2015

Measuring the Research Readiness of Academic and Research Librarians: A Project Report of the Institute for Research Design in Librarianship

Kristine R. Brancolini, *Loyola Marymount University*
Marie R. Kennedy, *Loyola Marymount University*

PROCEEDINGS OF THE
2014 LIBRARY ASSESSMENT CONFERENCE

BUILDING EFFECTIVE, SUSTAINABLE, PRACTICAL ASSESSMENT

AUGUST 4–6, 2014
SEATTLE, WA

EDITED BY
SARAH DURSO, ASSOCIATION OF RESEARCH LIBRARIES
STEVE HILLER, UNIVERSITY OF WASHINGTON
MARTHA KYRILLIDOU, ASSOCIATION OF RESEARCH LIBRARIES
ANGELA PAPPALARDO, ASSOCIATION OF RESEARCH LIBRARIES

ARL
ASSOCIATION OF RESEARCH LIBRARIES

W UNIVERSITY LIBRARIES
UNIVERSITY of WASHINGTON

The paper used in this publication meets the requirements of ANSI/NISO Z39.48-1992 (R1997) Permanence of Paper for Publications and Documents in Libraries and Archives.

Measuring the Research Readiness of Academic and Research Librarians: A Project Report of the Institute for Research Design in Librarianship (IRDL)

Kristine R. Brancolini and Marie R. Kennedy
Loyola Marymount University, USA

Abstract
The Institute for Research Design in Librarianship (IRDL) is a continuing education program designed to help academic and research librarians improve their research skills and increase their research output. Funded by a grant from the Institute of Museum and Library Services (IMLS), the centerpiece of the project is a nine-day workshop on research design each summer for three years, 2014–2016. Twenty-one participants each year will leave the IRDL with increased knowledge of research skills and with a viable research proposal to be conducted during the following academic year. Project assessment is carried out each of the three years with input from an internal assessment team, the co-investigators, and an external reviewer. The four-part assessment plan includes scoring each research proposal pre- and post-IRDL workshop; social network analysis; mastery of curriculum content; and research confidence, measured by a confidence scale administered immediately before the workshop and at the end. The confidence scale is a revised and expanded version of a scale used with respondents to a survey conducted by two of the researchers in 2010.

Introduction
The Institute for Research Design in Librarianship (IRDL) is a continuing education program designed to help academic and research librarians improve their research skills and increase their research output. It builds on more than two decades of scholarship surrounding the importance of academic librarian research and the challenges facing librarians who want and/or need to conduct research. For the purpose of this project we define research broadly to include theoretical research, designed to advance knowledge in the field of library and information science, often conducted by "academic researchers," and operations research, designed to inform decision making, often conducted by "practitioner-researchers."[1] Project co-directors Kristine Brancolini and Marie Kennedy used the following working definition of research; it was included on the survey instrument that serves as the basis for the needs assessment that informed the development of IRDL:

> The process of arriving at dependable solutions to problems/questions/ hypotheses through the planned and systematic collection, analysis, and interpretation of data: it may be applied or theoretical in nature and use quantitative or qualitative methods. (This definition does not include library research that is limited to activities such as compiling bibliographies and searching catalogs).[2]

In order to understand how academic librarians describe their own research design backgrounds, rate their own confidence levels in performing the discrete tasks of a research project, and report on institutional support for research, Brancolini and Kennedy designed and administered a national survey, targeting academic librarians. The survey was launched in early December 2010 via distribution lists and gathered over 900 responses. The results confirm uneven prior training in research design, varied levels of confidence in the steps of the research process, and uneven support at their institutions.[3] Based on these findings, Brancolini and Kennedy received funding from the Institute of Museum and Library Services (IMLS) Laura Bush 21st Century Librarian Program grant for three years, 2014–2016, to create the Institute for Research Design in Librarianship (IRDL),[4] a training opportunity that supports those three areas of need. Specifically, IRDL is designed to provide the conditions for research success:
- Foster an environment of collegiality and support in the research process
- Provide instruction in areas needed to complete the research design for a project developed by each participant

- Encourage the dissemination of research through publication or presentation
- Instill confidence in institute scholars about the research process by providing clear instruction on each step

The centerpiece of IRDL is a nine-day summer research workshop held on the campus of Loyola Marymount University in Los Angeles. The first of three annual workshops was held June 15–26, 2014. The target audience for IRDL is self-described novice researchers, who hold an appointment in an academic or research library in the United States. Eighty-seven academic and research librarians from across the country submitted applications for this first cohort. An inclusive advisory board and the IRDL co-directors selected 25 participants, with broad representation across types of academic library, job titles and functions, race and ethnicity. Each applicant submitted a draft proposal for a research project to be completed during the 2014–2015 academic year. During the summer workshop, two faculty members—one an anthropologist/researcher who has conducted similar training workshops, the other a professor and prolific scholar from the School of Information at San Jose State University—provided instruction in various aspects of the research process and consulted with participants individually to help them revise their proposals. One month after the workshop ended, each participant re-submitted their revised proposals, which became the basis for one of the program assessments.

Assessment of IRDL

Multiple assessments of the institute's effectiveness have been incorporated into the project plan. The co-directors and instructors use the assessment findings to guide revisions for the subsequent years. Assessment focuses on the effectiveness of the entire program, with special emphasis on summer workshop, the follow-up communication with IRDL participants, and their communication with one another. The assessment plan has four parts:

1. Scoring research proposals pre- and post-IRDL workshop, completed July 28–29, 2014
2. Social network analysis, based upon a questionnaire administered at four times throughout the cohort year
3. Mastery of curriculum content, based upon pre- and post-tests throughout the workshop

4. Research confidence, based upon a questionnaire administered right before the workshop began and at the end

An external reviewer from Colorado State Library was on site for three days for the first year of IRDL. She observed workshop instruction and interviewed instructors and participants. The focus of the interviews was participants' perceptions about factors that contribute to learning, workshop outcomes, and suggestions for improvement. The co-directors surveyed all IRDL scholars in late July, incorporating feedback from the external reviewer in the design of the survey.

Research Confidence

One factor that might lead to the research success of a librarian is confidence. The researchers posed the following question: Did participation in the IRDL Summer Workshop 2014 increase the confidence of participants with regard to completing the steps in the research process? Psychology research suggests that self-efficacy (confidence) might be an important factor in encouraging academic librarians to undertake research and in their success in completing research and disseminating the results. There is ample psychological research in the area of perceived self-efficacy—"people's beliefs about their capabilities to produce effects"[5]—related to work-related performance and achievement.[6] Assuming that Bandura's idea of reciprocal determinism is correct, we expected that the confidence of academic librarians in their ability to perform discrete tasks in a research process, along with environmental factors (hence the survey questions about demographic data), would be related to behavior (that is, conducting/disseminating research).

Brancolini and Kennedy included questions on research confidence in their 2010 survey of academic librarians; the questionnaire appears at the end of their 2012 article.[7] Based upon Bandura's theory of self-efficacy, we predicted that confidence in their ability to conduct research would correlate with success in completing research on the part of academic librarians.[8] In Q10 of the questionnaire respondents were asked to rate their confidence in performing the discrete steps in a research project on a scale of 1 to 5, with 1 being "not at all confident" and 5 being "very confident." We measured ten discrete steps: turning your

topic into a question that can be tested; designing a project to test your question; performing a literature review; identifying research partners, if needed; gathering data; analyzing data; reporting results in written format; reporting results verbally; determining appropriate format for disseminating results (poster/presentation/article); identifying appropriate places to disseminate results (publication/conference).

We expected that whether or not an academic librarian had conducted research since completing a LIS degree would be associated with how confident the librarian felt in performing the discrete steps of a research project. To test this association, we created two variables: Average Confidence and Conduct Research. Average Confidence was constructed from Q10, as noted above. Conduct Research was constructed from Q7, which asked if the participant had conducted research since completing a library or information science (LIS) master's degree, giving an optional response for "n/a (Do not have an LIS master's degree)." We removed responses to this question from respondents who did not have an LIS master's degree, leaving behind only those cases that have a yes/no response to the question, "Have you conducted research since you completed your library or information science (LIS) master's degree?" We found by running a logistic regression in SPSS 16.0 using the enter method that a significant model emerged: F_1, 792 = 111.174, p = 0.000; adjusted R-squared = .122. The predictor variable Confidence has a Beta = -.351 and p = 0.000. This suggested that confidence in performing the discrete steps in a research project may be useful as a predictor for whether or not an academic librarian conducts research. IRDL 2014 provided the opportunity to further advance the use of this confidence scale. Before we used the scale again we evaluated its validity through an exploratory factor analysis to determine the relationships between constructs, to identify which items on the scale were correlated and could appropriately represent specific dimensions of research confidence.

Exploratory Factor Analysis

We evaluated the confidence scale to determine if all of the components we identified indeed held together statistically as part of the whole process of "research." The first step was to determine the validity of the ten-item confidence scale. In 2014

Chavez[9] ran an exploratory factor analysis (EFA) using the original ten-item research component confidence scale. It was determined that the sample size (n=816) is large enough to conduct an EFA. Using the Kaiser-Mayer-Okin Measure of Sampling Adequacy and the Bartlett's Test of Sphericity, it was also determined that the data are suitable for factor analysis.

Method
As the factor structure of the confidence scale was uncertain, exploratory factory analysis was chosen as the most appropriate method (rather than confirmatory factor analysis). Both principal component analysis and principal axis factoring with varimax rotation were performed, and several methods, including investigation of scree-plots, Kaiser's eigenvalue criterion, and theoretical insight, were used to investigate the confidence scale. Finally, Cronbach's alpha was used to measure internal consistency of the scale.

Results
Chavez found a three factor solution, with the above two items removed, to be the ideal solution. The three factors measure the following constructs: planning phase, data phase, and reporting phase of the research process. These three factors cumulatively explain approximately 80 percent of the variance. The items "performing a literature review" and "identifying research partners, if needed" performed poorly. Factor loadings for these items suggested that the items should be removed from the confidence scale. In addition, after removing both items, Cronbach's alpha for the eight-item scale (0.898) and the alpha for each factor (Planning=0.876, Data=0.834, Reporting=0.860) indicates a high level of internal consistency. The analysis pointed to areas of improvement for the scale:
1. Deletion or revision of the "performing a literature review" item. The item is vague and could be improved by breaking it down into more specific aspects. For this reason, Chavez recommended that the question be revised for future use.
2. Deletion or revision of the "identifying research partners, if needed" item. This item may not have contributed much to the overall measurement of research confidence, as it is not a necessary step in the research process, as many conduct research without partners. For this reason, Chavez recommended that this

item be deleted or measured separately from this scale.

Revised and Expanded Research Confidence Scale

Based upon the results of the factor analysis, we deleted the item related to identifying research partners and revised the item related to performing a literature review in order to capture the components of this complex step in the research process. Since we had evidence that the scale measures valid constructs, we decided to further break out other steps in the process. We wrote additional questions intended to fit the three factor solution and decided to use the revised and expanded research confidence scale with the first cohort of IRDL Scholars in June 2014.

Method

The twenty-five 2014 IRDL Scholars completed the revised and expanded version of the confidence scale a few days before the summer research workshop began and immediately after it ended. This version of the scale asked thirty-eight questions in eight categories, with at least two questions in each category. These eight categories conform to Chavez's three factor solution:

1. Planning
   - Turning a topic into a question that can be tested (three questions)
   - Designing a project to test your question (six questions)
   - Performing a literature review (five questions)
2. Data
   - Gathering data (eleven questions)
   - Analyzing data (five questions)
3. Reporting
   - Reporting results written (four questions)
   - Reporting results verbally (two questions)
   - Determining appropriate reporting (two questions)

The questionnaire uses a five-point Likert scale to report respondents' confidence in completing the steps in the research process, with 1 being "not at all confident" and 5 being "very confident." We administered the expanded confidence scale to each of the 25 IRDL scholars just before the 2014 workshop began and again at the end of the workshop, following nine days of instruction and mentoring.

Results

IRDL scholars scored significantly higher on the confidence scale after the workshop. The means across all 25 participants were Time 1 (immediately before the IRDL workshop) = 91.16 and Time 2 (on the last day of the IRDL workshop) = 144.52. The paired samples t-test was significant at $p <$ .0005 (SPSS reports this as .000). We expected that overall confidence would have increased for the participants, but we wondered what the scores of the individual questions may reveal. We were interested to learn where participants experienced the greatest increases in confidence. We examined the data for Time 1, immediately prior to the IRDL workshop, Time 2, immediately after the IRDL workshop, and compared the means for each question between Time 1 and Time 2.

Time 1. Using the scale measurements, with 1 being "not at all confident" and 5 being "very confident," the scores at Time 1 on individual questions ranged between 1.28 and 3.8. The lowest average score was for Q5.4: Knowing which statistical test(s) to run. The four other questions with the lowest results and their average scores include:
- Q5.3: Identifying which statistical package may assist you in analyzing your data (1.44)
- Q4.9: Knowing how to run a focus group (1.56)
- Q4.8: Knowing how to design a focus group (1.64)
- Q4.3: Determining how many members of a population to include in your study (1.68)

Two questions tied for the highest average score (3.88): Q3.4: Using relevant keywords to discover literature about your research topic; and Q6.3: Knowing how to apply a style guide. The three other questions with the highest results and their average scores include:
- Q3.3: Identifying appropriate information sources in which to conduct your literature review (3.52)
- Q3.5: Determining if a piece of literature is an appropriate source for your research question (3.44)
- Q7.2: Knowing how to adapt your written research paper for an oral presentation (3.12)

Time 2. At Time 2 the average scores on individual questions ranged between 2.72 and 4.48. The lowest average score at Time 2 was on the same question as at Time 1, 5.4: Knowing which

statistical test(s) to run. However, the average increased from 1.28 to 2.72. It was the only average score at Time 2 below 3 (moderately confident). The highest average score was on Q3.4: "Using relevant keywords to discover literature about your research topic," which was one of the two highest scores in Time 1.

Comparisons between Time 1 and Time 2. None of the question averages were above 4 on Time 1. However, for Time 2 ten questions had average scores above 4, in addition to Q3.4 noted above (with change in average noted in parentheses):

- Q6.3: Knowing how to apply a style guide (APA or MLA, for example) (3.88 to 4.4)
- Q3.3: Identifying appropriate information sources in which to conduct your literature search (3.52 to 4.28)
- Q3.5: Determining if a piece of literature is an appropriate source for your research question (3.44 to 4.4)
- Q7.2: Knowing how to adapt your written research paper for oral presentation (3.12 to 4)
- Q1.1: Turning your topic into a research question (2.96 to 4.08)
- Q1.3: Determining if your research topic makes a contribution to the field, based on the relevant literature (2.8 to 4.16)
- Q2.2: Identifying other research studies similar to yours in order to examine the methods used (3 to 4.4)
- Q2.3: Exploring research designs that are appropriate for your question (2.28 to 4.24)
- Q3.2: Determining how your study can contribute to the existing literature (2.92 to 4.04)
- Q6.2: Knowing the components to construct a traditional social sciences journal article (2.32 to 4.16)

Discussion

The librarian research confidence scale, first developed in 2010, tested via exploratory factor analysis in 2014 and revised and expanded in 2014, provided interesting and useful data for the first 25-member cohort of the Institute for Research Design in Librarianship (IRDL). The results of the pre- and post-IRDL confidence measures indicate that the nine-day research design workshop, using a model often called a "boot camp," significantly increased participants' confidence in the research

process overall, with increases in the means on each of the 38 questions.

Data from the confidence survey reinforce qualitative data gathered during the assessments of IRDL 2014, including interviews conducted by the external reviewer. We anticipated that even after IRDL participants would feel a relative lack of confidence in the use of statistics for data analysis, which was confirmed by the average scores on the scale. We had already determined that this is an area in which many academic librarians lack education and training, and thus, lack confidence. On the positive side, we were pleased to learn that confidence in conducting a focus group increased from an average score of 1.56—one of the lowest pre-IRDL—to 3.80, which was the greatest increase from Time 1 to Time 2. The IRDL workshop included instruction on planning and conducting focus groups and hands-on experience in conducting a mock focus group, with various participants playing different roles. However, we have a few unanswered questions related to the components of the research process that our scale intends to measure. We plan to conduct further data analyses to determine which components produced statistically significant results between Time 1 and Time 2 for this and future cohorts of IRDL. We also intend to disaggregate the data resulting from this scale to determine which steps in the research process continue to score low post-IRDL for at least some of the participants. All of these results will influence the revision of the curriculum and other institute-related activities for future workshops. Our desire is for every IRDL participant to leave the workshop with a score of 4 (confident) or 5 (very confident) on each of the 38 questions of the research confidence scale. We will continue to test the scale for the duration of IRDL and will eventually conduct analyses to determine if research confidence was a predictor for the completion of their research projects for IRDL participants.

—Copyright 2015 Kristine R. Brancolini and Marie R. Kennedy

Authors' Note

by the Institute of Museum and Library Services (RE-06-13-0060-13).

Endnotes

1. C. R. Hildreth and S. Aytac, "Recent Library Practitioner Research: A Methodological Analysis and Critique," *Journal for Library and Information Science Education* (ALISE) 48, no. 3 (Summer 2007): 254.

2. R. R. Powell, L. M. Baker, and J. J. Mika, "Library and Information Science Practitioners and Research," *Library & Information Science Research* 24 (2002): 49.

3. M. R. Kennedy and K. R. Brancolini, "Academic Librarian Research: A Survey of Attitudes, Involvement, and Perceived Capabilities," *College & Research Libraries* 73, no. 5 (2012): 431–448, doi:10.5860/crl-276.

4. For details about IRDL, see the project website: http://irdlonline.org.

5. A. Bandura, "Self-Efficacy," in *Encyclopedia of Human Behavior*, vol. 4, ed. V.S. Ramachandran (New York: Academic Press, 1994): 71.

6. A. D. Stajkovic and F. Luhans, "Self-Efficacy and Work-related Performance: A Meta-Analysis," *Psychological Bulletin* 124, no. 2 (1998): 240–61.

7. Kennedy and Brancolini, 442–444.

8. Ibid., 434.

9. C. Chavez, "Librarian Research Survey Exploratory Factor Analysis," unpublished report, 2014, available from the authors.