

“You Need to Have a Street Beat”: A Qualitative Study of Faculty Research Needs and Challenges

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abstract: In the spring of 2015, 14 faculty members in social science or in science, technology, engineering, and mathematics (STEM) spoke with a working group from the University of Kansas (KU) Libraries regarding their research needs and challenges. Their responses highlighted a dynamic research environment in which individual researchers desire to connect with other experts, yet often remain isolated within their departments. Common challenges included dealing with data storage, management, and preservation, as well as understanding publication impact and dissemination methods. Respondents looked to KU Libraries as a neutral entity that could connect them to experts, materials, and practices that would enhance their research.

Introduction

The current study is a follow-up to a survey of faculty and graduate student researchers at the University of Kansas (KU) in Lawrence conducted in the fall semester of 2013,¹ which focused on identifying current and future research needs of these constituents. Utilizing qualitative methods, the present study focused on gathering more in-depth contextual information about research practices from a narrowed population of KU faculty researchers in the fields of social science or science, technology, engineering, and mathematics (STEM). In addition, the authors collected data related to potential library services and gauged awareness of current services to

improve KU Libraries' understanding of researchers' challenges and needs. Overall goals for the study included:

- Understand the current challenges faced by local faculty researchers
- Understand how the libraries currently add value to the local research community
- Learn about research support services KU Libraries could consider offering in the future
- Identify ways to improve awareness of KU Libraries' existing services.

Finding out how researchers do their work and how, or if, the library takes part in the process offers an indication of where libraries succeed in providing value. An advantage of utilizing qualitative methods for the current study is that participants use their own words in response to broad questions, as opposed to responding to the earlier surveys created by KU Libraries, which were formed from and bound by librarians' internal perceptions of library services.

Literature Review

As academic research becomes more collaborative and interdisciplinary, the role of the research library is shifting in response. Once primarily defined by their collections, academic libraries must strive to maintain a user-centered focus. In many cases, this entails a shift toward services that extend beyond providing access to physical or electronic materials.² Libraries must support researchers' need to share and manage large data sets, navigate publication contracts, and review overwhelming amounts of literature, while acknowledging that access and discovery of materials remain important to conducting research. Literature on the relationship between librarians and researchers reveals areas in which libraries struggle to meet research faculty's changing needs, as

well as areas where libraries have potential roles in facilitating and collaborating in faculty research.

Traditionally, libraries have provided value to faculty as a means to acquire resources, as well as by offering assistance with instruction. One way that librarians have attempted to do this is by providing embedded support, especially for promoting information literacy.³ An embedded librarian forms a close relationship with an academic department or other group to develop a deep understanding of their work and provide information services targeted to their needs. In the 2015 Ithaka S+R report, faculty members ranked the role of “research support” least important out of a list of possible roles for the library, while the roles of “buyer” and “undergraduate support” ranked highest.⁴ Another study found that both faculty and librarians prioritize services that benefit students’ learning experiences.⁵ Some faculty acknowledge that research support is often sacrificed to emphasize support for students, and both faculty and librarians indicate higher satisfaction with library services that benefit students.⁶

However, the same 2015 Ithaka survey indicated that there might be opportunities for libraries to contribute to the research cycle. Forty percent of respondents said they were “highly dependent” on their university library for research support. Additionally, a 2015 *Library Journal* survey reported that 89 percent of faculty respondents felt the library was essential to their research.⁷ The literature indicated opportunities for librarians and researchers to collaborate in the areas of interdisciplinary work, data management, scholarly communication, and publishing needs. There may also be roles for librarians to assist with practices identified in the literature as “self-sufficiency.” These situations often involve faculty employing stopgap or less than optimal measures when institutional solutions failed to meet their research challenges.

Collaboration both within and among disciplines is perhaps the biggest reality defining current academic research. Some universities collaborate formally by joining consortia that include both libraries and experts in cyberinfrastructure, the advanced information technology systems that support data acquisition, storage, management, integration, mining, visualization, and other data handling. These partnerships allow faculty to stay on top of research trends and access a broader range of resources than their institution alone provides.⁸ Such formal collaborative arrangements offer participants various tools, but these solutions do not always meet the needs of all participants. Researchers often create their own informal networks using digital tools that allow for remote and asynchronous communication, discovery, and sharing of information. Faculty view technologies such as Google Docs, Skype, and Dropbox as intuitive, cost-effective solutions for maintaining connections and sharing data.⁹

The challenges of sharing, managing, and preserving research data are necessarily one of the central issues of collaborative research. Tasks involving large data sets are common in STEM fields but also extend to social sciences and some areas of medical research, where qualitative data collection is a common practice.¹⁰ Emphasis on making research data openly available has increased the necessity for data management and storage solutions.¹¹ Pressing these challenges may be, overcoming these interconnected issues is too unwieldy for individual faculty members to accomplish alone.¹²

The publication and dissemination of scholarly work is another area where faculty and librarians might benefit from collaboration. Three of the top four library services that 2015 Ithaka survey respondents identified as helpful involved scholarly publication (assessing publication impact, determining where to publish, and assistance with negotiating publication contracts). Other studies indicate that faculty struggle with these issues but do not approach the

libraries regarding them.¹³ On the other hand, librarians also indicate that they feel a lack of confidence in approaching faculty who seem self-sufficient in their work. Librarians also struggle to know enough about each discipline's particular needs to "articulate the help they could offer in terms that resonated directly with research staff's interests."¹⁴

Finally, while not discussed as a prominent trend in the literature, faculty self-sufficiency surfaced as a common occurrence. The 2015 Ithaka S+R Faculty report indicated that 90 percent of respondents organized data on their own computers as opposed to seeking help with the management and preservation of their data either within or outside their university.¹⁵

Libraries must find ways to communicate their relevance to research faculty and to promote the library as a partner rather than a service provider.¹⁶ Researchers know their own needs best and require direct evidence of how libraries will provide value in the research process.¹⁷ Consequently, librarians must develop strategies for engaging faculty to understand the contexts where library services might be employed. Libraries can provide faculty with optimal tools and environments to conduct effective research when the service design process is open to user input.¹⁸

Methodology

In the spring semester of 2015, KU Libraries formed a five-member working group to learn more about faculty researchers' current and future research needs. The team formulated a plan for conducting two focus groups of faculty, ideally involving 15 to 20 individuals from the social science and STEM fields, at the direction of the libraries' Dean's Cabinet. In drafting the focus group questions, the working group examined the results of the 2013 survey of KU faculty and graduate students to elicit further context and information about researchers' practices and awareness of library services. The team tested the questions in a trial focus group held with two

graduate students from two social science disciplines (see the Appendix for a complete list of questions). Table 1 details the departments represented in this study.

Table 1.
Academic departments or institutes represented in the study

Social sciences	Science, technology, engineering, and mathematics (STEM)
Psychology (2)	Chemical engineering
Institute for Policy & Social Research	Chemistry
Linguistics	Ecology and evolutionary biology
Political science (2)	Geology
Public administration	Molecular biosciences
	Physics
	Mathematics

Members of the working group initially recruited participants by contacting the chairs of all departments identified with social science or STEM fields, asking them to recommend two faculty members who might be willing to participate in a focus group. In addition, the working group sought input from the University Senate Libraries Committee regarding recommendations for potential participants. After these two methods failed to fill all of the desired spots in the focus groups, the working group expanded the setting to include individual interviews with additional faculty members (see Table 2). Librarians with current or previous faculty outreach experience recruited these participants.

Table 2.
Study participants by grouping

Focus groups/interviews	Number of participants
Science, technology, engineering, and mathematics (STEM) focus group	5
Social science focus group	4
STEM interviews	2
Social science interviews	3

The researchers used purposive sampling, as is consistent with qualitative research methods, to gather responses from the specific fields the authors were directed to investigate.¹⁹ In this method, researchers select participants based on their knowledge of the population in a deliberate effort to gain representative samples by including typical groups in the sample. In total, 14 faculty members participated in the study, either in one of two focus groups or one of five individual interviews. Ideally, the number of participants would have been closer to 15 to 20.²⁰ However, utilizing both focus groups and interviews provided more varied data in a project that experienced difficulty meeting its minimum participation goal. As Barbara Wildemuth and Mary Jordan explain, “While focus groups have been and will continue to be used as the sole collection approach for some studies, they are a much stronger research tool if used in combination with other methods such as in-depth individual interviews.”²¹ A semi-structured interview format was used for both focus group and individual interview settings. Participants were asked the same questions in both settings. All settings were recorded, although a technical malfunction resulted in the loss of one focus group recording. At least one working group member took notes during all settings.

Both techniques yielded similar results for some questions, suggesting that during the group settings, individual participants were not necessarily unduly influencing the conversation. In addition, the length of the focus groups (one hour) and the interviews (30 to 45 minutes) produced quality data that can be used to provide context for other studies at KU and illuminate potential roles for the libraries. After completing the final interview, an initial review of responses revealed similar themes across all settings, indicating that, even with a small number of participants, the project might be reaching saturation in terms of responses.²²

A professional transcriptionist was hired to transcribe the audio recordings of one focus group and all the interviews. All members of the working group developed an initial thematic coding structure after reviewing the transcripts. This structure used the interview and focus group questionnaire (see the Appendix) as a broad framework in which more specific codes could be assigned as they emerged. Three members of the working group (the authors of this article) used this coding structure to independently code all transcripts for focus groups and interviews. In the case of the lost focus group recording, the authors coded two sets of notes taken during that setting. Each coder then used open coding to identify emergent themes not present in the initial coding structure. Once independent coding was completed, the authors merged their coded materials and began analysis. They used ATLAS.ti qualitative data analysis software, version 7, for coding and analysis.

The authors kept track of the number of times subjects were mentioned across all interviews and focus groups. Throughout this paper, a “mention” is a quotation from a focus group or interview that coders determined was pertinent to a topic. There were seven “settings” total in this project—two focus groups and five interviews. In most cases, only issues that were mentioned 10 or more times throughout the project were included in the analysis.

Limitations

A limitation of this study, as with any qualitative study, is the lack of generalizability. Since the sample size is not representative of KU's faculty researcher population, the results are not generalizable to the entire faculty of KU, let alone other universities. In addition, the study focused on gaps between researcher needs and services provided rather than the many areas of value provided by the libraries. For example, the participants were not directly asked about physical library space or the libraries' collections.

Another limitation of this study is the working group's reliance on personal connections when recruiting participants for the focus groups and interviews. Because of their personal connections to one or more library employees, some participants may have possessed increased awareness of, or bias in favor of, the libraries.

Results

In coding and analyzing the focus group and interview transcripts, the authors affirmed an advantage of using qualitative methods as a follow-up to a predominantly quantitative study. In KU's 2013 survey of faculty and graduate students' methods and practices, participants were largely constrained to selecting predetermined responses to the survey questions. However, the open-ended nature of focus group discussions and interview interactions enabled participants in the current study to provide context and insight into their needs, highlighting nuances of their research requirements in ways the libraries could not have anticipated when constructing a strictly quantitative survey. The results of this study not only provide glimpses into the needs of individual faculty researchers but also present common themes that ring true for many of the participants. In presenting these results, the authors have organized their exposition of participants' responses into the categories created by the questions (see the Appendix). In many

cases, themes continue to surface across multiple categories and will be discussed in more than one section of the results.

Seeking Assistance with Research

The authors began by asking participants to share a picture of the skills, expertise, or both they seek when conducting their research. Participants were asked not to limit their responses to services they associated with KU Libraries. Participants mentioned the issues in Table 3 as the top expertise, skills, or tools they need to help them conduct their research (see Table 3).

Table 3.
Expertise, skills, or tools identified as needed by participants

Type of assistance	Number of mentions	Number of settings
Subject knowledge	22	7
Collaborators	21	6
Graduate students	21	5
Data analysis	19	5
Access to research materials	18	7
Research design	18	5
Skill sets	12	5
Computation	12	3
Data	10	5

An unexpected theme that emerged from responses to this and other questions and that recurred throughout most of the settings was the need for human capital in the form of collaborators and graduate students. Of the items that participants indicated they sought most when conducting research, the top three all involved finding people for their assistance or expertise. Researchers sought expert collaborators who could share knowledge, including computational skills and data analysis.

In an increasingly collaborative environment, one of the primary needs for researchers is to develop relationships with colleagues, both within and outside their disciplines. Participants

indicated that they seek out collaboration with both peers and graduate students. Through these relationships, the faculty expect to gain access to specialized expertise, skill sets, and, in some cases, equipment or software. Examples of specialized skillsets participants sought included qualitative methodology and software, statistical methodologies, and computational skills. Faculty also indicated that collaborators with skills in data analysis or research design are integral to their research:

I have a pretty solid network of long-term collaborators, both in the United States and overseas. The research has been becoming increasingly interdisciplinary in the past 15 years or so . . . Either people have equipment that I do not have or they have the knowledge that I do not have. By putting our forces together, we can make a significantly bigger impact.

STEM interview participant

Students were mentioned in response to multiple questions throughout all settings as resources essential to the research process, both as collaborators and as conduits of information or skills. One faculty member noted that the students they he or she works with need training to function as ideal collaborators:

[A] lot of the resources I need are computational. And so the kinds of assistance that I often need for my research—I have postdocs, graduate students, and undergraduate students. The kinds of training that they need are usually in different kinds of software packages, just for the technical aspects of accessing the data, displaying the data, making selections on the data, and that kind of thing.

STEM interview participant

Additionally, faculty discussed the need for help with various aspects of the data cycle, particularly with data analysis. The assistance they desired entailed help not only with research design but also with data storage, retrieval, and computation primarily. Faculty sought both software and training regarding quantitative and qualitative methodologies to parse their data.

Data storage was a frequently discussed topic, and many faculty used their own means of storing data, including Google Docs, Dropbox, or personal computers. While some faculty relied on KU-provided storage options, others were unable to do so because of stipulations with their international collaborators, the size of their data sets, or security concerns. The last four items in Table 3 include needs in this area, which faculty mentioned in relation to seeking expertise in research methodologies or to access software they could not independently acquire. The theme of collaboration extends to these needs because faculty often receive training or access to software and materials via their collaborations.

An additional service sought is access to research materials, which some faculty receive via their collaborations as well. It is unsurprising that, with this need high on the list for conducting scholarly research, interlibrary loan was one of the most-mentioned services faculty brought up in focus groups or interviews. While some faculty mentioned using a search engine on their own to locate scholarly research, many participants did mention their satisfaction with the libraries' interlibrary loan service for acquiring books and articles not in the physical collection.

Research Challenges

Although researchers were asked separately about the challenges they faced when conducting research, in most settings the two issues of the skills or expertise sought and the challenges encountered overlapped considerably. Respondents described seeking assistance with completing their research tasks and facing obstacles in finding the right assistance, whether it be human or financial capital, hardware, or other infrastructure supports. Table 4 summarizes the issues with more than 10 mentions by participants.

Table 4.
Challenges researchers face

Challenge	Number of mentions	Number of settings
Funding	40	6
Graduate students	26	6
Data storage	25	5
Data management	24	6
Data sharing	20	5
Data	19	6
Collaborators	18	4
Time	18	6
Data analysis	17	4
Research design	15	2
Information technology	12	3
Communication	11	3
Infrastructure	11	5
Software	11	4

Participants discussed the issue of funding, the most-mentioned challenge throughout the project, in several different contexts. Receiving and maintaining grant funding were major concerns, more for those in STEM fields than for those in social science fields:

When I was a graduate student, the funding rate for somebody who was already an established scientist and had grants before was upwards of an 80 percent chance of being refunded again. Now, if you already had a grant and you are renewing it, you have about 40 percent chance. If you are new, like an assistant professor, your chance is under 10 percent.

STEM interview participant

Students, already mentioned as an integral aspect of participants' research, are important to fulfilling faculty research and teaching missions in both social science and STEM disciplines. However, students present challenges in terms of funding and training. Social science participants more frequently mentioned encountering challenges with funding students, but both social science and STEM participants described struggling to find graduate students who are prepared to be research assistants. Participants acknowledged that preparing students for research

was part of the teaching mission of faculty, but they found it difficult to balance this obligation with their own research commitments. Many participants who voiced this concern felt that students who might otherwise benefit from the experience of working on a faculty member's research project lacked basic research skills, including critical thinking, writing, and bibliography-building experience.

I think it might be nice to have less start-up time with students . . . I have some students who come in who just absolutely know how to do lit reviews for me and can go into the library. They know how to do some targeted lit reviews, find some resources, and build a bibliography for me. I've decided that's sort of my litmus test for if I'm going to hire somebody, if they can build a bibliography for me quickly that is comprehensive and useful and thoughtful. That is a really important skill. Some of them have it, and some of them don't.

Social science interview participant

I would say the biggest challenge is training students how to write. I'm not the only one. I think we have noticed that students need to have more formal preparation particularly by the time they [are] writing [a] thesis . . . I'm requiring all of my students to take a writing class at the graduate level before they write their thesis.

STEM interview participant

While funding and graduate students were the most-frequently discussed individual challenges, challenges related to data dominated the list compiled from the coded transcripts. Five of the top 10 challenges mentioned throughout this study related to various aspects of dealing with data, which is consistent with results from the 2013 KU faculty survey.²³ In that study, faculty selected "identifying relevant data" and "managing data" as the most challenging phases of the research process.²⁴ Participants in the current study expressed these same challenges, especially those in STEM fields. This result aligns with trends in the literature from 2013–2014 in which services such as assisting researchers with the complexities of doing "big data" analysis, creating data management plans as part of the grant-writing process, and accessing data sets for reuse

were relatively new to the suite of library-based research support services at the time.²⁵ The ACRL “2016 Top Trends in Academic Libraries” report indicates that, while many libraries are training staff and creating positions specifically geared toward providing this support, the number of libraries providing research data support services has remained flat.²⁶

Participants frequently discussed collaboration and collaborators as elements they sought when conducting research. Both topics were also mentioned when participants talked about the challenges they faced. Faculty discussed seeking assistance from others within and outside KU for help with such things as research design, computation skills, and gaining access to infrastructure. Within the KU community, some respondents found it difficult to connect with those outside their home departments who might have expertise in areas that would be mutually beneficial, such as qualitative research methods. Some, particularly in the STEM fields, extended the theme of collaboration to the international research teams in which they participate, which can include hundreds of researchers around the globe. The issue of collaboration intertwines with obtaining access to specialized skill sets or software. Participants mentioned access to software as well as an information technology (IT) infrastructure that facilitates research 11 times each:

I know there are a lot of people on campus in different departments that use [restricted-use data sets] and can say, “Here’s how I did it. Here’s the shortcut to meet those requirements. Here’s best practices through what we’ve done.” Seeking those folks out, getting that advice, and figuring out the data warehousing and management aspects of the projects makes writing the proposal for access a lot easier when you have all those pieces in place.

Social science interview participant

Participants in the social sciences frequently discussed needing assistance with data analysis, data management, and big data. Some respondents from the social sciences expressed a need for help in connecting with potential collaborators, both in terms of

locating nodes of expertise and in facilitating introductions across departmental or institutional lines. One faculty member mentioned this need in relation to multidisciplinary research:

I really think one of the big challenges is there are people who really know this stuff that may be in the next building over and we're floundering . . . I don't know that those of us who have expertise in particular research methods think of our skill as being portable or think that we have any community responsibility to share that expertise.

Social science focus group participant

Finally, participants identified time constraints as a major challenge to their research, which is consistent with the findings of Susan Kroll and Rick Forsman's 2010 report.²⁷ The KU faculty mentioned this issue 18 times in a variety of contexts, including splitting time between research and teaching commitments, the lack of continuity in work when switching between projects, and a sense that the university did not always value researcher time or use it in efficient ways, for example, when scheduling infrastructure maintenance or implementing new, unfunded laboratory safety requirements.

The Library's Role in Faculty Research

After sharing their challenges, participants were asked whether they thought the libraries could assist with any of the issues they mentioned. Their responses shed light on how researchers in various disciplines function and reinforced the literature's assertion that librarians must remain flexible in their approach to research support.²⁸ Table 5 highlights issues mentioned throughout the study with which participants indicated the libraries could help.²⁹

Table 5.

Challenges with which libraries can provide assistance

Challenge	Number of mentions	Number of mentions with the code “Could library help? yes”*
Preserving research data	31	35
Access to data storage (working and archival)	25	26
Data management	24	23
Data storage	25	22
Other	25	16
Research dissemination support	11	13
Data sharing	20	12
Assistance negotiating publication contracts	14	12
Infrastructure	11	10
Infrastructure: information technology	12	10
Access to software	10	10
Assessing publication impact	14	10
Writing code	6	10

* Due to the way ATLAS.ti calculates mentions when multiple coders apply codes to the same document (known as the number of co-occurrence events, the third column in this table), the number of co-occurrence events may exceed the total number of mentions for a code. See Susanne Friese, “Explaining Frequency Count and Number of Quotations Listed” in *ATLAS.ti 7 User Guide and Reference* (Berlin, Ger.: Atlas.ti Scientific Software Development, 2013), 293, http://atlasti.com/wp-content/uploads/2014/05/atlasti_v7_manual_201312.pdf?q=/uploads/media/atlasti_v7_manual_201312.pdf.

As in other areas of the study, issues surrounding research data dominated the discussion.

In some settings, faculty freely discussed their perceptions of areas in which their skills did not match requirements for managing research data. These participants communicated a belief that libraries were knowledgeable about these skills and were equipped to train researchers in good data management practices:

It’s . . . also the format in which we save [data] at any given time. How do we know we will be able to access it later? I remember when WordPerfect came out. No one uses WordPerfect anymore. We kind of need assistance with that. We don’t know what the future has in store. We don’t know what

format of data will be available in the future. We may store things in a particular format and keep saving it on a drive. And 20 years down the road, we want to go back to this but we can't open it.

Social science focus group participant

In addition to educating faculty about data management practices that meet current requirements and promote future data access, participants also perceived data storage as an area in which the libraries could assist. Examples of this help ranged from consulting on storage locations to methods for organizing files and effective backup practices (see Table 6):

[Data storage] would be extremely useful for me. When we write grant proposals, specifically for NSF [the National Science Foundation], we now need to include the data management part in the proposal. We often take it very lightly because we don't know what to write in there. We say very obvious things like we're going to store and back things up, but having a formal tutorial and learning about opportunities particularly for those of us who have a ton of data would be important.

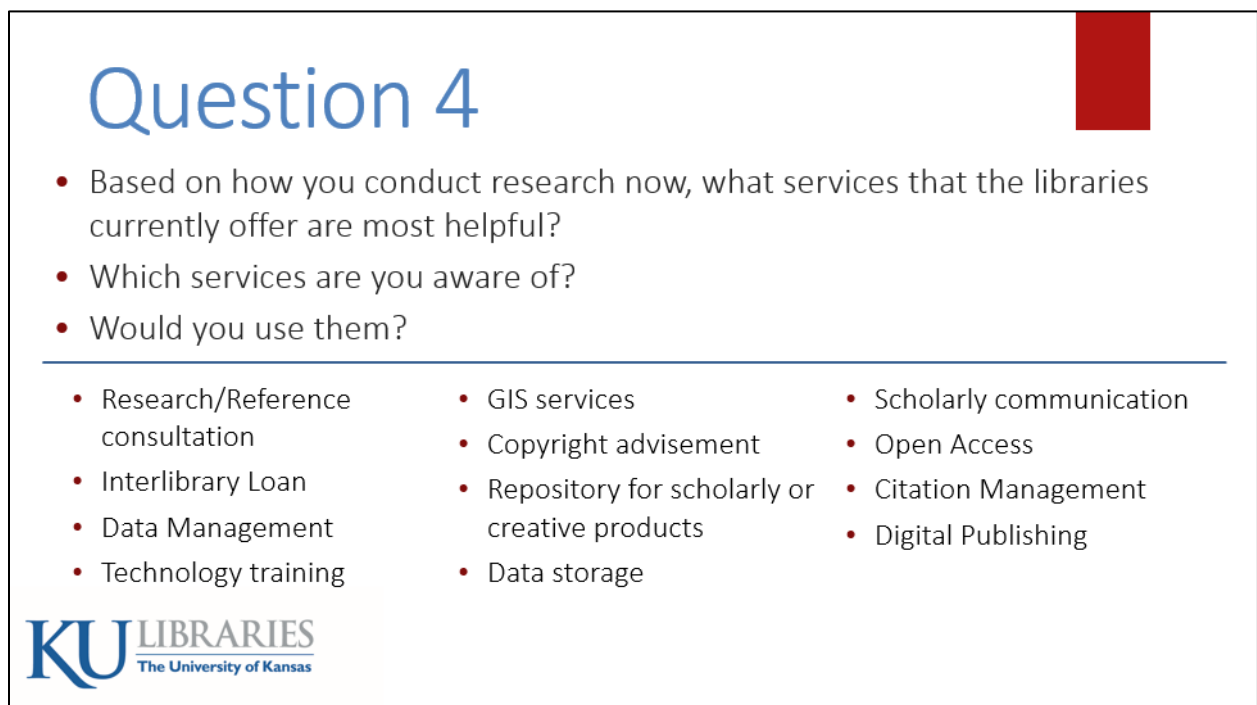
STEM interview participant

Table 6.
Participants' answers to the question "What library service do you find most helpful?"

Service	Number of mentions	Number of settings
Preserving research data	31	6
Access to data storage (working and archival)	25	6
Other	25	5
Assessing publication impact	14	5
Assistance negotiating publication contracts	14	6
Research dissemination support	11	3
Access to software	10	4

Awareness and Use of Library Services

During the focus groups, participants were shown a partial list of library services (see Figure 1) and asked, “Based on how you conduct research now, what services that the libraries currently offer are most helpful?” During the interviews, these items were read aloud. A similar list of services was offered to respondents on the 2013 survey of faculty and graduate students, though the 2013 survey focused primarily on researchers’ importance ranking for various services versus the services they actually used.³⁰



Question 4

- Based on how you conduct research now, what services that the libraries currently offer are most helpful?
- Which services are you aware of?
- Would you use them?

• Research/Reference consultation	• GIS services	• Scholarly communication
• Interlibrary Loan	• Copyright advisement	• Open Access
• Data Management	• Repository for scholarly or creative products	• Citation Management
• Technology training	• Data storage	• Digital Publishing

KU LIBRARIES
The University of Kansas

Figure 1: The partial list of library services shown to focus group participants when they were asked, “Based on how you conduct research now, what services that the libraries currently offer are most helpful?”

The services participants mentioned the most are shown in Table 7. While participants mentioned some of these services spontaneously, they discussed other services in response to viewing the slide (see Figure 1) or hearing the list read aloud. Participants did not have enough time to comment on all the library services of which they were aware; therefore, a low number of

mentions does not necessarily indicate that participants were unaware of a particular service. Even the selective list of services contained more possibilities for consideration than could be accommodated during the focus group and interview settings. For this reason, some services with fewer than 10 mentions are included in Table 7 to highlight those that received the most mentions in the time allotted.

Table 7.
Participants' awareness of library services

Service	Number of mentions	Numbers of settings
Interlibrary loan	13	5
Open access	13	6
Research/reference consultation	9	5
Repository for creative products	8	4
Scholarly communication	6	3

Compared with KU Libraries' 2013 survey of faculty and graduate students, these findings incorporate more discussion of scholarly communications services, especially copyright advice, perhaps indicating increased awareness of these services. In both studies, research and reference consultation remained highly visible services. However, a survey allows for respondents to view and choose from all available options. In the focus group and interview settings, the interviewer or focus group facilitator invoked the selective list of services for reaction by respondents. Many services received no mention within these settings, possibly due to lack of awareness, utilization, or discussion time. Participants were also asked which library

services they currently use (see Table 8). It is unsurprising that this information closely mirrors Table 7 because participants must be aware of services before they can use them.

Table 8.
Services participants actually use

Service	Number of mentions	Number of settings
Interlibrary loan	12	5
Research/reference consultation	8	4
Open access	6	3
Scholarly communication	6	3
Copyright advisement	5	3

Future Library Services

Participants were asked to identify library services that could help with their research in the coming 10 years, based on where they believe their field is heading. To start this discussion, the working group offered participants a list of possible library services as suggestions (see Figure 2) but did not confine participants' answers to the listed services. The most frequent responses clustered around themes of data and scholarly communication; other responses focused on the libraries' role as a connector.

Question 5

- Based on where you believe your field is heading, in 10 years what services from the library would be most helpful?



- For example:
 - research dissemination support
 - assistance negotiating publication contracts
 - writing code
 - assessing publication impact
 - preserving research data
 - hardware for checkout
 - etc.

Figure 2: The list of possible library services shown to participants when they were asked, “Based on where you believe your field is heading, in 10 years what services from the library would be most helpful?”

Participants communicated a sense of anxiety with regard to their research data. They were conscious of external pressures on their data practices, including requirements imposed by funding agencies and trends toward research transparency and reproducibility within their disciplines. Some were also aware of potential challenges caused by their own data practices, including storage and backup, lack of documentation, and use of proprietary formats. Many respondents described a need for help, specifically in the management and preservation phases of the data life cycle, and recognized the potential for the libraries to play a role in relieving these pressures:

This is the pain of my life. I know a lot . . . but it’s strewn about in this digital world haphazardly. And to me what librarians do, is they bring order to chaos. And this is the chaos that has caused me the most pain, so if you can figure out how to help out with this . . . I have a secure area . . . where

all my data lives. It took me a while to separate my data from this other stuff. If somebody had clued me in and said, “Hey, if you just keep all your data here—”

Social science interview participant

The most frequently mentioned future services are shown in Table 9.

Table 9.
Participants’ desired services

Service	Number of mentions	Number of settings
Preserving research data	31	6
Access to data storage (working and archival)	25	6
Assessing publication impact	14	5
Access to software	10	4
Opportunities for multidisciplinary networking with University of Kansas colleagues	8	3

Scholarly Communication

Scholarly communication encompasses a broad range of current and potential library services. Respondents discussed services that they felt would support the dissemination of their research. Specific concerns included awareness of author rights, negotiation of publication agreements, and publication fees for open access journals. Respondents also indicated that they were being asked to provide measurements of the impact of their publications but were confused about the differences among various impact metrics. Participants remarked on a general awareness that the libraries and KU ScholarWorks, the digital repository at the University of Kansas, might be useful

for their publication processes, but their comments also communicated a lack of time and attention to keep relevant details at hand:

I know I'm supposed to be doing something for KU ScholarWorks, but I haven't ever done that. It's not that I don't care or don't want it in KU ScholarWorks. Part of it is I haven't sought out the knowledge on how to do it. From my perspective, it adds an extra step. By the time the publication has happened, I'm on to something else . . . Some kind of a service where I can just hand that stuff off. You may tell me right now you already have that and I'm just not using it.

Social science interview participant

Respondents reported that the institution's efforts to quantify publication impact and calculate status among peers were growing areas of concern. Multiple participants expressed a sense that they were expected to demonstrate the impact of their research and publications, yet these participants also reported lack of familiarity with the details and tools of impact metrics. They viewed the libraries as a resource for assistance with this developing requirement:

Impact factors or *h*-index or T-index or whatever the heck the publication impact letter of the day might be. I think there's room for libraries to help us with that. I think you guys think about dissemination of information much more broadly than individual faculty members likely do. Because you're not in a particular silo . . . If you could help us come up with metrics that could be sensitive to and respectful of the diversity of publications that are out there, that would be sweet.

Social science focus group participant

Libraries as Connector

In some settings, respondents indicated a desire to know more about other researchers on campus to connect with those knowledgeable about data manipulation, research methodologies, or other desired knowledge or skill sets. Some respondents also indicated frustration with their lack of access to specialized software. For both cases, a few respondents characterized the libraries as a potential solution to their problems. These characterizations seemed to stem from the libraries'

reputation as a neutral service provider or as an entity that exists outside of departmental silos, the mindsets that make certain departments reluctant to share information with others:

I see the libraries as a place that could play a role in [sharing research methods]. You all are about sharing knowledge . . . What's not happened is a sustained effort . . . We talked about speed dating for research. Set up a big room, you move around the room—the expectation there is, “I want to do a piece of research. You have the expertise. You're here because you're willing to potentially work with somebody.” So, it's like in speed dating in that nobody enters into that environment without knowing the point of being there, which is to set up a date. I think people go to Red Hot Research [a monthly forum for sharing research at KU] to support their colleagues and to see some of the cool stuff that's happening. But I don't think anybody goes in there expecting to find a long-term relationship.

Social science focus group participant

Library Communications

The results of the 2013 survey of KU researchers and graduate students revealed that many respondents were unaware of a number of library services. To learn more about this apparent knowledge gap, the current study asked participants how the libraries could more effectively communicate with faculty about library resources and services.

Most responses suggested that personal communication was an effective way of reaching faculty members. Participants mentioned specific strategies, including delivering communications in person, targeting messages to the recipient or recipients, and providing information at the researcher's point of need. At least one participant articulated the highly personal nature of communication strategies they considered impactful, saying that librarians “need to have a street beat;” i.e.: need to develop personal connections and maintain regular contact with faculty in settings other than the library:

It's by word of mouth. It always happens by word of mouth. That is how you need to do it. You need to have a street beat. You need to be out . . . rubbing elbows and talking this stuff up . . . That kind of expensive human capital touch, that's what I would say.

Social science interview participant

Participants suggested providing outreach to research centers and research groups, attending department meetings, and approaching the Provost's Office about adding to new faculty orientation a component about library resources and services. While in-person messages were thought most effective, participants indicated that succinct e-mail messages targeted to a specific group's needs could also be useful. One participant provided a scenario of a librarian planning to attend a department meeting to present information about the libraries' services. In this example, the participant indicated that the librarian should network with some faculty in the department prior to the meeting to learn about researchers' needs. Another participant recommended a phased approach:

I think there has to be a multistage thing. At the very first stage, there needs to be a mechanism that's efficient for making faculty members just aware of what is out there. Then, the next step is helping me figure out how to take the next step and do it . . . [A specific unit on campus] will kind of broadcast what's out there more widely. Then, once you've indicated you're interested, they do more in-person things where you're invited to a lunch or a quick seminar or an online tutorial. I think my most valuable asset at this point is really my time, so making those things easy and seamless for me to access when I need them is the most important part.

Social science interview participant

Another communication-related theme that emerged was that participants learned about new services and resources through word of mouth. New faculty and new department chairs were specifically mentioned as important conduits of information because of their recent contact with up-to-date, formal orientation programs. Graduate students were viewed as an especially

important conduit for passing information to faculty members who would not receive information about the libraries through other channels. Instruction sessions for undergraduates were also mentioned as a means of communicating with faculty:

Where I've learned some tricks for using the library is by taking my freshman seminar to the library training. I sit in with them and I know Web of Science exists and I know how to do a couple of things, but I always learn something new when my class gets there. So that's been kind of an effective way to reach me through my students. Because when I take my freshmen to the library, I learn this stuff.

STEM interview participant

Discussion

Participants' responses to the six questions echoed with several interconnected themes.

Primarily, the participants saw the libraries as an entity that could bring researchers in various disciplines out of their information silos. This ability to bring researchers together was a prominent theme in recent literature as well and the concluding point of a notable 2016 report that presented a deep picture of how academic research is conducted.³¹ As with this study, the authors of the 2016 study asked researchers how they functioned outside the context of the library. They determined that if the library intends to become a research hub, it “needs to provide connections—between activities, and between people” as a primary function. Rather than guiding researchers through their work and acting as a gateway to content, librarians were viewed as providers of support and facilitators who can connect researchers with the tools they need to perform their work.³²

The literature suggests that researchers find conferences valuable for providing connections to peers with whom to collaborate.³³ In a similar way, some participants viewed KU Libraries as a place where these connections could happen via face-to-face events focusing on research. The 2014 ACRL “Top Trends in Academic Libraries” report indicates this as an

emerging role for librarians, specifically in relation to data issues, because library staff were viewed as able to identify and connect researchers to unfamiliar units across campus.³⁴ The 2016 ACRL “Top Trends” report did not explicitly address this role, possibly indicating that it either had become an understood role of the library or had become operationalized to the extent that it was no longer an emerging trend. In this study, participants echoed this desire, indicating that they wished for the libraries to help them engage with other experts and thus facilitate access to equipment, software, and skill sets. Several mentioned that they thought the libraries could organize some kind of networking event that would help bring about research partnerships and information-sharing on campus. Faculty research is built on a “foundation of direct human contact, researcher to researcher.”³⁵ Articles in the literature, as well as participants in this study, envision libraries as a neutral entity that can connect researchers to sources of support and to one another.³⁶ Participants extended this idea to other areas of work, such as the libraries housing templates for work flows or lab reports, or hosting events that would bring researchers together.

Data issues were of particular concern to participants—five of the top 10 challenges participants discussed revolved around data. This finding aligns with literature indicating that researchers desire data services ranging from computing and analysis training to data storage and management,³⁷ developing data publication standards, and hosting data management events.³⁸ Data issues described by participants varied widely, consistent with a broad range of discipline-specific needs and corresponding definitions of “data.” These issues also ranked high among those with which respondents believed the libraries could assist. Participants indicated a desire for help with various aspects of the research data life cycle, ranging from data management to storage and preservation. While they recognized that the libraries could help with these issues, they were not necessarily aware of current data services. They indicated that they wanted more,

and more convenient, data services. They expressed frustration with a perceived lack of services at the campus level, including insufficient data storage and software, but did not always know who or how to ask for these services, if they existed. Some of these issues, such as access to highly specialized software or to high-capacity working storage, were challenges the libraries alone could not address. However, in keeping with the theme of the libraries connecting researchers to other campus stakeholders, participants viewed the libraries as an entity that could communicate their challenges to IT and work jointly with other departments to solve their issues. The libraries, being aware of these challenges, can begin to address some issues where they are able to provide expertise, service, a contributing role, or all three.

Another clear aspect where researchers viewed the libraries as a source of help was publication. The 2016 Ithaka report indicates that traditional scholarly incentives motivate researchers to seek out publication assistance, while performing other data functions such as storage and management on their own.³⁹ While not initially prominent in the list of skills researchers sought or their challenges with research, issues of publication impact, dissemination, contract negotiation, and even funding to publish in open access journals arose when participants were asked where the libraries currently add value to their research or could add value in the future. They viewed the libraries as an entity that can help with identifying avenues and methods for getting their research published. The 2013 survey seemed to show an awareness gap regarding these types of services. However, this project indicates that participants are aware of services that assist publication but view them as secondary to their current individual publishing processes. The results of this study suggest that KU faculty may be receptive to more targeted efforts by the libraries to offer advice on publication contracts and assistance with navigating impact metrics.

Another, more subtle, theme that emerged across settings and answers to specific questions was the problem of time. Participants struggled to find sufficient time to teach, further their research, publish, and train graduate students. Learning or incorporating new skills or practices into their work flows seemed nearly impossible, no matter how potentially beneficial or necessary. When conducting their own research, faculty report that they may “satisfice” if a less than ideal solution appears more efficient.⁴⁰ This outcome echoes findings in the literature that faculty struggle under serious time constraints, causing them to “use and prefer easy solutions that are adequate, not optimal.”⁴¹ Given their responses, KU faculty seem to operate under similar pressures. Consequently, KU Libraries would be well served by directly addressing issues of time and efficiency in its outreach to faculty and in its partnerships with other campus entities that serve faculty. Possible approaches that merit further exploration include offering dedicated time and space for specific activities, for example, writing sessions without distractions, and highlighting the efficiency aspects of skills taught in the libraries’ instruction and workshop programs, for example, research data management as a time- and stress-saving skill.

The participants were asked about how to improve communication with them to address the awareness gap revealed by the 2013 survey of faculty and graduate students in which participants requested services the libraries already provided.⁴² Participants explained that targeted messages that met their specific needs were most effective. Such communications could be delivered through established structures such as department meetings or through research groups. E-mail messages could also be effective, if targeted or timed to coincide with a particular need. Alternatively, word of mouth was another communication channel that participants repeatedly mentioned. A somewhat surprising finding of our study was that faculty often receive

information about new technologies, library services, or events from their graduate students. One participant even indicated that he learned about new databases or search methods by attending introductory research overview sessions with his undergraduate students. This indication that students are a valuable conduit of information to faculty in both the classroom and the lab is an insight that can help inform how KU Libraries communicates library services to faculty.

The findings mentioned here are important indicators of the value of conducting local qualitative studies of researcher needs. Had a follow-up to the 2013 project been constructed as a survey, the results may not have revealed the specific challenges of departmental information silos and how faculty view the library as assisting with overcoming these challenges, or the value of graduate students to faculty research productivity. The literature review for this project illuminated national trends in how academic research is conducted and the potential roles for the library within this cycle. However, each institution will have its exceptions and idiosyncrasies regarding these trends, and talking in depth with researchers from the social sciences and STEM fields has provided KU Libraries with areas for further attention when considering how to design library services or communicate them to faculty.

Implications and Conclusions

The present study is a local attempt to let KU faculty explain in their own words why research environments outside the library may be an ideal starting point for envisioning research libraries of the future.⁴³ The qualitative methods used in this study have provided KU Libraries with context for participants' responses to prompts regarding research needs and have highlighted some unique findings that may not have surfaced in a more quantitative setting. Both librarians and researchers see the library as a potential connector or facilitator of research activity. However, while most of the literature focuses on the librarian's point of view and ways in which

librarians can approach faculty as collaborators, the ideas voiced by participants in this study were unique—for example, acting as a template library or hosting research “speed dating” events where the goal is to provide connections to colleagues. While the authors spoke with only a small sample of STEM and social science faculty, their unsolicited responses regarding connections demonstrate that there are multiple ways in which researchers desire to do this, and the libraries can act as a catalyst.

Similarly, faculty self-sufficiency surfaced in this study not through an explicit discussion of reasons that faculty may avoid the library, but through the lack of discussion of standard library services. While faculty echoed trends in the literature expressing needs to help manage their research data or to navigate scholarly publishing, there was little discussion of such services as research consultations, use of the print collection (other than through interlibrary loan), and use of electronic databases. Through this study, the working group learned that researchers often gain access to expertise via their collaborations, or sometimes through graduate students. The group also learned that some STEM researchers are bound by their international collaborations in terms of how they can share and publish their data, and have data management solutions via these collaborations that the libraries cannot provide. Consequently, even though there is a need for these services, some researchers meet these needs outside the libraries. Without talking to researchers, employees at KU Libraries would have little idea about which services faculty do not use because they do not need to do so, because they are unable to do so, or because they are unaware the service exists. These findings indicate that while faculty at various research institutions may fall in line with the major trends regarding research support, the nuances in how they do so may vary locally.

As well as providing insight regarding research practices of KU faculty, this study highlighted areas for possible future research. One of the study's unique findings was the prominence of graduate students' roles in faculty research, ranging from collaboration to passing on information about new services and technologies. This insight may inform ways to approach library marketing of services to graduate students and faculty.

Other areas of further study come from highlights in the literature that this study did not directly address. Faculty indicate that the library continues to provide value in the form of distraction-free spaces to perform work.⁴⁴ As e-mail and social media offer faculty constant connectivity to their work, they must carve out time away from these connections to perform other aspects of their work, such as thinking and writing. Because this study did not ask questions relating to library spaces, this may be an area for future research.

Finally, this study confirms that there is no single, definitive role for libraries to play as the research process continues to evolve, and they must be willing to adapt and take on various research support roles.⁴⁵ Research is an ongoing process that often has no closure; consequently, library services must be ubiquitous to support this complex, pervasive process.⁴⁶ An overarching theme independent of specific services suggests libraries as an optimal connector for individual researchers as well as for campus entities that facilitate research, such as IT and research administration.⁴⁷ This suggestion resonates with indications from both the current study and the literature that the future of research lies in personal relationships and connections within the academy.⁴⁸

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Appendix

Interview Instrument

Question 1	What specialized skills or expertise do you commonly seek out to help you with your research?
Question 2	What challenges do you currently experience when doing research?
Question 3	Do you think that the Libraries could help with any of these challenges? If so, how? If not, why not?
Question 4	Based on how you conduct research now, what services that the libraries currently offer are most helpful? Which services are you aware of? Would you use them?
Question 5	Based on where you believe your field is heading, in 10 years what services from the library would be most helpful?

Question 6	<p>How can we communicate library services in ways that resonate with you?</p> <p>How would you like to be contacted?</p> <p>Can you think of an example of effective communication from an entity on campus that informs you about what is going on there?</p>
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