

Along for the Journey: Graduate Student Perceptions of Research

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Graduate students' identities and personal lives are heavily tied to their experiences of research, and many struggle to find, understand, and use information for research purposes. Using a drawing exercise rooted in visual research methods combined with semi-structured interviews, a research team in the United States and Canada explored graduate student perceptions of research with nineteen participants. Thematic analysis identified six themes: research is abstract; research is an odyssey; social support makes or breaks the student experience; research is an emotional continuum; interplay between identity/values; information is problematic. The study has implications for how librarians support graduate student research.

Introduction

Graduate students are increasingly becoming a demographic of interest and focus for academic library services and programming. This burgeoning interest in the field originates from the desire to better support the scholars, and subsequent library champions, of tomorrow as well as the recognition that graduate students are interacting with in-depth, often interdisciplinary, research that needs holistic support. Despite these trends, graduate students' information behaviors and research experiences have received significantly less notice in the literature than undergraduates or working professionals. This study fills that gap and helps those academic library individuals who work closely with graduate students to better understand their perceptions of, and experiences with, research to address their needs more fully.

Literature Review

Student Information Behaviors

Studies in the Library and Information Sciences (LIS) field have focused on the student experience and self-conception of information seeking for the past thirty-five years.¹ Existing studies in the field have emphasized the literature review as paramount in considerations of graduate student research.² However, this study looks at the research process holistically during the entirety of graduate level study, connecting this work more strongly to the existing literature on student information behaviors and affect in research. Several theories that

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underpin information-seeking behavior have primarily focused on particular populations: Kuhlthau's theory of information-seeking behaviors derived from work with primarily high school students;³ sense-making theory has studied undergraduate students;⁴ and cultural-historical activity theory has looked extensively at information use and conceptualization in the workplace.⁵ Existing studies on graduate research behaviors have primarily examined how they used search strategies or perceived library resources, not the overall research process.⁶ Furthermore, the majority of studies that do consider graduate students as a particular population have focused on those studying the humanities,⁷ or education⁸ rather than looking at students from diverse areas of study.

Largely missing from the existing literature are more holistic examinations of how graduate students—who are themselves being trained to participate in and conduct significant research—participate in and experience research as a phenomenon. This gap is partly due to the nature of training that graduate students receive while in their programs. There is a conception by faculty that graduate coursework adequately prepares students to engage in research. However, graduate students themselves report an overall lack of attention to their preparation as researchers.⁹ Within graduate programs, the purpose of research is determined by the level of study, with an emphasis on direct application of concepts at the master's level and the ability to advance the knowledge of a field at the doctoral level.¹⁰ These factors in graduate student research training are further complicated by the increasing emphasis on interdisciplinarity in research, the requirement of interdisciplinary and interinstitutional research teams, and the need to develop graduate student identity across all areas of professional and research practice during the course of study.

How, then, do graduate students learn to do research and arrive at original research ideas? Jurisevic found that students needed to pull from their own lived and professional experiences to iterate within their research.¹¹ Golde suggests it is an emphasis on apprenticeship with experienced faculty researchers that develop research capacity.¹² Boyce et al. found that a clear understanding of the processes for funding, publication, and authorship developed these abilities.¹³ Wessels et al. created a model to depict affective-motivational dispositions needed to attain research competence (RC) in moving through challenging situations in the research process.¹⁴ Impacting these considerations of how students seek information is a full-some understanding of the affective domain as it applies to research tasks.

Affective Dimension of Research

Kuhlthau asserts in her seminal information search process model that feelings correlate with thoughts and actions throughout the entire research process, from uncertainty at the beginning to relief after search closure.¹⁵ Students often initially hold a negative bias against research,¹⁶ which impedes successful research. When patrons lack motivation, they stop their search.¹⁷ Conversely, positive attitudes—such as motivation to learn, personal investment in learning, enjoyment of learning, and sense of accomplishment—impact cognitive and sensorimotor success in research.¹⁸ For example, phenomenological interviews demonstrate that passion for a topic motivates students to continue their search.¹⁹ LIS studies divide the learning process into three domains: affective (feelings), cognitive (thoughts), and psychomotor (actions).²⁰ Some studies assert that a continuum characterizes the affective domain from primary neurological responses to foundational genetic characteristics.²¹ Schroeder and Cahoy define the affective domain by its components: “attitudes, emotions, interests, motivation, self-efficacy, and values.”²²

In 2015, the Association of College and Research Libraries (ACRL) developed the Framework for Information Literacy for Higher Education (Framework) to aid librarians and faculty in teaching information literacy. In addition to knowledge practices, the Framework addresses dispositions, “which describe ways in which to address the affective, attitudinal, or valuing dimension of learning.”²³ Several studies analyzed which frames connected to college students’ experiences of research.²⁴

Most information literacy research regarding the impact of the affective domain on the research process studied undergraduate populations,²⁵ with a few outliers reviewing other populations: high school students,²⁶ faculty,²⁷ and information science graduate students.²⁸ Most studies involved interviews.²⁹ Two studies watched participants in a search process.³⁰ While Nahl and Tenopir did involve non-library science graduate students,³¹ the study involved users who were new to using electronic databases due to the study’s date in 1996. Previous studies have not used visualization or drawing as part of their interview process to learn about students’ affect regarding the research process.

Visual Research Methods

The use of visual research methods may provide new insights to graduate perceptions of research. Used throughout the social sciences in qualitative research since the 1960s, the use of visual research methods in LIS has been increasing for the last ten years. As the use of these methods grows, researchers rely on methods developed outside of LIS³² as well as examples of visual research from inside the field.³³ The growth of visual methods can be attributed to several advantages, including new insights for existing research questions, more complete, comprehensive data, flexibility to work with diverse populations, and more participatory relationships between researcher and subject that can empower participants.³⁴ In particular, visual methods, such as the draw-and-write technique or graphic elicitation, have been found to help researchers better understand complex and abstract phenomena, such as conceptions of information,³⁵ student conceptions of group work,³⁶ and conceptions of research by librarian and archivists,³⁷ as well as by graduate students and staff from university business schools.³⁸ In these studies, participants draw complex ideas and describe their drawings in writings, interviews, or focus groups with researchers.

Although Doucette & Hoffman have used graphic elicitation to understand librarian and archivist conceptions of research,³⁹ the method has had limited use in understanding how students, particularly graduate students, conceive of this complex topic. Bryan and Mavins discuss the value of drawing research in a classroom setting through their work with doctoral students and staff in the business school department who drew research or researchers in a workshop setting.⁴⁰ However, they focus less on how students perceive research. Visual research methods can provide deeper insights into research questions. Therefore, using this method to understand graduate student perceptions of research could give a much-needed understanding of how students understand research and how to best help graduate students become proficient researchers.

To date, there have been limited studies examining the graduate student conception of research itself, with prior research focusing on the performative aspects of conducting research rather than the mental models of understanding research. While studies have addressed the impact of the affective domain on the research process, they have not focused on graduate students, nor used visual methods. This paper seeks to address this gap by applying graphic

elicitation methods to a semi-structured interview protocol to examine graduate student self-conceptions of research.

Methods

The research questions for this study were:

1. How do graduate students at U.S. and Canadian institutions conceptualize research, including how they see themselves as researchers, how they perceive research is conducted, and what they consider the point of research to be?
2. What emotions or elements of the affective domain do graduate students associate with research?

Justification of Methods

In this study we used a combination of two methods of data collection: semi-structured interviews and graphic elicitation. We thematically analyzed the data to identify the major findings, using a grounded theory approach. The purpose of a grounded theory study is for a researcher to, “derive a general, abstract theory of a process, action, or interaction grounded in the view of the participants of the study.”⁴¹ We selected these methods as our research questions focused on understanding graduate student perceptions of, and experiences—both lived and affective—with research. We chose a semi-structured interview approach to provide points of comparison between research participants while also allowing for follow-up questions that could be tailored to individual participants to better explore the phenomena under study.⁴²

While data collection for qualitative research is often rooted in analyzing written text, there has been a recent movement toward defining text as inhabiting a variety of visual information formats beyond written work, including drawings, videos, and artwork.⁴³ Graphic elicitation is a visual research method where the participant draws something and then discusses their drawing, which allows the researchers to, “see through the eyes of the participant” with a new lens.⁴⁴ Visual research methods: are beneficial for new insights into existing research questions;⁴⁵ provide more complete, comprehensive data; build more participatory relationships between researcher and subject, which can be empowering for participants;⁴⁶ and provide flexibility in working with diverse populations, representing abstract concepts like information, group work, and research.⁴⁷ Given these benefits, and following the best practice of combining qualitative methods for data validity purposes,⁴⁸ we chose to use a visual research method with semi-structured interviews to provide greater insight and participant explanation of the drawing and thoughts about research.

Recruitment, Ethics, and Informed Consent

Participants for the study were graduate students aged 18 or older enrolled in a program of study at a U.S. or Canadian institution who could communicate with the researchers in English; they were voluntarily recruited from the institutions at which the researchers worked, via email. We sent emails directly to students at the University of Waterloo from a list available to the member of the research team employed there, to enrolled students at Adler University, and to a randomly selected group of enrolled graduate students at Northern Illinois University. We scheduled participants who met the study inclusion criteria for a Zoom interview with two research team members (an interviewer who had never interacted with the participant before and a second researcher taking notes). We provided informed consent in advance of each interview and again at the beginning the interview.

During the interview, we asked participants to, “draw what research is to you” and gave them ten minutes to draw, after which we asked them to describe their drawing and any emotions associated with it. Participants provided their own drawing utensils and completed their drawings in a number of ways. Some drew digitally, others drew with a pencil and paper, and others added color. After the interviews, we asked participants to share their drawings and had the option to sign a second informed consent for using their copyrighted drawings in subsequent presentations and publications. Research participants were incentivized to participate in the study through inclusion in a drawing for one pair of Apple AirPods, which we provided at our own expense.

The study received ethics approval through the Institutional Review Board (IRB) at Northern Illinois University in the United States (Protocol # HS21-0349), through the Office of Research Ethics at the University of Waterloo in Canada (ORE # 43220), and a reciprocal agreement with Northern Illinois University by the IRB at Adler University. We recorded interviews and used these recordings to review and edit auto-transcriptions generated by Zoom for accuracy. Data were protected through a shared, encrypted folder on a Canadian-based server in compliance with the data privacy protections required by research ethics approval.

Participant Pool

The participant pool for this study consisted of nineteen self-selected graduate students who responded to recruitment emails. Nineteen participants is an appropriate number for this type of study as, “Qualitative researchers usually study a single setting or a small number of individuals or sites, using theoretical or purposeful rather than probability sampling.”⁴⁹ There were eleven master’s and eight doctoral participants from all campuses associated with the researchers’ institutions, including online programs; therefore, students resided across the United States and Canada. The students were enrolled in programs in various fields of study, including counseling, education, psychology, engineering, public health, biology, policy administration, anthropology, and kinesiology. While the researchers did not collect demographic data about our participants outside their study area, participants were openly diverse in their race, gender, age, life experience, and citizenship. The participants were likely diverse in other ways, but we did not gather these demographic data as it was not a direct focus of the study. This size of the participant pool and diversity of experiences at the graduate level of study is representative of the later graduate student population and allows the data gathered to provide in-depth elucidation of the participant experiences.

Data Analysis

After the research team edited transcripts and verified them for accuracy, we used a thematic coding approach. This method of analysis was selected as thematic coding is appropriate for “those exploring a participant’s psychological world of beliefs, constructs, identity development, and emotional experiences.”⁵⁰ The use of nVivo (version 12) software allowed researchers to use the same codes reliably across coding sessions. The researchers coded the first transcript in a collaborative, synchronous meeting to establish the initial code book and subsequently coded all other transcripts in pairs. Any issues of disagreement or uncertainty were then referred to the third member of the research team for a final determination and to ensure inter-coder reliability. Where applicable, we used the drawings to complement, illustrate and thicken quotations from transcripts.⁵¹ Once the research team coded all transcripts, we

met to group the codes into larger themes. We determined the final themes through iterative reflection, which is represented in the findings.

Researcher Positionality

Given the impact researcher identities can have on research, we need to share the context of our positionalities.⁵² The members of the research team acknowledge that we present as White. Two of the researchers are cis-gendered women, and one identifies as non-binary. We are all employed professionally as librarians at the institutions from which our research participants originated. We attempted to mitigate the influence of social power structures by having a member of the research team from a different institution as the participant conduct the interview. Our identities and the potential for perceived power may have influenced what our research participants shared with us as well as what was of interest to us in probing further during follow-up questions in the interviews. Further, we acknowledge that our own experiences as graduate students in LIS and other fields influenced our understanding and presentation of the findings and helped us make meaning from our data.

Findings

Six themes emerged from a thematic analysis of the semi-structured interviews: 1. research is abstract; 2. research is an odyssey; 3. social support makes or breaks the student experience; 4. research is an emotional continuum; 5. interplay between identity and values; 6. (information is problematic.

Research is Abstract

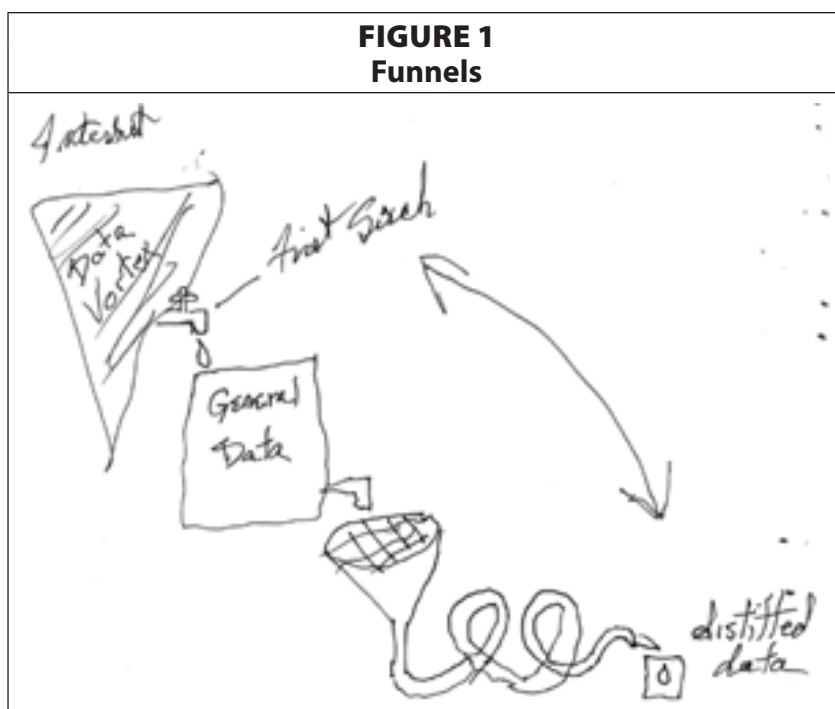
The experience of research as an abstract and hard-to-grasp phenomenon was common throughout our interviews. Students often struggled to describe what research means to them, and turned to metaphors and similes for their descriptions. Among many other metaphors, participants described research as:

- A sphere of light that sends out waves to light up other bulbs
- A rolling ball
- A series of cabinets to open
- Circles within circles
- Digging in the desert with paintbrushes
- A game of baby steps
- A path that is not always smooth
- Planting a tree that you will never sit in its shade
- Panning for gold
- A big mess I have to clean up
- Jumping off a diving board into information
- A bobsled or roller coaster
- A puzzle
- A treasure hunt

These metaphoric, or abstract descriptions also appeared in many of the drawings that participants completed. For example, one participant likened research to a funnel (figure 1), writing:

So, here we have the internet vortex of data. And then you do your first search, and you have general data. And then after looking that over and solidifying what you want, and then it goes through more filters and then you wind up with just the distilled data, but, when you get here, that doesn't exactly mean that you are done because from here, it can also mean that you have to go back because you found more information in the data and you have

to re-refine or gather more information from it. It's cyclical, but it can go off into rabbit holes. But, it doesn't, that's not always a bad thing.⁵³



At least two participants described research in relation to sight. For one, they drew a pair of muddy goggles and described how: "I truly feel like research starts out as a big mess that I have to clean up" (figure 2). For another, they drew a pair of eyes and described research as a way of seeing the world (figure 3), writing:

So, what research means, or is, to me is seeing. And so, eyes, and then these are people that are being seen. And then through the eyes of the researcher it's being translated into all these many more, many more either people or ideas or data.

FIGURE 2
Muddy Goggles

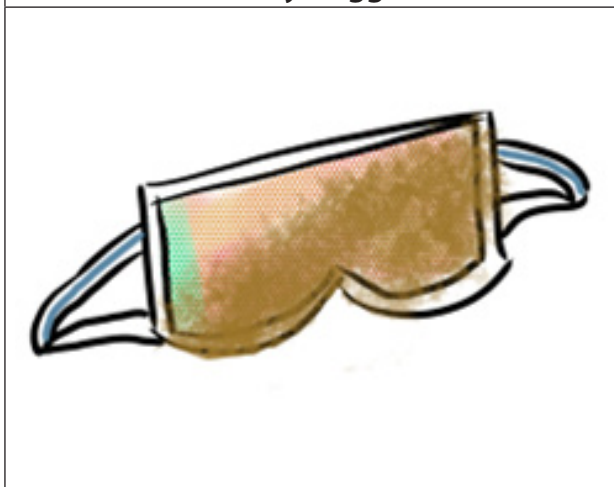
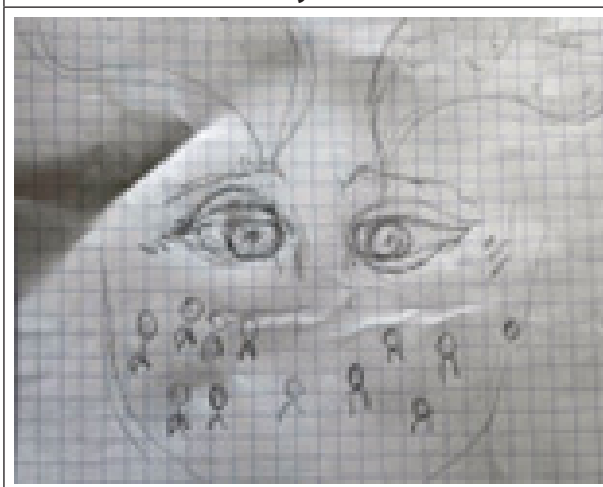


FIGURE 3
Eyes



But it's sort of transmitting through the eyes. I think that's the most important feature. Translating, transmitting.

Another participant described research as a wall that they had to get past (figure 4), writing:

there's a person at the bottom, and they're not entirely sure. They had this idea of where they want to go, but they're not entirely sure how to get there, so he's sitting there at this like wall kind of stuck...Umm, and so they have this idea of where they're supposed to go, but they can't even quite see all of what the final product could be anyway. Umm, because, despite everything you're still chasing almost like a moving target...Um, a lot of that comes from like, my experience of just being like, I'm stuck and I don't quite know where I'm going. But that's, that's like really what research is to me.

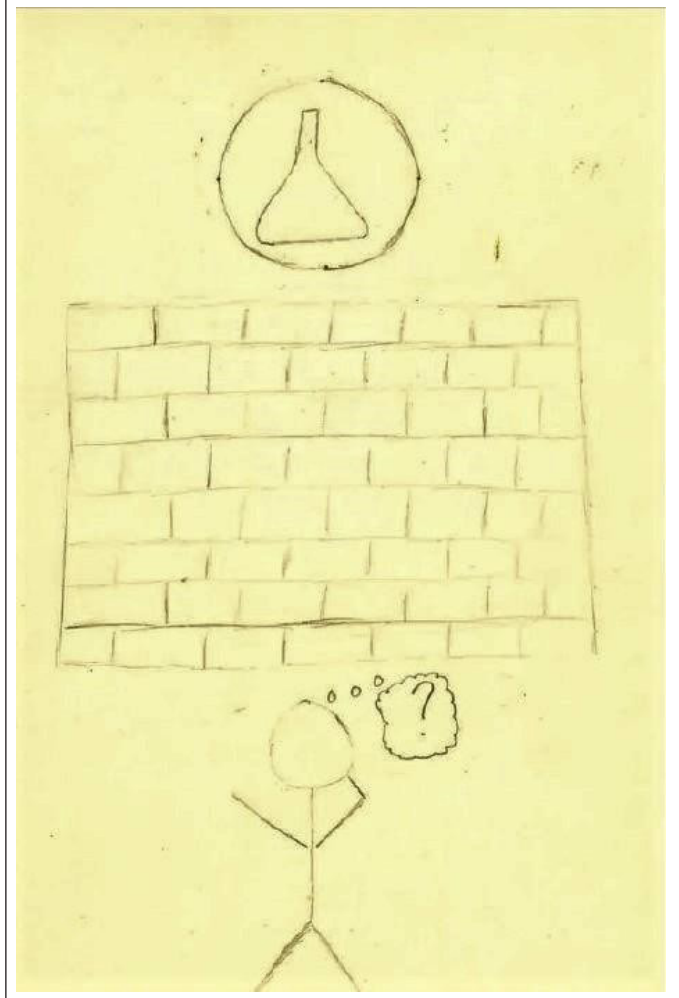
The use of metaphors to describe research suggests the largeness of the concept. For one student, the inability to truly know what research was likened to pregnancy: "It's like being pregnant. There's no point of reference. And everything is new. Right. But after you've had a child, better prepared about what to expect." Due to the abundance of metaphors in the drawings and interviews, the researchers concluded that research is an abstract concept that is difficult to describe.

Research is an Odyssey

Within this study, participants were far from homogenous, but their experiences were simultaneously in tension between the universal and the unique. One participant shared their conception of research as follows:

Okay, so basically my idea of our research is that we face a mess, or any issues or whatever questions we are interest to do a little bit further investigations. So of course, there's always questions but then we have a kind of like later moment to think about maybe there are some possible solutions.

FIGURE 4
The Wall



Another participant was heavily invested in the same construction of research being messy and unknown, observing:

Because it's research like: man we don't know what we're going to find, we don't know what we're gonna solve, you know, discover, but we're going to get in the water. [tone becoming more excited here] And see, and that's the research basis part, and where you make these discoveries where you figure out what's real, right? You take those thoughts that you had in your mind, and you bring them down into a space where you're going to, sort of, like, find things that are new so that was an interesting question.

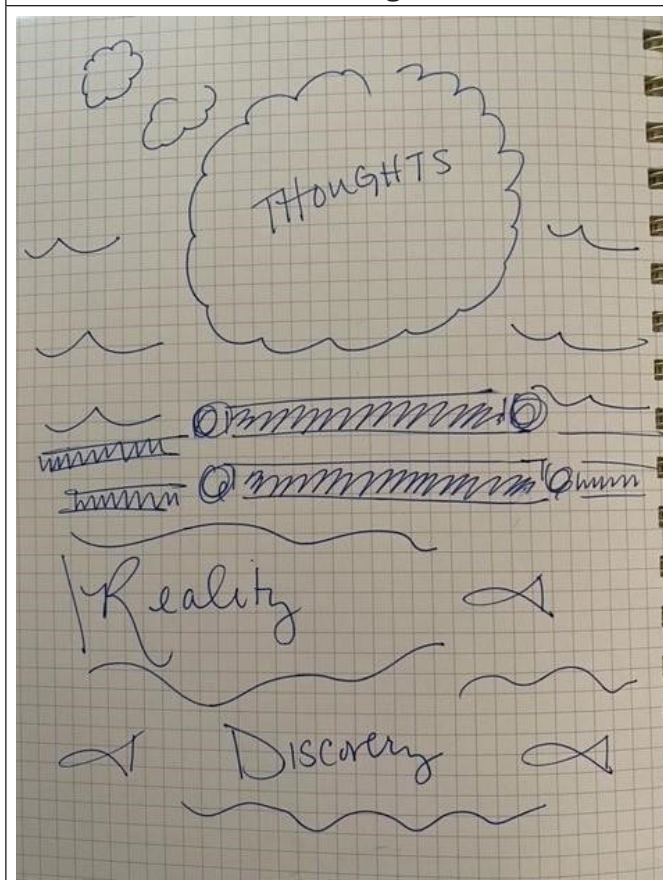
This same participant carried the metaphor of jumping into the water further in their drawing of the research experience, sharing that research is a bridge between two big ideas (figure 5). The surrounding dark waters are characterized by the reality of doing the work and the potential for discovery as an eventual outcome.

Participants' descriptions were unique, yet these overall conceptions of research were shared universally. Participants held this same tension between their unique experiences and the universal when considering how they performed research or engaged with the research process. One student noted: "So, in the beginning it was really just, you know, trial and error, I'm looking for these things out there." A second participant expanded on this concept of trial and error describing their experience with research as, "Once you go about doing it and you start trying to do it and keep realizing, things aren't working and you have to like continually go back to the drawing board and figure out something."

These conceptualizations strongly mirrored classic stories, like the Odyssey, in which an individual goes on a long and harrowing journey and the expectations of the journey are not always met. Further, the experience of graduate-level research is both liminal, that is, constantly existing between two states or places of being, as well as a recursive process. One participant expressed this experience eloquently, stating:

So I think it increases the comfort that like it's all going to work out. if you, if you think of it as this kind of like: these are the steps that I have to take. But I also feel like it doesn't help anybody to ignore the realities of, you're gonna have to

FIGURE 5
The Bridge



go back, you know, it's not going to work out in that linear process. I feel like the linear process is a place to start when talking about research.

Another participant described their approach to working within liminal spaces noting, "But the biggest thing that I've learned is to just set in it, set in the confusion for a minute and just, let it marinate and sit. And the more you're able to look at things objectively, or, well, yeah, objectively, the clearer the path will become for me." A third participant continued to grapple with the in-between experience of research stating,

"You know, that's a struggle with, with research in general is they don't tell you what's enough. You know like no one, no one tells you like, this is good enough, or like, this is where it should be." This concept of the journey also appeared in participant drawings, including one where the participant had to take a pause for family reasons, exemplified by the tent, part way through their academic program (figure 6). The onslaught of research always threatens to create an avalanche that can impede or throw off the journey, but reaching the summit is a rewarding and compelling outcome.

Ultimately, many participants expressed value in the journey and the learning that resulted. Expressing this value, one student shared, "And, but by the time the end of it you have this incredible bond that that you build you have done this thing you made these discoveries and you have a remarkable story to tell."

Social Support Makes or Breaks the Student Experience

A common theme in our interviews and our participant's drawings of research was the importance of social support to research. Participants discussed the importance of social support, often mentioning the value of supervisors, fellow graduate students, and others as instrumental in their progression and success.

Participants described how the support or lack of support from a supervisor could enhance a student's experience or make it impossible for them to succeed. One participant shared:

Whenever I'm doing research and I have to send it back to the supervisor real quickly and be like: Hey, what do I add here? Is this full? Do you think this is, am I applying theory the right way? And then she would comment back and gives me great feedback, it might take time but it still gets back to me, which is great. Versus other students where their supervisor sometimes like, I don't know, you work it out, you're the student. It's like, woah. But I'm learning from you, technically. Or even simple things like maybe she reminds us, "Apply for the scholarship. Do this. I'll give you a reference dah, dah, dah." I've heard of students... Um, that

FIGURE 6
Mountain



one supervisor told the other student, her own student, that she's not going to give a reference to it because they've been working online and she doesn't know the student well. But it's like, one of the requirements of that scholarship is the supervisor gives you reference. Second, it's the time of COVID and we are working online. So it's just like that. How is that even acceptable? Um, so they could be examples of how can one succeed in this whole role versus how can one not succeed.

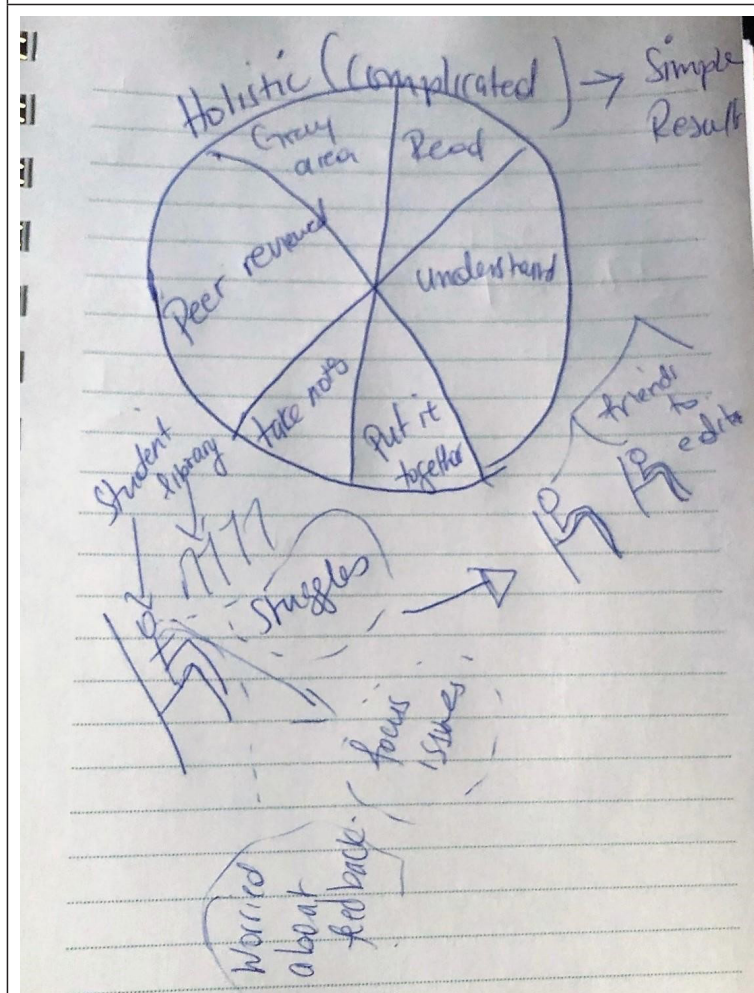
This quote exemplifies how the supervisor provided feedback and guided the research process, which supported the student in applying for scholarships. At the same time, the participant recognized the value of this relationship as they compared it to peers who were held back by supervisors who refused to support scholarships.

It was not just supervisors that participants mentioned. Many participants also discussed the importance of their fellow graduate students as supports throughout the research process. One participant shared:

And the research that I do wouldn't be the research that I'm doing without my collaborators. I, you know, I spent a lot of time alone doing statistical analysis but even that isn't completely solitary because I'm constantly asking for help and feedback and new ideas and, you know, even the research part—that's like the part where you're reading before you start a project, I don't view it as entirely solitary because you're building on the ideas that other people had. And if you're lucky some of those people are still alive and willing to talk to you. [laughs]

One participant included their colleagues in their drawing of research, describing this aspect of their drawing as “a couple of students sitting on the other side of things called friends who are going to edit this work” (figure 7).

FIGURE 7
Social Support



Some participants also shared positive interactions with librarians, primarily in reference situations, as supportive to their process. However, it was rarely a focus of their discussions unless they were specifically referring to the literature review. One participant stated:

Even when I...read studies and things like that for papers I feel a little like I don't know if I'm doing this right.... I had a meeting with [a librarian] and it just really, really helped kind of organize this is how you do it.... And then I did find all these articles and then even that again [the librarian] was like okay now don't read all of them or don't read two of them and forget the rest because you don't have time, sort of that process of get this layer first get the abstracts, and understand what's happening there.... It was helpful. It's almost like the structure became visible to me and it never was visible, before.

One participant bemoaned the diminished opportunities to talk to other graduate students due to the pandemic, stating:

So, I haven't had the chance to talk to participants, or you know collect data, and then also because of Covid, I haven't had a chance to socialize with other graduate students, which I think, by the way, is the most, one of the most valuable things as a research graduate students, right, being around other graduate students who are also struggling to run their studies. You know, it just helps to know that you're not alone.

Lastly, participants described the importance of other people in their life outside of academia supporting their research. For example, one participant described the value of family support during their research as follows:

And also it's, I find that it's important for my son to see me invested in my work. And, and when he's older I guess explain to him like this is what I had to do during that time... like I have support, like I'm lucky I have support I wouldn't say it's like for everybody.

Overall, graduate students described many examples of how their social support networks either helped or hindered their progress in research.

Research is an Emotional Continuum

The first question the researchers asked participants was: "what kinds of emotions are associated with research in your drawing?" One student responded, "it's just a huge [sigh] collection of emotions." Many participants in this study repeated the sense that research involves different emotions.

Students described negative emotions at the beginning of the research process, which they often attributed to being overwhelmed by the number of sources to read and evaluate for their literature reviews. One student asserted, "it's scary because it's unknown." Others

felt overwhelmed by learning to balance uncertainty with a desire to read everything; as one student explained, “it’s not always easy to feel like you don’t know all of the literature and I have to remind myself that’s not possible.” Here, the student knew they were not expected to, nor could they, read all the literature, but they wrestled with recognizing saturation. Another student struggled with not having enough time:

You know, because you don’t have...a lot of time, you know, to kind of narrow your focus and, you know, I mean journal articles and research studies are not short, and they’re not necessarily easy to read, especially when you’re new, you know, to this type of research and writing.

Another student said that, beyond a lack of time, the graduate experience of research contains more uncertainty than undergraduate research, which increases anxiety. They explained:

But when you go to graduate school, you realize that there’s so many unknowns, and there’s no definite answer...and they [the committee] would ask you questions about research that...it’s not well established or not well known or it’s a knowledge gap and then you’re trying to address this, and you’re not quite sure, because you have not read all of the literature [sweeping gesture with hands out and around] that exists, right? So I would never feel like I’m as confident as I was an undergrad where it’s like you have those readings, you read them, and then they test you on those readings.

This quote indicates essential differences in the research experience between undergraduates and graduate students. Graduate students are expected to find current gaps and create new knowledge, rather than summarizing texts from others.

Even after completing the literature review, participants continued to lack confidence, leading to emotions of fear and frustration. One student, referring to their research experiment stated, “and so there’s I think that fear part of me is like, I’m not going to do this right.” Another participant explained:

I think that no one’s comfortable with the idea that their experiments aren’t going to work, or that they’re not going to find something that is worth disseminating. I think that’s like the scariest thing to a graduate researcher, thinking like, ‘Oh my gosh, what if I don’t find something.’

Several participants echoed this fear that even if the research is designed well, they still might not find relevant results.

These negative emotions were often intertwined with positive emotions for the participants, creating tension between perseverance and procrastination. One student articulated:

Oh, I thought this method will work or this model will work, but in reality, when we start really doing something then I need to change. So I guess it’s kind of like half of it is exciting and the other half is uncertainties.

Some participants found the beginning of the process more frustrating, whereas they later felt more excitement, particularly after a success. One participant said: “finishing things like this gives me, you know, that sense of accomplishment, you know, it’s one step, one thing. So it’s both good and bad feeling I suppose.” Here the student highlighted their sense of accomplishment, but also the frustration that this positive emotion was just for one small task within the larger scope of their research.

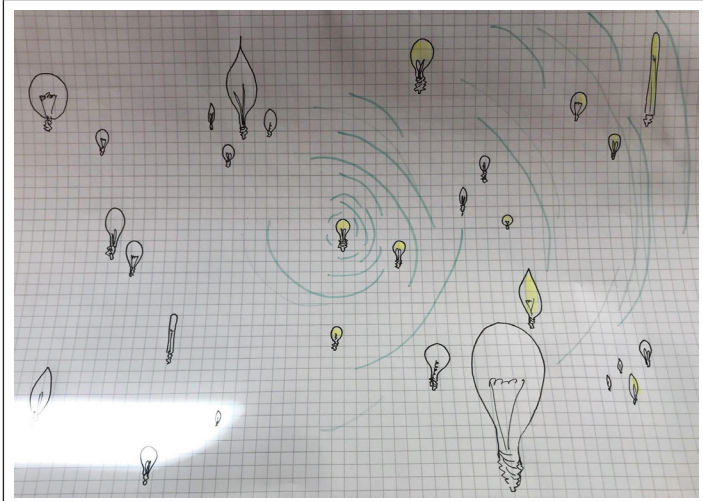
Several students said research connected them to something beyond themselves. One participant shared that their passion for research allowed them to become immersed in the flow, saying:

And I know with me myself and I, the three of us can become extremely — engaged doesn’t even cover... — what is the word I’m looking for, so ‘immensed’, so part of the process that hours can literally fly by. It’s almost as bad as Facebook. So I am so drawn in and captivated by what I’m doing that, everything else is out, it doesn’t even dawn on me [hands move in the air around their head, like ideas floating past the head]. I have to set an alarm to make dinner, because I get all wrapped up in what I’m doing. And when a portion is completed, whether that’s chapter, whether that’s survey item, whether that’s looking for a coefficient value, whatever it is, I just feel so delighted with me. [laughs] and I feel achieved, so there’s you know, a sense of ‘all right Me! You go Me!’

Other participants appreciated how research connected them to others. One drew lightbulbs of different shapes and sizes, depicting which resources impact others (figure 8). They explained that research gives them a “feeling of connectedness and understanding...I do feel like I’m actually connecting in some sense with the authors of the papers that I read.”

However, even amid their excitement, most participants still returned to feelings of overwhelm. One participant shared:

FIGURE 8
Lightbulbs



I often get overwhelmed by the idea of all these things that I have to do... on the one hand, it’s very, very overwhelming to think about all the, all the details, because there’s so many of them, you know, there’s research just requires so much little pieces of effort, and all those little pieces of effort, you know, have to be, you know, then eventually coalesced into your, your research project. But year, then on the other hand, I find research very fulfilling, and so, I think that’s the other side of it is, is the sort of accomplishment feeling.

In the quote above, the participant expressed the tension between emotions amid the overwhelm. Another student similarly explained the overwhelming and conflicting emotions of research, stating:

there's a lot of this idea of like, continuously moving forward even if moving forward seems like a step backwards in some cases. So like yes, I did figure, I did figure out how to like track all these particles. But oh no, tracking all those particles in the way I was doing it wasn't particularly useful. How do I go back and actually put this into a usable format? And it's like, okay well now I've got all this. It's like, wait a minute some numbers aren't making sense. Why aren't they making sense? Oh, that's because actually didn't want these things wrong and I need to go back and start looking at it again. And now that I have the output in the form that I want it, now I can watch them change as I'm making these very small changes to how I'm looking for certain angles and certain characteristics.

Feeling various emotions was a common theme throughout the interviews with graduate student participants. They expressed a mix of positive and negative emotions, as well as a sense of discord between their various emotions.

Interplay between Identity/Values

Participants pursued research for a variety of reasons, many firmly connected to their identity, such as inherent personality traits, an interest in knowledge itself, a desire to improve the world, and personal career goals. Many participants noted that it was their personality that drew them to research, or that enhanced their enjoyment. Several focused on their innate curiosity, such as one participant who stated, "I have this avid curiosity. So, I would describe myself, like my thoughts around research, as hopelessly in love with it." Similarly, another participant believed their inquisitiveness has always made them a researcher, stating, "if I were to think about it now, I think I became a person who was always going to be a researcher, very young. I think that folks who have that inherent curiosity, they kind of have the spirit of the researcher... I think what... unites researchers is a drive to find things out." Some specifically mentioned enjoying challenges and bringing this into their research, such as the participant who shared: "as I progressed, I was like, I felt I was slowly getting to my end goal, but it was definitely not a smooth journey and I didn't expect it to be smooth because I did do my master's, so I knew what research entails, and if anything, I enjoy challenges. And if it were to be smooth, I don't think I would... be drawn to research."

However, others felt that their personality or life experiences decreased their aptitude for research. One participant suffered the death of a loved one during their dissertation, which they described as impacting both their mental health and research, sharing, "my own mental illness and my own loss that made my ability greatly diminished, you know, I don't think I'm the researcher I was two years ago. Instead of getting better with experience, I think... my own problems have made me kind of worse at it. I guess because of these, you know, fears and difficulties with it, right, so you're like, you've got to put yourself out there and things like that, and that's incredibly difficult." Another student recounted their frustration with the lack of rewards or recognition for their work which they expected, stating, "I would work very long hours, and there's nobody who's like, 'oh wow you've been doing so many hours, like that's

amazing.' Like, your work ethic is kind of like expected, as opposed to if I was working in the industry and I was investing this much time and effort, I would be rewarded at a much greater rate." This student decided they did not want to continue in academia but would instead go into industry after graduation.

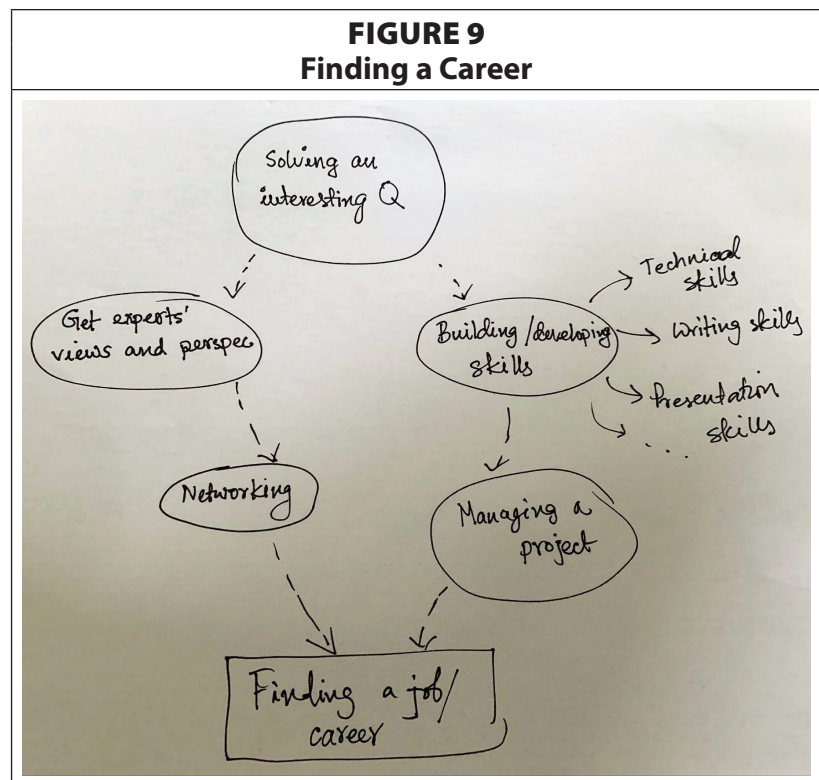
Figure 9 depicts multiple values, including investing in a career. This participant shared, "I tried to shape my research more like that would be helpful for me, for future, like when I graduated. I can use my research, and the skills again from my research to find the job I want." Another participant focused on obtaining a degree when asked why they research. These profoundly personal rationales impacted how students reacted to pitfalls or detours in the research process.

Several students discussed the importance of the impact of their research, which they linked to their values. They valued this knowledge for themselves or for the sake of the world. One participant said, "I think I'm coming to the conclusion that it ultimately, me doing this is as much to enlighten myself as it is to fix the world around me." This participant had drawn partially muddy goggles (figure 2), which they explained showed the chipping away at ignorance. Another student stated:

and when I say learning, that's also including the research, because when I'm doing the research, I'm also learning about. And it isn't, you know, I may be making it sound glib. But it isn't. It's also the reason why I get jazzed about what I'm studying because information is good. Knowledge is good. Science is good.

This quote exemplifies the connection between the value of information and the interest in research. One student who had given birth during their dissertation process reflected on how their struggles with research would impact their son, sharing, "I find it's important for my son to see me invested in my work."

Some participants were motivated by broader aspirations of their research shaping the scientific community or the world, such as the participant who wrote: "one of the things that... was very powerful and meaningful to me was the idea of finally getting to be a part of like this, scientific community intent on bettering, like humanity as a whole, and not just being someone doing something on their own. It's the idea that everything we do is for people." This quote exemplifies what others also expressed: the desire to be part of something larger.



Several students noted that their research might play only a minimal part: “if you can see circles within circles, then you’re... at least cognizant... that you’re... a speck, you’re a spec of reality.” Another also spoke about, and drew, research in terms of circles (figure 10), saying, “but if you take into account the millions upon millions of people doing

research right now. Each tiny blip that they had increases the circumference of this circle, which is all the combined knowledge that we have up to this moment.” So, despite the small potential impact of any particular study, students still believed that research would “positively impact our society. And, you know, help us move forward.” For many graduate students, the connection between their identities and their research was closely tied.

Information is Problematic

Throughout the interviews, participants expressed an awareness of the idea that information itself is problematic. Participants expressed that finding the information you want or need is not a clear-cut experience and requires an openness to exploration.

Some participants expressed this difficulty with information seeking and use as a major aspect of their drawing. In both figures 11 and 12, the participants identify information gathering as a critical component of generating ideas, as well as exploring ways of examining and understanding the experiences of others within their research. Figure 11 identifies journal databases as a key component of research, and figure 12 shows a diagram of how library/resources help point to an idea. The participants also discussed this concept at some length during the interviews. Representing the feelings of many, one participant captured this idea well by sharing,

FIGURE 10
Circles

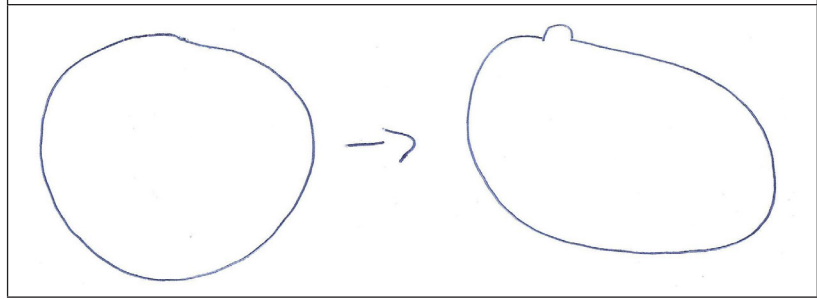


FIGURE 11
Information Gathering

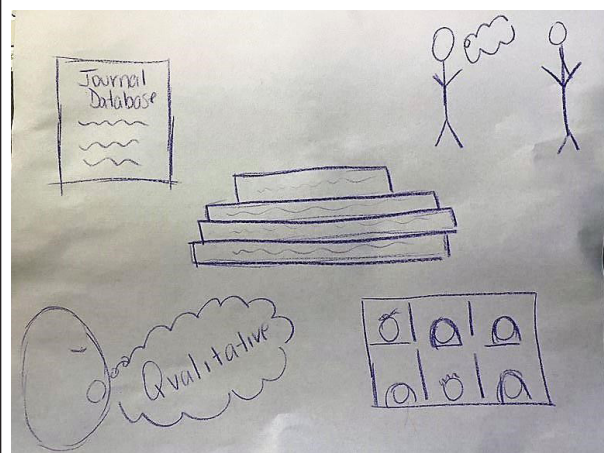
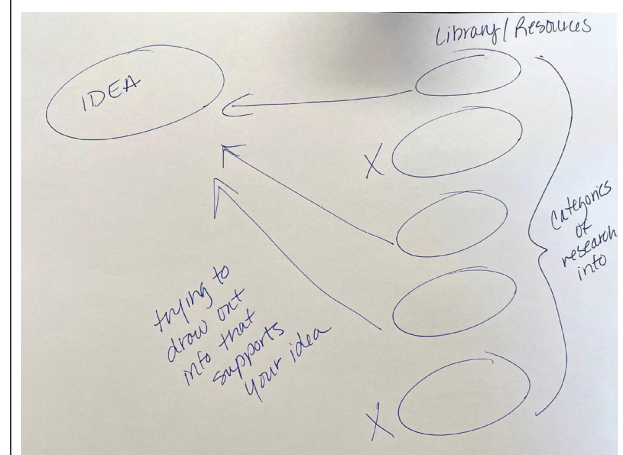


FIGURE 12
Information Gathering



I feel like when you're doing research that each step of the research along the way is connected to the previous things like if I have a research question. Then I go in with, with a certain formulation of it but then as I explore conflicts in the literature space. It's like the question often changes and, and morphs into a related but slightly different question. It's quite associative? Yeah, yeah so it ends up forming a network like, like a neural net or something like that.

These conflicts within the existing information could change the way an individual approached their work, exemplified by a participant who shared, "It expands and sometimes shifts. Yeah. So, as you kind of like, illuminate more of the research puzzle. You end up either broadening or narrowing your question, depending on what you find."

While the problematic nature of information could be felt in how it shaped and reshaped the overall research process, it also led to significant questions about validity, trustworthiness, and saturation. Participants grappled with how to know if they had found enough information, the right information, or the best information. A participant succinctly captured these tensions observing, "But there's also ones where you look at the article and you go, okay, I am not skilled enough to determine the validity of this yet, or, I don't have a sense of the field and to know who was in the field and who's looked at this and like how." The participant further shared that they attempted to use citation count as a proxy for information quality, saying, "I guess I could say that I've started to kind of pick up on like, oh, they've been cited a lot in a paper and Google Scholar is good for that, like, you know, you see whose side of what, how many times it's been cited, all that kind of stuff ." The participant went on to explain that they worked strategically over time to overcome this issue, saying, "I would say that I pretty consistently worked over the course of that stretch of months to get to that point where it's like, oh okay I'm kind of getting this. But it still feels like I'm having trouble determining validity versus, you know, public acceptance." These interconnected thoughts from one participant were indicative of observations and approaches shared by several others who attempted to develop or employ strategies to determine the validity or value of the research upon which they planned to base their original work upon.

Beyond approaches used to navigate and assess validity in published information, participants also grappled with how their approaches to original research could result in problematic information. One participant, working on survey-based research, opined,

I feel like to truly gain somebody's trust in a way that they are going to even answer survey questions totally honestly and from a frame of mind where they're trying to be unbiased with their own experiences, umm is really difficult. And, you know, like, you want to start asking people about their own trauma, like everyone finds their own way to process and deal with their trauma, and a lot of that is not completely true to what actually happened.

Another shared that they were fascinated by why certain things might be missing from the existing body of literature, saying,

I mean the temperature in your room effects to what your kids learn like and why isn't that part of the conversation? Or, or the humidity in your room can affect

what your kids are learning, or, you know, the exposure to light the amount of windows or the quantity, the air quality, like all that stuff is very, very pertinent but, somehow, like you, know early theorists skipped over it because they had bigger ideas or whatever else. Who, knows? You know?

For this participant, the missing information in a study was concerning. Whereas another participant felt that researchers were aware of the limitations of their work, but that the general public pushed for the information gleaned from studies to be less complex and more generalizable than it actually is, explaining:

And I feel like research scientists take that and we'll publish. You know, this is what we found, this does not mean that this is applicable to anybody else in any other context. That we're not saying that this is how humans work. This is just what we found under the specific sets of circumstances and there's always, you know, that section: opportunities for future research. You know, like I think social scientist researchers [emphasis on researchers] are really good about understanding the limits, but human beings are not. And so you have things that people pick up from data sets without really looking at the limitations or understanding the data well.

For many graduate students in this study, dealing with the information in research created challenges for understanding, organizing, and working with that information.

Discussion

Models of Research

Existing theories of information-seeking behavior do not fully apply to the experience of graduate students in this study. While there is a strong emotional component for graduate students and other populations studied, both Kuhlthau's Information Search Process⁵⁴ and Dervin's Sense-Making Theory⁵⁵ indicate that individuals feel a level of affective relief and increased certainty or motivation in their research tasks. For the participants in this study, heightened emotions and a sense of uncertainty or imposter syndrome persisted throughout their experiences. This distinction may be related to the graduate student experience particularly or it may be indicative of the difference between research activities aimed at creating new knowledge rather than those focused on synthesizing existing knowledge.

The cultural-historical activity theory,⁵⁶ which, to-date, has primarily been used to investigate workplace information use and human computer interaction, is potentially a better fit for explaining the research experiences of graduate students because it intentionally incorporates a social dimension to the experience of learning and communicating. Within the experiences articulated in this study of graduate students, participants routinely mentioned social supports, as well as opportunities to interact with supervisors and peers, as critical for their persistence or success. This theory fails, however, to address the affective dimension more fully realized in the Information Search Process or Sense-Making Theories. Taken as a whole, these findings indicate a single existing theory of information behavior is unlikely to explain the complex, varied, emotionally tenuous, and socially-informed research experiences of graduate students.

Research is Complex

Research at the graduate level is fraught with overwhelming complexity. Graduate students communicated this complexity via their metaphors and drawings of research, and in their stories about research. Conceptual Metaphor Theory suggests that the metaphors students used in their drawings and descriptions of research are not just linguistic devices, but a way of making and expressing meaning for complex phenomena.⁵⁷ In choosing to use metaphors to describe research, graduate students struggled with the amorphous nature of research. The sheer size of research at the graduate level often resulted in expressions of overwhelm. Existing studies discuss the emotional components of research,⁵⁸ but what was interesting for the graduate students in our interviews was the simultaneous emotional tension between positive and negative emotions throughout the research process.

The stories that graduate students shared about their research were also complex and filled with challenges that often-mirrored great classical journeys like the Odyssey. Despite interviewing graduate students from different disciplines, and at different stages throughout their research process, the similarity in their journeys suggests there is a strong commonality to conducting research at the graduate level. This finding stands in contrast to existing LIS research focused on the literature review aspects of the research process in which disciplinary conventions and differences were distinct.⁵⁹ Considering the graduate research experience as a broader journey necessitates the examination of the many barriers that graduate students experience. One of these challenges involves information: finding, making sense of, organizing, and using information. Other research has looked at some of the challenges that graduate students experience related to information;⁶⁰ however, what is interesting for librarians from this study is that few students discussed issues with using a database or knowing where to click. Instead, graduate students discussed challenges like knowing when to stop gathering information, how to know which information is essential, or how to know when a topic is too narrow or too broad. Existing research has explored some of these challenges. Moore and Singley highlight that students follow threads of information, no matter how far away it takes them from their original topic of study.⁶¹ Barrett identifies the constant searching for information as a continuous “digging” cycle.⁶² This study suggests that surfacing and explicitly addressing the emotional challenges of the research process, as well as information discovery and use, is a critical element for student success that supersedes disciplinary considerations.

Research is Personal

The interviews in this study suggest that research is both intra- and inter-personal for graduate students. Previous literature supports the connection of identity to research.⁶³ The participants in this study also indicated that their personal identities guide and motivate their research interests. Some linked their values to the impact they hoped their research would have. Those values and impacts included personal enlightenment, improvement of society, and access to specific careers. Students indicated that their dispositions moderate their resiliency to the inevitable complexities encountered during their research process. For example, some mentioned relishing challenges or being innately curious as being protective factors against wavering/failure. However, one participant described how their grief and mental illness undermined their resiliency.

Our findings also show that interpersonal social support influences graduate student research experiences, corroborating past literature.⁶⁴ For example, Frick and Pyhältö reported

that, in their quantitative study of doctoral students in Finland and South Africa, some of the most prominent positive and negative experiences revolved around supervisor encouragement and, conversely, lack of supervisor support.⁶⁵ Participants in this study also indicated that supervisor encouragement and commitment to the relationship created positive experiences for the students. One interviewee mentioned that their chair suggested scholarship opportunities and provided helpful feedback on their work. Their experience suggests a discrepancy in how effective different chairs are at mentoring graduate students, which raises some interesting questions for faculty working with graduate students.

Additionally, students mentioned the importance of connecting with peers to normalize the emotional journey of research and improve their skills. Could more opportunities for graduate student socialization be provided? Is there a way to create more collaboration between peers on research? The physical isolation of the Covid-19 pandemic may have mitigated the social support students in this study received, as interviews were conducted in the summer and fall of 2021. Future studies should review the impact of the current work-from-home culture on graduate student sense of support.

Implications for Practice

The findings of this study show a need for librarians working with graduate student research to decenter the database, to join students on their journey using an affective lens, and to emphasize pedagogy that increases connection and social support across disciplines. Although participants knew they were talking with librarians, they did not discuss database struggles. Instead, they discussed challenges around biases in information, knowing when they had enough, how to deal with too many relevant results, and refining topics. Graduate student research experiences show the need to decenter database demonstrations in information literacy instruction. By this, we mean focusing classroom time on the examination of deeper information contexts and problems, while intentionally moving away from a primary focus on demonstrating database interfaces and features. This pedagogical shift provides more time for deeper grappling with information in instruction and reference appointments while better aligning with the ACRL Framework for Information Literacy.⁶⁶

This study reveals that students experience many emotions, including continuous overwhelm, throughout the research process. This sense of overwhelm can impede their ability to progress. The more reference and instruction librarians are involved in research themselves, the better they will be able to personally connect to the student's emotional journey while also helping students understand how the literature review relates to the rest of the research process. In instruction sessions and reference appointments, librarians can normalize emotions and illuminate a path through the research process so students can move forward despite being overwhelmed.

Participant discussions indicate that graduate student research journeys transcend disciplinary boundaries when considering the research process holistically. Therefore, librarians can consider various models beyond the classroom or reference-based interventions, including co-curricular workshops, asynchronous learning objects, and interdisciplinary orientation sessions. These approaches may be most student-centered when designed in collaboration with others who can bolster social support at other points of the research process beyond the literature review.

Limitations

This study was subject to several limitations. First, as with studies of this nature generally,⁶⁷ the participants self-selected, which likely resulted in a participant pool of students who are more interested in, and engaged with, research than might be typical of those in graduate school as a whole. Because of the self-selection, the participants were also not representative of all potential areas of study. This limitation, however, is somewhat balanced by the finding that research experiences had consistent common elements across all participants. Second, the participants were drawn from only three institutions, all of which are situated within the North American higher education context. These limitations are consistent with those routinely found in qualitative research, which often includes participants from only a single data collection site and a specific geographic region.⁶⁸

Finally, validating interpretations of subjective data, such as drawings, presents challenges when using a visual research method like graphic elicitation.⁶⁹ A few participants commented throughout the interviews that they might change their drawing, which suggests that drawings cannot represent a complete understanding of a large concept like research, and echoes existing findings that interviewees refine and clarify their thinking during the interview process.⁷⁰ These limitations are partly why we used visual methods in combination with the second method of semi-structured interviews, so that the images could be connected to the participants' discussion to guide interpretation.

Conclusion

This paper explores graduate students' holistic conception of research. Grounding the study in graphic elicitation provided a key to accessing participant affect, allowing the interviewees to delve beyond their immediate reactions,⁷¹ particularly given the complexity and amorphous nature of research. Although the findings of the emotional aspects of research are not entirely unfamiliar within the field of library science, the contribution here exists in how the graduate experience of research differs in the magnitude of uncertainty throughout the research process.

The interviews show that graduate students' internal values and motivations were protective factors, providing perseverance to complete the research. Similar to prior research,⁷² the qualitative data point to the prominence that constructive relationships (supervisors, classmates, community/family, and librarians) empowered graduate students. When asked about research, graduate students in this study, unlike other populations,⁷³ were less concerned with search experiences but rather with the complexities of information itself, as well as the challenges inherent in navigating uncharted, amorphous processes. Additionally, as seen in this study and supported by Frick and Pyhältö,⁷⁴ graduate student research experiences are not bounded by a particular field of study.

These findings imply that graduate students have an experience of research distinct from other populations. This difference suggests that librarians who help graduate students with their research should focus less on teaching database navigation. Instead, librarians need to acknowledge the complexity of the entire research process, take time to help the student process where they are on the journey, and validate the inevitable emotions involved with that experience. Librarians should also provide structure to graduate students so they have at least a sense of how to build a map of their research journey. Additionally, if librarians bring themselves fully into interactions with graduate students, they may serve as empowering social support. The help provided by librarians will, therefore, in part, need to transcend disciplinary boundaries.

Future studies will benefit from incorporating a similar methodology as different ways of thinking about information may help the participants to think more holistically and deeply. Longitudinal studies are needed to study graduate students' conceptions of research as they move through their programs; this would be particularly salient during the dissertation process. Further, while this study did not collect data on participant identity, participants still mentioned how their identities shaped their research. Future studies could consider the connection of participant positionality to graduate student research.

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The authors extend our deep appreciation for our research participants, who were generous in sharing their time and experience with us. This work would not exist without their participation, and the impact of the findings would have been significantly muted without their open and candid conversation.

Finally, the authors note that the researchers in this study contributed to the project equally at all points during the process. Authorship order was determined by a collaborative conversation within the team and reflects the order in which each author joined the study.

Appendix A: Interview Questions

1. Please draw what research is to you. You will have up to ten minutes to draw and then we'll ask to see the drawing and to have you tell us about it. If you're ready to discuss sooner, please let us know.
2. Please share your drawing.
3. What kinds of emotions are associated with research in your drawing?
4. How do you see yourself as a researcher?
5. Tell me about your most recent experience with research.
6. Why do you do research? OR What do you hope to achieve by engaging in research?
7. Last question: Is there anything else you would like to share today?

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