Research Section Spotlight

Research Roadmap: Understanding the Research Process (Part 1)

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Editor's note: This piece has been split into two parts due to length. Part 1 covers advice and guidance about doing research while Part 2 (which will be in the Hypothesis Spring/Summer 2019 issue) discusses how to share the products of your research.

Introduction

Since 1982, the MLA Research Section has fostered discussion, shared advice, connected members to potential collaborators and research mentors, and kept its membership up-to-date on library research efforts, particularly as they apply to a wide variety of academic life sciences and community health efforts. Towards these endeavors, the 2017-2018 Research Section program planners proposed a Special Content session on understanding the research process for the 2018 MLA Annual Meeting & Exhibition in Atlanta, GA. The session was envisioned as a panel discussion for an audience of new to intermediate librarian researchers that would offer advice around getting started, from formulating an idea, to study design, data collection, and finally dissemination and the publication process. Other MLA Sections--Leadership and Management Section, Hospital Library Section, and Educational Media and Technologies Section--offered their support. Panelists were recruited based on their previous involvement in continuing education and editorial work regarding library research, and several belonged to multiple Sections sponsoring the session. In discussion with the Research Section Program Chair [Billman] and the session moderator [Powell], each panelist [Akers, Alpi, Eldredge, Holmes] selected to focus on an area most relevant to their work, with the recognition that all the presenters had expertise across the following topics comprising the presentation:

- Overview of the research process
- Finding and working with a research mentor
- Turning daily work into a research project
- Choosing research methods that fit you and your question
- Using technology and data collection methods efficiently
- Disseminating your research
- Understanding the publishing process

"Research Roadmap: Understanding the Research Process," was presented on May 20, 2018, and 2018 MLA Annual meeting attendees can access the recorded session by logging into the online program with their registration information (https://www.eventscribe.com/2018/MLA/). This account of the session is presented so those unable to view the recordings may benefit from the panelists' advice and expertise.

Making a Member-Driven Presentation

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In planning the session, we wanted to respond to MLA members' questions about the research process. On April 5, 2018, Billman posted a call for questions in the MLA-FOCUS, an email update sent to all MLA members. Questions received before the submission deadline were addressed in the content presented. The session incorporated two question and answer periods, one after the first two speakers and the second at the end. At the beginning of the session, a slide encouraged the audience to "Submit Your Questions" using a tinyurl online survey or on cards. Those not addressed by the presenters during the session have responses from our panelists in the Appendix.

The Roadmap as Presented

Overview of the Research Process

We began by reviewing the Evidence Based Practice Process and the opportunity for research after the existing literature has been critically appraised, and before its application to the problem that spurred the initial search for evidence. Moving on to the research process, we shared a four-step version for which we would provide our experiences:

1. Formulate a Research Question (**Objective**)
2. Design an appropriate **method** to answer the question
3. Interpret your **results**
4. **Communicate** your results

As we developed our expertise through being mentored and mentoring others, and because several of the questions we received were about finding mentors or collaborators, we addressed mentorship first.

Finding and Working with a Research Mentor

A mentor can be defined as "an individual with advanced knowledge, usually more senior in some regard, who is committed to providing upward career mobility and assistance for the protégé …" Moreover, "The mentoring relationship has been characterized as an intense, sometimes intimate professional relationship devoted to providing social support and development for the protégé's career."[1] Johnson observes that mentoring represents an enduring and reciprocal personal relationship in which the mentor serves as a role model while offering a safe environment for the protégé to consider new ideas. In this context, the mentor provides acceptance, protection, challenge and coaching for the protégé.[2]

While many studies have investigated career or academic mentoring, few investigations have rigorously explored the specialized world of mentoring other professional colleagues in conducting research. And almost all investigations into research mentoring have

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focused upon faculty-student mentoring. Eldredge has mentored more than 20 colleagues over the past two decades. A few of these colleagues have been new faculty members in his medical school whereas most have been library or information practitioners wanting guidance with research projects. These early experiences, coupled with limited time for mentoring individuals, led to sponsoring "The Research Mentor" column in *Hypothesis* during 2008-2014. These columns featured topics about which his protégés needed recurring guidance ranging from creativity in research [3, 4, 5, 6], to defining authorship [7, 8], to the pragmatic aspects of research [9, 10]. They also included interviews with esteemed researchers [11, 12] and a reflection upon a past mentor's long-term effect upon his own career [13]. Additionally, the author participated in several of the University of New Mexico's Mentoring Institute's Research Conferences [14].

Roles of the protégé

Generalizing from these experiences, the protégé needs to practice reciprocity in the mentoring relationship. The research mentor brings a wealth of knowledge and skills on how to conduct a research project. The gains to the protégé are obvious. Yet, what does the protégé bring to the mentoring relationship? Inventorying the attributes possessed by the protégé might strengthen the relationship:

1. Previous research education
The mentoring relationship should not be confused with a tutoring relationship in which the mentor provides comprehensive one-on-one instruction on all aspects of research. The protégé should bring previous learning on research methods to the relationship. The protégé can learn research methods by taking or auditing courses at nearby or online academic institutions, such as those in subjects such as psychology, biology, or one of the social sciences. The new MLA Research Training Institute might provide an avenue for some protégés to gain research methods education and identify mentors, but this new, not yet evaluated, program does not offer the depth of training found in a graduate-level research course.

2. Literature searching
Every research process involves literature searches in the formative stages due to the need to perform iterative literature searches until the final research question reflects the state of the existing research knowledge on the topic to be investigated. Designing the research methodology provides another stage in which one or more literature searches will inform how the research project will unfold. Finally, once the research is done,

additional literature searching will assist in interpreting and discussing the results. Librarians who are capable literature searchers can assist a research project with their unique skill sets.

3. Organization

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Librarians are legendary for their organizational skills, and many have learned project management skills that have direct application to the complex dimensions of a research project. Librarians also can use bibliographic management tools such as Zotero or EndNote to organize the hundreds of references associated with any research project. A recently published scoping review involved elaborate bibliographies and analytics, highlighting the protégé's contribution of an impressive skill set to the project [15].

4. Track record

Many librarians have contributed to research projects as part of their everyday work. These roles often involve literature searching and bibliographic management. While most involvement with research projects takes a more episodic form, some projects involve larger commitments. These projects form a track record of librarian involvement in past research projects that librarians can point to when approaching a research mentor for guidance.

5. Commitment

The potential protégé needs to bring a commitment to completing the research project to the mentoring relationship. Experienced researchers know that many well-intended research projects are abandoned at various phases prior to completion. Ideally, the protégé can present the potential mentor with a plan and timeline that will advance the research project through completion and communication to the profession through poster, presentation, or publication of the results. The multi-phased MLA Research Agenda project [16] tested the commitment of all researchers involved yet when it reached completion, it provided a great service to our profession [17].

6. Creativity

Established researchers sometimes descend so deeply into the weeds of the research design and its careful implementation that we forget to consider the opportunities to lend some creativity to the project. A noteworthy example surfaced when one of the authors included three medical students in a randomized controlled trial on Point-of-Use tools. The three medical students expressed their creativity by producing a top-notch training video for participants in the study. In other ways, the students also added elements of creativity unrecognized by the veteran researchers and thereby improved project participation among providers [18].

7. Enthusiasm

A few years ago, one of the author asked an audience of translational researchers what adjectives they would use to describe the research process. The adjectives offered were "tedious" and "detailed" and "comprehensive." There are admittedly boring moments in any research project in which one can be tempted to walk away. Toward the end of the project, however, excitement builds as results, particularly difficult to explain results,

emerge in need of interpretation. A protégé with enthusiasm most likely will rely on it to muddle through the less exciting aspects of a research project. One applied informatics research study that comes to mind involved a lot of tedium, but the researchers all plowed through the hours of careful checking in this fidelity study to produce surprising results [19].

Initiating the mentoring relationship

We have focused on how the protégé seeking to recruit a research mentor needs to step outside the limits of her or his own perceptions to consider the perspective of the potential mentor(s). The MLA Mentoring/Expertise Directory (http://www.mlanet.org/page/mentoring) is one way to find mentors who have already indicated willingness to engage in mentoring relationships. In other cases, you may identify someone in the literature or at your institution with expertise you aspire to develop and there you will not know their willingness to mentor until you make the approach. It is up to the mentorship dyad to set mutually agreeable terms of the relationship. The respect is reciprocal, and it is also clear that the more experienced researcher can gain insight and satisfaction, and sometimes co-authorship from these relationships. In some cases, an enduring relationship develops that leads to new studies as collaborators.

Turning Daily Work into a Research Project
There are many ways to turn daily work into a research project; it is a matter of looking and asking thoughtful questions about what work is being done. More specifically, it means looking at what we are, or perhaps should be, measuring. Valuable research can be performed at many levels; not every question is best addressed by a large, multi-center NIH-funded study. This is especially true in library research projects because much of what we measure and seek to improve is part of our daily work. One of the key pieces of evidence-based library and information practice (EBLIP) is applying local evidence to evidence in the literature, and to our own professional knowledge. Considering the five principles of EBLIP as presented by Koufogiannakis and Brettle [20] may help us better understand ways we can turn daily work into research:

Articulate: A clear understanding of the problem or question must be reached. Part of articulating the problem includes working out what is known already and why the

information is needed, as well as ensuring that the problem is set in the appropriate context.

Assemble: Evidence should be assembled from multiple sources that are the most appropriate to the question or problem at hand and should include research evidence, local evidence, and professional knowledge.

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Assess: Evidence should be assessed for its quality (often known as appraisal or critical appraisal), determining what the evidence says as a whole.

Agree: Determine a course of action and begin implementation of the decision. If working with a group, try to achieve consensus based on the evidence and organizational goals.

Adapt: Evaluate the decision and how it has worked in practice. Revisit goals and reflect on the success of implementation.

Applied research at the Medical University of South Carolina (MUSC)

Keeping these principles in mind and thinking through the work that we do daily at the library, a relatively simple research project grew out of updating LibGuides. We were looking at click stats on our guides and noticed some irregularities such as usage considerably different from what we expected. That started us in the first principle of EBLIP, asking (**articulating**) the question of why these irregularities were present. The research project developed from seeing the numbers and articulating the question. Before we knew it, we had developed the project. Ultimately, looking at the clicks in our LibGuides gave us an opportunity to **assemble** the evidence, **assess** it, and decide (**agree**) on what to do with what we learned.

Using what we learned, we decided on ways to reformat our Guides and to reconsider placement of links based on perceived importance. If things we felt were important had been prominently placed, but were not getting many clicks, we moved them a little further down the page since fewer clicks seemed to indicate less importance to the user. Conversely, when we found things placed lower getting a lot of use, we relocated them to a more prominent position. It is a very simple project, and one that we can easily **adapt** over time. We will revisit the statistics in the future to assess whether our repositioning made any difference.

It is important to note that this simple project led to more questions being asked and therefore more research needing to be done. A secondary outcome (that we had not considered until we really looked at the data) was the realization that we needed to adjust our instruction sessions to include more guidance on navigating LibGuides, as well as accessing the resources therein. A follow-up study looking at data from and the questions being asked through LibAnswers is also being launched. The results will also factor into future LibGuides updates and we expect it to bring out even more questions and things to study. This is one small example of taking our everyday work and turning it into research. It is a project we know we will learn from, and we anticipate publishing our results to share our procedures with others who may consider a similar project. For another example from a different institution, see Lindsay, Oelschlegel & Earl [21].

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Identifying and overcoming obstacles

How do we find time to do research when we often feel like we do not have enough time to do our day-to-day job? Further, how do we find time to do research when it is not expected of our position, or when our superiors are not supportive? This author [Holmes] feels that the best way to achieve time for research is to simply prioritize. That means figuring out what can and cannot be shuffled, eliminated, or delegated from your daily work. It also means setting aside dedicated time in your schedule to get the research done, even if it is on Saturday afternoon [Holmes] or in thirty-minute blocks before work while others are sleeping [Alpi]; see Chronicle of Higher Education [22] for more ideas. You must set boundaries so that your dedicated time is not always interrupted or sacrificed, and you also must enforce the boundaries.

If you are passionate enough about a topic and want to research it, then you must be willing to pursue it on your own time. There are many librarians who are either not in positions where there are expectations of publishing and presenting or who lack support from their superiors or even their colleagues, yet they want to be involved in advancing our profession. It is important for all library staff with questions to find their own way to pursue their interests, even if it is on their own time. In fact, most librarians spend a portion of their own time (and often their own money) to pursue their professional goals and interests. The results that will come from taking the time to work on projects will help your resume/*curriculum vitae* (CV) for future opportunities.

Another obstacle that we frequently encounter is lack of access to resources, whether it is software or people or something else. Your mentor or your professional association can help you find these resources, but your own professional networking efforts will probably yield the biggest benefit. If someone's research interests you, it is entirely appropriate to contact the researcher to say you would like to know more about the work or perhaps even suggest a collaboration. It helps to have a scholarly presence online (e.g. LinkedIn or Google Scholar Profiles) so they can learn more about you before responding to your inquiry. Collaboration is one of the keys to success, and it requires work on your end to make those meetings happen. Collaborators can provide resources like software or expertise, but they can also end up serving as a mentor or a network to yet another person with whom you may be able to work with in the future.

While a lack of understanding of the research process is an obstacle for early researchers, it is very much a learning opportunity. Looking to the literature is one of the best ways to get an introduction to the process, and again working with a mentor can help with guidance. Educational opportunities are increasing, and the MLA's **Research and Evidence Based Practice Curriculum Committee** is in the process of building an education curriculum for learning about research. A final suggestion for learning about the research process, and a general way to get more involved in research, is to engage with

your Institutional Review Board (IRB)/ethics committee. If you are going to study your users or analyze educational output from previous courses for a presentation or publication to the outside world, you will need to have your proposed project reviewed by the IRB. Understanding the background of your IRB members or looking into becoming an IRB member yourself may be an excellent engagement opportunity to learn about research at your institution, and how you might find a partner. No matter your role, you will learn much more about the process, and when the time comes for your own research with human participants, you will know what you have to do to prepare your own submission for approval. Always be sure to check with your IRB prior to starting your research so you will know if what you propose will qualify as research or be considered quality improvement. Having this information at the beginning of your work will save you a tremendous amount of time later and will be important if you plan to present or publish your findings!

In summary, there are many ways to turn daily work into research. It is a matter of taking time to really look at the work you are doing, deciding what is measurable, and considering if those measurements can or will make a difference to how we work in the future. Technology is changing how we do our jobs almost overnight, so it is important that we continue to make ourselves and our work relevant. That cannot be done without producing evidence, so we must find ways to work together to meet our goals and foster our professional interests.

Choosing Research Methods that Fit You and Your Question
There is not a "right" choice of research method for any question. As researchers at any level of experience, we work on a continuum of what may help us address our question and be feasible to execute.   There are several characteristics of a proposed study to consider in deciding among methods—your question, the participants, timing, and capacity.

The first consideration is your research question—what do you want to know or learn? Research questions are also not set in stone. You may start with a very broad research question and realize that you need to focus it in order to begin working on it. Participants are an extremely important component as you have varying levels of access to the insights they can provide. Consider whether you can learn what you want to know from direct engagement with people (clients, students, library staff, etc.), artifacts representing people (assignments, electronic health records), or documents (cataloging records, reports, published articles, etc.). You as the researcher are also a participant, bringing your experience and current point of view to the study design, your interpretation of the results, and the conclusions you make. In qualitative research, you must be explicit about this in terms of sharing your contextual bias and subjectivity—for more see Preissle [23].

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Timing and capacity often intertwine, and they tie back into your choice of participants. For example, you may be interested in interviewing a lot of people, but you do not have sufficient capacity to perform a lot of interviews, so you choose to do a survey or analyze existing records. Research always takes much longer than we propose, so usually we come up with an initial time estimate and then double or triple it. You must include time and resources to pilot test ANY methodology. Piloting surveys is common best practice, but you also need to pilot interview protocols, observation checklists, data extraction forms, and any other tool that would be used to gather or analyze data.   If you do not feel you have time to pilot the tool, then you probably do not have sufficient time for the research. Pilot testing does not have to be with the target participants, but should be with participants who are not involved in the research and are relatively similar to your intended population. Many research projects are cross-sectional, meaning they measure a slice of a population at a single point in time, typically a one-time survey administration or observation. For more robust evidence of change over time, particularly in educational research, it would be ideal to perform longitudinal research, repeating measures on the same population over multiple points in time. However, tracking participants over time can be challenging.

Methodologies have inherent characteristics and limitations, but they are also more or less effective in the hands of experienced practitioners. Look at studies that have addressed questions similar to yours in the library/information science literature and other social science fields such as education, psychology, management, etc. If the literature on a topic is from case studies or single-institution surveys, consider expanding the view with other study types or by including additional institutions for cross-institutional comparisons. If you are interested in applying a method and need assistance, methods mentorship can be internal or external to your institution or field. You do not have to seek the most renowned experts; it may be easier learn from those with slightly more skill or experience

who can describe their approaches and refer as needed to those with greater expertise. The next section discusses a few common methodologies you may wish to consider.

Common Methodologies in Research

a. Document review and analysis
Analyzing published documents is a very comfortable research strategy for librarians and can be a study on its own or part of a larger mixed methods study. Examples include a) evaluating information quality and readability; b) bibliometrics of publications or networks; and c) systematic or scoping reviews. You may evaluate materials produced by your own institution or those produced by others. If using your own materials, be aware of your potential bias and consider a collaborator or second evaluator not involved in the production of the materials being evaluated. Standard and well-documented methodology

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for the evaluation or data extraction such as a codebook is very important for reproducibility! This is an area where the analysis can easily be either one-time or longitudinal, looking at annual compilations/comparisons.

b. Observational methods
Observational studies have different units of analysis, such as individuals, groups of people, or things. Observations in libraries may be easy to facilitate since libraries are public places, whereas observations in other areas may require permission to access that environment. The potential impact of being observed can be very high in an environment where the observer stands out to those being observed. It may take several passive observation periods to reduce that effect. Having an observational protocol and recording form that has been pilot tested in a similar environment is helpful to make sure observers are consistent. In addition to what is being observed that has been thought of, it is often help to note other things you notice which may turn out to be confounders, things that could explain the situation, but are not what you planned to study. There is value in observing cohorts or comparison groups, whether contemporary or historical, so that you have a sense of whether the observed phenomenon is consistent across groups or may have been an outlier specific to one group. This question of generalizability of findings is also an issue when gathering survey or interview data.

c. Gathering data from people: surveys and interviews
The primary limitation to surveys and interviews is that only certain people participate and therefore findings may not represent the broader population from which you recruited your participants. This is one reason you report on the baseline population you attempted to survey when you calculate the response rate. For example, a survey of medical students may have a response rate of 50% (which would be considered very good). However, if all the participants are female, the survey is not representative of your

population if half of your students are male, and no females participated. One way to understand a phenomenon more deeply and gain multiple points of view is to gather data on the same issue directed to multiple types of respondents and then look at correlations between respondents, e.g. asking instructors, students, and library staff about perceptions of same issue. Surveys and interviews introduce recall challenges for participants in terms of whether they remember accurately what they did to report on it for the survey or whether those that had a negative experience are more likely to remember it and respond accordingly. It is important to understand whether respondents truly understand what you are asking. Ways to address this are to use previously studied and validated measures, work on developing your question-writing skills, and use piloting combined with cognitive interviewing when you are writing new questions that may have never been asked in your study population.

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d. Combining multiple methods
Case study research often combines multiple methods to add validity. A recent case study by North Carolina State University doctoral candidate J.J. Evans included a pilot study followed by four types of data gathering and analysis: 1) Demographic Survey; 2) Semi-structured Interviews; 3) Research Activity Log; and 4) Documents & Investigator's Research Journal. Case studies often include other types of document analysis to provide historical and geographic context for the case or can include and draw conclusions from multiple cases. For more on case studies, see a forthcoming editorial in the *Journal of the Medical Library Association*.

e. Interventional ("experimental") methods
We have opportunities for interventional studies in library practice. Although educational studies come most often to mind, these do not have to be measuring real-time interactions with people. For example, studying the impact of changes in policy that affect circulation, collections, etc. can be done using analysis of existing records before and after the period in which the change was made.   Pre- and post-test evaluations in a population that have received an intervention are common; they require attention to the effect of testing itself as it is possible that taking the first test is what primed the person to do better on the second test and the intervention did not produce the effect. Another option is historical control groups, if they are sufficiently like the current group. There may be an opportunity to do a group or individual randomized controlled trial in a course with the same instructor or different instructors. For fairness, consider offering a crossover design so that the control group eventually gets the intervention if the intervention is shown to be valuable or even neutral. As you involve multiple investigators in delivering the interventions, following the protocol to be sure you are measuring the impact of the same intervention becomes very important.

f. Combining data from multiple institutions
One of the questions we received prior to the presentation was about our experience with multiple institution studies to strengthen confidence in our findings. Designing a study to include multiple institutions has several positives. It may be that you would not have had the capacity to do your study alone if the partner institutions had not provided expertise or funding. Having larger potential populations can may help with finding significant effects by reducing Type II (Beta) errors. This would mean you do not find a statistically significant effect when there is an effect, because you do not have enough power to detect a difference. This is usually due to a low number of participants or the effect is smaller than you anticipated. Or it may allow enough participants to identify subpopulations affected differently by what you are studying. It may also improve generalizability since effect is measured at multiple institutions if similar results are seen across the institutions. Finally, it allows you to comment on the reproducibility of methodological tools and of findings.

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Challenges

Now for the challenges—the three most salient are timing, instrument development, and ethics approvals. Collaborators may find it difficult for all members to be available at the same time, even in terms of scheduling meetings in different time zones. Timing also comes into play with accessing participants, particularly if the institutions are on different calendars or structures. For example, if you want to reach nursing students in their third week of classes, that could be weeks apart at different institutions. It can also be difficult to get multiple investigators to agree on the same protocol or survey questions. Although there is the possibility of adding unique questions at some institutions, lengthening an instrument can affect response rates, jeopardizing the larger survey participation or introducing other variability. This can be addressed through joint instrument development and selecting very similar institutions for the collaboration where question wording would not need to be greatly changed. IRB/ethics board differences across institutions may also cause delays, as many IRBs will not accept the judgment of another IRB (although that is slowly changing). In our experience getting a multi-site study approved by multiple IRBs, some had a separate minimal application form for studies anticipated to be exempt, while others required a full application but then the study went through expedited review. This meant that many of the questions asked by the full IRB application form had never been considered by the research collaborators at the other institutions.

Using technology and data collection methods efficiently

1. Audience and timing impact choice of methods
One you have considered your question, participants, timing, and personal capacity related to potential methods, it is time to focus on the audience and their timing and your institutional capacity. Who is the audience for your anticipated findings? What kind of evidence will convince them? If your question is to respond to the needs of administrators, it may need to address return on investment in addition to the effect itself. It may not be enough to say something has an effect if you do not also include the costs of achieving that impact. Questions that you are trying to answer to impact researchers or clinicians who are used to evidence-based practice and high-quality research literature may need to have control or comparison groups for them to trust in your findings. If you pursue research to build a portfolio for your library promotion and tenure committee, be sure you understand how they will value individual versus collaborative efforts, as that may shape whether you execute a study on your own and acknowledge others versus offering the opportunity for co-authorship with greater involvement.

In addition to the audience, consider whether the research is time-sensitive or time-specific. For example, is there a limited window of time in which the study is possible (e.g., pre- and post-construction) or are the findings to be the basis of a time-sensitive decision?

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Do you have deadlines to produce publications for promotion? These can all lead you to choose methods that can be planned and executed quickly although almost any methodology can be expedited if you have enough help or funds and the ethics committee/IRB finds the study to be exempt. Some examples of exempt research are anonymous surveys, passive observation of public behavior without collection of identifiers, and retrospective chart review. Even if you have help or funding, it matters whether it is consistently available throughout, or in chunks, or at the time of day you need. An example is whether to use student labor, your own labor, or funds to hire external people to transcribe interviews. For observational studies, it might be whether you can do the observations at the time needed such as evenings or weekends or offsite daytime, or whether you need to hire or train others to do the observations, or you decide to rely on self-report data since no one is available to do the observations.

2. Anonymous vs. confidential
One of the most common questions that you must clarify for the IRB submission is whether the participants will be anonymous or confidential, and this often determines whether a study will or will not be exempt from further review. Your study design, the risk to participants, and the safeguards you must place on your data and whether you can share it often depend on getting this distinction correct in your consent documentation. If data collection is truly anonymous, you do not know who participated and hopefully no one could figure it out from your data. If it is confidential, you know the participants (people/institutions) and you take steps to conceal their identities. There are benefits and drawbacks to both approaches.

Choosing to collect anonymous data is generally an easier write-up for the IRB application, since there are fewer risks of identity exposure and fewer data protections to describe. However, if your data is anonymous, you cannot follow up with respondents about their responses, do longitudinal studies, or join the data with other data sources that contain identifiers if you decide to expand the scope of your research project. Even anonymous surveys require data protection considerations. For example, to be anonymous you must not track or download the IP addresses of participants which are often automatically gathered by online survey systems such as Survey Monkey or Qualtrics. If you recruited by sending surveys to individual emails through the software system mailing functions, you may also need to have the system unlink or mask the responding email addresses. Survey tool functions are discussed later, with some shown in Table 1. If questions are specific and the population studied is small enough, people may be identifiable from their responses, and this may essentially turn your study into a confidential one where you need to redact identifying information from open-ended questions or only share aggregated responses for questions that have over five respondents in a certain category. Confidential data collection involves assigning participants a unique identifier which is maintained securely and separately from research data. Because people are identifiable

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in-person, by voice, and image, methodologies such as individual and focus group interviews and audio or video analysis can usually only be treated as confidential data.

3. Analysis planning as part of the research design
Consider the relationship between your questions, your analysis skills, and your research team members. If you have a question with multiple factors and competing explanations, and you intend to gather and analyze quantitative data you will need some statistical expertise. It is much better to discuss your questions and data collection on the front end of the project with a statistician for statistical consulting so that you can come to a good understanding of the number of participants you will need to reach a meaningful conclusion and what type of data you might collect that allows you to test your question most robustly. If your research team includes students or library student workers or volunteers, consider what they can learn about data collection and analysis, and what expertise or capacity they already have. For example, while it may be more efficient to pay a transcription service to create transcripts of video interviews, if you have time and that is something you want the students to gain experience with you may decide to have them do some of the transcriptions.

In planning your research timeline, design, and budget, it is important to consider the tools you have available and your familiarity with using them and what types of output they produce. A common choice is deciding on what online survey tool to use (see Table 1). If you have designed and pilot tested your survey on paper, thinking about what question types will make it easy for participants to answer questions. It can be frustrating when the type of question you made is not available in one of the free tools. Be sure to pilot test the online version of your survey to make sure it works properly, and that the resulting data is captured successfully. It is worth finding out whether you have institutional access to a tool such as Qualtrics or REDCap, as that will also make it possible to share surveys across institutions to facilitate collaboration. You also want to test question types by answering them in your survey tool to make sure that the output will be easy to analyze. For example, if you use a multiple checkbox function in Google Forms, the data will be in the same column in the spreadsheet separated by a delimiter and you will have to then use a function to separate those responses and group them. While the native Google display will show the aggregated data, you will not be able to pull out the data that way. We compare the features of the most common online survey tools (Qualtrics, REDCap, Google Forms, Survey Monkey) available to us as university-based health sciences librarians in Table 1.

Survey Tool	Free Account	Subscription Account	Notes

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Google Forms (drive.google.com)	Includes <15 MB of storage Unlimited surveys, responses, and questions	>15 MB of storage Month-to-month fee	Minimal data analysis available regardless of the account type Offers no support. Minimal types of questions available For questions with multiple response options, view individual, not group, responses to get the full picture.
Qualtrics (www.qualtrics.com)	100 responses 10 outgoing emails 8 question types 1 active survey Unlimited questions Summary reports & filtering Survey logic & randomization Online reporting No expiration	Limits to features are based upon account type and subscription plan Expiration occurs when subscription to product ends	Initially designed for business and market research surveys Works for other types of research as well
REDCap (projectredcap.org)	One week trial 15 templates All collected or entered data is removed after the trial version concludes	Unlimited templates Technical support for implementing and maintaining the product	Initially designed to support researchers and to encourage collaboration Relatively easy to create a survey without using tutorials Video tutorials and step-by-step instructions available in all versions
Survey Monkey (surveymonkey.com)	Create surveys with up to 10 questions or elements (i.e. question types, descriptive text, or images) Collect up to 100 responses per survey	Unlimited questions and question types, descriptive text, images, etc. No limits to collecting numbers of responses	Learning curve is small. Not easy to share unpublished surveys with non-subscribers for testing or editing purposes. Support features are minimal. The knowledge base, while useful, is not easy to search

Table 1. Comparison of Select Survey Tools based on publicly available information as of May 2018. Compiled by Margaret Hoogland.

Timing questions are more intensive for studies with a qualitative component, particularly analyzing any text or images or videos for your studies. Will you ingest text into computer-assisted qualitative data analysis software tools (e.g. NVivo, Atlas.ti, Dedoose) for analyzing transcripts or other data resources, or will you annotate in Word or by hand

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on print copies? If you have multiple coders involved, where will you maintain the code listing? Multi-institutional studies have more complexity in terms of sharing data storage, access controls, agreeing on tools and preferences for types of analysis. Regardless of the tools used, keep track of which members of the team performed which aspects of the research, as many journal publishers require a statement about how each author contributed to the research.

Learn about options for disseminating your research and how the journal article publication process works in the Spring/Summer 2019 issue of *Hypothesis*.

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Appendix

Questions from Participants

These questions came electronically from MLA members prior to and during the session. We addressed questions received verbally during the session within the body of the article.

Prior to the Session Via MLA-FOCUS (n = 1) and email to Research Section and Hospital Libraries Section email lists (n = 2)

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1. How can you move beyond research studies based primarily on your own work (which tends to be case studies), into doing research that will have bigger impact on the field? Or put another way, how do you come up with research studies that will be impactful, but are still manageable to do within the confines of your job and institution?

One way to move beyond your case study is to aggregate multiple case studies from similar institutions to strengthen the patterns of findings (see Robert K. Yin's *Case study research and applications*, 6th ed., 2018). Another is to use your case study as pilot data for a different methodology that involves a control population or other attempts to capture or address confounding variables.

2. How to find collaborators, especially for hospital librarians that are solo or may have an idea, and don't have time to pursue by themselves?

3. My question about research is how the heck can I do it as a solo librarian.

Addressing questions two and three together, one approach to advancing research as a solo librarian is to mentor a library science student doing research as part of a field experience in your library or to mentor student volunteers from other social science disciplines in your library. Many students have research skills or requirements but struggle to come up with a meaningful question or real data, both of which you can provide. Author Alpi co-authors many of her research studies with student employees from diverse majors or library students doing field experiences. You can reach out to your local library school, state library association, or post your inquiry to the MLA Medical Library Education Section (http://www.mlanet.org/page/section-landing-medical-library-education-section) to reach instructors of health sciences library students in online programs who may be interested. In a small library, choosing projects that can survive a longer timeframe or partnering with other areas of the institution with more capacity or the ability to advocate for answering the question, e.g. nursing research, continuing education, or quality improvement.

During the Session Verbally or via the Online Form

1. How can you find a research mentor at an institution with promotion and tenure requirements similar to your own?

The MLA Mentoring website allows you to look at the institution of the mentor, but beyond examining the title of the librarian for indicators of rank, does not offer any other information about those requirements. The website Academic Librarian Status (https://academiclibrarianstatus.wordpress.com/) offers a list of academic institutions in the United States and elsewhere, sorted by the professional status of their librarians. Although the professional school libraries may not always have the same requirements as the university libraries, this is a good starting point. Mentors may have worked at multiple institutions with diverse requirements and therefore it is important to consider past experience beyond the mentor's current institutional affiliation.

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2. I'm gung ho about my research project but my more experienced research partners are not as excited. Any advice on finding research partners who are excited to work with new researchers on their early projects?

The first question that comes to mind is have you asked why they are not excited—it is the topic, the method, the role, the collaborators, or their own capacity? The piece of this article about what you offer mentors may provide some insight. If your institution is pressuring them to produce more advanced evidence, you may be better off finding peer collaborators or mentors outside your institution who do not feel the same pressure. You must be open to the idea that your research project is not as compelling to others as it is to you—check the literature to see how your proposed idea may be received if you decide to go forward.

3. What are your opinions of keeping daily stats of everyday work and do you know of ways to turn those daily stats into a story that highlight librarian/library impact?

At NC State University we track public service daily work statistics and space usage using an open-source program called Suma (https://www.lib.ncsu.edu/projects/suma) to gather data. It has built-in analytic tools. We track activities by user type and when we see changes or growth with a certain user population this invites us to dig deeper. For example, if we are doing more transactions with house officers, we then might interview a few to understand how we are impacting them. Since intern/resident support is an important issue, telling a story of how we support them would resonate. We also tell Library Stories based on experiences, see https://www.lib.ncsu.edu/stories/supporting-ncsu-researchers-achieving-nih-public-access.
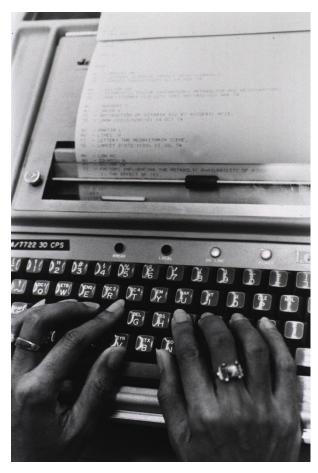
4. Clinicians and academic faculty barely have time or interest for my short 7 question surveys, but the questions I have are best answered by surveys. How can I better engage my test audience? Is there an alternative to surveys?

One of the best ways to engage an audience is to have co-authors who represent that audience. Can you co-author the survey with key opinion leaders or have them distribute the survey for you? If you have a library committee with members from your test audience, they might be able to assist. Depending on the topic of your surveys, it may be easier to do a mini-focus group with representatives of the test audience at a meeting. Feel free to contact author Alpi with more details to receive more focused feedback.

5. When your paper is submitted, and you are about to revise and resubmit, can the author ask for new reviewers?

Probably not. When you are asked to revise and resubmit your manuscript, the editor of the journal most likely wants the original reviewers to re-evaluate the revised manuscript to ensure that your revisions have sufficiently alleviated their specific concerns. Moreover, inviting new reviewers at this point would likely only prolong the peer review process and create more "hoops" for you to jump through. However, if you have serious concerns about a reviewer—perhaps you feel that they did not carefully read your manuscript or

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were unreasonably critical—you can privately express those concerns in an email or formal letter to the editor, who will take your concerns into consideration when weighing the reviewers' opinions to arrive at a final decision regarding acceptance.

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