Libraries, 2015). Librarians design lessons focused on specific information literacy concepts (e.g. exploration, inquiry, authority) that connect to course objectives and assignments to develop students’ information literacy skills. Most often, librarians deliver a lesson during a single 50-minute class session or provide an equivalent asynchronous lesson online, when students are working on or are about to start research assignments.

As instruction librarians, we often work with undergraduate students in Advanced Writing, a required upper-division writing course in which students learn about writing in their academic and professional fields. Students choose one of the following Advanced Writing divisions: Language and Literature, Arts and Letters, Business and Organizations, Engineering, Sciences, Human Services, or Social Sciences. The courses address:

Study of writing for those invested in the [relevant disciplines]. Exploration of academic and professional rhetorical situations. Practice with research

methods, document design, editing, effective collaboration, and ethical issues in the production of documents in multiple genres for multiple audiences” (College and Advanced Writing Program, 2020).

In spring 2019, librarians who design and deliver information literacy instruction for Advanced Writing courses began discussing how to better meet Advanced Writing students’ research needs. Specifically, we’re interested in students’ information behavior; when they need information, how do they look for and evaluate information? How do they use information? We designed this research project to find out what the research process looks like for students, why they do things the way they do, and what challenges they face when doing research.

## **Background Research**

To explore how students understand and feel about doing research, we began searching literature to learn about how other librarians had conducted similar research. We reviewed work on information behavior and found Carol Kuhlthau’s Information Search Process model particularly well-suited to our question. Described in *Seeking Meaning* (2004), the model includes students’ feelings, thoughts, and actions, all of which we were interested in for this research. We found related research about help seeking and research anxiety (Beisler & Medaille, 2016; Kracker, 2002; Kracker & Wang, 2002), research about how first-year students understand the research process (Markowski & Dineen), and research about students’ affective responses to library and web-based research (Bell, 2011). However there was a gap in the literature focused on how upper-division students understand the research process.

As we began planning our research, we were particularly interested in the student-drawn maps and drawing methods described in Brianne Markowski and Rachel Dineen's 2019 LOEX conference presentation *Uncovering First-year Students' Conceptions of the Research Process*. They had a similar research question about first-year students, and they asked students to map out their research process. We were drawn to this approach as a way to see how students understand the research process. Liking that approach, we looked for other student-focused research that used student drawings.

Molly Beisler and Ann Medaille (2016) asked students to draw their steps in completing a research assignment in their article *How Do Students Get Help With Research Assignments? Using Drawings to Understand Students' Help Seeking Behavior*. Some students also responded to written questions and participated in interviews. We liked their combination of drawings and written questions.

## **Methods**

### **Study Design**

We worked with several Advanced Writing instructors to collect student research process maps and reflections on their class research project. We collected student work from sections of the course focused on engineering, sciences, human services, and social sciences.

We developed the mapping activity based on the work of Beisler and Medaille (2016) and Markowski and Dineen (2019). The prompts shared with students are included in [Appendix A](#).

We hoped to understand how students understood the research process through their maps, and to learn how students felt during research through their reflections. After considering surveys and other forms of data collection, we decided on a reflective writing assignment that could be collected by the class instructor. Reflection prompts are included in [Appendices B](#) and [C](#).

### Data Collection

After designing the study and finding interested instructors, we collected student maps and reflections in spring 2020. This coincided with the beginning of the COVID-19 pandemic in the United States. Our campus closed during March of that year, and library services along with all Advanced Writing instruction were offered remotely. Some instructors who had planned to participate dropped one or more of the assignments as they made last-minute changes to their classes (see Table 1).

The Advanced Writing instructors spoke with us about how the abrupt move to remote learning and the accompanying stress of the early months of the pandemic may have had some effect on students' experiences with research in their courses during this time. While we recognize the impact of this on students, the student responses we collected described very similar research struggles to those we had seen Advanced Writing students encounter in previous semesters.

**Table 1**

*Assignments Collected from Each Advanced Writing Class*

Assignment	Engineering	Human Services	Science	Social Sciences
Process map	✓	✓	✓	✓
Mid-process reflection	✓	✓	N/A	✓
Final reflection	✓	✓	N/A	N/A

Early in the semester, students drew maps of the research process they'd used for a past project. After beginning their research project for Advanced Writing, they wrote a mid-process reflection on their current research process. After completing their class research project, students wrote a final reflection about their experience.

We received work created by 130 students and randomly selected thirty maps to analyze in depth. These included maps drawn in classes focused on engineering, sciences, human services, and social sciences.

Based on the maps chosen, we selected completed reflections written by those same students, as we wanted to see how their research questions and attitudes changed during the semester.

## Analysis

We began analyzing the maps using an open coding approach. We discussed the maps at length, refining our codes in the process. After completing the map analysis, we approached the reflections in the same way.

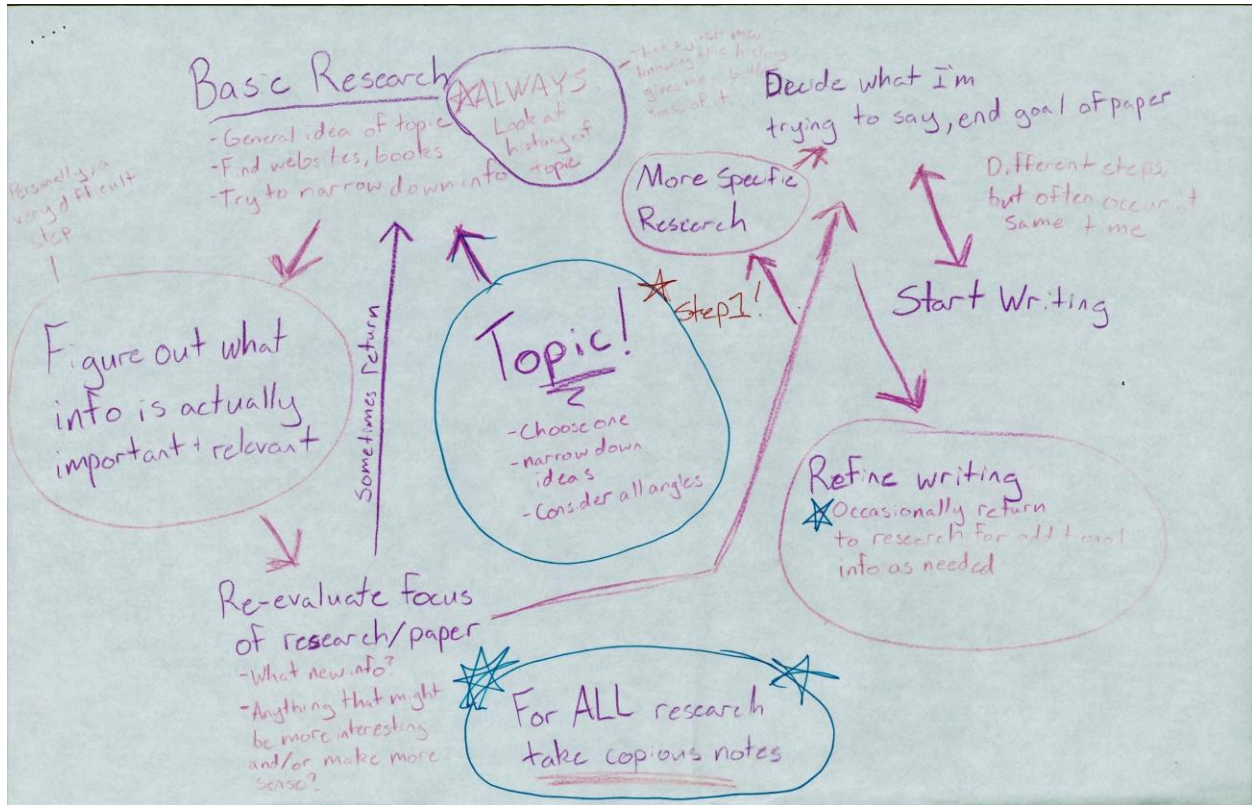
## Findings

### Mapping the Research Process

We were struck by the similarities in students' maps of their past research process. Despite very different aesthetics, similar steps and phrases appeared again and again in maps created by students across disciplines.

**Figure 1**

*Process Map Created by Social Sciences Student 9*



**Topic Development**

A majority of students included defining a topic as part of their process (28 of 30). A few students described coming up with topic ideas in response to assignment criteria or their own interests. Some students described changing topics or refining a topic as they began gathering information.

Topic also came up in response to the questions “How do you feel about various steps? Are some more challenging or frustrating than others? Are some easier or more fun?” (see [Appendix A](#)). While one student described enjoying the process of



choosing a topic, it was more common for students to describe difficulties with topic selection.

I have the hardest time with topic selection because there are a lot of topics I can choose from. I get frustrated when there is little information on my topic.

- Human Services Student 16

The hardest part of my process is thinking of a thesis statement that can be researched. It takes time to think of ideas and filter the ideas that are worth it.

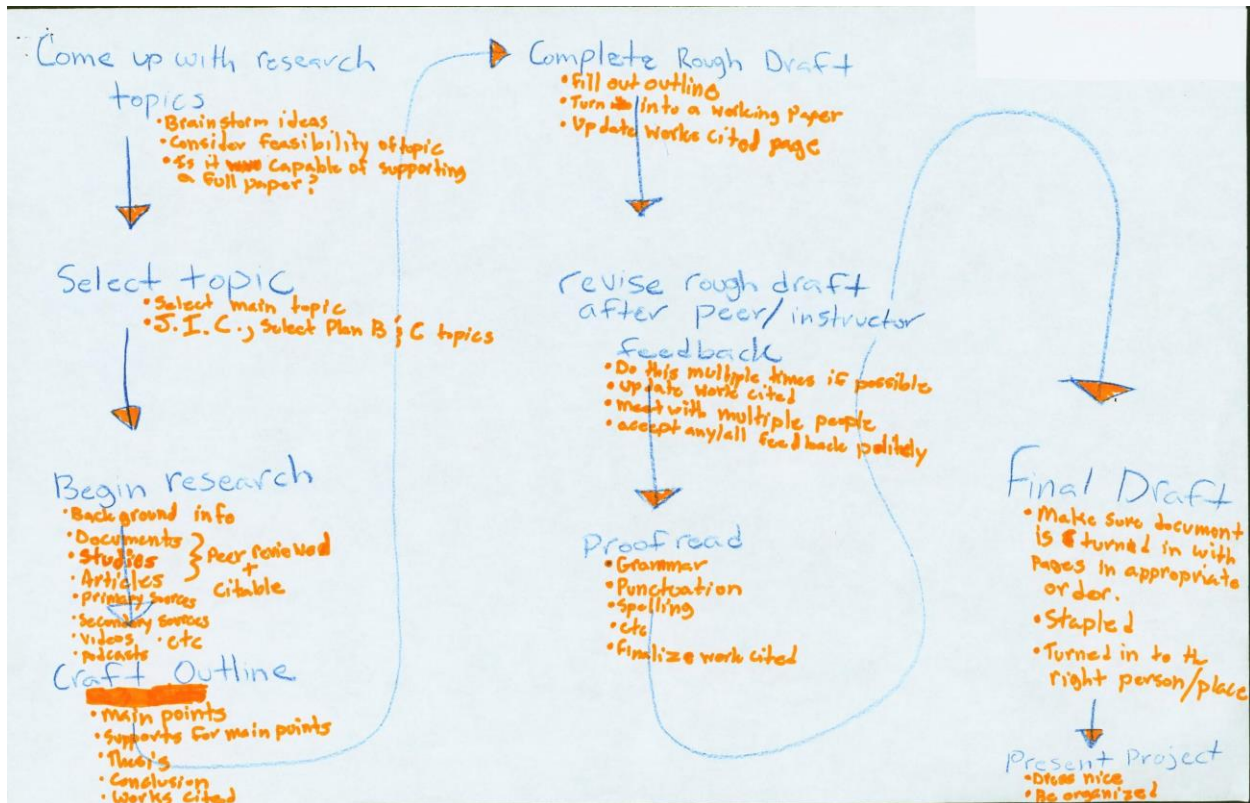
- Science Student 12

### ***Writing***

After topic selection, writing was the most common step in research process maps. Most students (23 of 30) included at least one writing step in their map; more than half the maps showed multiple drafts as part of the research process (see Figure 2).

**Figure 2**

*Process Map Created by Human Services Student 7*



A few students specifically mentioned formatting citations as part of their research process. For some students this was particularly frustrating, especially if they were focused on perfectly following a formula rather than providing enough information to identify a source. One student noted

My least favorite part of the entire process is creating the citations because it's a tedious and time-consuming process.

- Social Sciences Student 4

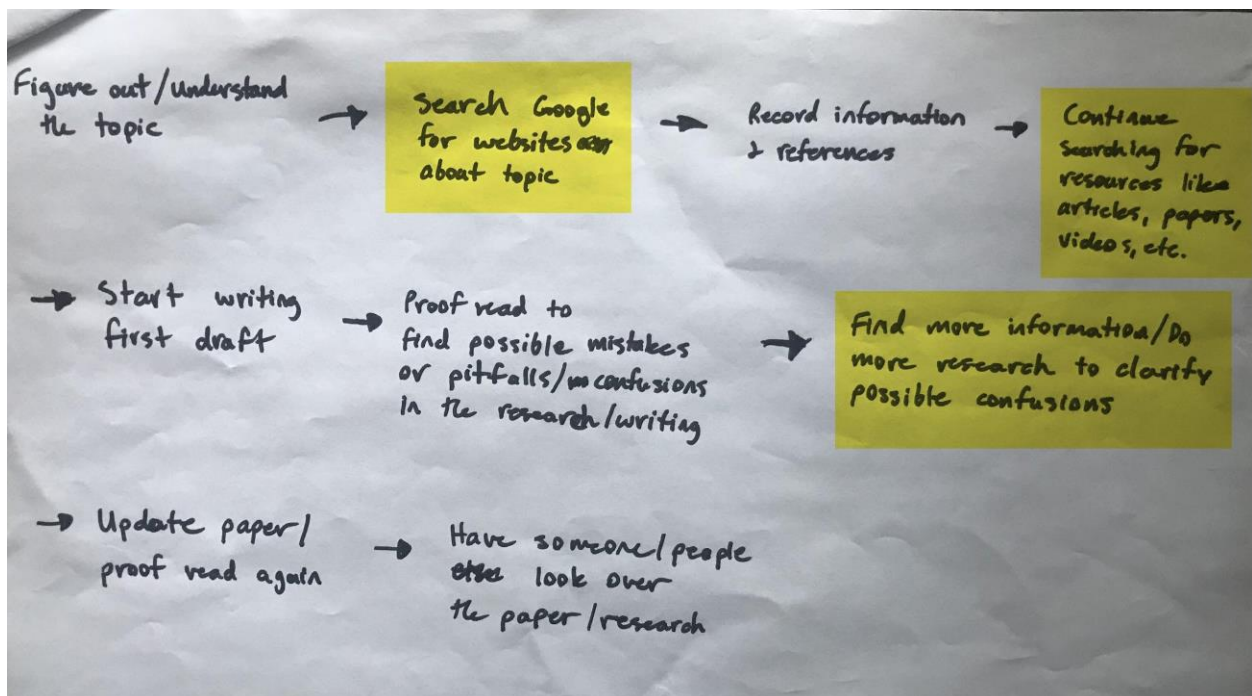
**Information Seeking**

We were interested in all of the ways students described looking for information and learning more as part of their research process. We coded this as information seeking. For more on information seeking, see Carol Kuhlthau (2004) and James Krikelas (1983).

Most student maps (22 of 30) included information seeking. Some students wrote about this in terms of where they would search; some described the type of sources or information they sought. Figures 3 and 4 show examples.

**Figure 3**

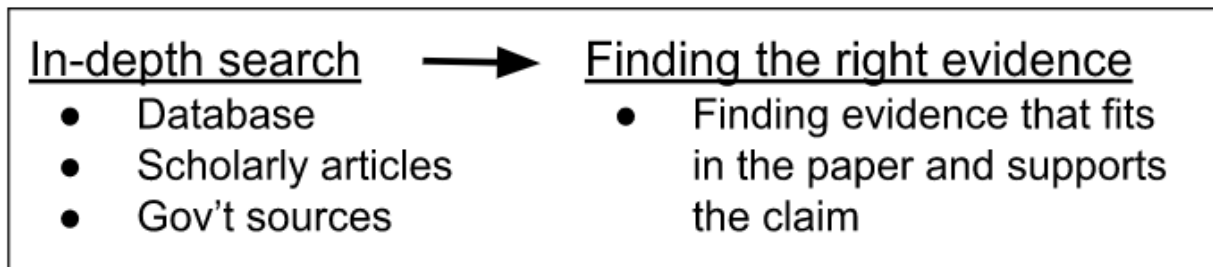
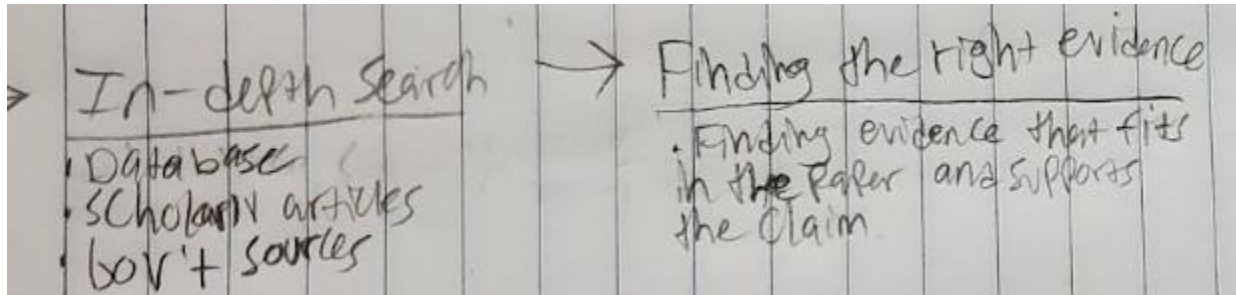
*Process Map Created by Engineering Student 9*



Note. Highlighting added by the researchers.

**Figure 4**

*Information Seeking Steps of Social Sciences Student 20*



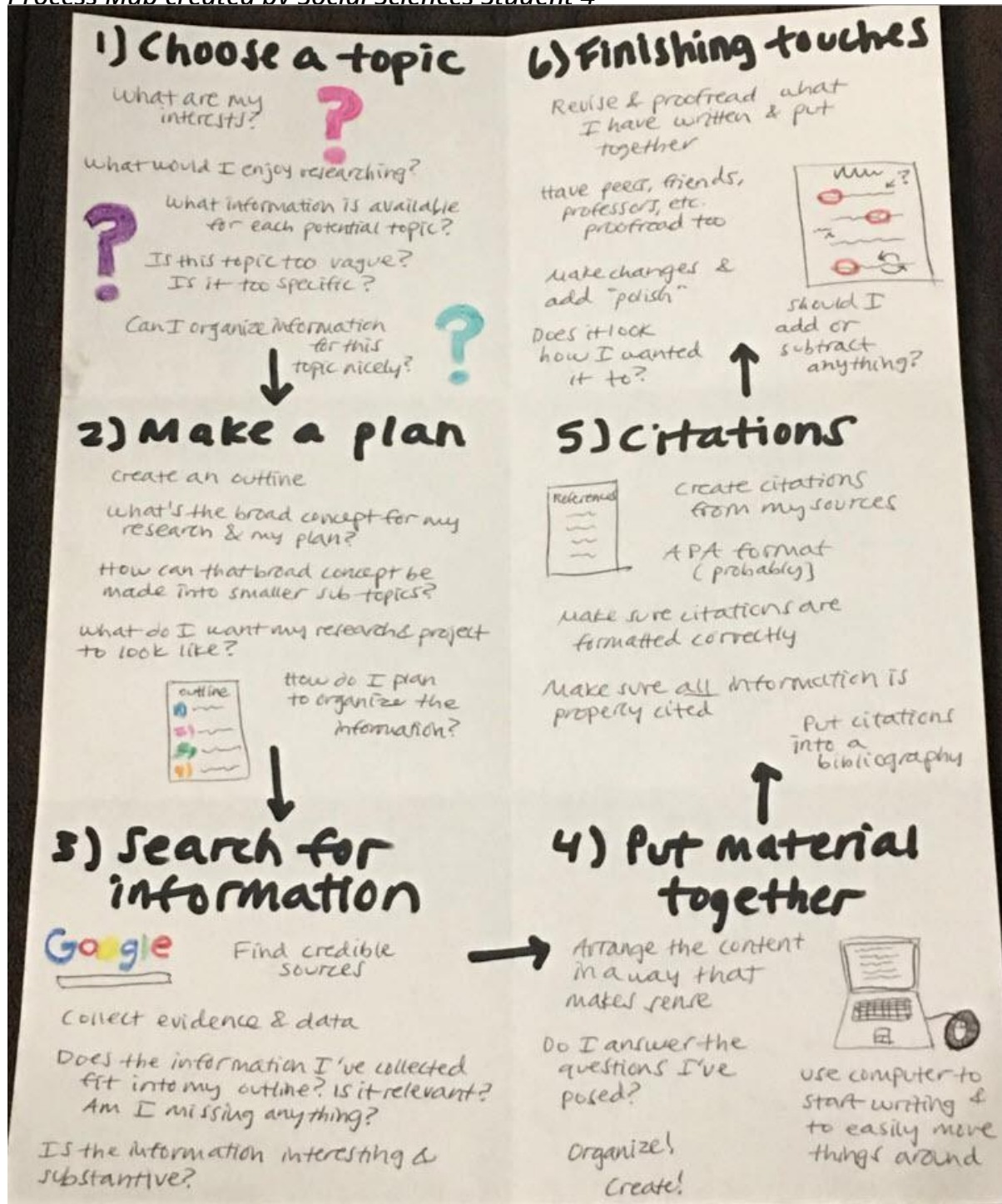
We were concerned by the approach to source selection in some of the process maps. In these maps, students first decided what they were going to write and then looked for sources that supported that argument (see Table 2 and Figure 5 for examples).

**Table 2***Seeking Sources to Support Argument*

Student	Outlining step	Seeking step
Sciences Student 12	Create a thesis. Design an outline to encompass all requirements.	Find sources that support ideas of thesis.
Social Sciences Student 15	Plan: Set up a plan for how and what I'm going to write, such as what each paragraph will entail.	Start research: Use my plan and basic research to figure out what I need to research more about.

Figure 5

Process Map created by Social Sciences Student 4



The student who created the process map in Figure 5 went on to explain:

I prefer to choose a broad topic and then to create my subtopics. Once I've chosen those subtopics, I can begin creating an outline for my research. I like to create an outline before I begin my research so that I know what information I need to be searching for, and so that I know how much information I need. It helps me decide which information is relevant, and then I can sort the information as I collect it.

- Social Sciences Student 4.

Like other information behavior researchers, we see research as a fundamentally exploratory process (Krikelas, 1983; Kuhlthau, 2004). Engaging in that process takes a long time; generous amounts of time spent seeking and reading, creating bookmarks and notes and half-formed ideas before you have anything close to an outline. The previous examples seem to describe laying out an outline before that exploration begins, then searching for information to expand on the outline. It can become an issue if the plan is too specific or if it is followed too strictly. We discuss potential ways to structure assignments to encourage more exploration in the Assignments section.

### Reflecting on the Research Process

Students reflected on their research process at three points. Students answered reflection questions in conjunction with creating their maps (see prompts in [Appendix A](#)), when their research projects were underway (see prompts in

[Appendix B](#)), and after submitting their projects (see prompts in [Appendix C](#)). We noticed some patterns in students’ responses.

***Difficult Stages***

Many students identified choosing a topic, searching for information, or writing as the steps they found particularly challenging or frustrating (see Table 3).

**Table 3**

*Challenging Stages of Research Process (Beginning of Semester)*

Stage	Number of students
Choosing a topic	8
Searching for information	7
Writing	9
Other (depends on the project, etc.)	6

After submitting their final research assignment, students were asked about difficult stages in their process. Their responses are described in Table 4.



**Table 4**

*Challenging Stages of Research Process (End of Semester)*

Stage	Number of students
Choosing a topic / topic specificity	1
Searching for information	4
Reading and evaluating information	4

In this reflection prompt, the question “How did you feel at different points during the research process?” followed several questions about searching for information (see questions in [Appendix C](#)). This may contribute to the differences between which stages students described as difficult at the beginning and end of the semester.

***Research Process***

In the mid-process reflections, students compared their current research process with the maps they made of a prior research assignment (see questions in [Appendix B](#)). Most students (12 of 22) felt that they were following the same process they had described in their maps. Some students (3 of 22) described their research process as generally similar to their maps, but noticed some differences (see Table 5).

**Table 5**

*Differences Between Research Process and Earlier Process Map*

Student	Reflection
Sciences Student 3	I have gone through the same steps in roughly the same way. I am currently on step 3 but it is a little different than I am used to. Typically, I compile everything in one go, while this has given me time to actively look and find better/more reliable sources than I have really ever had. It helps to show me that procrastination isn't as productive as I thought.
Engineering Student 9	I think my path is pretty similar to how I wrote it out, I would say I did a lot more reading and looking into more sources than I would have thought, and definitely didn't say anything about writing an annotated bibliography, especially before doing any drafts.
Human Services Student 22	My process for this project has followed the pattern rather well, however the pacing is different due to the nature of the research project. Instead of straight 'writing', there is more development in the research processes, which makes the steps more 'stop-and-go' like.

In their final reflections students considered how they might approach research differently in the future (see questions in [Appendix C](#)). Most students (9 of 12) had ideas for things they would like to change for their next research assignment; a few students (3 of 12) described their successes and their intent to use these same skills in the future (see Table 6 for examples).

**Table 6**

*Student Approaches for Future Research*

Student	Reflection
Human Services Student 18	One thing I would do differently next time I do research for a research project is to not be so specific when I search for information. I was adding too many irrelevant words when I was searching for information and that may be why it was a tad difficult to find sources at first.
Human Services Student 17	I truly believe that I would not change a thing. My group and I did a great job finding relevant information and splitting up our tasks appropriately. I think we did the right thing by starting this project by finding sources and information and then picking it apart and going from there.

***Topic Development***

Students were challenged by developing and selecting research topics. They showed a variety of levels of confidence, skill, and understanding of moving between broader and narrower ideas. Some students were working in groups and it should be noted that group dynamics affect the topic development process.

We were particularly interested in the challenges students described in coming up with a “researchable” idea or question. A few examples are included in Table 7.

**Table 7**

*Students Describe Difficulties with Research Topic Development*

Student	Reflection
Sciences Student 12	The hardest part of my process is thinking of a thesis statement that can be researched. It takes time to think of ideas and filter the ideas that are worth it.
Social Sciences Student 15	The first few steps are the most difficult for me because I have a hard time picking things that are researchable.
Human Services Student 16	At the beginning of the research process, I felt slightly overwhelmed because our group did not have a solid research question. Over time we refined our research questions and this made me feel a lot better.

Students were challenged by selecting a topic that fit their assignments' scope. Some students were able to choose an aspect of their initial topic to focus on for the assignment, while others abandoned their initial topic when they ran into problems (see Table 8).

**Table 8**

*Students Describe How their Topic Changed During the Semester*

Student	Reflection
Social Sciences Student 11	Yes it [the topic] has changed a little bit, we started off looking into how western diets (which occur from large scale agriculture) impact the environment and we are no longer looking at diets, just the agriculture aspect. Another thing that has changed is that we were also going to look at human health due to this but we are only going to focus on environmental health.
Social Sciences Student 18	We were doing 'Does pollution affect sea-life?' We changed it because it was too broad. [new topic was: Is animal testing necessary for cosmetic tests? ]

Students showed that they would benefit from more modeling and practice with topic exploration and development in the context of their courses.

***Searching***

At the end of their research project, students addressed several prompts about their experience searching for information (see [Appendix C](#) for prompts).

Students showed strengths in the search process and understanding of ways to revise their searches (see Table 9).

**Table 9**

*Students Describe their Search Strategies*

Student	Reflection
Human Services Student 16	When I first started looking for sources I did a regular google search just to see if there was any information on my topic that I found interesting. After I did this I narrowed down my search by having a narrower research question. I then used the school library's data retrieving tool to look up scholarly sources that I could use for my research. I learned that this process works for me because starting broad allowed me to see what questions I had about my topics.
Engineering Student 6	Research for the Analysis and Recommendation report began with a simple google search for a brief overview of the "buzz" associated with the topic. This simple search created search terms that were developed from the common topics of the search. From there, research databases were used to find in-depth academic journals and published research papers to determine the monetary and environmental impacts of renewable energy.

We also saw some concerning search strategies. At least one student from each course described looking specifically for sources that would support their predetermined argument. For examples, see Table 10.

**Table 10**

*Students Describe their Search Strategies*

Student	Reflection
Engineering Student 4	I googled my topic to get some general information regarding it then I went to google scholar and the libraries search engine to find sources that would convey similar information as I was trying to show.
Human Services Student 17	I spent about 2 hours searching. As I clicked on each link, I went through to make sure the date was at least within the last 5/10 years, and that the data and information supported my case of STEM taking over humanities.

***Evaluation***

Some students felt comfortable evaluating sources for their research project (see Table 11).

**Table 11**

*Student Confidence in Source Evaluation*

Student	Reflection
Human Services Student 18	<p>I felt confident in my research process throughout the entire experience, and this may have been because I was not alone in my process, I have team members that assisted me in finding good sources.</p> <p>Since we were researching the inequalities within the Duluth School District, it was not that easy for us to accumulate peer-reviewed sources, but we did what we could and used what we had to the best of our ability and advantage. When we came across this issue we made sure the peer-reviewed research we had was going to really help us prove our point, so when we used news article research that may not have been as credible, it still all made sense because we had a good balance of both.</p>
Human Services Student 10	<p>During research, I felt somewhat uneasy with some of my resources because I did not know if they would be good enough.</p>

Other students struggled to find sources that met their expectations (see Table 12). This often stemmed from unrealistic expectations about what kind of information any one source was likely to contain. Students who had particularly narrow ideas about the types of sources that could be reliable had a particularly difficult time. Rather than considering how to best research their chosen topic,



some students ruled out most types of publications, or sources more than five years old.

We believe students would benefit from approaching source evaluation less as a checklist to run through and more as a nuanced, context-dependent process.

**Table 12**

*Student Criteria for Source Evaluation*

Student	Reflection
Human Services Student 22	Finding adequate sources turned out to be a struggle as it is difficult to find quantitative research on my topic.
Engineering Student 4	For example many articles that I found went through and derived very technical equations for efficiency, cost, profit, and maintenance, now this information is useful but I was looking more for raw numbers regarding cost, maintenance and profit between the different types of hydroelectric power (i.e. large scale, small scale, pumped, etc).
Human Services Student 17	I spent about 2 hours searching. As I clicked on each link, I went through to make sure the date was at least within the last 5/10 years, and that the data and information supported my case of STEM taking over humanities.

***Time***

Limited time influenced students’ approaches to and feelings around research. Students brought up time concerns in response to prompts about how they felt about various steps in the process, not just when specifically asked about time.

We wonder if students are unprepared for the amount of time that some steps require. Some of their examples included less visible parts of research like reading articles and deciding what information needs to be included (see Table 13 and 14). There may be opportunities to model these processes for students and give them a better idea of what to expect.

**Table 13**

*Students Describe Time-consuming Parts of a Past Research Project*

Student	Reflection
Human Services Student 33	I find organizing my information is one of the most difficult [steps]. It takes a lot of time to decide how I want to put my information together, or decide what I should exclude altogether
Engineering Student 4	Research is the most time consuming in my opinion because their [sic] are usually a lot of articles that are lengthy so it takes a while to sort through them.

**Table 14**

*Students Describe Time Spent on Current Research Project*

Student	Reflection
Human Services Student 22	I spent just as much time researching and seeking out sources as writing the research project itself.
Engineering Student 4	As with anything in life there were a few hiccups that came with the research. The main one that sticks out to me was trying to find articles that were “close to home” and could be put into context for someone that is not an expert. This was combated by putting more time into the research and looking at more articles. The extra time put into the research was frustrating more or less because of the amount of articles I looked at and so few that I thought were useful.

**Disciplinary Differences**

The disciplinary divisions in Advanced Writing courses influence the kind of research assignments students are asked to complete. For example, students in Advanced Writing Human Services are asked to identify and propose solutions to a problem in their field using academic literature and create a presentation with that information designed for a relevant audience. In Advanced Writing Social Sciences, students investigate a local or campus problem and write a report with proposed solutions or create an annotated bibliography or a literature review on

a topic of their choice. In Advanced Writing Science, students choose a topic in their field and create an annotated bibliography and literature review.

Despite differences in assignments, across disciplines students were challenged by the same things and largely conceived of the research process in similar ways. That being said, we did note a few differences in what students emphasized in our analysis. Due to our small sample sizes we don't want to draw conclusions from this information but do want to be aware of them as possible things to keep in mind for the future. We speculate that these differences could be attributed to what the course instructors have emphasized, what is emphasized in assignments, and students' prior course work. Differences included:

- Sciences students talked about their approach to reading individual articles
- Engineering students didn't have as much to say about topic selection as students in other Advanced Writing courses
- Human Services students talked more about tailoring their writing to a particular audience
- Despite sharing challenges in their research process, students didn't mention getting help with research. Some Engineering and Social Science students did mention getting help with writing.

## **Epiphanies and Opportunities**

As we worked on compiling and analyzing data collected from the students, we began to make connections to our own experiences teaching and consulting with

students. Librarians witness how students struggle with the research process and oftentimes we are aware of things outside of the students' control that add to their struggles.

For instance, students' reflections talked more about topic development, evaluation, and time constraints than they did about searching. Their maps showed similar attention to those parts of the process. We realized that we don't spend much time on these areas in our teaching and neither do writing instructors. We let ourselves imagine what addressing these barriers in teaching might look like.

We began to refer to these connections as "epiphanies." They were "ah ha" moments that reinforced our experience and suggested opportunities for change. The epiphanies and opportunities represent key results of our research. Understanding what barriers students face inspires us to approach our teaching with new tools.

We grouped our ideas for change into two categories: Assignments and Revising Instruction.

### **Assignments**

The structure of research or writing assignments impacts students' ability to work successfully through the research process. Advanced Writing students work on a research topic in a course where the primary focus is on writing and research receives less time and attention. In cases like this, assignments may offer a simulation of the research process as an underpinning for what is actually a

writing assignment. This can give students false ideas of what research is and what kind of research they may need to do post-graduation.

Instructors may assume that students know how academic research, writing, and publishing works, or even what it looks like, which can create confusion and frustration for students. Multiple students in our research mentioned being introduced to library resources for the first time in Advanced Writing.

Expectations for specific source types, a required number of sources, or designated date cut-offs, can be confusing to students when provided without context.

Group assignments can also pose challenges for learning about the research process. A group assignment might be meant to give students a chance to work through a project as a group, and to write for a specific audience, and to research a topic. One that's good for the first two may not be good for the third one. Group work and group writing experiences often run counter to understanding the research process because students don't necessarily take part in the whole process, but rather split up the work among group members.

It can be difficult for instructors, who have significant experience doing research in their own fields, to understand what it's like to explore a topic without that level of expertise. The initial step of familiarizing oneself with a topic is frequently skipped or shortened in research assignments and students struggle because they are choosing a topic instead of developing one based on things they have already read.

Instructors should consider whether an assignment is asking students to work through a genuine research process versus using the process as a means to an end. Many assignments require shortcuts in the research process that are confusing and frustrating for students. The research process may appear to be a step-by-step plan or a series of hoops to jump rather than an opportunity to engage curiosity and exploration.

One example of these shortcuts is an assignment that has students begin by forming a thesis or a position, or identifying a narrowed topic. Students then view their research as a means of finding sources to fill in and support the ideas they already have, as opposed to exploring and learning about a topic in order to form and inform their thinking. In these assignments, confirmation bias starts with topic formulation. The lesson students learn from this can be actively dangerous if, for example, a student mentions the five papers finding a medical treatment works and not the four describing its serious risks.

### **Revising Instruction**

Recognizing that research or writing assignments can create barriers to student learning gives instructors an opportunity to make meaningful changes. We imagined possibilities and came up with ideas for faculty workshops as well as ideas that instructors might use with students.

Faculty workshop ideas include:

- Examining assignment guidelines critically to find out what information literacy skills students are being asked to use or develop, and what students are asked to do that's counter to those goals.
- Attendees exchange assignments with each other, perhaps with someone in a different discipline, and plan how they would complete the assignment and identify what kinds of information literacy skills are being called upon.

Activities for students include:

- Practice testing assumptions. Give students a factual statement and ask them to prove it. For example, "Divorce rates are rising."
- Practice reading for understanding and making connections. Begin with instructor-provided readings and have students practice reading with those. It might be reading research articles, or reading and comparing different types of sources.
- Have students investigate a topic in order to come to a research question. This could be a semester-long assignment that focuses on finding, evaluating, reading, understanding, and using sources to synthesize information.
- Break up parts of the research process to help with time constraints. For example, give students sources to use in one assignment, then ask them to look for and evaluate sources in a different one. Allow more time for



exploring parts of the process. These parts don't need to happen in the same course.

- Have students write a journal about their process then write what they have learned as the final assignment. This would be appropriate in a mid-level disciplinary course with a goal of topic exploration, topic development and learning about source types.

## **Conclusion**

We began our research wondering about students' conceptions of the research process. Our findings from maps created by students in upper-division writing courses were similar to the findings from student maps created by first-year students in Markowski and Dineen's (2019) work. Like them, we found that students require more time for topic development and more support in evaluating sources. The students' reflections showed that their experiences and understanding of doing research were often shaped by what was being asked of them in a research assignment. When an assignment posits research as a set of simple and discrete steps or paces the work in a way that asks students to rush through a process of inquiry, students miss out on the reading, reflection, and learning that is at the heart of doing research.

Collaboration between librarians and instructors is essential to providing students with opportunities to build knowledge and skills about the process of doing research. In our next phase of this work we look forward to opening conversations with instructors, providing opportunities for faculty development,

and finding new ways to integrate learning about the research process into student writing assignments.

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## **Appendix A**

### Research map prompt

Think about a recent research assignment and the process you went through.

Take 15-20 minutes to draw the steps you took for that research project.

(Use as much space as you need. You can include text, pictures, arrows - whatever helps you express your approach.)

Once you've finished drawing your process, describe each step in a few words or a sentence.

Thinking about the process you've drawn, answer the following.

1. Why do you do things in this order?
2. How do you feel about various steps? Are some more challenging or frustrating than others? Are some easier or more fun?

## **Appendix B**

### **Mid-process reflection prompt**

This is part of a research project into students' experiences and attitudes related to the research process.

1. What is your topic or research question?
2. Have new questions come up related to your research topic? Has your research topic changed?

Look at your research process map to answer the next 2 questions.

3. What stage of the process are you at?
4. Think about your research process so far for this class. Have you gone through the same steps in the same order as you expected when you drew the map? Describe your path.

## Appendix C

### Final reflection prompt

Please respond to the following questions about your experience completing research during your most recent research assignment. Your response should be approximately 300-600 words, or around one double-spaced page. Plan to spend about a half an hour writing this informal reflection.

- What process did you use to find sources for your assignment and what did you learn from that process?
- Where did you search for information? What types of resources or tools did you use?
- Approximately how much time did you spend searching?
- What challenges or problems did you encounter while searching? What did you do when you came across these challenges or problems? Be specific and provide examples.
- What worked when you were doing your research? What did you try that didn't work? Be specific and provide examples.
- How did you feel at different points during the research process?

- What would you do differently the next time you complete a research project? Has your approach to research changed over the semester? If so, describe how your process has changed.