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Working Across Disciplines and Library Units to Develop a Suite of Systematic Review Services for Researchers

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Cover Page Footnote

NOTE This article is based on a presentation at the Congress of Academic Library Directors (CALD) of Maryland, Loyola Graduate Center, Columbia Campus 8890 McGaw Rd., Columbia, MD 21045, April 26, 2019 and a poster at the Mid-Atlantic Chapter of the Medical Library Association Annual Conference, Durham, NC, October 5-7, 2019. ACKNOWLEDGMENTS We extend special thanks to Kelsey Corlett-Rivera, Head of Research Commons, and Antonya Huntenburg, Administrative Assistant, Research Commons/ Research & Learning, UMD Libraries for providing valuable assistance and support in the development and marketing the systematic review workshop series.

Peer Reviewed Article

Working Across Disciplines and Library Units to Develop a Suite of Systematic Review Services for Researchers

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Abstract

Since their inception in the health sciences field, systematic reviews have expanded into many other subject disciplines. To address this growing need, subject librarians at the University of Maryland Libraries collaborated on a pilot program in three phases to introduce researchers to the process of conducting systematic and scoping reviews. This article describes the design and development of a workshop series based on participant feedback. Assessment and evaluation techniques are shared to encourage further refinement of the systematic review service.

Keywords: systematic reviews, research syntheses, librarian as a research partner, research services, expert searching, STEM libraries, participant feedback, participant-centered workshop design, social sciences, humanities, engineering, scientists

Introduction and Background

Systematic reviews proliferated in the health and medical sciences in the late 1990s and recently have grown exponentially.^{1,2,3} Requests

for systematic review services have increased at the University of Maryland (UMD) Libraries in College Park not only in the public health sector but in other subject disciplines as well.⁴ This ar-



ticle describes the development of various collaborative efforts leading to a new systematic review service within the existing infrastructure of the UMD Libraries. Collaborations during this service have been between various subject librarians, librarians from different campuses, library functional units and subject librarians, and librarians and researchers. The service includes three tiered levels of research support and a series of workshops developed based on participant feedback. Benefits and challenges during the pilot phase have been outlined, including training of subject librarians across disciplines and developing a sustainable, collaborative service model. Finally, assessment and evaluation techniques are shared, highlighting efforts to further refine the systematic review service.

Literature review

Scholarly communities are producing more articles every year due to the implementation of more rapid review processes and innovative technologies for research dissemination. To quickly inform best practices and policies, systematic reviews have emerged beyond the health and medical sciences. Systematic reviews involve a rigorous, concise, and transparent process of identifying, critically appraising, and synthesizing relevant findings.⁵ Researchers from other subject disciplines including agriculture, education, engineering, humanities, library science, and social sciences, have also begun to explore ways to compile, analyze, and evaluate the best evidence in a systematic way to inform future practices. To address this growing need for research support, librarians are creating new services^{6,7,8,9,10,11,12,13} following the guidelines created by teams of experts who develop systematic review standards. Systematic review standards that address the librarian's role include the Cochrane Collaboration,¹⁴ the Campbell Collaboration¹⁵ and the Institute of Medicine of the National Academies of Sciences, Engineering and Medicine.¹⁶

Systematic review methodology emphasizes a transparent, structured, and comprehensive approach to searching literature that concludes with a formal synthesis of research findings. Due to this approach, it is necessary for librarians to acquire new skills for every step of the systematic review process in order to meet the needs of researchers. Townsend et al.¹⁷ identified a set of six core competencies for librarians who are involved in systematic reviews:

1. Systematic review foundations
2. Process management and communication
3. Research methodology
4. Comprehensive searching
5. Data management
6. Reporting

Furthermore, Spencer and Eldredge¹⁸ conducted a scoping review of the literature and described 18 different roles performed by librarians and other information professionals that could be easily mapped to the core competencies. These roles include searching the literature, guiding researchers in using technological tools, planning and data management, and more. Ginier and Anderson¹⁹ presented over 60 librarian's roles at the 2017 Medical Library Association Annual Meeting. They grouped the roles in the broad categories of:

1. Project management
2. Support and training
3. Literature searching
4. Generation and delivery of results and data
5. Post-search process
6. Publication process
7. Post-publication process

A recent study by Johnson²⁰ highlights examples of various ways librarians engage with faculty and students to facilitate the research process for their users. The roles described in the literature

provide a useful map for librarians and managers who embark on planning, developing, implementing, and assessing a systematic review service. It is imperative to take into consideration the skills current librarians and informationists have and create a plan for professional development in order to answer specific and more in-depth requests from researchers.

Based on the librarians' skills, time commitment, and job responsibilities, as well as patrons' research needs, Jewell et al.²¹ provide an overview of two different service configurations for offering systematic review services: a team model and a tiered model. Also, several case studies explain various approaches for developing a systematic review service such as a team-based model,²² a fee-based model,^{23,24} strategies for managing the demand for library support,²⁵ contributions and challenges of librarians in the systematic review collaborations,²⁶ and specific recommendations for developing, launching, and promoting a systematic review service to researchers on campus.^{27,28} In addition to this systematic review specific guidance, consulting the *Primer for Managers* by Gore and Jones²⁹ would be the first step for any librarian who wants to build an infrastructure for a successful systematic review service.

Institutional profile

A team of five subject librarians from two branch libraries of the University of Maryland (UMD), College Park, partnered to develop a suite of systematic review services. One branch, the STEM Library, is located on the main UMD campus and provides resources and research support to students in science and technology disciplines. UMD offers more than 90 majors and over 200 graduate degrees through programs within 12 colleges and schools with 40,000+ students, faculty, and staff.³⁰

The Priddy Library is an off-campus branch at the Universities at Shady Grove (USG) in Rockville, 19 miles away from College Park, and meets the research, instruction, and curriculum needs of students and faculty for a range of disciplines including biological and health sciences. Serving around 4,000 students, it offers more than 80 upper-level undergraduate, graduate degree and certificate programs from nine USM institutions on a non-residential campus.³¹ USG has a strong focus on student success and workforce development, and many of the faculty who teach at this campus are adjuncts. Until recently there has not been a focus on research at USG. However, the new Biomedical Sciences and Engineering Education Facility (BSE) opened in fall 2019, and this will bring new research-intensive programs to USG, as well as an increase in tenured and tenure-track faculty.

Phases of the Development of the Systematic Review Services

Launching the systematic review service at UMD Libraries did not happen in isolation. What started as a demand from library users (mainly in the health sciences), continued to spread to other areas of research. Once a need for the service emerged in other subject disciplines, we (a newly formed systematic review team) initiated a pilot program. Many stakeholders were involved in this interdisciplinary and functional collaboration activity, including subject librarians, functional library units, disciplinary faculty, and library administration.

Phase 1: Laying the Groundwork

In order to create a new service, STEM librarians at UMD College Park explored various service models to gain an understanding of the challenges surrounding the planning, development, implementation, and evaluation of a systematic review service. We also took into consideration some of the associated challenges outlined in Gore and Jones³² during this process: training,



mentoring, time commitment, workload, and tenure and promotion.

Professional Development, Continuing Education and Mentoring

Unlike librarians in medical libraries who often have core responsibilities in assisting researchers with literature syntheses, librarians on campuses without a medical school are less likely to offer a systematic review service. However, as systematic reviews become more prevalent in other fields, the needs of researchers are also changing. These changes led to the necessity for the STEM librarians at UMD and USG to acquire new skills. We attended several paid in-person workshops locally and nationally, as well as free and paid online webinars, exploring different aspects of the systematic review process. The financial support from upper level administration was crucial in these training opportunities.

In the summer of 2018, we assembled a systematic review team consisting of librarians with various subject expertise (liaisons to departments in engineering, natural sciences, health sciences, and agriculture) and different levels of systematic review knowledge to collaborate on this effort. This collaboration between subject librarians happened naturally since several UMD degree programs are offered at USG and some UMD faculty teach on both campuses, and the subject librarians often collaborate in other areas of work. Less experienced librarians on the team relied on those with additional training and experience to learn about the systematic review process, while providing specialized knowledge about how reviews and evidence-based information is utilized in their disciplines. Additionally, we consulted with library colleagues who had implemented systematic review services at their institutions at various conferences, monitored LISTSERVs (including expertsearching@pss.mlanet.org and acr-srr-mig@lists.ala.org), and explored the literature related to systematic review services in libraries.

We continue to solicit the experts in the field to gain various ideas on future professional development opportunities.^{33,34,35,36}

Levels of Time Commitment – Tiered Model

Lack of time is one of the main barriers for librarian's involvement in systematic reviews. This is true for the researchers themselves, as well. However, librarians' subject expertise can assist a systematic review team in completing their research within tight deadlines. We sought an opportunity to expand our library services while at the same time factoring in the competing priorities and responsibilities of each member of the research team. The UMD Libraries' are committed to increasing access to information, and we work together to enrich learning and research. We decided against a fee-based service (common in many libraries with greater demand for this service), so we could focus on collaboration and supporting research. To this end, we developed a free, tiered systematic review service with clear expectations for service and collaboration at each tier:

- *Tier 1: General consulting.* In a one-hour in-person consultation, we provide a basic overview of the systematic review process such as developing a protocol, designing a search strategy, selecting relevant databases, collecting and organizing studies, screening the results, or writing the manuscript.
- *Tier 2: Credit given as acknowledgement.* We offer assistance in generating key terms, creating search strings for specific databases, and/or reviewing search strings created by the researcher. The researcher should acknowledge the librarian in the final publication.
- *Tier 3: Credit given as co-authorship.* We develop the search strategy, execute the searching in various databases, manage the resulting citations, prepare them for screening by the research team, and write



the search methodology. The researcher should agree to include the librarian as a middle author.

These expectations offer an overview of the time commitment necessary and provide a base for discussion between the subject librarian and all members of the research team. They also establish the magnitude of the workload and provide a justification for librarians during a professional review process.

Online Resources and Marketing the Service

To promote the service and to introduce the process of conducting a systematic review, we developed an introductory workshop and established an online presence. We created a [Systematic Review LibGuide](#) outlining the systematic review process and the tools needed at every step. This extensive LibGuide complemented the introductory workshop for those who could not attend in person and outlines the UMD Libraries systematic review services. We also created a [website](#) under the [UMD Research Commons Unit](#), which offers a range of research support services, such as statistical consulting, data and text mining, and geographical information systems (GIS). The mode of support varies and includes workshops, customized lectures by librarians, course support, faculty and graduate student research support, and one-on-one consultations. The UMD Research Commons colleagues were instrumental in providing the tools to manage the scheduling process and workshop registration.

To separate the routine research consultation requests from the systematic review inquiries, we developed a separate online form, a [Systematic Review Appointment Request](#), which included additional information pertinent to systematic reviews (e.g. the research question, benchmark articles, deadline for completing the review, etc.). Another form, a [Systematic Review Work-](#)

[shop Request](#), streamlined requests from teaching faculty or research teams who wished to have a themed workshop delivered within their departmental location. We also designed flyers and handouts for outreach at various events.

Phase 2: Delivering the Introductory Workshops

In the fall of 2018, we piloted four introductory workshops at both the UMD and USG campuses. At the end of each session, we distributed a feedback form to gain insight into three items participants had learned, two items they still did not understand, and one item they would like to see in our future programming - commonly referred to as a 3-2-1 Reflection. The feedback was overwhelmingly positive, and participants asked for more discipline-focused workshops, searching strategies, dissertation writing, streaming presentations, video tutorials, and more.

Phase 3: Developing and Delivering a Suite of Themed Workshops

After successfully implementing the introductory workshops during fall 2018 and receiving feedback from participants, the team developed more specialized workshops covering different areas related to systematic reviews. In spring 2019, we offered four workshops on search strategy design, two workshops on tools for systematic reviews and two different citation managers (EndNote® and Zotero). The citation manager workshops were spread out over two sessions. The collaboration between both campuses allowed us to offer these workshops at two locations thus providing flexible workshop times and locations based on the scheduling needs of participants.

The search strategy design workshop was one of the most popular, exemplified by requests for instructional collaboration from two faculty members asking us to spend a class period covering this topic for their students. We continued

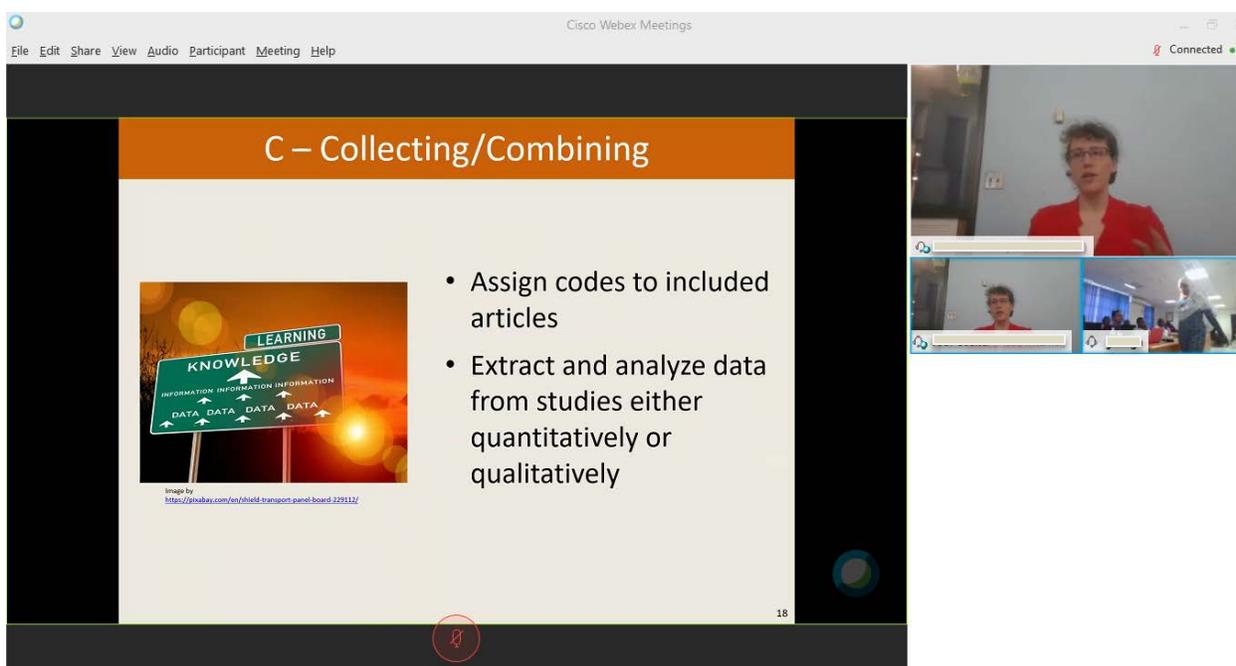


to provide the 3-2-1 Reflection form to participants at our workshops and received further feedback on this suite of workshops.

The suite of workshops expanded beyond the UMD Libraries. Per a request from a coordinator in a research institute from Nigeria, we took our skill-building workshops on the road by providing a webinar to ten international researchers

(Figure 1). They discovered our services through the online training materials we posted on the [UMD Research Commons website](#). They also found that the LibGuide suited their immediate needs. The timing for preparation was just right, as the end of the semester provided some free time for us to focus on reworking the workshop content for a webinar.

Figure 1. A screenshot from the webinar with international researchers via the WebEx platform.



Due to the time difference, we agreed to offer a 2-day webinar with three hours of presentations per day. The international coordinators supplemented the curriculum with their own trainers after consulting with us on the appropriate resources to meet the learning objectives. During the webinar sessions, we used active learning techniques to engage the attendees with the content. Using [Mentimeter.com](#), an open-source web-based application, we invited participants to

brainstorm some keywords for a research question we set up in advance. We walked the group through collaborative work using Google Sheets to transfer the keywords according to the [PICO framework](#). At the end of each session, we invited participants to complete the 3-2-1 Reflection form via Google Forms. Not all participants completed the form after each session, so the numbers below reflect the total number of responses across the entire webinar training.

Measures of Success

Reviewing the registration lists (Figure 2), interest came from many colleges and schools on campus. It is not surprising that the UMD School of Public Health led the list as the subject area most closely relates to medical and health sciences research. Interest in systematic reviews originated from this subject discipline, and due to the close relationship of our systematic review team with respective departments, our liaison colleges also populated the top of this list –

the Clark School of Engineering and the College of Agriculture and Natural Sciences.

A total of 18 workshops in two locations were offered during the academic year of 2018-2019, including a 2-day webinar (3 hours/day) to a group of ten international researchers (Figure 3).

Figure 2. Workshop attendees' affiliations.

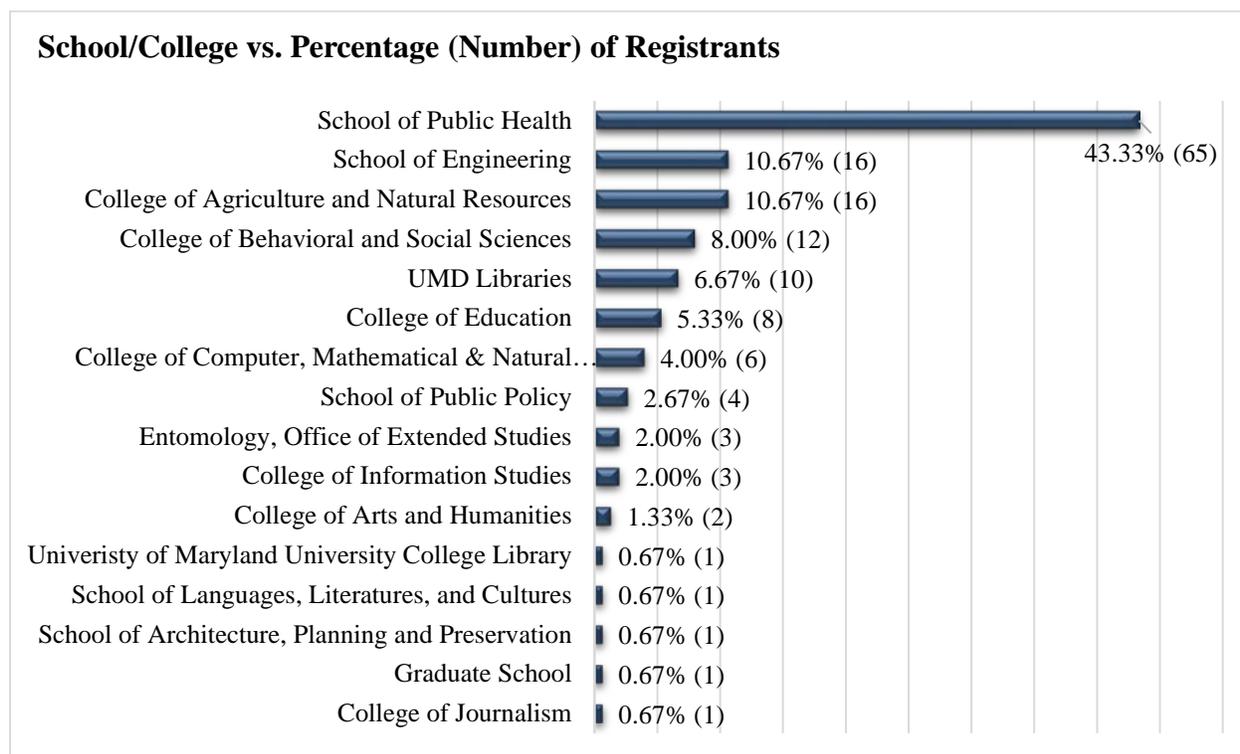


Figure 3. Number of workshops per location.

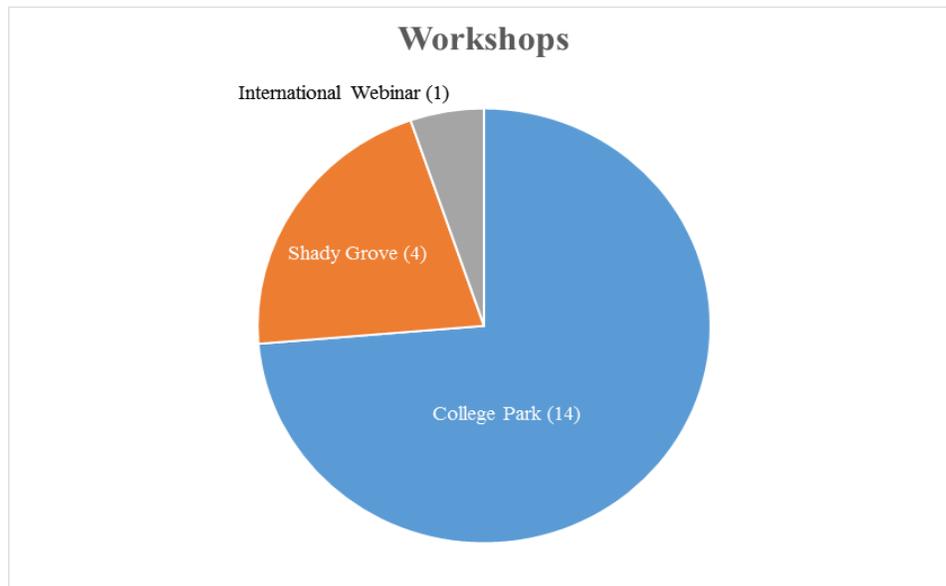


Figure 4. Number of research products.



The workshops were attended by 150 participants, including undergraduate and graduate students, faculty, and librarians with a 75% attendance rate from the registrants' pool of 200. New relationships with faculty were established resulting in three co-authored peer-reviewed publications, four joint projects underway, and one co-authored grant proposal (*Figure 4*). We received eight requests for consultations following, or instead of, in-person workshops. Another 12 research teams inquired via email about research assistance or workshops recordings.

Attendance and use of the service have been higher at UMD than at USG, but in general, workshop attendance at USG tends to be lower for all workshops as they serve a non-residential student body and a smaller overall number of students and faculty. This also makes sense in light of USG's reduced focus on research. However, this is expected to change over the next few years, prompting USG to also offer workshop services. We found that many UMD graduate students live closer to USG than UMD, and so providing workshops in an alternate location is often more convenient for them. Through our collaborative efforts, the UMD Libraries are meeting researchers where they are.

At USG, we attracted two attendees from University of Maryland, Baltimore's School of Pharmacy, one attendee from Montgomery College who is part of the UMD-USG Terp Transfer Program and will be attending UMD's Accounting Program at USG, and one attendee from University of Maryland, Baltimore County's Industrial and Organizational Psychology Program. Other registrants, also at USG, were from the University of Maryland, Baltimore Social Work program, the UMD Information Science program and the University of Baltimore's Simulation and Game Design Program.

Some participants were Ph.D. students who found the systematic review workshops beneficial for their dissertation writing when it came

to designing literature searches, managing findings, and using tools for conducting the research process. Conducting a systematic review at the early stages of their doctoral program allows them to thoroughly and deeply scan the literature. This helps them identify gaps that could be developed into feasible research questions for their final dissertations.

These workshops were beneficial not only to our participants but to our library colleagues, as well. Several librarians attended the workshops to learn more about the systematic review process. Additionally, we advised the UMD Research Commons Unit about how to implement a tiered services model into their own practices for statistical consulting and data management services.

The webinar attendees took away both new tools and knowledge. We utilized a 3-2-1 Reflection form to assess learning: three things they learned, two things they still did not understand, and one suggestion for improvement. Feedback from international participants is highlighted below for each question.

3 Things Learned:

- Better understanding of the complex systematic review process
- PICO framework
- The functionality of Google Scholar and PubMed databases
- Specific searching techniques (phrase searching and truncation)
- Usefulness of free management tools (e.g. [Zotero](#), [Cadima](#), [Rayyan](#))

2 Things still not understood:

- Specifics of database searching and management of search results
- Cochrane reviews

1 Suggestion for improvement:

- Technology issues need to be addressed
- Add structured short periods for practice



- Cover techniques for randomization and blinding studies

Within the 3-2-1 Reflection evaluation form, we also included a section for comments. Participants expressed satisfaction with the webinar and most importantly, they valued the open access resources provided. One participant commented, “Thank you for this question because most questionnaires don’t give this opportunity.” One of the international participants also expressed that the biggest problem for them in an academic institution in Nigeria, is that [HINARI](#) (which gives free access to current high quality journal articles) is no longer available as the economic situation of Nigeria has improved and they have lost eligibility. Overall the workshops were well received, and participants gained skills to assist them in their systematic reviews. This outcome would not have been possible without the collaboration of different librarians each bringing instructional knowledge for their subjects and technical expertise to run a webinar.

Demand for Additional Services

The 3-2-1 Reflection forms were instrumental in understanding the areas where participants needed further assistance. In addition to the themed workshops outlined in Phase 3, participants suggested the following themes to be considered in future workshop designs:

1. *Discipline-focused workshops.* We derived the guidelines and practices for workshop content from the health disciplines. However, much of this could be applied to other disciplines and some disciplines have begun to develop their own systematic review guidelines. Describing these standards for specific departments may be helpful.
2. *Workshops on database searching.* Participants were familiar with Google Scholar

but not with the functionality of traditional abstracting and indexing databases’ search features.

3. *Streaming presentations* for those participants who cannot attend in person, as well as for the international researchers who found our Systematic Review Lib-Guide online and asked us to deliver a webinar.

Various Modes of Collaboration

Collaboration infused all aspects of the development and implementation of this new suite of systematic review services, as shown in the description above. Collaboration occurred between different groups and in different ways, and, overall, the benefits of working together far outweighed any challenges. The initial collaborative group for this project was the systematic review team, consisting of subject librarians from various disciplines and two campuses. This collaboration allowed for each librarian to bring their expertise to this service, with those more knowledgeable in systematic reviews drafting the initial content, while others refined and adapted it to ensure the appropriate application to specific disciplines. This also involved embracing the opportunity to learn new skills from each other. In addition, as demand for systematic review services has grown in a variety of fields, having a team of librarians allowed us to better serve our own liaison populations and distribute the workload. The systematic review team also reached out to other subject liaison librarians and provided suggested email content to be forwarded to their respective departments to help market this new service.

The systematic review team’s partnering with other functional units within the library provided invaluable outreach and marketing support. The UMD Libraries’ Research Commons Unit had already established a robust communications system using the [Springshare.com](#) calendar platform and other tools. Coordinating with



our colleagues from this unit provided us with insight into the pitfalls of the calendaring system and offered valuable advice on how to seamlessly handle the workshop registration process. The Research Commons staff was instrumental in sending out weekly emails to UMD Graduate Student Life, which aims to disseminate information about programs, services, and advocacy for graduate students. Additionally, monthly emails were pushed to our Graduate Student Mailchimp list (with approximately 1,000 members), the campus calendar, heads of graduate programs, as well as to the Graduate Student Government. In addition, the workshops series were also promoted through a system created to link UMD's Living and Learning Communities to the library's outreach and instruction programs.

Faculty, graduate students, postdoctoral researchers, and librarians represent another core collaborative group of this initiative. In response to an increase in requests from various researchers on campus, the collaborating librarians reached out to academic departments through online materials via a [LibGuide](#) and themed workshops tailored to researchers' needs. Instead of offering services without demand, our collaboration and user feedback ensured we offered introductory workshops outlining the systematic review process and asked the participants to identify where in this process they needed more knowledge and training. Through this suite of services, the librarians became stronger research partners rather than simply service providers. By working on various research projects, the librarians gained a better understanding of research being conducted on campus. For certain projects, it has also allowed the librarians to tap into skills and knowledge they have from previous positions or their own research agendas. For example, one librarian on the systematic review team has a background in STEM education and promoting greater diver-

sity in STEM fields. She connected with a psychology professor through this suite of services and is now working on a comprehensive literature review on the female African American student experience in engineering. As mentioned previously, several systematic review standards stress the importance of involving a librarian in the systematic review process. Partnering with librarians can lead to higher quality research outputs and/or greater success with grant proposals. One librarian on the systematic review team received a request to collaborate with a researcher who has had her manuscript rejected by several journals and received feedback from one reviewer to seek out the assistance of a librarian. In several instances, too, librarians assisted researchers in meeting tight publication deadlines through their efficient searching skills.

The faculty-librarian collaboration provides benefits to the faculty but also impacts the professional growth of librarians. Less skilled librarians acquired deeper knowledge on research methods and searching strategies, while more experienced librarians were inspired to deepen their subject knowledge. For instance, one librarian applied for a [Sewell Stipend](#) to offset the cost of attending the American Public Health Association (APHA) conference. This non-library conference exposed the librarian to public health diversity, which is not always obvious when working directly with students and faculty. This attendance allowed for meeting with public health faculty and identifying further research collaborations.

Working with faculty and graduate students is not without its challenges, however. Balancing expectations in terms of what type of work librarians can do, on what timeline, and with what type of acknowledgement is crucial. This also needs to be delineated prior to starting the work. In some instances, given the realities of the life of a faculty member, projects might start, the librarian does months of work on developing and implementing search strategies, and



then the research is dropped due to funding loss, changes in teaching loads, or the emergence of other research priorities. With doctoral students who are tackling a systematic review project, there is a time challenge for librarians as students seek face-to-face consultations several times throughout their research project. Often librarian's work may remain invisible and not acknowledged in students' publications.

As the program grew, encompassing more of the librarian's time, there was some concern from the administration about where the program was heading. In August 2019, administrators charged a task force of four librarians working in the program to determine the scope of other research institution's programs, resources that may be required in the future, and any changes to the program's organization that might be helpful. Recommendations from this task force will help a formal systematic review team better collaborate with fellow subject librarians and communicate both progress and need to administrators.

Conclusion and Future Plans

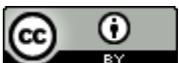
The systematic review workshop series at UMD Libraries has been successful during the pilot phase. The success of this initiative was possible due to various collaborations, particularly with our UMD Libraries Research Commons colleagues, as well as the commitment of the librarians on the Systematic Review Team. This initiative also benefits librarians as it allows for the opportunity to learn about the systematic review process, including the tools and techniques

involved with it. Additionally, it supports creating new relationships with faculty and students, and co-authoring publications and grants.

To explore where this service might go in the future, we held a debriefing meeting and reflected on our experiences at the end of the year. During this session, several ideas came up that will guide our next steps. In the short term, we are planning to explore the development of an online self-paced course within the UMD Libraries' Electronic Learning Management System (ELMS) - Canvas, as an alternative training tool for those participants who cannot attend the in-person workshops. Various factors such as workload, time commitment, and administrative and financial support will play crucial roles in providing this course as an open access educational training to audiences outside the University of Maryland. A long-term goal is to explore the need and possibility to develop a for-credit course. Finally, we will continue to evaluate this service model and make recommendations for future re-alignment of activities based on an environmental scan, staffing needs, space, and equipment needs.

Note

This article is based on a presentation³⁷ at the Congress of Academic Library Directors (CALD) of Maryland, Loyola Graduate Center, Columbia Campus 8890 McGaw Rd., Columbia, MD 21045, April 26, 2019 and a poster³⁸ at the Mid-Atlantic Chapter of the Medical Library Association Annual Conference, Durham, NC, October 5-7, 2019.



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