Evidence Based Library and Information Practice

An Exploratory Study of Accomplished Librarian-Researchers

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Citer cet article

Kennedy, M., Brancolini, K. & Kennedy, D. (2020). An Exploratory Study of Accomplished Librarian-Researchers. *Evidence Based Library and Information Practice, 15*(1), 179–217. https://doi.org/10.18438/eblip29655

Résumé de l'article

Objective – This work explores potential factors that may contribute to a librarian becoming a highly productive researcher. An understanding of the factors can provide evidence based guidance to those at the beginning of their research careers in designing their own trajectories and to library administrators who seek to create work conditions that contribute to librarian research productivity. The current study is the first to explore the factors from the perspective of the profession's most accomplished librarian-researchers.

Methods – This exploratory and descriptive study recruited 78 academic librarians identified as highly productive researchers; 46 librarians participated in a survey about their professional training and research environments, research networks, and beliefs about the research process. Respondents supplied a recent CV which was coded to produce a research output score for the past 10 years. In addition to fixed-response questions, there were five open-ended questions about possible success factors. All data were analyzed with descriptive statistics and tests of significance correlations.

Results – Accomplished librarian-researchers have professional training backgrounds and research environments that vary widely. None is statistically associated with research output. Those with densely connected networks of research colleagues who both know each other and do research together is significantly related to research output. A large group of those identified in the research networks are "both friend and colleague" and offer each other reciprocal support. In open-ended questions, respondents mentioned factors that equally span the three categories of research success: individual attributes, peers and community, and institutional structures.

Conclusion – The authors found that that there are many paths to becoming an accomplished librarian-researcher and numerous factors are conducive to achieving this distinction. A positive research environment includes high institutional expectations; a variety of institutional supports for research; and extrinsic rewards, such as salary increases, tenure, promotion, and opportunities for advancement. The authors further conclude that a librarian's research network may be an important factor in becoming an accomplished librarian-researcher. This finding is supported by both the research network analysis and responses to open-ended questions in which collaboration was a frequent theme.

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Research Article

An Exploratory Study of Accomplished Librarian-Researchers

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Abstract

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Introduction

The authors of this article investigated the professional training and environment, research networks, and attitudes about research of accomplished librarian-researchers. The authors consulted a group of librarian-researchers who represent the high end of research productivity to explore potential contributors. This is the first study that examines these possible contributors for the population of the most productive librarian-researchers. In academia, the proxy for productivity is publication activity, so the authors identified academic librarian-researchers who have written the highest number of library and information science (LIS) publications over the past 10 years. The authors analyzed the resulting data to learn if there are commonalities among these librarian-researchers.

Problem Statement

Librarians at the outset of their research careers can benefit from understanding factors that contributed to the productivity of accomplished librarian-researchers, such as professional training and research environment, social supports in the research network, and beliefs about and the practice of the research process. Insight into these factors can help them to imagine their own career trajectories. To that end, this study is guided by two research questions:

1. What are the factors that accomplished librarian-researchers identify as having

contributed to their becoming a productive researcher?

2. What are the compositional commonalities of the research networks of these librarian-researchers with a high level of research output?

Literature Review

In the LIS literature there has been a recent focus on research productivity among librarian-researchers, including the factors that may be related to the successful completion of research projects. There are three areas of concern in this study related to factors that may align with productivity of librarian-researchers in an academic setting: professional training and research environment; research network; and beliefs about and the practice of the research process. This section addresses literature in those areas.

Professional Training and Research Environment

Many academic librarians are actively conducting and disseminating the results of their original research. Librarians author the majority of articles in LIS journals (Chang, 2016), including the profession's most highly-regarded journals (Galbraith, Smart, Smith, & Reed, 2014). For example, they account for the majority of the authors in the *Journal of Academic Librarianship* (Luo & McKinney, 2015). Despite this success, an often-cited barrier to librarian research productivity is the lack of research training in the LIS master's curriculum. Lili Luo found in her 2010 review of the degree requirements for the 49 American Library Association-accredited LIS programs that 61% list research methods as a required course (Luo, 2011). However, there is not a standard research methods curriculum at the master's degree level, so the training offered across the programs varies in content and depth. In addition to lack of research training, librarians cite other barriers, including lack of research confidence, lack of a research community, lack of institutional support, and

lack of time (Kennedy & Brancolini, 2018). Despite these barriers, researchers have found that some academic librarians are intrinsically motivated to move forward with a research agenda, noting reasons such as personal satisfaction, intellectual curiosity, and the desire to contribute to the profession (Fennewald, 2008; Hollister, 2016; Perkins & Slowik, 2013). Related to those intrinsic motivators, Watson-Boone (2000) noted that academic librarian authors' efforts "improve their own practice and further develop their own levels of expertise" (p. 91).

The employment environment may also contribute to the productivity of librarian-researchers. In a study of the relationship between, faculty status and research productivity, Galbraith et al. (2014) examined the authorship of articles published in the top 23 LIS journals. They found that 42% of the articles were written by academic librarians. Of those, 65% worked at libraries with faculty status and tenure.

Hoffmann, Berg, and Koufogiannakis (2014) identified 42 empirical research articles on productivity for librarian and non-librarian practitioner-researchers – such as doctors, nurses, and social workers. Based on a definition of research productivity as "completion of research activities and subsequent dissemination of research findings" (p. 15), the authors conducted a content analysis of these articles and identified 16 factors that they believe contribute to research productivity, which cluster into 3 broad categories: individual attributes, peers and community, and institutional structures and supports. They used these categories to develop a survey administered to 1,653 librarians who worked at the 75 Canadian Research Knowledge Network and were likely conducting research as part of their job responsibilities (Hoffmann, Berg, & Koufogiannakis, 2017). In the study, Hoffmann et al. calculated a research productivity score and looked for statistical correlations with specific success factors. They did not identify a single factor within the three categories as the

main statistical contributor to research productivity, leading them to conclude that "an environment that embraces all three areas, by encouraging individual attributes, foster peer and community interaction, and providing institutional supports, will be likely to promote research productivity among librarians" (p. 116).

Research Networks

Research "peers and community" networks are important contributors to research productivity. A successful librarian-researcher has built his or her own personal network of social contacts over the course of a career. These networks can be measured using the method of social network analysis which is designed to describe the relationships between those social contacts (Borgatti, Everett, & Johnson, 2013; Wasserman & Faust, 1994). Social network analysis provides a conceptual structure and measures for examining the relationships in a research network.

The authors identified only one publication that uses social network analysis to measure the research networks of librarian-researchers. That singular study investigated the personal research networks of novice librarian-researchers (Kennedy, Kennedy, & Brancolini, 2017). The approach to measurement used in that analysis is the *personal* or *egocentric* network approach, since the focus of study was to understand the social ties surrounding an independently sampled set of focal individuals (McCarty, 2002). In that research the authors relied on those focal individuals (referred to as *egos*) to report on the relationships with those they identified as being part of their research network (referred to as *alters*) and their perceptions of the relationships between all possible pairs of those in the network, including themselves (Krackhardt, 1987). Network composition (the types of people in the network) was measured by calculating the proportion of network ties with a certain characteristic, such as the proportion of network members who offer research assistance (as described in

Crossley et al., 2015). Network structure (interconnections among network members) was assessed by calculating the ratio measure of the number of connections among network members compared to the total possible number of ties (called *density*) (as described in Crossley et al., 2015; McCarty, 2005; Wasserman & Faust, 1994).

The authors did not find any examples in the literature of investigations of the networks of accomplished librarian-researchers.

Beliefs about and the Practice of the Research Process

As the literature in the field of library and information science (LIS) has now well described the barriers to conducting research, researchers have turned their attention to the influences on research success. The recent literature has focused on supportive structures from an administrator viewpoint (Berg, Jacobs, & Cornwall, 2013; Perkins & Slowik, 2013; Sassen & Wahl, 2014; Smigielski, Laning, & Daniels, 2014) as well as from a practitioner-researcher perspective (Fiawotoafor, Dadzie, & Adams, 2019; Meadows, Berg, Hoffmann, Gardiner, & Torabi, 2013; Vilz & Poremski, 2015).

Methods

The authors developed a survey to elicit information about the respondents' professional training, their research networks, their beliefs about research, and their research practices. The survey included questions about research beliefs and practice adapted from Hoffmann et al. (2017). The survey also included five open-ended questions about factors contributing to research productivity designed to elicit a more comprehensive understanding of the factors directly from the accomplished librarian-researchers. The authors also measured productivity of participants directly by collecting and coding full and recent CVs of each participant rather than self-reports, which can be unreliable (Hoffmann et al., 2017).

Study Population

A requirement of this research is identifying the most productive librarian-researchers. There is no database kept in the United States at the national level of academics classified by their field of specialty, as in Italy (Abramo, D'Angelo, & Di Costa, 2019), so the authors needed to create a list of those accomplished librarian-researchers for this work. The list was formed from two sources of data.

The first source of data was drawn from Clarivate's Web of Science (Clarivate, 2018) and focused on librarians working at public and private university libraries in the United States of America that are members of the Association of Research Libraries (ARL) (2019), which are research-intensive institutions. Using the Web of Science Social Science Citation Index, the authors conducted advanced searches for each of the 99 ARL libraries (using the Organization Enhanced field tag), combined with the topic of "library" and the Web of Science category, "Information science library science," including all document types, and published from the time span of 2007 to 2018. From each library the authors of those publications were ranked by number of items published. Those with five or more items published were highlighted. The researchers conducted an internet search for each of those authors, to verify if the person was a practicing librarian; if so, they were included in the set, resulting in 39 librarians.

The authors supplemented this list with a second source of data: a list of researchers not necessarily affiliated with ARL Libraries provided by the first author of an article about worldwide contributors to the literature of library and information science (Walters & Wilder, 2015). This study identified the top librarian authors in the field (based on a harmonic weight of authors publishing in 31 LIS journals). From this data the authors selected the top 50 from the United States and merged them with their Web of Science set. There were 10 names included on both lists, producing a total

of 79 unique librarians, 60 from ARL member libraries and 19 from other academic libraries.

Recruitment and Survey Dissemination

After receiving approval of the protocol from the Institutional Review Board, the authors sent an initial email with the request for participation with a link to a personalized survey. Recruitment emails were successfully sent to 74 of the 78 librarian-researchers. Three were not able to be contacted because their emails were returned as undeliverable and one was unintentionally omitted from recruitment. One follow-up email was sent to those who did not respond to the initial request. The recruitment email may be found as Appendix A. A $100 USD gift card was offered to each respondent who completed the survey and supplied their CV.

Survey Design and Measures

The authors designed the survey around three areas of concern related to research output: professional training research environment; the research network of the respondent; and beliefs about and the practice of the research process. The survey was constructed using EgoWeb 2.0 (2015), the freely-available open source tool for network data collection. The survey was administered using a personalized URL.

Professional Training and Research Environment

Respondents were asked a series of questions that assessed their graduate-level educational background, including the year in which their LIS degree was completed and if they wrote a thesis while completing their LIS degree or another master's degree (yes/no). Respondents were also asked if they believed their LIS degree prepared them to read and understand research-based literature (yes/no) and if they believe it prepared them to conduct original research (yes/no). To assess experience with research method training, respondents were presented with a list of educational activities about research methods and asked to mark all in

which they have ever participated. The list includes: formal master's degree LIS course; formal master's degree non-LIS course; formal doctoral LIS course; formal doctoral non-LIS course; continuing education program; staff development program; self-education, and; none of these. To assess respondents' early and current research support, respondents were presented with a list of support options and asked to identify which were available them and which they had used. The options include: release time; short-term pre-tenure research leave; sabbaticals for librarians; travel funds (full); travel funds (partial); research grants; formal mentorship; informal mentorship; research design consultant; workshops.

To measure mentoring experiences, respondents were asked if they had ever participated in any formal or informal mentorship programs. Respondents were also asked if they had achieved tenure at a previous institution and/or at their current institution and their rank. The respondents were then asked one question to assess if they conducted their early research either (1) on their own, with partners who were (2) more, (3) less or (4) equally experienced, or with research teams that were composed of (5) mostly novice researchers or (6) mixed novice and experienced researchers. They were also asked this same question about their current research coupled with an open-ended question asking them to describe their current research. Finally, respondents were asked two open-ended questions, one prompting the participant to note anything else about their *professional training* over the last 10 years that they believe may have contributed to their productivity, and the other prompting to note anything about their *research environment* over the last 10 years.

Research Network

After answering questions about their own research experiences, respondents were asked about their research networks using standard ego-centered network data collection procedures (Crossley et al., 2015; McCarty et al., 2019). The

first step, *network elicitation*, prompted respondents to name the people (up to 40) with whom the respondents have research interactions (their "alters"). Next, "name interpreter" questions were asked about each alter to produce measures of *network composition.* Questions included how often the respondent interacted with alters over the past 30 days, and how often they discussed research during those interactions. Respondents also classified each alter as a personal friend, professional colleague, or both friend and colleague and reported on their advice/help relationship with each alter (the respondent usually asks for advice/help, usually offers advice/help, or the research interactions include asking for and giving help in equal amounts). Respondents reported if alters were local to the respondents' workplace, and their mode of usual communication with each alter (in person, online, phone, etc.). Finally, respondents were asked if they had a formal mentoring relationship with each alter and if they mentored the alter or the alter mentored the respondent. After each name interpreter question, respondents were asked one question to measure *network structure.* Respondents were asked to evaluate the relationship between each unique pair of alters: if they know each other and, if yes, if they had research interactions. The section of the survey ends with an open-ended question to discover if there is anything else about the people in the current research network that may have contributed to the productivity of the respondent.

Beliefs about and the Practice of the Research Process

The last section asked respondents to evaluate twenty-eight statements regarding beliefs about the research process with a *yes* or *no* response to report whether it generally applies to them or not. The statements are a subset from the survey administered by Hoffmann et al. (2017) to academic librarians employed by Canadian research libraries. To facilitate comparisons with this previous study, the statements used as much of the verbatim language as the original

question as possible. The final question prompted the respondent to think back on their entire career and list the three factors that have been the most significant to them becoming a productive librarian-researcher (open-ended text response).

The informed consent and full questionnaire may be found as Appendix B.

Research Productivity

Research productivity was measured based on a review of each participant's current CV. At the completion of the survey, participants were asked to forward their CV to the authors, who reviewed the research output over the last 10 years. The authors used the counting and scoring scheme developed by Hoffmann et al. (2017, p. 107), outlined in Table 1. The score was not adjusted for multi-authored pieces; if the output was listed on a CV, it was counted as one item, regardless of author position.

Table 1
Scores Used for Research Output

Output type	Score
Poster	0.5
Presentation	1
Conference proceeding	1
Non-peer-reviewed article	3
Book chapter	5
Edited book	6
Peer-reviewed article	9
Authored book	10

Items such as book reviews, creative writing, teaching a class, moderating a conference panel, editing a journal, or writing an evidence summary were not included as research output. Although these works are scholarly in nature, they were excluded because they are not dissemination of original research. For this analysis, if a presentation was determined to be part of a participant's job performance (for example, a webinar about how to use a library

resource), it was not scored. The authors do include the following, as done by Hoffmann et al. (2017): poster; presentation; conference proceeding; non-peer-review article; book chapter; edited book; peer-reviewed article; authored book.

Analysis

Descriptive statistics (counts and percentages for categorical / nominal responses, means and standard deviations for continuous measures) were calculated for each individual survey item. The final research output score for each participant was calculated by multiplying the number of types of output and their related scores, then adding all scores together.

For questions about the research network, descriptive measures of *network composition* were calculated from the raw responses about alter characteristics and relationships with alters provided by respondents. First, *network size* was calculated at the participant level by counting the total number of alters provided by each participant and then averaged across all participants. Measures of network composition were produced at the respondent level as well as across all respondents' networks. Counts of different types of network members were produced for each respondent (e.g. professional colleagues, mentees, etc.). Also, measures of percent of different types of network members were produced for the entire sample of alters by counting the total number of network members with the characteristic divided by the total number of alters named by participants. The measure "density" was produced to measure the *network structure* of each respondent's ego-centric network data using statistical software R's "igraph" package (Borgatti, Everett, & Johnson, 2013; Csárdi, 2019). Density is the ratio of observed relationships in a network to the total number of possible network ties and rages from zero (no observed ties) to one (all possible ties exist). A density measure was produced for the tie between alters who knew each other and did research together.

The authors conducted bivariate correlation tests to test the association between survey responses and research output. First, a Shapiro-Wilk test was conducted in SPSS (Version 24) to test for data normality for the research output scores and it was determined that the distribution of research output scores is not normal (p = .00). The histogram for the research output scores is included in Appendix C. The following findings, then, use the non-parametric tests Mann-Whitney U and Spearman's rho, depending on the nature of the variables tested. The significance of correlations was evaluated at the 95% confidence level (p < .05).

Coding of Open-ended Questions

The authors coded responses the four open-ended questions, using codes initially informed by the research success factors identified by Hoffmann et al. (2014, 2017). The initial code definitions were iteratively modified and refined to fit the data, including differentiating factors that are close to one another. For example, the authors split Education from Experience, to create two codes; and they wrote definitions for Intrinsic Motivations to differentiate them from Personality Traits. The authors also created a new code for Job-related Characteristics or Opportunities, to account for respondents' comments about the nature of their work and its contribution to their research. They also eliminated one of the factors, Departmental/Institutional Qualities, as it was impossible to differentiate it from Organizational Climate.

The research success factors provided a useful framework for coding the respondents' answers to open-ended questions and validated the categories and success factors identified by Hoffmann et al. (2017). New codes were easily placed within the three categories: Individual Attributes, Peers and Community, and Institutional Structures and Supports. The codebook is Appendix D, with example text from the survey respondents.

Results

A total of 46 participants completed the survey and provided their CVs, for a 58.97% completion rate. Of the 46 respondents, 70% currently work in ARL member libraries and 30% in other academic libraries.

Survey

Professional Training and Research Environment

Other than holding a LIS master's degree (held by all but one of the 46 respondents), there was diversity in professional training and research environment among respondents. There was a range of types of graduate degrees and a mix of degree types. There were 19 respondents who hold no additional degree beyond the LIS. Another 15 respondents hold a second master's degree, while 12 respondents hold a doctoral-level degree, 9 of those with a second master's degree and 3 without an additional master's degree.

The professional age of the group varies, with degree completion ranging from 1970 to 2015. Of the responses received, 1 respondent completed the LIS degree in the 1970s, 5 completed it in the 1980s, 17 completed it in the 1990s, 19 completed the degree from 2000-2010, and 3 completed it since 2011. On average, this group has held their professional LIS credentials for about 20 years (*SD* = 8.62).

There is strong agreement in the group related to their belief that their LIS Master's degree did not adequately prepare them to conduct original research; 38 of the 46 do not believe their degree provided research-readiness. On the whole, the group participates minimally in educational activities about research methods, reporting about three activities, with self-education being the most popular, noted by 41 of the 46 respondents.

Only 1 of the 45 respondents with a LIS master's degree wrote a thesis while completing the LIS degree. Of the 26 who reported holding an additional master's degree, 12 wrote a thesis while completing that degree (46.15%). Of the 45 respondents, 26 believe that their LIS master's degree adequately prepared them to read and understand research-based literature, but only 8 believe that their LIS master's degree adequately prepared them to conduct original research.

The group notes the availability and use of partial travel funds from their institutions or libraries, with that option present for 39 of the 46 respondents. The support option least offered was short-term pre-tenure research leave, with only 11 respondents reporting it; 5 of those 11 had taken advantage of that support.

The group has participated more often in informal mentoring opportunities, both as mentor (33 of 46) and mentee (30 of 46), than formal mentoring opportunities. It was reported that 27 had participated in a formal program, as a mentor and 11 had participated in a formal program, as a mentee.

In total, 35 respondents (76%) replied that they had achieved tenure either at their previous institution, at their current institution, or both. At their current institutions 33 of the respondents are currently at the rank of Associate Librarian or Librarian. There were 11 respondents who skipped past this question, which did not have a required response; it is unclear if the respondent refused to answer this question, accidentally skipped answering, or if they did not achieve tenure at their previous or current institution.

Early successful efforts in conducting research were mainly conducted as solo endeavors, noted by 25 respondents. Similarly, 22 responded that they currently mainly conduct their research alone.
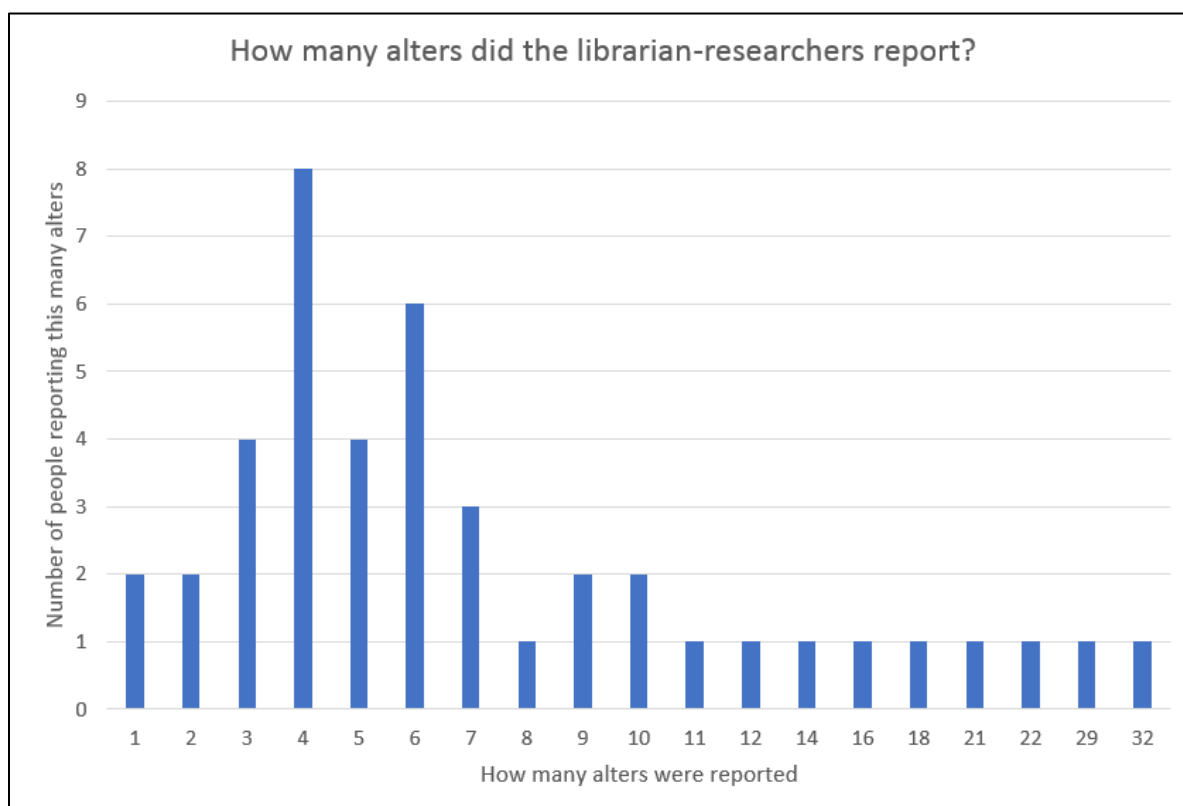

Figure 1
Numbers of people in the research network.

Table 2

Category of Relationship by Type of Support (n = 348)

	Personal friend		Professional colleague		Both friend and colleague	
	Number reported	%	Number reported	%	Number reported	%
I'm usually asking this person for advice or help	10	43.48	47	27.33	16	10.46
I'm usually giving this person advice or help	3	13.04	56	32.56	13	8.50
It's pretty even; I ask for help but also give help in equal amounts	10	43.48	69	40.12	124	81.05
Total	23	100	172	100	153	100

Research Network

Of the respondents, 43 provided complete network data. The number of people in each research network ranged from 1 to 32, with the most frequently reported as 4 (with 8 respondents reporting this number). The average number of people in the research networks is 8.09 (*SD* = 7.03). See Figure 1 for the range of network sizes reported by the respondents. Of the 348 total people mentioned, the respondents reported having been in contact over 3 or more times, for any reason over the past 30 days, with 170 (48%). The respondents had research interactions with 82 (34%) of the 348 mentioned.

On average, the respondents offered help to 1.75 other people, with even support on average of 4.90. As shown in Table 2, "Professional colleague" is the group with the largest relationship type reported, with 172 people in the category. It is interesting to note that in the relationship type of "both friend and colleague," reciprocal support is the highest, with 124 people fitting those two criteria.

Of the 179 people (of 348 total) identified as working at the same institution, in the same library, the majority of communications are done in person, with 158 reported as such. Of the 35 identified as working at the same institution but not in the library, half of communications are done in person, followed by email. Of the 134 who do not work at the same institution, 43% (57) of those communications are conducted via email.

The majority of the 348 people mentioned as part of the respondents' research networks are not involved in any mentor relationship, with 219 being identified as having "no mentor relationship between us." Of the 348, 67 are reported as being the mentor in the relationship, and 62 as being the mentee.

Of the 2,273 possible relationships between the persons named, the average density is 54% (SD = 0.49). Only 361 (or about 16%) do research together.

Beliefs about and the Practice of the Research Process

All 46 respondents answered each research process question (listed in Appendix E). Among the four lowest scoring questions were three

questions designed to measure peer support and one related to extrinsic motivation. Two of the three peer support questions ask about participation in a writing group and a journal club, both support activities that are relatively recent activities and focused on the needs of novice researchers. The lowest scoring question, with only seven *yes* responses, states "I do research only because it is a requirement of my job." The 12 highest scoring questions, with scores at or above 40, were designed to measure personal commitment to research, institutional support, extrinsic motivations, and personality traits. Of the 46 respondents 45 answered *yes* to: "I can achieve my research goals"; and "Publishing gives me a personal sense of satisfaction".

Research Productivity

As shown in Table 3, presentations are the most recorded research output, accounting for 49.91% of total research output (802 presentations). The least recorded research output, accounting for just 0.50%, are edited books. The one output type which all participants had used is peer-reviewed articles, with one as the minimum recorded; all other output types have zero recorded as the minimum. The research output scores for each participant were calculated according to the weights noted in Table 1 and ranged from 32.5 to 307.

Correlations between Research Output and Professional Training, Research Environment

There were no significant correlations between research output and professional training or research environment. Completing a thesis for an additional master's degree (other than the LIS) was also not significantly correlated with research output ($U = 78.5$, $p = .838$). Belief that one's LIS degree had prepared one to read and understand research-based literature and research output was also found to be not statistically significant, as well as belief that one's LIS degree had prepared one to conduct original research ($U = 244.5$, $p = .954$ and $U = 126.5$, $p = .530$, respectively). The authors divided into one group those respondents who reported participating in four or more educational activities about research methods and into another group those who reported three or fewer, of seven possible activities listed in the survey, but found no statistically significant difference between the groups, related to research output ($U = 236.5$, $p = .727$). The authors found no statistical significance between the number of research support options provided by the institution or library, and research output ($r_s(46) = .181$, $p = .228$). There is no statistically significant difference in the distributions of those who are currently tenured and research output ($U = 207.5$, $p = .864$).

Table 3
Participant Research Output, 2008-2018

Output type	Min	Max	Mean	Median	SD	Total number reported	% of output reported
Poster	0	68	3.7	1	10.3	169	10.52%
Presentation	0	92	17.4	11	21.5	802	49.91%
Conference proceeding	0	7	1.2	0	1.9	55	3.42%
Non-peer-reviewed article	0	14	1.6	1	2.5	74	4.60%
Book chapter	0	12	1.9	1	2.4	86	5.35%
Edited book	0	2	0.2	0	0.4	8	0.50%
Peer-reviewed article	1	27	8.6	8	5.4	397	24.70%
Authored book	0	3	0.35	0	0.7	16	1.00%

Research Output, Related to the Research Network

Ego-centric network size was not significantly correlated with research output ($r_s(46)$ = -.061, p = .687). Also, having any type of mentor relationship with an alter (as formal mentor, as informal mentor, as formal mentee, as informal mentee) was not significantly correlated with research output (U = 216.5, p = .372; U = 193.5, p = .608; U = 147, p = .251; U = 222.5, p = .686). Being above average in giving help or above average in giving/taking an equal amount of help from those in the research network was also not significantly correlated with research output ($r_s(11)$ = .318, p = .341 and $r_s(15)$ = -.190, p = .498, respectively). There was no significant correlation between the number of alters in the research network who either worked in the library or at the university and research output ($r_s(43)$ = -.098, p = .530). The authors did find that the density of egocentric networks defined by ties between alters who both knew each other and did research together was significantly correlated with research output ($r_s(41)$ = .398, p = .010). The denser the research collaboration network, the higher the research output. Figure 2 shows an example of a network of a low research output respondent that also has a low-density network and a network of a high research output respondent, with a high-density network. It is interesting to note that in the low research output network, most of the alters are categorized as colleagues only, with a few friends/colleagues but in the high research output network all of the alters are categorized as both friends/colleagues.

Low research output ego, low-density network

Research output score = 32.5, research tie density = 0.03

High research output ego, high-density network

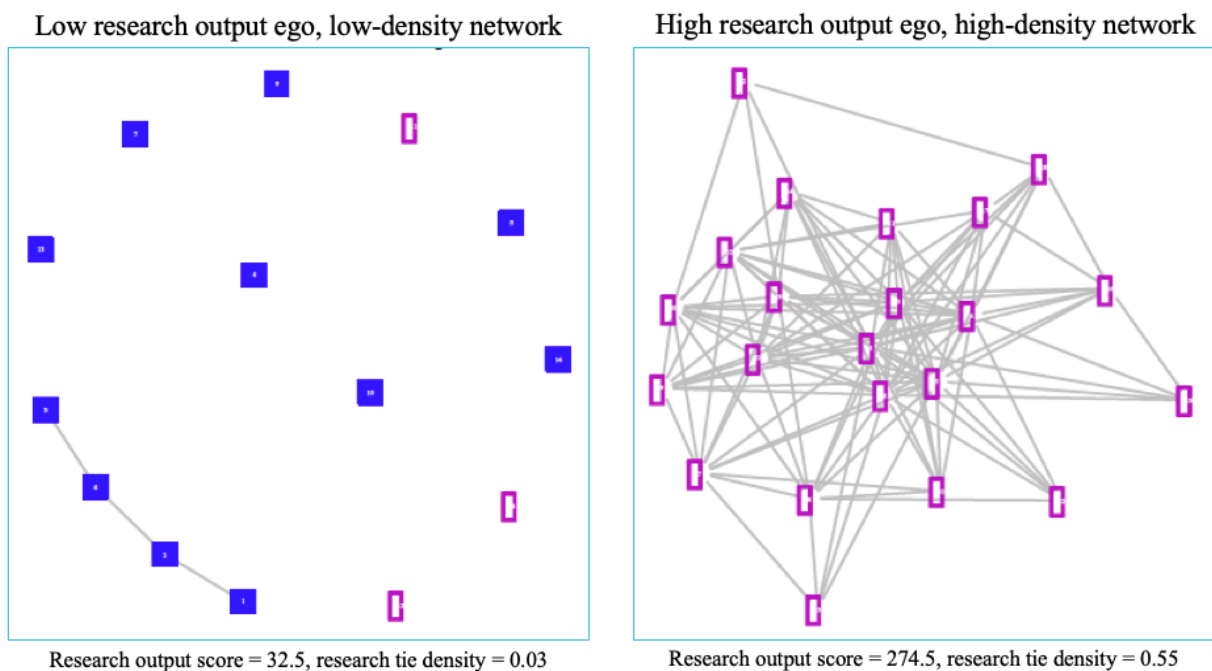Research output score = 274.5, research tie density = 0.55

Figure 2
Research output and research tie density.

Research Output, Related to Statements about the Research Process

The authors tested for associations between each of the 28 statements and research output and found 1 significant association. The distribution of the statement, "I have space where I am able to work effectively on my research" is similar to the distribution of research output ($U = 10$, $p = .009$).

The authors replicated the analysis completed by Hoffmann et al. (2017), using the number of peer-reviewed articles as the outcome variable, with no resulting statistical significance.

Responses to Open-ended Questions

The responses to the open-ended questions revealed important factors in the librarians' process in becoming accomplished researchers. Respondents noted that the research environment can be a major contributor to research productivity, or it can be a hindrance. A positive environment has many components, including institutional supports, collaboration, and community. The environment that many respondents found most conducive to developing as a researcher includes high expectations; a variety of supports for research; and extrinsic rewards, such as salary increases, tenure, promotion, and opportunities for advancement. This is an illustrative comment: "My library is very supportive of research and scholarship, and librarians are expected to publish and work on scholarly projects." Many librarians noted that being on the tenure-track provided an extrinsic motivation to develop research skills and become a productive researcher. One librarian wrote: "There is both pressure and support in tenure track positions for conducting research." Another theme was that often librarians conduct research in order to fulfill the requirements of tenure but develop a personal commitment to research and intrinsic motivation. This is a representative comment: "The tenure track and the focus on writing was a big element that got me started. Once I became

comfortable, I realized how much I enjoyed writing."

Another important factor is supportive colleagues and a community of researchers. This is an illustrative comment: "Librarians have created networks of support such as writing sessions and research forums, in which we share our projects with our colleagues and possibly find opportunities to cooperate." Some of the comments reveal personality traits that contribute to research success. This is representative: "I believe in working for shared good, which is truly collaborative. I base my work on mutual aid and tend and befriend (not competitive, pushing ourselves to be our best together, inclusivity and diversity that grows and improves from our differences), and my collaborators work in the same manner. This makes collaborative work more productive, better, and more joyous."

Discussion

The most unique finding of this work relates to the research network. The authors found that a high number of persons in the networks who both know each other and do research together is significantly related to research output. The denser the research network is in terms of research collaborations, the higher the research output. Another finding of this work is that a productive grouping of network members is those who are both friends and colleagues and also give/take research help in equal amounts. These findings align well with the responses to the open-ended question about the people in the current research network that may have contributed to the productivity of the respondent, which are mainly on the theme of collaboration.

As might be expected, there was little variation in responses to *yes* and *no* statements designed to differentiate successful librarian-researchers from other librarians. The librarians in the present study were chosen because they are all accomplished researchers. Of the 28 statements

about the research process, the strongest group response was to the statement, "I can achieve my research goals"; 45 of 46 respondents agreed in the affirmative that this statement does generally apply to them. Of the respondents, 44 have "participated in activities that support LIS research," and 43 "have space where I am able to work effectively on my research."

The authors' statistical tests of associations between research output and all other variables from the survey overwhelmingly did not show significant findings. In the area of professional training and research environment, there were no significant correlations between those variables and research output. Fiawotoafor et al., as did the authors, found no positive correlation between number of years in the profession and research output (2018). In the area of research networks, the one meaningful significant finding is that those who have networks with high density of research collaborators was significantly related to research output. In the area of the statements about the research process there was one significant association, with those who said that they had space where they can work effectively on their research tended to have higher research output. The authors wish to be clear that this finding does not imply a causality; it may be that having space helps productivity or that productive researchers make sure to have space to work productively.

The open-ended questions revealed both commonalities and differences among the respondents. They offer important insights into the individual motivations of librarian-researchers. In addition to the many positive factors in their lives and professional environments, the open-ended questions also provided respondents with an opportunity to mention negative factors in research productivity, including the loss of a supportive supervisor or administrator, the demands of a new administrative position, family pressures, and anxiety over the need to publish and achieve tenure. The impact of assuming an

administrative position is especially interesting; respondents noted that this changed their research or hampered their ability to conduct and disseminate research.

Limitations of This Study and Future Research

This study is the first to examine the research experiences and beliefs of accomplished librarian-researchers. One limitation of the study is the difficulty in defining the population. Although all respondents are among the most productive librarian-researchers in the U.S., many equally productive researchers may have been missed by the methodology used to identify them. The respondents vary in the volume of their research output and the types of their research output. Hoffmann et al. (2017) noted that librarians often disseminate the results of their research via conference presentation rather than publication. The authors found this to be true as well and considered that non-research presentations might skew the research totals. In order to reduce this effect, the authors counted only presentations that are scholarly in nature. The point system also strongly favors publication over presentation. In a future study, the authors would like to explore the phenomenon of librarians presenting about their research rather than publishing their findings. Another interesting finding is that while most of the respondents have a positive attitude toward research and feel confident in their research abilities, some expressed a high level of anxiety regarding research and do not enjoy research. The authors plan to explore these factors in follow-up interviews with the respondents. What is the source of this anxiety and lack of confidence?

The authors do not report in this study on the hierarchical academic rank of the people the librarian-researchers identify in their networks (as described in Fu, Velema, & Hwang, 2018), though this may be a fruitful topic of conversation in follow-up interviews. The authors could discover if the choices the

librarian-researchers made about the people in the development of their research networks over the course of their career were decided based on "reaching up" in the hierarchy, to gain a research-related benefit (Fu et al., 2018, p. 266). This line of inquiry would expand on a narrow area of focus in this research, that of mentor relationships, and whether the respondents act as mentees (those in a lower rank gain an advantage from a mentor in a higher rank), mentors, or have no mentor relationship with those identified in their research networks (Abramo, D'Angelo & Murgia, 2017; Hollingsworth & Fassinger, 2002).

For this work the authors do not focus on collaborations leading to co-authorship, though that is well addressed in the literature (see Lee & Bozeman, 2005, and Xia, Chen, Wang, Li, & Yang, 2014) and may be an area the authors identify as a possible future area of inquiry with this data set. Abramo et al. (2019) describe in their work the advantage of scientific collaboration may have, especially related to attracting different resources and perspectives which result in a wider audience for the research. The authors did notice during their review of the CVs that some of those in the population were co-authors, so in future work the group may examine the co-authorship network to look for associations between centrality and research output (as in Abbasi, Altmann & Hossain, 2011, and Abbasi, Jalili, & Sadeghi-Niaraki, 2018).

Finally, the authors did not address the concept of gender and research productivity. Research is being conducted in this area (see Mayer & Rathmann, 2018) and is a topic of concern, given that the field of librarianship is dominated by women. Hoffmann et al. (2017) found that gender did not have a significant effect on research productivity and so for this work the authors decided not to pursue that as a variable. However, for librarian-researchers at the highest levels of accomplishment, there may be gender differences. This may be an interesting area of

inquiry for follow-up in interviews with respondents.

Summary

This work explores the factors that may contribute to a librarian becoming an accomplished researcher. An understanding of these factors can provide evidence based guidance to those at the beginning of their research careers in designing their own trajectories. It may also aid library administrators in creating a supportive environment for researchers.

The population studied is the group of librarians identified as accomplished researchers. They were identified through 2 means: employed at Association of Research Libraries institutions who published more than 5 items indexed in the Social Science Citation Index in the last 10 years and the top 50 most published librarian-researchers for 2007-2012 (Walters & Wilder, 2015). This population was recruited into the study that included both a survey and CV component.

Analyses of the resulting survey data and CV data show that this population has professional training backgrounds and current environments that vary widely and are not statistically associated with research output. Those with a high number of persons in their networks who both know each other and do research together is significantly related to research output, a unique finding for the profession of library science. A large group of those identified in the research networks are "both friend and colleague" and offer each other reciprocal support. Those who agree with the statement, "I have space where I am able to work effectively on my research" is also associated with research output.

The statistical data do not tell the entire story, however. In open-ended questions, the respondents cited numerous factors over their careers that led to their research success. These factors span the three categories identified and

studied by Hoffmann et al. (2014, 2017). The results of this study support their finding that becoming a productive researcher is the product of individual attributes, peers and community, and institutional structures. From these categories, the three most frequently-mentioned factors from the open-ended questions were developing a personal commitment to research, collaboration, and positive organizational climate. Furthermore, the open-ended questions allowed the respondents to elaborate on positive and negative influences in their educational background; previous work; and professional and personal environments.

Acknowledgments

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Appendix A
Recruitment email

Email subject: Personal invitation, survey for accomplished librarian-researchers

Email body:

Greetings!
We invite you to participate in a study of accomplished librarian-researchers. We selected you for this study based on your high number of publications in recent years. As part of a small group of productive librarian-researchers, we hope you will agree to participate in the study. The purpose of the study is to understand the factors that contributed to your productivity.

For your participation, we are pleased to offer you a $100.00 gift card (via https://www.giftcards.com/virtual-gift-cards). Your participation includes two actions:
1.   Complete a web-based survey. In the survey, we will ask you to click through a series of questions with options for response. The survey can take up to 30 minutes to complete.
2.   Send your current CV to Marie Kennedy at marie.kennedy@lmu.edu, so that we may examine the last ten years of your scholarly productivity and professional experience.
We plan to publish and present the results of this study. At the time of publishing and presenting, the data will be anonymized. There are no expected risks for you in participating in this research.

To initiate your participation, please complete the survey at [personalized survey URL]. Use the email address [participant's email address] at the prompt in the survey. Please plan to complete the survey by July 1, 2018.

Your voice is an important one in this research. Thank you for your consideration.

Kind regards,

Marie R. Kennedy, Loyola Marymount University
Kristine R. Brancolini, Loyola Marymount University
David P. Kennedy, RAND Corporation

Appendix B
Survey

Page 1: Accomplished Librarian-Researchers -- Informed Consent

Introduction to the Study

We invite you to participate in a study of accomplished librarian-researchers.
You have been selected for this study based on your high number of publications in peer-reviewed journals in recent years. As part of a small group of productive librarian-researchers, we hope you will agree to participate in the study.

Purpose

The purpose of this study is to understand the factors that contributed to the productivity of accomplished librarian-researchers.
We hope to publish and present the results of this study. At the time of publishing and presenting the data will be anonymized.

What Will Happen During the Study

We will ask you to take two actions:
1. Complete this web-based survey. In the survey we will ask you to click through a series of questions with options for response. The survey is likely to take up to 30 minutes to complete.
2. Send your current CV to Marie Kennedy at marie.kennedy@lmu.edu, so that we may examine the last ten years of your scholarly productivity and professional experience.

Your Privacy is Important

We will make every effort to protect your privacy.
No sensitive information will be gathered as part of this survey.
Any information you provide will remain confidential. Only the co-investigators will view the results of the survey in their raw form.

Your Rights

Your participation in this study is completely voluntary and no risks are anticipated for you as a result of participating.
If you decide to be in the study, you will have the right to stop participating at any time.

Incentive

When the co-investigator has confirmed that your CV has been received and the survey completed you will be sent a $100.00 gift card from any eGift card brand listed at https://www.giftcards.com/virtual-gift-cards.

Institutional Review Board Approval

This study has been reviewed by the Office of Research and Sponsored Projects at Loyola Marymount University. If you have any questions about your rights as a research participant in this study, please contact the David A. Moffet, Ph.D., Chair, Institutional Review Board, Loyola Marymount University, One LMU Drive, Suite 47000, Los Angeles, CA 90045 at (310) 338-4400 or at david.moffet@lmu.edu.

If you agree with all of the above statements, provide your electronic signature by clicking on "Next" below.

Page 2: Introduction to the survey

There are three sections to this survey. It begins with a series of questions about your research training and work environment, continues with a section about your research network, and finishes with a series of statements about the research process.

Question 1. Please select the response that best describes your graduate-level educational background.
I have an LIS Master's degree
I have an LIS and another Master's degree
I have a non-LIS Master's degree
I have a doctoral degree

Question 2. In what year did you complete your LIS degree? Enter the four-digit year.
Text entry for response
(Question 2 appears if Question 1 response is *I have an LIS Master's degree* or *I have an LIS and another Master's degree*)

Question 3. Did you write a thesis in completing your LIS degree?
Yes
No
I don't remember
(Question 3 appears if Question 1 response is *I have an LIS Master's degree* or *I have an LIS and another Master's degree*)

Question 4. Did you write a thesis in completing another master's degree?
Yes
No
I don't remember
(Question 4 appears if Question 1 response is *I have an LIS and another Master's degree* or *I have a non-LIS Master's degree*)

Question 5. Do you believe that your LIS master's degree adequately prepared you to read and understand research-based literature?
Yes
No
(Question 5 appears if Question 1 response is *I have an LIS and another Master's degree* or *I have an LIS and another Master's degree*)

Question 6. Do you believe that your LIS master's degree adequately prepared you to conduct original research?
Yes
No
(Question 6 appears if Question 1 response is *I have an LIS and another Master's degree* or *I have an LIS and another Master's degree*)

Question 7. In which of the following educational activities about research methods have you ever participated? Check all that apply.
Formal master's degree LIS course(s) (e.g., research methods, statistics)
Formal master's degree non-LIS course(s) (e.g., courses in other departments)
Formal doctoral degree LIS course(s) (e.g., research methods, statistics)
Formal doctoral degree non-LIS course(s) (e.g., courses in other departments)
Continuing education program(s): Workshops, conferences, or other continuing education activities outside the library/your institution
Staff development program(s) provided by your library or university
Self-education activities (e.g., professional reading, online tutorial)
None of these

Question 8. Did you take advantage of any of the following research support options provided by your institution or library when you were early in your research career? Check all that apply.
Release time during the work week
Short-term pre-tenure research leave
Sabbaticals for librarians
Travel funds (full reimbursement)
Travel funds (partial reimbursement)
Research grants
Formal mentorship (experienced librarian researcher partners with novice researcher)
Informal mentorship (journal club discussions or article/proposal feedback sessions)
Research design or statistical consultant
Workshops or other forms of continuing education
No research support was available to me

Question 9.1. Which of the following research support options does your current institution or library provide for librarians, and which have you taken advantage of? *Release time during the work week*
It is offered and I HAVE taken advantage of it
It is offered but I HAVE NOT taken advantage of it
It is not offered

Question 9.2. Which of the following research support options does your current institution or library provide for librarians, and which have you taken advantage of? *Short-term pre-tenure research leave*
It is offered and I HAVE taken advantage of it
It is offered but I HAVE NOT taken advantage of it
It is not offered

Question 9.3. Which of the following research support options does your current institution or library provide for librarians, and which have you taken advantage of? *Sabbaticals for librarians*
It is offered and I HAVE taken advantage of it
It is offered but I HAVE NOT taken advantage of it
It is not offered

Question 9.4. Which of the following research support options does your current institution or library provide for librarians, and which have you taken advantage of? *Travel funds (full reimbursement)*
It is offered and I HAVE taken advantage of it
It is offered but I HAVE NOT taken advantage of it
It is not offered

Question 9.5. Which of the following research support options does your current institution or library provide for librarians, and which have you taken advantage of? *Travel funds (partial reimbursement)*
It is offered and I HAVE taken advantage of it
It is offered but I HAVE NOT taken advantage of it
It is not offered

Question 9.6. Which of the following research support options does your current institution or library provide for librarians, and which have you taken advantage of? *Research grants*
It is offered and I HAVE taken advantage of it
It is offered but I HAVE NOT taken advantage of it
It is not offered

Question 9.7. Which of the following research support options does your current institution or library provide for librarians, and which have you taken advantage of? *Formal mentorship (experienced librarian-researcher with an agreement to advise a less experienced librarian-researcher – one-on-one)*
It is offered and I HAVE taken advantage of it
It is offered but I HAVE NOT taken advantage of it
It is not offered

Question 9.8. Which of the following research support options does your current institution or library provide for librarians, and which have you taken advantage of? *Informal mentorship (more casual one-on-one consultation about research or peer mentoring, such as journal clubs discussions or article/proposal feedback sessions)*
It is offered and I HAVE taken advantage of it
It is offered but I HAVE NOT taken advantage of it
It is not offered

Question 9.9. Which of the following research support options does your current institution or library provide for librarians, and which have you taken advantage of? *Research design or statistical consultant*
It is offered and I HAVE taken advantage of it
It is offered but I HAVE NOT taken advantage of it
It is not offered

Question 9.10. Which of the following research support options does your current institution or library provide for librarians, and which have you taken advantage of? *Workshops or other forms of continuing education*
It is offered and I HAVE taken advantage of it
It is offered but I HAVE NOT taken advantage of it
It is not offered

Question 10.1. Have you ever participated in any of the following types of mentorship program? *Formal mentorship (experienced librarian-researcher with an agreement to advise a less experienced librarian-researcher – one-on-one) in which you are the mentor*
Yes
No

Question 10.2. Have you ever participated in any of the following types of mentorship program? *Formal mentorship (experienced librarian-researcher with an agreement to advise a less experienced librarian-researcher – one-on-one) in which you are the mentee*
Yes
No

Question 10.3. Have you ever participated in any of the following types of mentorship program? *Informal mentorship (more casual one-on-one consultation about research or peer mentoring, such as journal clubs discussions or article/proposal feedback sessions) in which you are the mentor*
Yes
No

Question 10.4. Have you ever participated in any of the following types of mentorship program? *Informal mentorship (more casual one-on-one consultation about research or peer mentoring, such as journal clubs discussions or article/proposal feedback sessions) in which you are the mentee*
Yes
No

Question 11. Have you attained tenure?
At a previous institution
At my current institution

Question 12. What is the highest rank you attained at a previous institution?
Assistant librarian/professor
Associate librarian/professor
Librarian/Professor
n/a Librarians do not have academic rank
(Question 12 appears if Question 11 response is *At a previous institution*)

Question 13. What is the highest rank you attained at your current institution?
Assistant librarian/professor
Associate librarian/professor
Librarian/Professor
n/a Librarians do not have academic rank

(Question 13 appears if Question 11 response is *At my current institution*)

Question 14. In what year did you complete your highest academic rank? Enter the four-digit year.
Text entry response
(Question 14 appears if Question 13 response is *Assistant librarian/professor*, *Associate librarian/professor*, or *Librarian/Professor*)

Question 15. Think back to your earliest successful efforts in conducting research. How did you mainly conduct it?
Mainly solo
Mainly with a partner who was more experienced than I was
Mainly with a partner who was less experienced than I was
Mainly with a partner who was equally experienced as I was
Mainly on a team of novice researchers
Mainly on a team with both novice and more experienced researchers

Question 16. Describe the type of research you are currently conducting. What methods are you using? What research questions are you exploring?
Text entry response

Question 17. How do you mainly conduct your current research? Check all that apply.
Mainly solo
Mainly with a partner who is more experienced than I am
Mainly with a partner who is less experienced than I am
Mainly with a partner who is equally experienced as I am
Mainly on a team of novice researchers
Mainly on a team with both novice and more experienced researchers

Question 18. Is there anything else about your professional training over the last ten years that you believe may have contributed to your productivity?
Text entry response

Question 19. Is there anything else about your research environment over the last ten years that you believe may have contributed to your productivity?
Text entry response

Question 20. Please name here the people with whom you have research interactions. You may just bounce ideas off of some of these people and with others you may work more closely and often. These may or may not be people you communicate with on a regular basis and may be professional colleagues, personal friends, and family.
You may name up to 40 people. You may list just their first names, if you are able to distinguish between them that way; neither your name nor their names will be shared with anyone outside the survey.
Text entry response

Question 21. During the past 30 days, how often have you had contact for any reason with each of the following people?

[Respondent is presented with the names of the people entered in Question 20, with matrix response option]
Not at all
Once or twice
Three or more times

Question 22. During the past 30 days, how often have you talked about research (help, advice, bounce ideas off of) with each of the following people?
[Respondent is presented with the names of the people entered in Question 20, with matrix response option]
Not at all
Once or twice
Three or more times

Question 23. How would you mainly describe your relationship with each person? Select one type of relationship for each person.
[Respondent is presented with the names of the people entered in Question 20, with matrix response option]
Personal friend
Professional colleague
Both friend and colleague

Question 24. How would you characterize the majority of your research interactions with each of the following people?
[Respondent is presented with the names of the people entered in Question 20, with matrix response option]
I'm usually asking this person for advice or help
I'm usually giving this person advice or help
It's pretty even; I ask for help but also give help in equal amounts

Question 25. Are these people at your current institution?
[Respondent is presented with the names of the people entered in Question 20, with matrix response option]
At my institution, in my library
At my institution, not in my library
Not at my institution

Question 26. How do you mainly interact with these people? Select one mode of interaction that you usually use with each person.
[Respondent is presented with the names of the people entered in Question 20, with matrix response option]
In person (face to face)
Online forum (chat room, facebook, twitter)
Phone calls
Texts or personal messages
Video conference (Skype, GoToMeeting)
Email

Question 27. How would you characterize the type of interactions you mainly have with each of these people?
[Respondent is presented with the names of the people entered in Question 20, with matrix response option]
We usually just chat about research, or we may give/get some brief help from each other on a project.
We've done a/some small projects together. (example: sat on a conference panel together; collaborated on a conference poster)
We've worked on a/some major projects together. (example: put together a conference session, published an article together)

Question 28. Do you have a mentor relationship with any of these people?
[Respondent is presented with the names of the people entered in Question 20, with matrix response option]
I am a formal or informal mentor to this person
This person is a formal or informal mentor to me
We do not have any kind of mentor relationship

Question 29. Does [Person 1 entered at Question 20] know each of the other people in your list, and do they interact for research-related purposes?
[Respondent is presented with the names of the people entered in Question 20, with matrix response option]
They know each other and have research interactions
They know each other but I don't know if they talk about or do research together
They know each other but don't talk about or do research together
I don't know if they know each other
They don't know each other

Question 30. Is there anything else about the people in your current research network over the last ten years that you believe may have contributed to your productivity?
Text entry response

Question 31. Indicate whether or not each statement, in general, applies to you. *I consider research to be a priority.*
Yes
No

Question 32. Indicate whether or not each statement, in general, applies to you. *I am currently working on a research project.*
Yes
No

Question 33. Indicate whether or not each statement, in general, applies to you. *I usually have a research project that I'm working on.*
Yes
No

Question 34. Indicate whether or not each statement, in general, applies to you. *I believe it is important for librarians to contribute to the profession via research.*
Yes
No

Question 35. Indicate whether or not each statement, in general, applies to you. *I work on research outside of regular work hours.*
Yes
No

Question 36. Indicate whether or not each statement, in general, applies to you. *I schedule dedicated time for research.*
Yes
No

Question 37. Indicate whether or not each statement, in general, applies to you. *I have participated in activities that support LIS research (e.g., peer review, editor of a journal, providing writing assistance to a colleague, etc.).*
Yes
No

Question 38. Indicate whether or not each statement, in general, applies to you. *I have time to do research within my job.*
Yes
No

Question 39. Indicate whether or not each statement, in general, applies to you. *I have space where I am able to work effectively on my research.*
Yes
No

Question 40. Indicate whether or not each statement, in general, applies to you. *Professional associations are a source of research community for me.*
Yes
No

Question 41. Indicate whether or not each statement, in general, applies to you. *I attend conferences in order to connect with others who have similar research interests.*
Yes
No

Question 42. Indicate whether or not each statement, in general, applies to you. *I feel like I belong to a research community.*
Yes
No

Question 43. Indicate whether or not each statement, in general, applies to you. *I have participated in a peer support group related to research.*
Yes
No

Question 44. Indicate whether or not each statement, in general, applies to you. *I have participated in a writing group.*
Yes
No

Question 45. Indicate whether or not each statement, in general, applies to you. *I have participated in a journal club.*
Yes
No

Question 46. Indicate whether or not each statement, in general, applies to you. *I ask my colleagues for feedback on my research.*
Yes
No

Question 47. Indicate whether or not each statement, in general, applies to you. *I have received merit increments or promotion due to my research activities.*
Yes
No

Question 48. Indicate whether or not each statement, in general, applies to you. *I am (formally or informally) expected to participate in research and scholarship.*
Yes
No

Question 49. Indicate whether or not each statement, in general, applies to you. *I do research only because it is a requirement of my job.*
Yes
No

Question 50. Indicate whether or not each statement, in general, applies to you. *I enjoy doing research.*
Yes
No

Question 51. Indicate whether or not each statement, in general, applies to you. *I enjoy writing for publication.*
Yes
No

Question 52. Indicate whether or not each statement, in general, applies to you. *I am confident that I have the ability to do research.*

Yes
No

Question 53. Indicate whether or not each statement, in general, applies to you. *I can achieve my research goals.*
Yes
No

Question 54. Indicate whether or not each statement, in general, applies to you. *I enjoy presenting at conferences.*
Yes
No

Question 55. Indicate whether or not each statement, in general, applies to you. *I enjoy speaking with colleagues about my research.*
Yes
No

Question 56. Indicate whether or not each statement, in general, applies to you. *Publishing gives me a personal sense of satisfaction.*
Yes
No

Question 57. Indicate whether or not each statement, in general, applies to you. *I can easily identify questions that could be answered through research.*
Yes
No

Question 58. Indicate whether or not each statement, in general, applies to you. *I do research to satisfy my curiosity.*
Yes
No

Question 59. Thinking back on your entire research career, please list the three factors that have been the most significant in you becoming an accomplished librarian-researcher.
Text entry response

Question 60. Would you be interested in being contacted about participating in a possible follow-up study about accomplished librarian-researchers?
Yes
No

Final page.
Clicking the "Finish" button below completes the survey. Thank you for your participation.
Marie will be in touch with you via email to confirm the completion of the survey. In the meantime, if you have any questions or feedback about this survey please contact us at marie.kennedy@lmu.edu.

Appendix C. Histogram (with normal curve) of research output scores

Histogram

Mean = 117.77
Std. Dev. = 69.534
N = 46
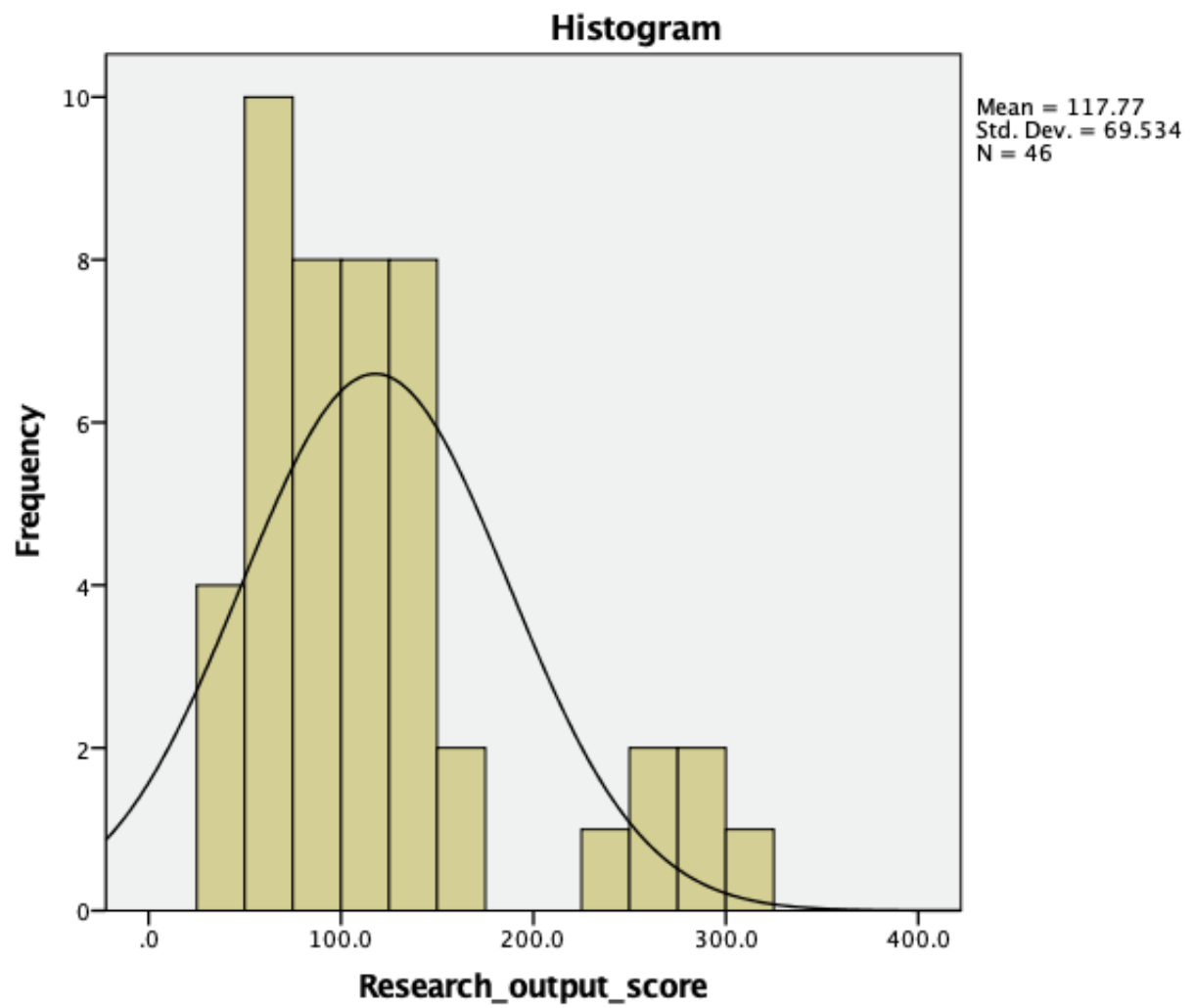
Appendix D
Codebook – Accomplished Librarian-researchers Success Factors

Code	Definition	When to Use	When NOT to Use	How to Use and Examples
Individual Attributes:				
Education	Formal education; continuing education; research training	Respondent mentions the impact of education on their research	If an educational program is not mentioned specifically, **use:** Experience	**Example:** Pursuing a Ph.D. (both in terms of coursework and mentorship from my advisor and peers). **Example:** Getting an undergraduate degree that required I learned research methodologies and statistics and apply them in a thesis.
Experience	Previous research experience; previous job experience with a research component	Respondent mentions a previous job that had a research component or requirement; or ambiguously uses the word "background."	If an educational experience is mentioned specifically – courses, academic degree program, continuing education, **use:** Education	**Example:** On-the-job experience in my former career… **Example:** Having a background in psychology.

Intrinsic motivations	Personal and professional reasons for conducting research	Respondent gives responses that answer the "why" question with an internal motivation. Respondent uses verbs rather than emotion words to describe motivations.	When respondent gives responses that answer the "why" question with external, tangible rewards – or to avoid punishment. See "Extrinsic motivations."	Code when respondent write about a research-oriented personality trait. **Example:** Having a strong desire to write and solve problems. Or more general motivation without specific rewards or punishment. **Example:** To enhance my career.
Personality traits	Self-efficacy; innate drive to achieve or excel; creativity; leadership; positive attitude	Respondent expresses positive feelings in the context of conducting research or any of its components	When the respondent specifically mentions activities or behaviors related to research, rather than emotions, **use:** Personal Commitment to Research.	Code when respondent expresses "an interest in" or uses positive emotional language: "confident," "achieve," "enjoy," "sense of satisfaction." **Example:** I love questions and finding the answers. **Example:** I have an unrelenting desire to do more, better.

Personal commitment to research	Making research and writing a priority; participation in research-related activities, including serving as a peer reviewer; reading research; use of productivity tools.	Respondent mentions conducting research despite lack of monetary or other tangible rewards – or that these rewards are **not** their motivation. Respondent mentions behaviors and activities, not emotions. Research has become part of the respondent's routine. A habit of research.		**Example:** I'm continually thinking about current and future projects. **Example:** Selection of topics that can be addressed using the existing data from publicly available sources… I spend less time administering surveys and more time analyzing the results.
Job-related characteristics or opportunities	The nature of the respondent's job leads to opportunities for research, stimulates research ideas, or provides access to data. Opportunity to positively affect practice; connection to teaching. Job reveals relevant and interesting research topics.	Respondent mentions job characteristics or research contributing to work success – opportunity to link research to practice.	When respondent mentions rewards or punishments related to the job, **use:** Extrinsic motivations.	**Example:** The kind of work I do (electronic resources) often has new things to write on. **Example:** Constant change in technology and standards relating to cataloging and metadata provide many opportunities for research.
Peers and Community:				
Collaboration	Composition and practices of research teams; collaborations between LIS faculty and librarians	Respondent mentions the positive impact of collaborators, co-authors, or research partners	If respondent mentions community of researchers, **use**: Community	**Example:** Colleagues willing to work with me.

Community	Professional associations; research networks; socialization	Respondent mentions interactions with other researchers as a motivating factor or desire to contribute to librarianship.	If respondent mentions actually working with others on research, **use**: Collaboration	**Example:** I love learning from others – especially those with more experience and expertise. **Example:** To nourish the profession.
Guidance and support of editors		Respondent specifically mentions editors	Respondent mentions someone else who played a role in their research success	
Family and personal relationships		Respondent mentions the positive influence of a family member or a friend who is a researcher or encouraged their research	Respondent mentions positive impact of mentors or professional colleagues. See "Mentoring" or "Peer support."	**Example:** My brother who is a prolific scholar and role model.
Mentoring	Informal and formal mentoring; supervising students; being a mentor; being mentored	Respondent mentions mentoring or being mentored; or working with students on research; or working with an individual.	The respondent mentions "peer mentoring" specifically, **use**: Peer support	**Example:** Working with a library dean who helped me see how research questions present themselves in the daily responsibilities of librarianship.

Peer support	Peer mentoring; writing support groups; seminar series	Respondent mentioned the positive influence of peers who were also conducting research; specifically mentions "peer mentoring." The respondent mentions specific programs design for and with peers to support one another's research.		**Example:** Early peer-mentoring group at my current institution (1984-1994)
Peers and community barriers	Lack of any of the supports noted above.	Respondent mention unsupportive peers or lack of a research community.		
Institutional Structures and Supports:				
Extrinsic motivation	Monetary rewards; required for promotion and/or tenure; requirement for employment; desire to build resume	Respondent mentions tangible rewards for research or punitive measures if they had not conducted research		**Example:** I am on the tenure track (and after achieving tenure, advancing to full professor is the only clear way to get a raise)
Positive organizational climate	Supportive leadership; research valued by the organization; culture of research	Respondent mentions encouragement or environmental support factors; research as an "expectation." "Rewards" are unspecified.		**Example:** Research is encouraged. **Example:** Working in a library that rewards it.

Institutional resources	Equipment; funding; staff support	Respondent mentions monetary or human resources provided by the library or the institution	Respondent mentions other types of support. See "Institutional supports."	**Example:** Our library administration funds librarians to hire research assistants.
Institutional supports	Support for research that is not monetary in nature, either funding or staff resources. General statement of support.	Respondent mentions "institutional support" – without specifying the type of support. Or mentions institutional supports like a statistical consultant or help from IRB.	Respondent mentions a support that has a monetary value. See "Institutional resources."	**Example:** Support from my library for research.
Time	Autonomy over work schedule; balance between responsibilities; release time; sabbatical leave	Respondent mentions time-related factors – such as release time or sabbatical – work schedule flexibility.		**Example:** Research time off has been helpful.
Institutional barriers	The absence of the one or more of the institutional or organizational support noted above.	Respondent mentions the negative influence of organizational or institutional conditions		**Example:** I accepted a position at an institution in which librarians do not hold faculty status and so there was no imperative to contribute to the scholarly literature in my field.

Appendix E
Section 3 of the Survey, Statements about the research process

The respondents were asked to indicate whether or not the following statements, in general, applied to them.

Statement	Yes	No
I consider research to be a priority.	37	9
I am currently working on a research project.	41	5
I usually have a research project that I'm working on.	38	8
I believe it is important for librarians to contribute to the profession via research.	41	5
I work on research outside of regular work hours.	36	10
I schedule dedicated time for research.	29	17
I have participated in activities that support LIS research (e.g., peer review, editor of a journal, providing writing assistance to a colleague, etc.).	44	2
I have time to do research within my job.	35	11
I have space where I am able to work effectively on my research.	43	3
Professional associations are a source of research community for me.	29	17
I attend conferences in order to connect with others who have similar research interests.	31	15
I feel like I belong to a research community.	26	20
I have participated in a peer support group related to research.	20	26
I have participated in a writing group.	12	34
I have participated in a journal club.	10	36
I ask my colleagues for feedback on my research.	38	8
I have received merit increments or promotion due to my research activities.	35	11
I am (formally or informally) expected to participate in research and scholarship.	41	5
I do research only because it is a requirement of my job.	7	39
I enjoy doing research.	42	4
I enjoy writing for publication.	37	9
I am confident that I have the ability to do research.	42	4
I can achieve my research goals.	45	1
I enjoy presenting at conferences.	32	14
I enjoy speaking with colleagues about my research.	41	5
Publishing gives me a personal sense of satisfaction.	15	1
I can easily identify questions that could be answered through research.	40	6
I do research to satisfy my curiosity.	40	6