CHAPTER TWO

What Do Librarians Need to Know about Quantitative Methods in Digital Humanities?

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Introduction

Digital Humanities (DH) librarianship is not necessarily a one-size-fits-all experience. As Zhang, Su, and Hubschman argue, DH positions cover a range of skills, many of which have not been fully codified into standard library positions.[1] These different skills can be drawn upon in a variety of ways: some may be more quantitative, some may be driven by narrative and focus on specific publishing platforms (such as Omeka), some may focus more on visualization, and some positions require a little bit of all these skills. While many DH librarians might have training in more than one particular method (such as network analysis, geospatial mapping, text and data mining, and/or digital editing), DH librarianship is built on librarians' assumed ability to learn several methods well enough to teach themselves the basics of emergent data practices to sufficiently guide humanities researchers through the process of using these resources.

The practice of quantitative DH librarianship is not limited to collaborations with humanities scholars; they will often interface with researchers in disciplines like communication or business, who are very interested in observing language in practice.[2] DH librarians are involved in instruction and consultations; they collaborate on projects as partners; and they often manage sustainability and the project life cycle for researchers. This is

important for humanities researchers, because they have discipline-specific needs, unique across the rest of the university. Most humanities researchers produce solo-authored, sustained arguments that rely upon direct quotes from primary and secondary source materials as evidence for a theoretically-supported claim. This is very different than the more experimental modes of the sciences or social sciences, which tend to begin with a theory and test that theory with a population of data using specifically qualitative, quantitative, or mixed-methods approaches. As Zhang, Su, and Hubschman argue, several other positions in academic libraries can cover aspects of these skillsets.[3] Crucially, though, we must avoid being too techno-positivistic in defining the DH librarian skillset, as the methods undergirding such projects often borrow advanced concepts from the social sciences and information sciences and retrieval.[4]

I argue that humanities data and humanities-driven projects imply specific, and often somewhat bespoke, approaches to librarians' roles. These may traditionally be described as "data librarian," "metadata specialist," "scholarly communications librarian," "statistical consultant," or "curator." Often, quantitative DH projects begin with scholars knowing what they want to investigate, but they may need help acquiring, curating, and applying methods to their imagined data set. In this essay, I will discuss how librarians who offer support to quantitative DH projects are meeting humanities researchers where those researchers are, which is often without a lot of underlying technical or mathematical knowledge. I begin with a literature review discussing various definitions of DH librarians' jobs. In the second section, I outline two distinct learning outcomes that typify quantitative DH projects and explore how DH librarians provide services to collaborators depending on which of the two learning outcomes they fall under. Finally, I summarize what librarians with other specialties need to know about how quantitative methods in DH look and operate differently from other kinds of research data services.

Literature Review

Sula's "Digital Humanities and Libraries" and Vandegrift and Varner's "Evolving in Common" each argue that DH services are a natural extension for libraries to take on.[5] Vandegrift and Varner specifically note that "the roles and responsibilities of research librarians are shifting to encompass the broadening scope of scholarship, especially involving digital archival and special collections, digital tools and progressive service models."[6] Sula

considers libraries the natural laboratory for humanities scholars, and despite concerns about institutional barriers to success,[7] it is clear that universities have largely bought in to the need for DH (or digital scholarship) services.

In their content analysis of DH job advertisements for academic libraries, Zhang, Su, and Hubschan identify seventy job postings for DH librarians from 2006 through 2018 in the United States. Their study implies that these jobs have permeated librarianship. The author's interest in DH librarianship suggests that the field has largely moved past Nowviskie's early-2010s model of "scholar-practitioners"[8] and to a place where at least some digital practices are subsumed into librarian training in graduate school; of their sample, only 7% of the listings required a PhD in a relevant discipline while 83% required a master's degree.[9]

Indeed, the first edition of this collection discusses many of the ways these roles are enacted in practice. For example, in their chapter "Traversing the Gap," Gibson, Ladd, and Presner describe bridging the gap between technologists and subject specialists, as well as the role DH librarians take on connecting researchers to other campus experts with relevant skillsets. They argue that "in libraries, this takes the form of making existing structures and services, such as metadata and repositories, available to scholars. The library acts in a supportive capacity, but it is not necessarily an active participant in the research."[10] A common service model is "to help researchers on campus learn about DH methods [and] foster campus-wide discussions on the topic."[11] Under this model, subject librarians are available to help interpret results but require a certain level of methodological knowledge to be effective, which requires regular knowledge upkeep. Other librarians, such as Rosenblum, Devlin, Albin, and Garrison, discuss how different kinds of instructional practices can connect with digital scholarship more generally in a collaborative model.[12] Vedantham and Porter focus on how different collaborative spaces also inform teaching and learning service models.[13] There has been increased discussion of consultations and trainings in practice since this volume was first published, including Russell and Hensley on pedagogy and instruction,[14] Morgan on consultations,[15] and Johnson and Dehmlow with a survey of DH librarianship's general portfolio (as a representative selection).[16]

While Johnson and Dehmlow offer a survey of DH outcomes, Zhang, Su, and Hubschan ultimately argue that these positions cover a range of scholarly practices while lacking a set of core competencies to measure against.[17] This particular arm of librarianship lacks a certain level of coherency: "Though 'DH Librarian' is now an actual job title and position in academic libraries, the American Library Association (ALA) has not developed a framework of

core competencies for this emerging profession, and few LIS degree programs and professional organizations are providing sufficient support for students and information professionals to gain the skills and knowledge required to be successful in the profession."[18] The ALA has established core competencies for all librarians, but different subspecialties (science librarianship, collections and technical services, archivists, law librarians, etc.)[19] have their own established communities of practice and shared expectations that allow for benchmarking success across institutions. The concern is that without a coherent sense of DH competencies, it is difficult to justify and assess why these positions are needed. Walker problematizes this somewhat, claiming "what we [DH practitioners] are doing is merely an extension of what we [libraries] have been doing for years."[20] Varner and Vandegrift would agree, arguing that this is a natural progression to best serve the evolving needs of humanities researchers.

In what follows, I build on these discussions of portfolio and praxis by suggesting that quantitative methods in DH librarianship offer two major discrete learning outcomes. I suggest that while we may lack a set of ALA-authorized core competencies, we provide a specific kind of service which is largely dependent on two sorts of patron needs. In each instance, our audience can develop quantitatively-driven skills and confidence without getting stuck in a cycle of endless referrals, where they are likely to receive mixed messages regarding next steps.

Two Kinds of Consultations

In general, DH librarians supporting quantitative research methods have two discrete kinds of consultations, which I frame in terms of their individual learning outcomes. I use 'learning outcomes' specifically because the DH librarian's role is to facilitate knowledge exchange between librarian and researcher. We *could* perform the task for the researcher, but that removes the possibility for situated learning to take place. Our two main learning outcomes are as follows, and echo Gibson, Ladd, and Presnell's discussion of "first-order" and "second-order" projects:[21]

1. Researchers will test an idea about performing a quantitative experiment by discussing best approaches with the DH librarian and decide on a suitable outcome.
2. Researchers will state a desire to learn a particular method or approach for a specific research question and develop a sustained course of action with the DH librarian to execute the project.

As DH research practices become more embedded in teaching and scholarship, there is the potential for additional learning outcomes to be introduced.

In this next section, I will discuss the potential routes the DH librarian will take to execute each of these learning outcomes, using prototypical examples derived from actual consultations with researchers.

In the first learning outcome, researchers come to the meeting with a sense of curiosity, wanting to explore the possibility of doing a difficult to execute or otherwise complex analysis. Depending on disciplinary background, this user rarely needs heavy support in command-line based programmatic practices. In many cases, they believe they are approaching some kind of impossible ask or imagine their needs will be met with complexity beyond the level of interest they have in the question. Often, they are not well-versed in what their available options are for doing this kind of work. These kinds of researchers could be looking to do something as simple as wanting to find out if a particular concept undergoes semantic change during a specific period, or if there is a way to track specific vocabulary in a small set of texts without having to set up codes with software such as NVivo. These are lower-stakes questions for both researcher and librarian, ones that usually require one or two consultations to figure out a reasonable plan to best help the researcher achieve their goals. Often, they are simply curious about what their options are and want to know what the best approach would be to achieve their task, without sinking a ton of training time into this activity.

This researcher needs a simple, straightforward solution. One example of this first kind of learning outcome is when a researcher is interested in semantic change of a word or concept over time. They may have heard of Google NGrams,[22] but are unclear on the underlying data and how to access this resource. In this case, the librarian can explain the pros and cons of using the Google Books collection in contrast to other platforms (including HathiTrust's historical collections[23] and the curated historical corpora from Brigham Young University's English Corpora[24] as two alternatives). From there, we establish the best resource for the task and the librarian teaches the researcher the basics of using the interface. After meeting, the researcher should be able to develop their own queries and interpret the outcomes for themselves. Should they decide they want to analyze their own collection of texts or need help developing a more specific query, they may return to seek advice with another targeted question.

This category of learning outcomes includes consultations with researchers who want to extract major themes from their own collection of texts, such as a survey, and can comfortably use entry-level platforms (like Voyant

Tools[25]) after one consultation to observe major themes and linguistic patterns in their textual data. If the researcher has previous training in quantitative methods, their needs can often be met by one-off consultations. The patron understands the stakes and has the skills they need to complete the task. However, these consultations may move into the second learning outcome if the researcher develops a sustained interest in developing quantitative analytic skills more deeply.

The second learning outcome described above requires more focused and ongoing support. When researchers state a desire to learn a particular method or approach, it is typically for sustained scholarly inquiry. Rarely do we see interest at this level "just to find out" what is happening. Therefore, the DH librarian will develop a plan of action which begins by prescribing a particular software or method the researcher should use to answer their stated question, and we will train them in the basics of this prescribed approach. From there, the researcher and librarian will collaboratively assess results from this process, with iteration being a key part of this second learning outcome. As the researcher proceeds, more complex concepts may be introduced, especially those related to statistical or other forms of numeric thinking. As the researcher gets comfortable with these quantitative methods, we continue to iterate and expand on the project.

In this second outcome, the researcher may have attended a conference where they encountered topic models they want to perform on their own texts, or they have become interested in tracing specific linguistic features in their texts at scale. These activities—even if they still involve using off-the-shelf resources such as Voyant Tools, AntConc, or MALLET—will require more hands-on learning to understand the outputs of these platforms. While tutorials are available, researchers often desire specific guidance on how to interpret and understand the outcomes of these processes. This specifically is what often leads to a more sustained series of consultations: the researcher wants targeted, specific help understanding the output of these processes.

In each learning outcome, support for quantitative DH requires deep and significant knowledge of which platforms, techniques, and methods are available for users at different stages of their digital methods journey. In many ways, the DH librarian's role is to provide direct assistance, rather than referring the researcher to various specialists around the library. In no particular order, we might consult on these areas of specialist expertise in our consultations: copyright, metadata, data management, literature review for methods, methods training and assessment, and data visualization. Thus, our real task is to assess what is available for the researcher according to

their current confidence with technology and develop a plan to help them execute their desired project. These varied informational and digital literacies are often the most complex parts of our roles, and are not a one-size-fits-all approach. For instance, a researcher coming in with advanced computational and/or digital literacies (such as experience programming in Python or R) can be given more advanced advice in the very first instance.

Some researchers are just curious about what is available to them as off-the-shelf platforms for performing simple word frequency analysis, and some want to launch a major methodological overhaul. Our consultations therefore contain several features of reference interviews, such as the following inquiries:

- What are your file types (or what files do you need), how were they selected, what do they represent, which dates do they cover, who wrote the articles? (Do you need to do this yourself, or can we use someone else's work?)
- Do you need a graphical user interface to familiarize yourselves with the concept at hand, or can you use a Python package to complete this task and simply need advice on best practices?
- What kinds of statistical methods are appropriate for this particular task?
- Do you need to visualize your data in a complex, bespoke way, or will something simple from an off-the-shelf tool suffice? Do you need to visualize *any* of your data?
- Where does the data go when we are done with the project? Do you have the rights to share it more widely? How will you preserve the data for future projects?

Rolled up in these questions is an assessment of which approach(es) would be best to solve the problem at hand. As with all reference interviews, the biggest part of our role as librarian is to provide interpretive support. We coach researchers through understanding what their data does, what it looks like, and how it operates within the scope of the platform we have selected for the project. Generally, DH librarians all have a range of trusted solutions for most tasks presented to us in these kinds of interviews. Answers provided in these discussions shape the directions of our conversations: for example, if developing a corpus for analysis becomes a key feature of the project, earlier phases of both kinds of consultations are often preoccupied with introducing the idea of metadata and data curation.

The researcher ultimately guides this process and we respond to what they bring to the table. We must, of course, be mindful of providing training and enabling our researchers to succeed. For humanities scholars in particular, we might be their first contact moving into more complex computational processes than they might be used to performing. Based on these answers, we might become an iterative partner in helping the researcher understand what their output looks like and how it functions. We might be able to send someone off to do their own analyses with a graphic user interface, but they may require additional support after working independently for a while to get them closer to the information they are seeking.

As Morgan writes, "while I can make strong recommendations, the scholars I work with are the ultimate decision makers; and this is why my work *is* emotional labor, as opposed to pure technical advice. The way that I provide guidance and information will have an emotional impact, and people will make better decisions if they are feeling steady, resilient, and energized, rather than depleted, by their work."[26] Morgan describes this as emotional labor in that it has a lot to do with setting expectations and being reasonable about the time and energy required to do this kind of scholarship. And sometimes DH librarians underestimate how much support a researcher might need, requiring further energy, labor, and effort. Quantitative DH methods often borrow methods and techniques from the social sciences and computer science. We may be already used to doing these tasks, so accessing the mindset of a novice is always helpful.

It is also in our best interest to avoid being too technocentric in these discussions. Our patrons may be approaching something mathematically complex like topic modelling for the very first time. We become involved in teaching the implications of the statistics for their particular purposes—but (generally) by keeping them away from the actual calculus underlying the processes. This is not about hiding the details of a chosen technique, but rather breaking tasks down into discrete tasks to understand quantitative digital approaches in a meaningfully scaffolded format. This builds researcher confidence in their ability to develop further skills. And, ultimately, we let the researchers set their comfort levels and respond accordingly. Quantitative methods in DH librarianship cover a wide range of formats and needs. Many projects can suffice with keyword-in-context or collocational analysis, but researchers might have encountered more complex methods such as topic modeling or sentiment analysis and be interested in applying these tasks to their research projects.

This section has outlined two major learning outcomes for scholars looking to get involved in implementing quantitative DH methods. In both learning outcomes, the librarian and the researcher collaborate to establish what they need to accomplish this project (a corpus) and introduce them to a software package to conduct their analysis. As necessary, we also train them to develop good metadata practices to trace vocabulary across the topics, as well as encourage them to think about language as data being presented in a wholly non-linear fashion, adjust their approaches to reflect the needs of the project, and iterate the process as needed. Next, I discuss how DH librarians use their skills and knowledge to execute these two specific learning outcomes as a larger discussion.

Discussion / Assessment

In each of the two learning outcomes described above, relationships between librarian and researcher are built on sustained trust. This trust is bilateral: first, that the librarian will not wildly overestimate the amount of time and energy the researcher can devote to this project and that the material is pitched appropriately for the researcher. In exchange, the researcher will perform the follow-through to learn the skills being presented to them. From the librarian side, it is crucial that someone coming from philosophy or history should not be expected to suddenly learn a programming language to perform a simple word frequency task, or have to familiarize themselves with advanced calculus to implement a topic model, *until they are ready to.* One danger of referring researchers to different specialists in the library is that not all colleagues may be familiar with a researcher's learning context and level of experience. Thus, for instance, scaffolding learning about regular expressions after establishing a practice of keyword-in-context searching may make the experience less daunting for someone trying out quantitative methods. Working with one DH librarian can help establish situated knowledge.

Having to refer the researcher around the library would mean having to constantly explain their project and goals to different colleagues. This also risks the researcher being given potentially conflicting advice from a range of different people. An even worse outcome would be if every library staff member they meet assumes the patron already has all the other necessary background knowledge for quantitative research. DH librarians can refer our patrons to appropriate channels should they need more support than we can offer them—having one centralized person to speak to is a strong benefit for the patron seeking advice. DH librarians are, therefore, more like

subject specialists, with specific knowledge of the methods available and the questions that come to bear on these methods. And, as the above learning outcomes show, working with a DH librarian is not a one-size-fits all experience. Researchers at different stages of developing quantitative projects in the humanities have unique needs.

As Zhang, Su, and Hubschan show, the range of skills DH librarians possess encompasses a range of methods as well as focused disciplinary knowledge. The most common analogous position to DH librarians might be a social science data librarian; researchers working with qualitative and quantitative social science have similar needs.[27] However, social science researchers have distinct needs from humanities researchers, including a requirement for methods in their degree programs. We understand the specific needs of humanities researchers: patrons from the humanities have such specific data-driven needs (including convincing them to think about their processes as data-driven in the first place). We use more generalizable approaches, such as text mining (a blanket term that covers a huge range of tasks, from machine learning techniques to keyword-in-context analysis) and data visualization in the sense of identifying what is data and what needs to be illustrated.

Conclusion

At the beginning of this essay, I referred to the range of skills and roles ascribed to DH librarians.[28] This article argues that the lack of consistency in DH roles is potentially troubling, as there is not a complete or otherwise specifically coherent set of skills anticipated in these roles, following on a lack of core competencies.[29] I have argued that the necessary skills and knowledge for DH librarians intersect with many different library positions. Unless they are specifically trained as DH practitioners, humanities researchers rarely (if ever) have this level of training and rely on the expertise of others. Quantitative and other DH methods involve meeting researchers where they are and providing them scalable, accessible resources. I argue that our consultations fall under one of two major tasks: trying out a hypothesis by performing a quantitative experiment, or wanting to develop specific research skills.

The major goal of these consultations is not to make these concepts seem impossible to implement. Instead, we provide quantitative support to humanities researchers to empower them to prototype or otherwise dip a toe into new-to-them methods while meaningfully growing their confidence. DH librarianship may lack an ALA-approved set of core competencies and a shared vocabulary, but our hybridity is ultimately a benefit to our scholarly communities.

Notes

1. Yin Zhang, Fangli Su, and Barbara Hubschman, "A Content Analysis of Job Advertisements for Digital Humanities-Related Positions in Academic Libraries," *The Journal of Academic Librarianship* 47, no. 1 (2021): 1–11, https://doi.org/10.1016/j.acalib.2020.102275.
2. This, of course, has lots to do with how individual colleges are structured and which departments are part of which collection of disciplines.
3. Zhang, Su, and Hubschman, "A Content Analysis," 1.
4. Paige C. Morgan, "The Consequences of Framing Digital Humanities Tools as Easy to Use," *College & Undergraduate Libraries* 25, no. 3 (3 July 2018): 211–231, https://doi.org/10.1080/10691316.2018.1480440.
5. Chris Alen Sula, "Digital Humanities and Libraries: A Conceptual Model," *Journal of Library Administration* 53, no. 1 (January 1, 2013): 10–26, https://doi.org/10.1080/01930826.2013.756680; Micah Vandegrift and Stewart Varner, "Evolving in Common: Creating Mutually Supportive Relationships Between Libraries and the Digital Humanities," *Journal of Library Administration* 53, no. 1 (January 1, 2013): 67–78, https://doi.org/10.1080/01930826.2013.756699.
6. Micah Vandegrift and Stewart Varner, "Evolving in Common," 68.
7. Miriam Posner, "What Are Some Challenges to Doing DH in the Library?," Miriam Posner's Blog (blog), August 10, 2012, http://miriamposner.com/blog/what-are-some-challenges-to-doing-dh-in-the-library/; Michael Furlough, "Some Institutional Challenges to Supporting DH in the Library," Mike Furlough (blog), August 16, 2012, http://www.mikefurlough.net/?p=51; Isabelle Galina Russell, "The Role of Libraries in Digital Humanities (El Papel de Las Bibliotecas En Las Humanidades Digitales)," World Library and Information Congress: 77th IFLA General Conference and Assembly, San Juan, Puerto Rico, 2011, 1–6, https://www.ifla.org/past-wlic/2011/104-russell-en.pdf; Trevor Muñoz, "Digital Humanities in the Library Isn't a Service," Trevor Muñoz, accessed July 15, 2022, https://trevormunoz.com/archive/posts/2012-08-19-doing-dh-in-the-library/.
8. Bethany Nowviskie, "Skunks in the Library: A Path to Production for Scholarly R&D," *Journal of Library Administration* 53, no. 1 (1 January 2013): 53, https://doi.org/10.1080/01930826.2013.756698.
9. That said, 22% of all postings described a PhD as a "preferred" or otherwise desirable qualification, and "the majority of job positions did not require a doctoral degree" (Zhang, Su, and Hubschman , 2021, 5). So while those with PhDs in digital humanities are encouraged to apply, a terminal master's in library science represents minimum requirement for 93% of these positions.
10. Katie Gibson, Marcus Ladd, and Jenny Presnell. "Traversing the Gap: Subject Specialists Connecting Humanities Researchers and Digital Scholarship Centers," in *Digital Humanities in the Library: Challenges and Opportunities for Subject Specialists*, eds. Arianne Hartsell-Gundy, Laura Braunstein, and Liorah Golomb (Association of College and Research Libraries, 2015), 7.
11. Gibson, Ladd, and Presnell, "Traversing the Gap," 8.
12. Brian Rosenblum, Frances Devlin, Tami Albin, and Wade Garrison, "Librarians Teaching Digital Humanities in the Classroom," In *Digital Humanities in the Library: Challenges and Opportunities for Subject Specialists*, eds. Arianne Hartsell-Gundy, Laura Braunstein, and Liorah Golomb (Association of College and Research Libraries, 2015), 151–176.

13. Anu Vedantham and Dot Porter, "Spaces, Skills, Synthesis," in *Digital Humanities in the Library: Challenges and Opportunities for Subject Specialists*, eds. Arianne Hartsell-Gundy, Laura Braunstein, and Liorah Golomb (Association of College and Research Libraries, 2015), 183.
14. John E. Russell and Merinda Kaye Hensley, "Beyond Buttonology: Digital Humanities, Digital Pedagogy, and the ACRL Framework," *College & Research Libraries News* 78, no. 11 (December 4, 2017): 588-600, https://doi.org/10.5860/crln.78.11.588.
15. Morgan, "The Consequences of Framing," 211–31.
16. Daniel Johnson and Mark Dehmlow, "Digital Exhibits to Digital Humanities: Expanding the Digital Libraries Portfolio," in *New Top Technologies Every Librarian Needs to Know: A LITA Guide*, ed. Kenneth J. Varnum (American Library Association, 2019).
17. Zhang, Su, and Hubschman, "A Content Analysis," 1.
18. Zhang, Su, and Hubschman, "A Content Analysis," 1.
19. See ALA's "Core Competences," Text, Education & Careers, June 10, 2008, https://www.ala.org/educationcareers/careers/corecomp/corecompetences. For a complete list of specialist core competencies, see "Knowledge and Competencies Statements," Text, Education & Careers, August 3, 2006, https://www.ala.org/educationcareers/careers/corecomp/corecompspecial/knowledgecompetencies.
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21. Katie, Ladd, and Presnell, "Traversing the Gap," 3.
22. Yuri Lin, Jean-Baptiste Michel, Erez Aiden Lieberman, Jon Orwant, Will Brockman, and Slav Petrov, "Syntactic annotations for the Google Books Ngram Corpus," Proceedings of the ACL 2012 system demonstrations, 2012: 169–174.
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25. Stéfan Sinclair and Geoffrey Rockwell, *Voyant Tools*, 2016, http://voyant-tools.org/.
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27. James Mahoney and Gary Goertz, "A Tale of Two Cultures: Contrasting Quantitative and Qualitative Research," *Political Analysis* 14, no. 3 (2006): 227–49, https://doi.org/10.1093/pan/mpj017; Michael S. Lewis-Beck, Alan Bryman, and Tim F. Liao, *The SAGE Encyclopedia of Social Science Research Methods*, 1st edition (Thousand Oaks, Calif: SAGE Publications, Inc, 2003).
28. Zhang, Su, and Hubschman, "A Content Analysis," 1.
29. Zhang, Su, and Hubschman, "A Content Analysis," 11.

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