
Using Images to Understand Students' Approaches to the Research Process

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Abstract

Using images in library research and assessment projects can provide a rich source of data for learning about user behavior. In this project, student-generated drawings were used both as independent objects of analysis and as an elicitation method during interviews. Two hundred twenty-two undergraduate students drew pictures of the steps they took when executing research assignments, and nine students were interviewed about their drawings. Findings revealed information about students' use of research sources, their patterns of help seeking behavior, and the affective dimensions of their approach to research assignments. Recommendations for using images in assessment projects are discussed.

Using Images to Understand Students' Approaches to the Research Process

Images provide a valuable method of collecting data for research and assessment. In designing projects, librarians can use pre-existing images, produce their own images, or have participants produce images. For participant-produced images, librarians may ask participants to take photographs or create videos of certain aspects of their environments, or they might ask participants to draw or assemble images that reflect their experiences or perceptions.¹ In this paper, we focus on the use of participant-produced images as a valuable tool for library research and assessment. We describe how we used participant-produced images in an assessment project that focused on understanding students' research processes, and we conclude with several recommendations for designing image-based assessment projects and for conducting image analysis.

Literature Review

The use of images in research and assessment allows participants to express ideas or feelings that might not have emerged through words alone. Sandra Weber describes how "images can be used to capture the ineffable, the hard-to-put-into-words... Images

can be used to communicate more holistically, incorporating multiple layers, and evoking stories or questions."² The process of creating images encourages participants to be reflective about their experiences, to consider issues in a different light, or to engage in more abstract types of thinking.³

Images can be used either as standalone items for analysis, tools that facilitate the researcher's interactions with participants, or items of participant empowerment. A common research technique that uses images is *visual elicitation* or *photo elicitation*, in which either pre-existing or participant-produced images are used as interview prompts to encourage participants to share perspectives that they might not otherwise have thought to reveal.⁴ Visual or photo elicitation may be used to prompt participants to discuss issues in different ways, to explore and reflect upon everyday events, to give them a more empowered role in the research process, or to facilitate closer collaboration between the researcher and participants.⁵ Another common visual research technique, *photovoice* or *video diaries*, involves giving participants cameras and asking them to communicate their stories through the use of images. Their products may then be shared with the community and be used to promote social justice causes.⁶ While these are two of the more commonly used types of visual research methods, researchers can ask participants to work with visuals in any number of different ways, such as drawing diagrams, timelines, or self-portraits; creating collages from a mix of visual materials; or creating products that combine image and text, such as memory books, graphic novels, or diary-photographs.⁷

When analyzed, images often allow researchers to understand participants' individual accounts of their experiences or to construct collective narratives.⁸ In addition, images can be especially powerful research tools when used in combination with text, and in many cases, images cannot be fully understood if they are divorced from the context in which they were created.⁹ However, images can also pose special

problems for researchers in terms of analysis. Weber explains that:

Images are open to interrogation and interpretation, and there are so many questions to consider... What constitutes a valid interpretation of images? Is there such a thing? What is the role of social and cultural context to interpretation?... What kinds of stories can images tell?... What relationships are possible between images and word?¹⁰

Regarding image analysis of participant-produced images, researchers have a number of options. Images can be analyzed quantitatively by identifying different variables, counting the frequency with which certain items fall into different categories and making comparisons between frequencies.¹¹ Images can be analyzed qualitatively by exploring the meanings of what has been depicted, which is often done in relation to textual analysis.¹² Alternatively, researchers may use some combination of quantitative and qualitative analysis.

Use of visual research methods in library research has grown over the past decade. Several library studies that have used ethnographic research methods to explore student and faculty information behavior have incorporated a visual component into the process of data collection. In studies of students' study preferences and work practices conducted at the University of Rochester, Nancy Fried Foster and her colleagues used a number of unique methods that combined image and text. These methods included photo surveys, in which students were interviewed about photos they took that reflected their lives;¹³ mapping diaries, in which students recorded their daily movements on a campus map and were interviewed about them;¹⁴ student designs of library spaces, in which students drew pictures or created visualizations of their ideal library spaces using poster board, markers, pencils, and sticky notes;¹⁵ and retrospective interviews, in which students "drew comic-strip pictures in a rough flow chart, while telling the story of their work on a recent research paper."¹⁶ In subsequent ethnographic studies of student research practices conducted at universities in Illinois and California, researchers also used photo surveys (alternately called photo journals), mapping diaries, student designs of library spaces, retrospective interviews, and cognitive maps, in which students were asked to draw maps of the library from memory.¹⁷ In all of these studies, images

served either as an interview elicitation technique, objects of analysis, or both.

In library studies that employ visual research methods, images are most commonly used as interview elicitation techniques. For example, in a photo diary study conducted at the Massachusetts Institute of Technology, students took photos and screenshots of their information-seeking activities and then discussed their images during interviews.¹⁸ Other photo elicitation studies have been used to inform the redesign of library study spaces¹⁹ and to study user perceptions of public library spaces,²⁰ Native American students' perceptions of academic library spaces,²¹ the reading habits of undergraduate students,²² and the information and library needs of music and dance students.²³

Method

The goal of this project, a collaboration between two librarians and the director of a university writing center, was to learn more about students' research and writing processes by using drawings as the primary research instrument. The researchers asked 222 students in eight different classes that covered a variety of levels and disciplines to think about a recent research assignment and to draw all the steps they went through from the time that they received the assignment to the time that they handed in their work. The students were told that they could use text, pictures, numbers, or any combination thereof. They were also given two optional written questions to answer:

1. Which step in the process was the most challenging? (105 responses)
2. What would have made the process easier? (123 responses)

As part of the drawing activity, students were asked to supply their names and e-mail addresses if they would be willing to be interviewed about their processes. The researchers conducted interviews with nine students from a variety of majors, using the students' drawings to elicit more detailed information about what the students did throughout their research and writing processes, and about why they made the choices they did. The students were also asked some set questions about which parts of the process were most challenging, how much time they devoted to different parts of the research and writing process, what kinds of research sources they used, and how and when they sought help. The

interviews lasted 25–50 minutes, and were audio-recorded and transcribed.

After data gathering was complete, the researchers developed unique coding schemes for the drawings, written questions, and interviews. Coding the drawings posed some challenges, due to the mix of visual and textual content and the need to decide how to handle imprecision. Is a stick-figure person a friend? An instructor? A librarian? Does an unlabeled drawing of a computer represent research, writing, or procrastinating online? The researchers devoted much time to the development of a coding scheme and went through several rounds of testing to make sure all coders were applying the scheme consistently. The final coding scheme included examples from the drawings to clarify what was meant by different categories. For example, the category “get frustrated” could be illustrated by expressions of panic or stress, frustrated symbols that may seem similar to profanity representations, eyes drawn as X’s, or exclamation points over

clock or head. The written questions were coded separately with several categories and analyzed for general trends. The interview transcripts were examined for recurring themes, categories were derived from the themes, and the researchers coded each interview accordingly.

Results and Discussion

Research

Students depicted research in various ways. The most common were through computers (sometimes labeled with specific websites or library resources), books, or piles of papers representing articles. Most students depicted some kind of research, as shown in Table 1. It is interesting to note that 11% of the students did *not* depict any research, even though the task was to draw their process for “a paper that you recently completed that required research.” It is hard to know whether these students actually do turn in papers for which they have done no research or whether this part of the process did not stand out in their memories of their work.

Table 1. Depiction of Research in Drawings (n=222)

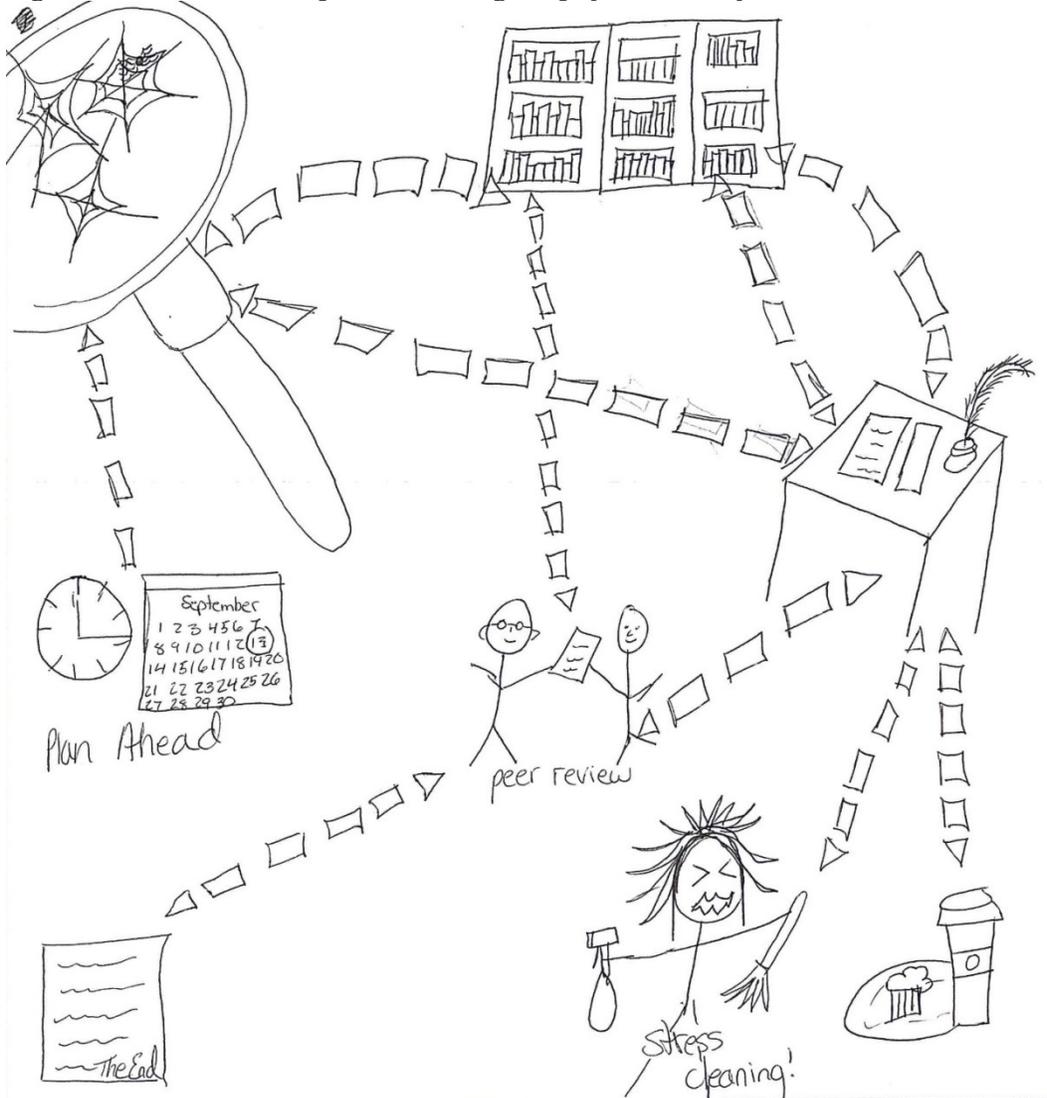
Depiction	Number	% of Overall Respondents
Any type of research	198	89%
General research (books, computers, search representations)	142	64%
Preliminary research (before finalizing topic for paper)	83	37%
Google	50	23%
Physical library (books or physical spaces)	49	22%
Articles or journals	32	14%
Library website	25	11%
Specific library databases	20	9%

Note: Some students represented research in multiple different ways.

Eighty students represented using specific library resources—databases such as JSTOR, journals, the library website—and/or the physical library; 53 represented library resources but *not* the physical library (see Figure 1 for a common representation of the physical library). This was encouraging for librarians. While, of course, it would have been

nice to see higher numbers, the fact that quite a few students voluntarily included information about use of specific resources indicated that at least some students are learning the value of library research sources as they are moving through their coursework.

Figure 1. One student's depiction of using the physical library for research



From the drawings, we saw how students viewed (or chose to depict) research as part of their processes. These depictions of research were also very useful prompts in the interviews for getting students to talk in greater detail about what they were doing. For example, one theme that emerged multiple times in the interviews was that students were having difficulty selecting a topic and finding appropriate sources about their chosen topic. Interviewee 4 talked about this: “It was a very open topic, where we could write pretty much whatever we wanted to, so first figuring out what I wanted to write about and then finding sources that helped to support what I wanted to write about was difficult.” The connection between choosing a topic and finding sources is something that emerged only superficially in the drawings but the connection became clearer when

students described these parts of their drawings in the interviews.

Help Seeking

Eighty students (36%) depicted getting some form of help in their drawings. Students depicted assistance either in some general fashion or specified the sources from which they received help as either peers, family members, the writing center, their instructors, or the library (see Table 2; see Figure 2 for an example of getting help from multiple sources). The most common source of help was peers or family members, with 47 students including this in their drawings, while the least common source of help was the library, with only two students depicting this. In addition to counting the number and types of help-seeking depictions, we analyzed

where those depictions occurred in relation to other elements. Students most commonly depicted getting help after they had already begun drafting their papers (67) versus before they had begun drafting their papers (30). Thus, for over a third of students,

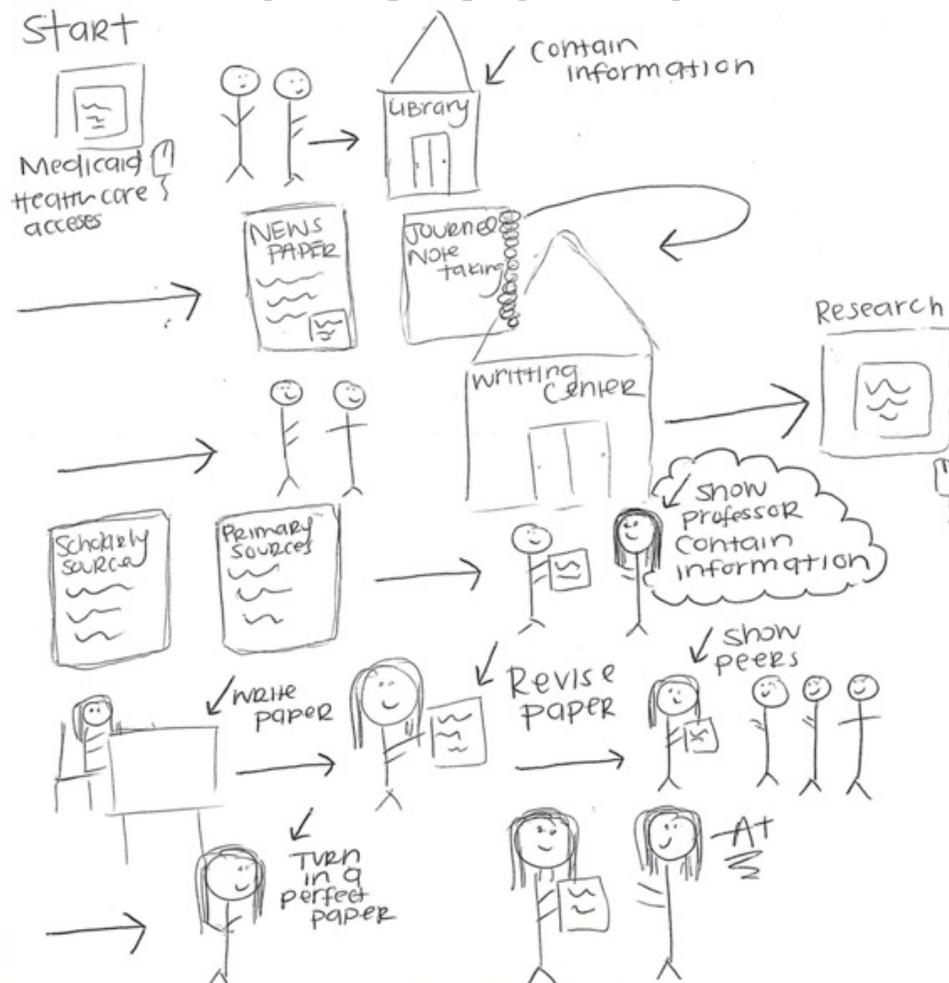
the process of getting help was important enough to depict visually, but help was usually sought toward the end of the process and usually from informal (peers and family members) rather than formal sources (writing centers, libraries, and instructors).

Table 2. Sources of Help in Drawings (n = 80)

Source	Number	% of Those Representing Getting Help	% of Overall Respondents
Peers or family	47	59%	21%
Unspecified	23	29%	10%
Writing center	19	24%	9%
Instructor	18	23%	8%
Library	2	3%	1%

Note. Some students represented getting help from multiple sources.

Figure 2. One student's depiction of getting help from multiple sources



Examining correlations between help seeking and other elements depicted in the drawings, we found that students who sought help generally showed better study, research, and writing habits:

- All students who depicted getting help from instructors (18) or the writing center (19) showed doing some kind of research.
- Those who depicted getting help from any source (80) were more likely to show better research habits (using specific databases or academic journals) and better writing habits (citing sources, using outlines, brainstorming before writing).
- Those who did *not* depict getting help from any source (142) were more than four times as likely to show procrastination in their drawings.

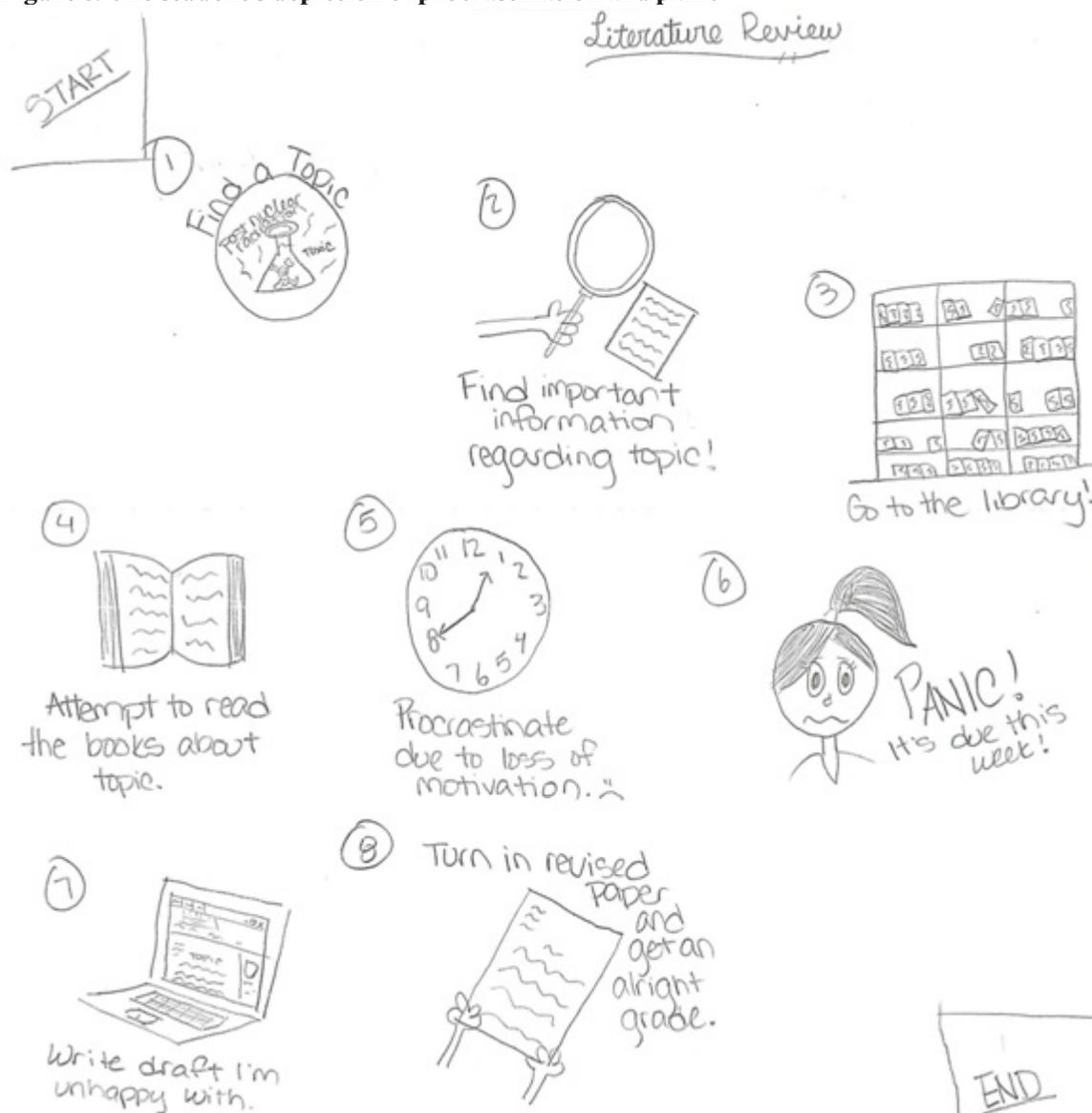
From the degree to which getting help seems to be connected to other positive habits, we concluded that getting help could be seen as a good research and writing habit in and of itself. It is impossible to know, however, whether those who seek help do so because they are more conscientious or dedicated students to begin with, or whether getting help fosters better research and writing habits.

Interviews provided further clarification of students' help seeking behaviors. Although only five interviewees depicted getting help in their drawings, all nine acknowledged getting some form of help upon further probing. This caused us to wonder whether help seeking is a much more common behavior for research assignments than was revealed in the drawings, even if some students do not recognize it as essential enough to warrant a visual depiction. In addition, the most common type of help that interviewees described receiving was for editing, which is consistent with our finding

from the drawings that many students received help after they had already begun drafting their papers. Interviewees also described the help they received from peers and family members in terms of varying levels of quality, ranging from in-depth feedback to more superficial types of suggestions. Finally, when we looked at students' responses to our written questions, we found that students struggled in a number of different areas. In particular, 36% of students wrote that some improvement in research skills would have helped them do better on their assignments. Thus, many students need help with some of the more complex tasks associated with research assignments, but they are usually getting help after these tasks have already been completed.²⁴

Procrastination, Frustration, and Taking Breaks

In drawing their processes of executing research assignments, students frequently included elements that were unrelated to the processes of planning, researching, writing, or editing (see Figure 3). For example, 29 students (13%) represented procrastination, which was often depicted as different types of distractions such as social media or other unrelated activities. Thirty-two students (14%) depicted getting frustrated, which was often depicted as panic or exclamation points over clocks or heads. Another 43 students (19%) depicted taking one or more breaks during the course of completing their assignments, which was often depicted as sleeping, eating, or representations of time elapsing such as clocks. The prominence of these elements in the drawings indicates that, for many students, executing research assignments is stressful and emotionally taxing. As librarians, we speculated that the drawing process enabled students to express these non-task-related elements in ways that they might not have done through other methods such as surveys or written responses.

Figure 3. One student's depiction of procrastination and panic

In the interviews, we asked students who had drawn these emotional or non-cognitive elements to elaborate more about them. Many of their responses indicated that they lacked confidence in their abilities or felt overwhelmed by such big assignments. For example, Interviewee #4 explained that “Once it starts getting closer, about two weeks before, I start really freaking out about it. I have anxiety problems.” The students we talked to described a variety of ways that they managed their feelings and completed their work. Interviewee #7 explained how taking breaks was an important part of keeping his stress levels in check: “I’ll start

going in depth over my research. And then I’ll kind of sit back and relax for a little bit because if I get too stressed, I tend to seize up really quickly. So I’m very good at keeping my stress levels down.” Overall, these drawings and students’ descriptions of them indicate that many had difficulty managing their time and stress levels when it came to working on research assignments. It also suggests that many students simply do not enjoy working on these types of assignments. Instructors and librarians can work together to address the affective elements that play such a large role in the way that students approach research assignments.

Recommendations for Using Images in Assessment

While images can be powerful research and assessment tools, they pose a number of challenges that have to be considered from the beginning of a project's design. When having students create images, your prompts need to be carefully constructed and tested with students. For our project, we initially began with just the drawing activity, but after trying it in two classes and looking at the results, we realized that it would be helpful to include a couple of brief written questions that asked students which part of the process was the most challenging and what might have made the process easier. We ended up getting very interesting supplementary information from those questions. As you consider adding more pieces to your data gathering, be sure to consider the additional time that will be required to both develop and test the different pieces.

Consider the instructions that you will give to students creating images. Despite having a script that was to be used to present the drawing activity, we soon discovered that it proved to be too easy for us to lead students toward either more text or more pictures simply by how we explained the activity, and so we had to make sure that we were consistent in giving instructions. Researchers should decide ahead of time whether or not showing students a sample drawing is advisable; if a sample is to be given, all students should see the same thing.

When designing your consent forms, make sure you get permission for any anticipated uses you foresee for the images or photographs you gather. Photographs require some special consideration. If participants are taking photographs, you may have to establish some guidelines about taking photographs of other people. Even if permission has been obtained, certain types of images do not protect anonymity—an issue of particular concern with using photographs—so you need to be clear about whether or not people should be in photographs and how you will use them if gathered.

When developing a coding scheme for analyzing drawings, considerable preparation needs to go into the creation of a method that encompasses all variations of how a certain concept may appear. If you are using a combination of image and textual data sources, you will need to decide whether to analyze images and text separately or together.²⁵

In the case of our project, we analyzed the images and textual data separately, and then compared them at the end for our final analysis. In addition, researchers need to recognize the limits of images as research objects and be wary of reading too much into an image, when a particular interpretation is not warranted.

When designing a collaborative project, you have the opportunity to bring together different perspectives that may offer a more in-depth view of your research question. But be prepared for the fact that you will need to analyze and code data from those different perspectives, too. These different perspectives give you more information but will require more time and discussion, and perhaps more work in achieving inter-rater reliability since individuals may perceive things differently or even use different terminology. If drawings or other images will be coded separately by multiple researchers, a considerable amount of time should be spent on practice images to ensure that all participants are coding items consistently. Despite the added time needed for collaborative image projects, having multiple researchers can be beneficial in providing checks to ensure that images are being interpreted as consistently and accurately as possible.

When using images as elicitation objects in interviews, consider how you will question students about them. You can choose to have students discuss parts of an image separately or ask them to discuss images as a whole. When using a collection of photos, you can have students discuss them one by one. If you are doing audio recordings of your interviews, you may need to indicate aurally which part of the image or which photograph you are looking at if you plan to do transcriptions for further analysis.²⁶

Conclusion

While using images in library research and assessment projects poses a number of challenges related to data collection and analysis, they can provide a rich source of data for learning about user perspectives. In this study, we used student-generated drawings both as independent objects of analysis and as a method for interview elicitation. In so doing, we learned much about students' use of research sources, their patterns of help-seeking behavior, and the affective dimensions of their approach to research assignments. This information has prompted a number of different strategies that

we are using or exploring in our library to better assist students with their research assignments.

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Endnotes

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