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Graduate student intellectual journeys: a functional method to identify library service gaps

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Abstract

Purpose – Investment in graduate education is costly in various ways so completion success is a big concern for universities and stakeholders. Largely the graduate educational landscape moves along a commonly structured path from acceptance to graduation. Despite many having successfully attained the award, the research literacies that signal doctoral achievement remain obscure and scholars continue to struggle with developing clear and tangible measures for the competencies that represent attainment of the degree. Feedback gathered from faculty at a large research institution through a series of semi-structured interviews illustrated the challenge departments have to effectively communicate what it takes to get through graduate education. As a result students still have a difficult time understanding the complexity of graduate training. This study views graduate education from the lens of intellectual journeys, as opposed to the research lifecycle, as a way of uncovering distinct disciplinary discourse practices and offering libraries critical points to align services using this framework.

Design/methodology/approach – The methodology is highly flexible and adaptable to many contexts besides graduate education. This study takes a different approach from previous studies in its framing of discussions with academic faculty, using journey maps, to focus on the intellectual journeys of graduate students. Faculty from different disciplines participated in one-on-one, hour-long interviews. Discussions were audio recorded, transcribed, and then coded into NVivo. Iterative review on the data continued until themes emerged. The data gathered were used to compile a detailed map of the processes and requirements that make up graduate education. This approach to the data helped to identify what faculty perceive as the greatest struggles for graduate students and provide evidence of the key places within the intellectual journeys of graduate students.

Findings – This paper provides a discussion of graduate student personas revealed through intellectual journeys, assesses the issues students encounter, shares critical time points and key places within these intellectual journeys where significant development occur, and suggests how libraries can and should connect with graduate committee members to establish missing support structures. Practical suggestions for library support are given for the areas where students struggle most. These critical services can be aligned to key developmental phases that will not only positively impact the time to completion but also retention.

Originality/value – First, the methodology discussed is highly flexible and adaptable to many contexts besides graduate education. Second, librarians adopting this methodology can generate their own editable journey maps not only to offer the most critical services but these tools also double as visual communication and negotiation tools for graduate students and their mentors during graduate training. Third, previous research has suggested that the most instrumental factor for graduate students completing their degree was the concept of forward progress. Framing the graduate experience and orienting library graduate support through the lens of disciplinary intellectual journeys achieves an action-oriented approach that supplements and addresses structural inequities by providing consequential support at meaningful points in a student's journey thus allowing students to make forward progress and ultimately lead to faster completion rates.

Keywords Graduate education, Disciplinary discourse practices, Editable graduate journey maps, Graduate committees, Intellectual journeys, Journey maps

Paper type Research paper

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Introduction

Libraries dedicate significant time to exploring the needs of undergraduate students and developing an array of support services for this population. The literature includes studies related to improving reference services (Ismail, 2010; Pellegrino, 2012) and improving instructional practices (Cook-Sather, 2014; Flierl *et al.*, 2018), renovating spaces (Kelly and Young, 2017; Yoo-Lee *et al.*, 2013), and usage of interlibrary loan services (Frank and Bothmann, 2008; Schulz, 2001) by undergraduates. In comparison, there is far less research related to how libraries can support graduate education (Doan and Rassibi, 2018; Rempel *et al.*, 2011; Rod-Welch, 2018). Given that the needs of graduate students are often more complex due to the range of their educational, research, and personal experiences (Nesheim *et al.*, 2006; Hardré and Hackett, 2015), it is imperative that libraries develop service models for this population that are diverse as well as supportive (O'Clair, 2013; Fong, 2017; Forbes *et al.*, 2017; Shanks and Arlitsch, 2016; Stitz, 2018). Studies in fields outside of library and information sciences reveal that students struggle during their graduate education (Foot *et al.*, 2014; Gardner, 2008; Schoot *et al.*, 2013) suggesting that despite the variety of fast-track or traditional educational term offerings, the graduate training experience is a complex undertaking for many students. Closer examination of the challenges graduate students face can help uncover opportunities for librarians to develop stronger and more durable service models that can help support graduate students during this intense educational training.

Library research studies commonly employ surveying techniques to gather information about user needs, but lack of resources plus survey fatigue (Porter *et al.*, 2004) makes it extremely difficult for organizations to gather input from users. This project purposely avoided surveys and instead began by investigating graduate students' experiences through examining the requirements and aspects that make up the graduate education process. The project study required a close review of the movements students make as they work through a graduate degree. The study was initially guided by the curricular mapping practices (Castro Gessner and Eldermire, 2015) that have traditionally been used to track information literacy pathways in programs. In this context, the curricular mapping approach revealed itself too singular in scope and did not allow for a full examination of all facets of graduates' experiences. In response to this, the researcher used journey mapping, a widely tested and effective user experience tool (McKelvey and Frank, 2018), to capture the totality of the user experience throughout the graduate training process. Journey mapping's main function is to offer a visualization of the process that a person goes through to accomplish a goal (Gibbons, 2018). The practice of journey mapping operates by asking participants to detail their actual experiences (Kaplan, 2019) which helps safeguard against librarians' perceived ideas (Nolen *et al.*, 2012) of what the graduate student user experience entails. The outcome of using this mapping methodology resulted in the charting of a complete map of the graduate educational experience and provided an outside-in versus inside-out visualization of the pain points students experience along their path. Finally, the practice of journey mapping revealed possible support areas that have traditionally been missed by the library (Kaplan, 2016).

Background of graduate landscape

Completion of the PhD signals that an individual is deemed an independent scholar who is capable of contributing research and scholarship in their chosen disciplinary area. Since the first PhD in the US was conferred in 1861 (Yale University, n.d.), the research doctorate has become inclusive to applied and professional degrees. Despite many having successfully attained the award, the research literacies that signal doctoral achievement remain obscure and scholars continue to struggle with developing clear and tangible measures for the competencies that represent attainment of the degree (Yazdani and Shokooh, 2018).

Time to degree is an important topic across higher education (Shapiro *et al.*, 2016) and is particularly salient for graduate studies. The average completion time for different PhD programs varies by discipline. According to data from the Survey of Earned Doctorates conducted by the National Science Foundation, an approximate median range to attain a degree is between 6.2 years for the Physical and Earth Sciences fields and up to 12 years for the field of Education (NSF NCES, 2018).

Along with time to degree, graduate persistence and attrition trends are an important area for universities to track and manage. A longitudinal study surveying 1992–1993 graduates 10 years after attaining their bachelor's degree indicated that the top three reasons graduate students had for leaving a program were: change in family status (30%), conflicts with their job and military duties (17%), and dissatisfaction with the program (16%) (Nevill and Chen, 2007). The general category of other reasons for not completing a program ranked second overall (26%). This latter category comprised situations that resulted in students abandoning their studies that were not able to be folded into a major theme. While the authors did not provide further description for this highly ranked factor, it suggests that graduate school is not only in itself an independent endeavor but also an individual and contextually situated experience.

The existence of non-intellectual or systemic influences are already suitably covered in the literature, and while outside of the scope of this study, deserve a brief mention because they can possibly account for graduates' inability to complete or even start their courses of study. The National Center for Education Statistics (NCES, n.d.) compiles informative reports and tables of data related to education including tuition and required fees, student loan debt trends, graduation rates, demographics of students in different disciplines, parents' educational background, socio-economic status, age, family status, race/ethnicity and gender. These data are too complex and difficult to offer generalized inferences, but it is illustrative for prospective students, parents, graduate school administrators, and policymakers as it can provide guidance about type of school to attend, inform about enrollment financials, or draw attention to opportunities for new funding initiatives. While enrollment, persistence, and completion will always be influenced by external life factors, successful candidates are capable of persisting despite the complexity and ambiguity that are part and parcel of graduate studies.

Graduate administrators per the nature of their duties focus largely on completion and failure rates. For years national failure rates hovered around 40–50%. These numbers were highly distressing to the graduate education community and sparked investigations such as The PhD Completion Project (Council of Graduate Schools, 2008). Academic mentors experience first-hand the struggles plaguing aspiring professionals and doctoral students. Mental health officials report rising concern due to stress in this student population. In a national survey (American College Health Association, 2020) data collected indicated a combined scoring range of 73.4% for moderate-high levels of stress among graduate students during the last twelve months. Increasing studies demonstrate there is a high prevalence of stress and anxiety amid the graduate student population (Evans *et al.*, 2018; Liu *et al.*, 2019). Medical experts caution that sustained levels of stress lead to chronic stress which is often associated with depression (Fuchs and Flügge, 2011). This concern exists not only for the trainee's mental wellbeing but also for the financial investment to the graduate education enterprise made by academic members, policymakers, and society. For a population with many apportioned responsibilities, it is not easy to identify the factors that put them in peril of not successfully completing their degrees. Academic faculty are calling for universities to recognize the need to support graduate students and offer intervention strategies to help students manage stress and successfully complete their degrees (Evans *et al.*, 2018).

Research gathered based on exit surveys of degree completers offers firsthand data about institutional characteristics that influence success (Council of Graduate Schools, 2009). One of six major program factors, the program environment, was particularly distinctive for its focus on the factors that influence integration or alienation between the student and the graduate school, department, and discipline. The program environment can be more fully defined through the lens of disciplinary discourse practices that exemplify the attitudes, behaviors, tools and activities, and cultures that shape and represent a discipline and enable effective engagement with others in that community (Airey and Linder, 2009; Becher, 1987). In the context of graduate education, disciplinary discourse practices are analogous to the socialization that happens along the path to professionalism within the discipline. Discourse practices differ between disciplines so teasing out the socialization that happens within disciplines can provide methods for alleviating some of the struggles encountered by students along their path to become independent scholars. Simmons (2005) framed librarians as disciplinary discourse mediators advancing critical information literacy using principles of genre theory for undergraduates. Green and Macauley (2007) later took a holistic view of the graduate learner positioned within a disciplinary backdrop. These studies consider the importance of socialization in disciplines yet solely focus on the information literacy domain. A review of the literature revealed that no other studies appear to have considered using the disciplinary discourse framework in combination with journey mapping to evaluate the entirety of graduate education in the provisioning of library services.

Local context

The University of Arizona (UArizona), the flagship institution in the State of Arizona, is a large public, land-grant institution located in the southern part of the state. UArizona is also recognized as one of the nation's top 20 public research institutions. Enrollment numbers for the last 3 years indicate a steady rise in matriculation for both undergraduate (2019 = 35,801, 2020 = 36,503, and 2021 = 38,528) and graduate students (2019 = 10,117, 2020 = 10,429, and 2021 = 10,943). In the same way that student population increases so have the academic offerings. There are over 130 individual colleges, departments and programs currently offering graduate programs in more than 150 areas of study.

UArizona faculty leading graduate training programs do their best to convey the institutional support available to students, including university library support. During admittance prospective graduate students are carefully screened by academic faculty which provides some measure of certainty that candidates possess the intellectual capacity to earn a higher education degree. Faculty make their best determination on who will succeed based on measurable metrics such as GPA or GRE; yet according to faculty, intangible personal characteristics, such as resilience, courage, and the ability to manage high levels of abstraction, are just as critical for success and not as easily assessed during the application process. While the faculty endeavor to ensure that students receive timely program information and support to succeed, irrespective of discipline, graduate faculty indicate facing a significant challenge in how to effectively communicate what it takes to get through graduate education.

Like many research institutions, the University of Arizona Libraries (UAL) have endeavored to develop services and support for graduate students (Covert-Vail and Collard, 2012) and similarly has struggled to connect graduate students to these services (Barton *et al.*, 2002; Gibbs *et al.*, 2012; Kuruppu and Gruber, 2006). Along with the challenges related to connecting graduate students to available services, declining budgets and staff turnover have resulted in multiple library reorganizations which have undoubtedly caused disruption in service to graduate students. The latest reorganization resulted in the creation of two small departments with only a small number of liaisons serving both undergraduate and graduate constituents. This study was undertaken to identify opportunities to develop systematic and sustainable library services for graduate students. It takes a different approach from previous studies in its framing of discussions with academic faculty. The data gathered were used to compile a detailed map of the processes and requirements that make up graduate education at the University of Arizona. In addition, the data were used to explore distinct disciplinary discourse practices that shape graduate students' research identity. This approach to the data helped to identify what faculty perceive as the greatest struggles for graduate students and provide evidence of the key places within the intellectual journeys of graduate students to pinpoint worthwhile areas for librarians to focus their efforts to establish missing support structures. The resulting maps have been designed to be able to be adapted and used by libraries at any institution that offers graduate degrees.

Design and methodology approach

The purpose of this project was:

1. To get a clearer picture of the graduate education experience across disciplines through conducting interviews with well informed individuals in graduate education
2. Identifying patterns within the graduate educational experience
3. Identifying points of need within the graduate educational experience
4. Identifying gaps in current library service offerings based on the data uncovered

Faculty recruitment occurred via email invitations. The main criteria for participation consisted of knowledge of graduate curriculum and requirements as well as experience mentoring graduate students through their graduate training. Twenty-two faculty from a variety of disciplines at UArizona ranging from sciences, social sciences, and humanities agreed to participate in semi-structured one-on-one hour-long interviews. Research suggests that this sample size is suitable for valid themes to arise through saturation (Guest *et al.*, 2006). Interviews were audio-recorded and transcribed followed by an applied thematic analysis technique (Guest *et al.*, 2012; Vinyard *et al.*, 2017). Two researchers independently engaged in an iterative process of reading the transcripts and generating codes, then met to discuss and come to agreement on the coding. Coding led to themes which provided a deeper dive and clearer picture of graduate education. The qualitative data formed stories, which contextually positioned the graduate student in disciplinary environments, providing specific information about stakeholders, roles, behaviors, and struggles. NVivo (QSR International, 1999), a qualitative data analysis tool, aided in the work.

The research design purposely avoided surveying users about needs as well as querying about library services. Instead, this study utilized journey maps, a practice adopted from user research, which concentrates on placing a lens on a user's interactions in order to understand the totality of the graduate educational experience (Nielsen Norman Group, 2018). Journey models also served as communication tools to flowchart interactions that students carry out (Figure 1). The construct of these came from extensive liaison experience serving a diverse graduate student base as well as a basic familiarity with academic requirements. The schemas helped faculty visualize the graduate processes such as the written comprehensive journey, scholarly writing journey, and thesis journey and served to gently guide discussion during interviews. The movability of the charts allowed faculty to remove, rearrange, edit, or add missing journeys or activities. This approach allowed the researchers to assemble an enhanced picture of the myriad dealings and experiences of graduate students and helped to crystalize a deeper understanding of the assumed roles by graduates. In addition, this approach clarified the perceived successes and challenges that take place throughout a graduate student's academic training.

Findings

Intellectual journeys in graduate education

The graduate educational landscape within higher education moves along a commonly structured path from acceptance to graduation. In the simplest terms for the majority of

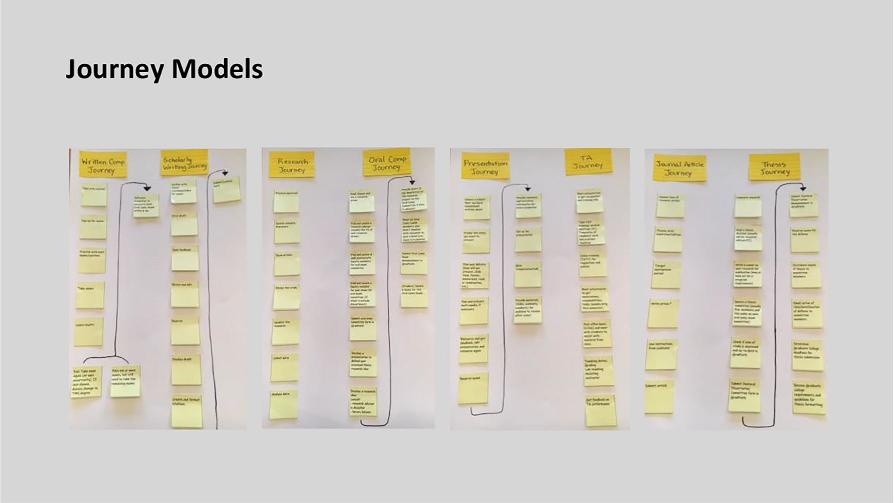
Journey Models
Written Comp Journey
Scholarly Writing Journey
Research Journey
Oral Comp Journey
Presentation Journey
TA Journey
Journal Article Journey
Thesis Journey

Figure 1.
Visual flowchart of various graduate student journey models

programs and professional degrees, the academic conditions for granting a higher education degree confirm students successfully progress through some or all of the following educational stages: coursework, exams, research, and thesis.

Interviews served to uncover the numerous intellectual journeys encountered by graduate students. Looking at those journeys through the lens of personas throughout the educational stages provides the emergence of a complex concept map detailing the typical graduate educational landscape (Figure 2). These varied identities reveal the sophisticated professional skills-based activities necessary to accomplish intellectual tasks at different timepoints.

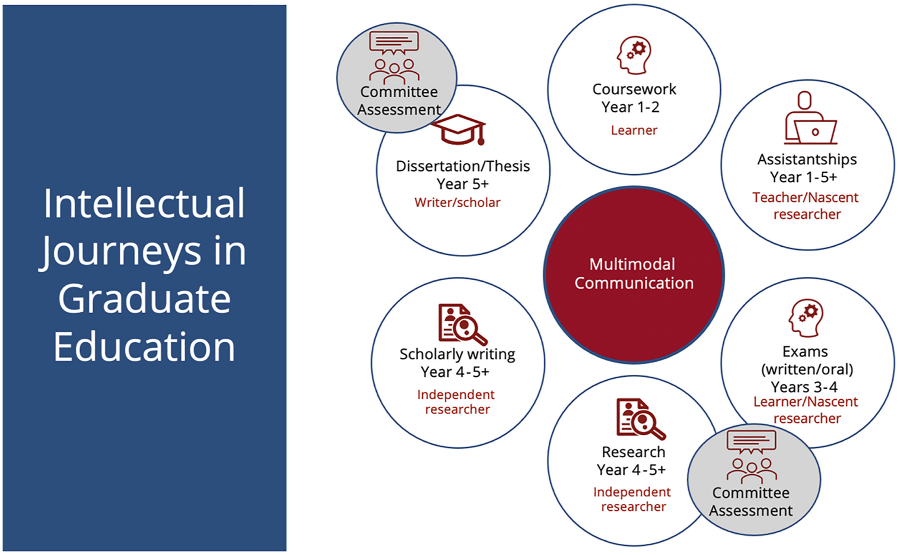
Intellectual Journeys in Graduate Education
Committee Assessment
Coursework
Year 1-2
Learner
Dissertation/Thesis
Year 5+
Writer/scholar
Assistantships
Year 1-5+
Teacher/Nascent researcher
Multimodal Communication
Scholarly writing
Year 4-5+
Independent researcher
Exams
(written/oral)
Years 3-4
Learner/Nascent researcher
Research
Year 4-5+
Independent researcher
Committee Assessment

Figure 2.
Graduate student intellectual journeys detailing roles, common timeline, and main assessment points

Clockwise, at the start of their journeys, post-admissions graduate students begin their **Coursework** assuming the role of a **learner**. Often, this is a familiar role since many graduate students have recently finished undergraduate education. Typically, students feel comfortable and extremely confident in their learning abilities and strategies. Next in that pathway individuals soon add to their load and start **Graduate Assistantships**. In this role, they are either **teachers** (Teaching Assistants, TAs) or **nascent researchers** (Research Assistants, RAs) supporting research-based teams. As TAs they start in a supportive role, often grading or running discussion groups. As they gain experience and seniority, they are given more responsibility ultimately shouldering the full responsibility of a course. In research assistantships, graduate students are assigned or sometimes given the ability to negotiate responsibilities that contribute to large team-based projects. The individual research contributions are often based on the specific expertise these aspiring researchers hope to develop. After the completion of their coursework, students are able to advance to **Exams**. Most comprehensive examinations are written and are followed by an oral exam. Both of these exams are formally reviewed by a committee. During the exam phase, students take on the roles of **learner** and **nascent researcher**. They must demonstrate theoretical knowledge and the ability to sustain a scientific argument in their discipline. After the successful completion of those requirements, students gain approval from their committee to begin independent **Research**, and it is at this stage that students begin to demonstrate **independence**. **Scholarly Writing** is different based on the program. In this phase, graduate students are independent researchers and begin to assume a **writer/scholar** identity. In some programs, writing occurs during the course of an RAship and in other programs, writing occurs after the completion of a graduate student's research. Finally, the **Thesis/Dissertation** stage is described by faculty as the stage when students *"put it all together."* It is the point when students formalize the documentation of the thesis and the last requirement that must be completed and approved by committee members before a student can graduate.

At the very center of the graduate training experience lies **Multimodal Communication** which is a meta-competency and includes communication skills in written or oral form. Multimodal communication can occur in a traditional medium like writing or in a non-traditional medium like a podcast or video presentation. Multimodal Communication is positioned centrally because it takes place at every journey. At every stage the students' communication skills evolve as they have opportunities to practice speaking and presenting via the delivery of papers, in class presentations, leading research meeting discussions or journal club readings, to ultimately delivering a presentation at a professional conference.

Besides gaining awareness of the realm of professional skill-based activities expected of students, what is also crucial to observe is when these journeys appear within the timeline of graduate education and the extent of their existence. Some journeys start and finish at specific points, while others overlap or continue for years. The coursework journey begins after acceptance and lasts up to year 2 at which point this stage is completed. Assistantships journeys occur from the 1st year to 5+. The exam journey normally occurs after the coursework journey is completed, commonly during years 3–4. This journey ends upon the completion of the written and oral exams. The research journey commences as early as year 1 for research assistants while the scholarly writing journey often takes place during years 2–5+. Thesis writing is the final journey and, depending on the program, happens at year 5+. Presentations occur throughout the educational experience.

Areas of greatest struggle for students

According to faculty, graduate students encounter a number of non-academic struggles during their training. One example that surfaced is the challenge that graduate students face when things take longer than expected or go wrong. Many faculty also noted the need for graduate students to possess resiliency in the face of these challenges. When it comes to intellectual challenges the top issues noted by faculty included preparing for exams, ideation and committing to a research topic, transitioning from student to independent researcher, and finally writing.

Exams

Participants indicated that students often experience anxiety when it came to the examination period of their journey. There is a tendency for students to get overwhelmed by the sheer volume of readings to master, thus taxing the learner, and resulting in a tendency to delay taking exams. The postponement is understandable as this phase marks the initial point where students can fail.

A big revelation during the interviews was the varying methodologies that exist across departments for preparing for exams. Some departments indicated that committees specifically call the literature to the students' attention, others shared that testing material came from classes students took, or that material for exams might be chosen jointly by committee and student. Assessment of interviews exposed distinct terminology for the practice of engaging with disciplinary literature to prepare for exams. It was common for faculty to refer to this exam related literature as Reading Lists. Comments shared by faculty explained they themselves do not conduct database searches much less train students in searching for literature and yet somehow also expect students to take initiative to discover content on their own.

> I am myself not trained in doing searches in those databases. So I cannot train them to do those things . . . in all of my experience here, the literature comes from citations from things we point out. It's unlikely to come from database searches.

> The one thing I think they are weak on is doing that search themselves. One thing that I've noticed, with my students anyway, I wish they were coming to me a little more with I found this article, is this relevant? Self-directed literature search. I feel they kind of depend too much. I understand that it's challenging to do . . . it's a little bit challenging to search things down.

The examination phase is laden with assessment points. Besides comprising essays for the written component, students must demonstrate their knowledge of the field and the graduate student's committee thoroughly questions students making sure they are able to properly communicate and defend scientific arguments. During this period, the committee gets a glimpse at the students' intended research focus, and the student has an opportunity to introduce and position their research topic within the scholarly landscape of their discipline.

Lost productivity was mentioned as a common occurrence in students impacting more than one journey. A number of faculty expressed frustration about the process when students "go away to study" for exams indicating it was "a big slow down" in their department. Faculty discussed how it can often take students a year or more to prepare for their comprehensive exams. Students exhibit such a habitual prolonging behavior during the comprehensive exam piece of the student journey that some programs instituted timelines requiring students to take exams no later than their 4th year. All programs have different completion timelines, but if students can get moved through this period faster, it would improve time to degree. This is a significant phase because committee members consider it foundational for the ideation step and leads directly to the graduate students' dissertation. If students fail to work through this part of the journey efficiently, they not only add time to completing their degree but also have a higher chance of floundering and compounding their stress levels.

Ideation/committing to a research topic

Equally daunting is the point in time when students must commit to a topic for their dissertation. A faculty member indicated how crucial this step is for graduate education stating,

> Really I think a PhD student if they have a lot of trouble coming up with ideas they probably should not be a PhD student. Because that is sort of your job is to find out, What's missing? What's interesting?

Another participant confirmed the ideation stage as a decisive moment for students in that it is often at this point where students either continue on or leave the program.

> The student is really almost never told what to do, and they have to really come up with an idea. . . . So we used to lose a lot of students because they could not focus formulating a thesis topic.

Committee members are keenly looking for development in the form of independent ideas and in most programs, faculty also serve as reviewers during the oral presentation of the research proposal. For the nascent researcher, it is the first big assessment of their promise and potential. This intellectual journey is closely connected to and simultaneously takes place with the examination period. Often the oral component corresponds to a discussion of their selected research interest. It is why the aforementioned step is essential in helping students explore and hone a research direction. In programs that follow strict timelines this period happens about year 4, unless prolonged by students. This is the timepoint when these young scholars feel confused, scared, and exhausted and often consider dropping out.

Transition from student to independent researcher

Successful students that make it past those phases face another unnerving experience during the transition from student to independent researcher. A faculty member recalling it was a tough changeover for her said,

> That's the hardest thing, I think. That was the hardest thing for me. I think that's the hardest thing for my students. And I imagine the hardest for anything (sic) is the transition from doing classwork to doing your own work. The independent stuff, and to find theoretical frameworks that are going to inform your work and all that.

During this stage no structure exists, the student is expected to self-manage and take the lead in research, solve problems, and execute the approved work. Students, regardless of disciplinary area, all experience a major sense of isolation as they transition into the role of an independent researcher and become fully responsible for the entirety of a project. Issues never faced before arise which test their resolve as they experience frequent failures often associated with research.

Interestingly, participants provided strategies for student success at other journeys except during the independent researcher phase. At this point the committee takes a step back so that the student begins to take autonomy. An interviewee framed it as a "dress-rehearsal" of sorts,

> Now once they finish their prospectus then they really are on their own, I mean . . . that's you're now an adult in this world and so the students are working on their PhD's and actually collecting and analyzing data, writing out their results. They work more on their own because we feel that's the way it's going to be when you graduate.

Proving it is a major isolating experience where students are expected to know or figure out disciplinary discourse practices and research skills out on their own without much training. The research journey is fruitful ground for further exploration and a major opportunity for libraries to offer much needed support.

Writing

The issue most cited as a struggle by all disciplinary faculty for all students, international and domestic alike, is the craft of writing. This intellectual journey comprises a variety of many advanced professional research literacies including technical writing, structuring ideas, making a clear and succinct argument, and supporting an argument with data, and writing for the right audience. Curricular writing assignments such as lab reports, critical essays, or research papers do not provide par for the course scholarly writing skills expected in the discipline as indicated by a faculty member,

> Ok that's good writing for this now let's take those good basic writing skills and transfer them to this genre, this discipline. And that's something in the journal article journey, you know, that's yet another whole other level. Because the way you write for class is going to be different than how you write for an audience there. That's taught primarily, so at the doctoral level, primarily through the individual doctoral mentors.

Of all the journeys the writing literacies were mentioned as requiring the most time-intensive mentor activity.

> . . . the writing is a real challenge. The writing is usually very poor. It's quite disturbing actually. It's poor on multiple axes as well. It's poor in the sense of how do I craft a scientific argument, the understanding of how that's done is usually . . . that's something we have to mentor them very strongly . . . So crafting an argument and then making it succinct and clear is usually a significant struggle.

Faculty are well aware of writing resources around campus yet are hesitant to offer PhD students a referral to the Writing Center citing an unsuitable service model often only allowing 1 h assistance as well as lacking technical expertise necessary for "a 200-page dissertation."

Faculty provided a hint as to why writing was such a concern. Writing is a major activity for scholars as explained by a participant,

> I think that it is at the very, very center of the field. I think it's maybe, I think it might just be at the center of every academic discipline really . . . And I think it's somewhat of a surprise, right. Our students might have been science majors in college and they might have gotten away without doing a whole lot of writing but it's really about writing. My job, it's all about writing. I'm in the lab sometimes but often I'm not writing papers, but I'm writing emails or I'm writing you know, writing grants or I'm whatever . . . I think it's the hardest thing for students to get their head around.

Discussion

Faculty that are well versed in the graduate education enterprise proved extremely valuable in this exercise with journey maps. The journey maps served as a communication mechanism that visually captured the processes common in the graduate educational enterprise and provided a close and holistic view of the graduate student's activities and helping to expose high and low experiences. Focus on the latter can serve as opportunities to develop support structures that lessen the low points and improve the journey interactions. The benefit of this approach was illuminating because it revealed not only similarities in disciplinary discourse practices and requirements but more importantly the differences. This is one extremely critical point for libraries to consider because it differentiates programs and their needs and services, and shapes decisions for customized versus one-size fits all models. Scalable services are invaluable because they help address staffing and resource shortages but fail when they do not meet or match disciplinary needs. One valuable product that libraries can use to organize services is the mockup of editable final journey maps that will help safeguard against overlooked needs and potential services (Figure 3).

Most journeys appear to overlap and take place simultaneously over multiple years. A graduate students' busiest workload occurs during years 2–5 because there are up to 3

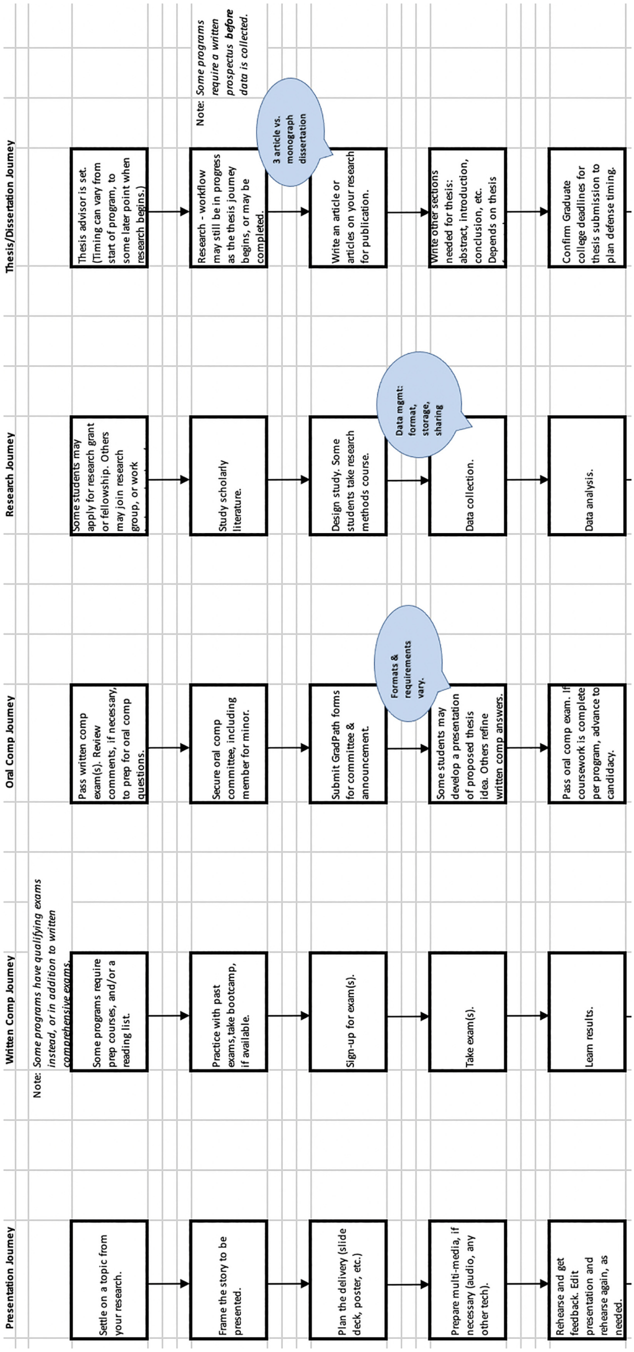
Presentation Journey
Settle on a topic from your research.
Frame the story to be presented.
Plan the delivery (slide deck, poster, etc.)
Prepare multi-media, if necessary (audio, any other tech).
Rehearse and get feedback. Edit presentation and rehearse again, as needed.
Written Comp Journey
Note: Some programs have qualifying exams instead, or in addition to written comprehensive exams.
Some programs require prep courses, and/or a reading list.
Practice with past exams,take bootcamp, if available.
Sign-up for exam(s).
Take exam(s).
Learn results.
Oral Comp Journey
Pass written comp exam(s). Review comments, if necessary, to prep for oral comp questions.
Secure oral comp committee, including member for minor.
Submit GradPath forms for committee & announcement.
Formats & requirements vary.
Some students may develop a presentation of proposed thesis idea. Others refine written comp answers.
Pass oral comp exam. If coursework is complete per program, advance to candidacy.
Research Journey
Some students may apply for research grant or fellowship. Others may join research group, or work
Study scholarly literature.
Design study. Some students take research methods course.
Data mgmt: format, storage, sharing
Data collection.
Data analysis.
Thesis/Dissertation Journey
Thesis advisor is set. (Timing can vary from start of program, to some later point when research begins.)
Research - workflow may still be in progress as the thesis journey begins, or may be completed.
Note: Some programs require a written prospectus before data is collected.
3 article vs. monograph dissertation
Write an article or articles on your research for publication.
Write other sections needed for thesis: abstract, introduction, conclusion, etc. Depends on thesis
Confirm Graduate college deadlines for thesis submission to plan defense timing.

Figure 3.
Editable journey maps

journeys happening at the very same time. During this period, students are often finishing coursework, working through a TAship, beginning research, and studying for comprehensive examination all at once. These students' attention and time is very limited, so it is no surprise to learn that there is a lack of awareness of library services. Normally libraries aim to reach graduate students during orientation. Although this is not a bad approach, it is not ideal since students do not tend to utilize research services until later in their journeys. Since there is a high likelihood that students will not remember all of the support that libraries make available to them, orientations may not be the best time to provide graduate students with information on library services. Given the pressures that graduate students face, most are simply thinking about the current or next immediate stage in their journey, not looking months or years down the road. Therefore, it would be wise for libraries to invest time in considering *when* the appropriate time is to approach graduate students with information and services that support their academic activities within the various intellectual journeys. Generating a timeline for the occurrence of key disciplinary journeys will better prepare librarians to offer assistance at the right time, when students experience most typical hardships in their critical development stages.

Once libraries determine the best time to reach users, appropriate and recognizable language must be used to ensure the uptake of services. Interview data confirmed lack of faculty familiarity with library services such as reference or one-on-one help, information literacy, or data management plans. Libraries often promote services to graduate students through the lens of the research lifecycle, moving forward, it would be advantageous to promote services based on the students' intellectual journeys, which will have a higher chance of resonating with intended users.

By aligning services to journey points where students struggle, libraries can build missing support structures that will help graduate students successfully navigate their academic disciplines. The identified areas where most students struggle require advanced research literacies and epistemological growth, in other words, they comprise professional skills-based activities where significant development occurs. It is during the first three journeys that the graduate student is under careful evaluation by their committee. These activities and experiences are all new to these students thus requiring that individuals place a lot of trust in the direction and advice given by these mentors. One untapped strategy for libraries would be to directly connect with dissertation committees to promote library services. The scholars that make up the graduate committee rest at the center of critical stages and form the official academic authority with responsibility to assess the knowledge and induct the novice scholar into a discipline. Committees tend to exert more intense scrutiny at the start of the educational journeys and loosen and transfer control to the student through the progression of their training. Each individual dissertation committee holds full authority in how they operate. Not all committees operate similarly, even within a single department, so librarians should explore the practices in their areas.

Along with providing a clear map of disciplinary practices, these models can serve as visual communication and negotiation tools by mentors in their training with graduate students. During the interviews one faculty member immediately noticed the value of this visual tool for both stakeholders, stating,

> This is so great. I've actually been thinking about this a lot lately because I do interdisciplinary work with colleagues from completely different disciplines and as we think about how we mentor students together, it turns out our students may have really different paths through these programs.

For the student, the maps can provide a useful guide to identify tasks, a tool to calculate and input deadlines, but mostly these maps can empower nascent scholars with topics to bring to their mentors or committees to assess progress, identify barriers, and resolutions that will advance their research.

It is important for librarians to be familiar with graduate student journeys in their disciplines. Though the educational stages are mostly the same, not all disciplines conduct research in the same way. Certain important considerations must be made by librarians prior to the provision and promotion of research services. Thoughtful design, support, and delivery of services are necessary for those disciplines whose disciplinary discourse practices do not produce scholarly works and instead require professional licensure or the passing of a standardized exam. Librarians can use the editable journeys to figure out what support is needed and design services accordingly.

Support structure during exams journey

Often students do not have a structure to follow as they navigate the ambiguity of the comprehensive examination. Panic and confusion looms over them when they realize the large amount of material they will need to master to succeed during this portion of their journey. Students do not have systems in place to compile, organize, or make notes. They often struggle with how to keep track of the literature, how to approach the content, and what information they should be focusing on. They lack sophisticated methodologies to synthesize readings and approach writing practice essays. One participant recalling her time in graduate school mentioned a series of courses that prepared her for the exams. Then lamented that such a helpful structure is missing in her program and sympathized with the hardship students experience. Librarians have the skills to put together a structure to help students get through exams. Students can benefit from having librarians develop some type of pedagogically based guide to assist students in their studying.

Support structure during ideation/committing to a research topic journey

Another very viable opportunity for librarians to establish support structures is from coursework to pre-exam period. Faculty often commented that students should be using their courses as starting points to identify an area of interest. Topics discussed in classes should eventually move from term papers to major essays, to comprehensive exams, and finally into dissertation topics. Several times faculty suggested that students take advantage of the examination phase to get started on their dissertation. Faculty expressed that readings during the comprehensive preparation phase should serve as groundwork for ideation and topic formulation.

> Plus, write essays related to three big questions that they have agreed with faculty, one in their primary area and two in their secondary areas. The hope is that at least one of them will end up being part of their dissertation. It does not have to be but it would be a waste of time if it does not. So usually what we want is they have to read a body of literature and synthesize it or say something about this part of your literature. And many times this could be part of the beginning of their dissertation.

Given that several faculty commented that students still struggled and often drop out of their graduate programs at this point, it is assumed that the faculty message is not getting through to students. Faculty recognize this as an indispensable opportunity to maximize the utility of one exercise toward another as well as impact time to completion. Therefore, it is advantageous to make the importance of this activity more explicit as well as offer some support to students.

The importance of proper research skills including literature searches and topic development is not new to librarians, however, by thinking about how these topics match up to these intellectual journeys, libraries can better build support structures during key developmental phases and not only positively impact the time to completion but also retention.

Support structure during independent research journey

Libraries can provide some structure by teasing out distinct disciplinary research practices and promoting appropriate services which students can use as a guide to make progress and gather input from advisor or committee. This is when students need to ensure their question is right sized, resources are secured, and that they have identified appropriate theories and frameworks that support their research. This is also where they must apply appropriate research methodologies and analyze their research data.

Discussions revealed that faculty are quite hands-off during the research journey. They also believe support to help shape the graduate students' research identity is missing or non-existent in some curricular program offerings yet there is still an inherent expectation for students to figure out how to navigate the nuances of behaviors, expectations, language, and culture often assumed by scholars in different disciplines. The journey of transitioning from student to independent researcher really puts all research literacies to the test. Yet no participant went into full detail about the research experience and the issues that challenge students making this a prime area for in-depth research.

Support structure during writing journey

Libraries are not writing centers with prose experts on staff, but there are some possible ways that librarians can help faculty that are mentoring graduate students through their journeys. Faculty are burdened with stress, too, when students procrastinate on their writing. A faculty member shared a common story about her frustration,

> So I'm put in a situation where I could make him lose his job or I could just totally stress about him trying to get this done. He's a good example of somebody where, it would have been better to have six months ago have a structured program with, or maybe either I need to be meaner or there needs to be somebody other than me that has a deadline, maybe that class should be there, I'm not sure what the solution to that is. But I'm sure that's not a unique story.

One strategy is to reach out to mentors for collaboration, and with a focus on disciplinary discourse practices, start with discussions to learn more about writing conventions in disciplines, understand the types of writing issues that take up most of a mentor's time and help devise some exercises that will ease the burden on the mentor. Librarians have a unique skill set and can use this to create a compilation of toolkits for the writing journey, whether they are workshops or LibGuides with resources, exercises such as providing activities to learn about key journals, author instructions, how to structure articles in a particular discipline, or small writing cadence exercises with deadlines, etc. to support faculty in their role as advisors through various writing activities. For All But Dissertation (ABD) students, a workshop on putting it together scheduled one to three months pre-graduation would be useful or simply a structured step-by-step guide that includes dates and deadlines on how to assemble the final thesis would help students make progress.

Conclusion

The variability of systemic factors, including the diversity of experiences students bring into and carry throughout their PhD programs, make it difficult to create a single structure that can support all graduate students across their training. Stakeholders in graduate education, in particular potential employers, often voice concern that educational training alone is not enough to adequately prepare students for their future professional roles (Maxwell *et al.*, 2010; Succi and Canovi, 2020). In response, departmental or in rarer instances institutions, often attempt to address that void through professional development offerings (Polson, 1999; Haladay *et al.*, 2007). As often is the case, lack of resources prevents these valuable programs from taking shape and being sustained in a systematic way. Devos *et al.* (2017) report that the most instrumental factor for graduate students completing their degree was the concept of forward progress. In that way, framing the graduate experience and orienting library graduate support through the lens of disciplinary intellectual journeys achieves a forward moving action-oriented approach that supplements and addresses structural inequities. It does this by leveling off some disparities and providing consequential support at meaningful points in a student's journey. Journey maps offer librarians a higher vantage point from which to view graduate students' experiences and develop programs and services that will help support these students along their intellectual paths. Ideally the maps can be used by libraries as a means of establishing a campus wide, sustainable, systematic, and actionable means of identifying and removing barriers across graduate education which will allow students to progress toward successful completion of their degrees while also positively influencing persistence and attainment numbers.

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