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Systematic Review Training Model for Education Librarians: A Case Study

Education librarians are receiving an increasing number of requests to help researchers with systematic reviews. Systematic reviews are evidence syntheses that require comprehensive, reproducible search strategies. Many of the available training programs and materials focus on systematic reviews in the health sciences, not education or the social sciences. Therefore, librarians at Texas A&M University Libraries developed and implemented a training model designed specifically for education librarians. The model consists of three components: shadowing, community of practice, and research projects. In this case study, we discuss the model, provide our reflections on the training, and describe how the model can be modified to fit other institutional contexts and social sciences disciplines.

Keywords: systematic reviews; training; professional development; education; social sciences

Introduction

There is a growing need for academic librarians to acquire the foundational knowledge and skills necessary to provide support and to fully collaborate with researchers conducting systematic reviews (SRs) in disciplines outside of the health sciences (Riegelman & Kocher, 2018). While the SR research method is commonly utilized and published in the health sciences literature, the number of SRs published in disciplines outside of the health sciences, and to a greater degree in the social sciences, is increasing each year (Slebodnik, Pardon, & Hermer, 2018).

In particular, the education discipline has seen a growth in the adoption of the SR research method as evidenced in the published literature. A search of ERIC (EBSCO) for journal

articles with either “systematic N2 review” or “meta-analysis” in the title field indicates that publication of these studies began slowly. There was one SR or meta-analysis published during the first decade, beginning in 1976, using these search parameters. From there, the increase is dramatic and accelerating with over 2,000 published between the years 2011-2020.

As education researchers become more aware of the challenges of developing a comprehensive search for a systematic review, education librarians are increasingly being asked to provide support. Librarian support can take a variety of forms, beginning with search strategy development, providing education and general awareness of existing SR standards, management of search results, and ending with participation as co-authors on research teams. This requires education librarians to build on existing expertise and to expand the breadth and depth of our skills.

In our experience, most academic librarians who provide research consultations in disciplines outside of the health sciences receive no formal training in the SR method, also an observation held by Riegelman and Kocher (2018). There are limited formal avenues for social sciences librarians to receive SR training as it pertains to social sciences disciplines. Education librarians could attempt using the training and educational resources offered to health sciences librarians to obtain a general understanding of the SR process, but disciplinary differences require training targeted more specifically to the needs and norms of education researchers. This article contributes to the literature on training librarians to support SRs with an emphasis on education and the social sciences. We present this case study as a model for developing the skills of education librarians to collaborate with researchers, beyond search strategy development, through all aspects of the SR process.

Library context

Texas A&M University is a large flagship research institution in the southern United States with an enrollment of over 64,000 students and employs over 3,000 faculty in the sciences, social sciences, humanities, engineering, and medicine. The College of Education and Human Development has an enrollment of over 6,600 students and roughly 300 faculty. Out of 33 subject librarian positions, three librarians are assigned as liaisons to education departments.

In 2012, one of the medical librarians with experience in conducting SRs, was named Systematic Reviews and Research Services Coordinator. Her primary role is to provide support to researchers conducting SRs in the health sciences. Over the last several years, as researchers from other disciplines on campus began adopting the SR research method, many have sought her expertise.

Initially, the expert SR librarian tried to address the growth of consultation requests outside of the health sciences by having clients meet with their subject librarian for recommendations on database selection and search strategy development. Then, the clients would follow up with the expert SR librarian for a consultation specifically related to the SR process. This practice was cumbersome for all involved and did not adequately address the clients' needs. Additionally, the education librarians began to notice that clients were requesting assistance with what they described as "systematic literature reviews." In fact, as revealed through the reference interview, some clients actually needed to conduct traditional literature reviews with searches undertaken in a "systematic" way in order to find as much of the relevant literature on their topic as precisely and efficiently as possible. With respect to education clients conducting SRs, our consultations revealed that education librarians needed a broader understanding of the SR process, beyond traditional search strategy development, to effectively

provide support. We needed foundational knowledge about the SR process to more fully understand how and where search strategy design fits into and informs the various stages.

The number of requests for SR support from education clients began to increase dramatically each year beginning in 2015. Eventually, requests for consultations reached the point where it was no longer feasible for one librarian to meet the growing demand, both in terms of numbers and subject expertise. Our statistics showed that SR consultations for education clients increased from under 20 in 2012, to over 100 in 2018. It became clear that additional librarians would need SR training in order to meet the growing demand and to provide subject expertise.

Initial training began during fall 2016. The expert SR librarian provided a one-day SR workshop for all interested subject librarians in any discipline. The workshop began with an overview of the SR research method, primarily from the standpoint of the health sciences. Additional topics included the standards available for health sciences and social sciences, some practice exercises, and a description of software applications such as Rayyan (Ouzzani, Hammady, Fedorowicz, & Elmagarmid, 2016), which facilitates the screening of references. Following the workshop, subject librarians were encouraged to continue learning independently by reading from a list of recommended resources such as articles, books, and standards. However, one workshop and independent reading proved to be an ineffective method of recruiting non-health sciences librarians to begin offering SR support to clients in their departments. Workload and position responsibilities did not allow for the additional time necessary to develop skills and experience with the SR process. Another factor was that SR training for librarians was not a departmental priority.

Eventually, with the encouragement of library administrators and a shift in departmental priorities, the organizational culture provided the conditions necessary for us to fully develop a training model for education librarians. In spring 2017, the Director of Evans Subject Librarians at the main campus library joined forces with the expert SR librarian to announce the launch of a SR consultation shadowing program. The program was meant to encourage participation in SR support by providing additional training, beyond a workshop and independent reading. Shadowing of the expert SR librarian during her consultations with clients became the first component of our training model. Additionally, the education librarians created a community of practice, which became the second component, so that we could share our experiences and learn from each other in a supportive environment. During summer 2017, the education librarians suggested that we begin to work on a series of SR research projects together with the expert SR librarian. These projects would become the third and final component of our formal training model. With additional time to acquire new skill sets and a deeper understanding of the SR process, education librarians began conducting SR consultations with clients during spring 2018, while continuing with our training.

Successful training most likely requires several years of subject librarian experience to transition from conducting more traditional research consultations to supporting SR clients. Experienced librarians are in a better position to quickly translate their existing subject knowledge and related database searching skills into those required for the SR process. In our case, each of the librarians participating in the SR training process have many years of academic library experience. The educational psychology liaison has 29 years of academic library experience as a reference and subject librarian in social sciences and education. The liaison to Educational Administration & Human Resource Development has 25 years of academic library

experience as an information technology, media, and subject librarian in social sciences and education. The liaison to the Teaching, Learning, and Culture department has 10 years of experience – seven years as an academic librarian and three years in a medical library, which included involvement with developing a SR service. The expert SR librarian, who provided much of the training and mentoring, has 20 years of experience in academic and medical libraries. This case study explains in greater detail the three primary components used to train librarians to expand SR services in support of education clients: shadowing, community of practice, and research projects.

Literature review

Training is an essential component of preparing librarians to assist researchers with systematic reviews (Knehans, Dell, & Robinson, 2016; Ludeman et al., 2015; McKeown & Ross-White, 2019; Riegelman and Kocher, 2018). While systematic review training for the health sciences is well developed (Ludeman et al., 2015), formal training opportunities to support the development of librarians to collaborate on systematic reviews in education is limited. In the health sciences, both the Medical Library Association and Network of the National Library of Medicine (NNLM) sponsor webinars on conducting SRs. Entire training programs, like the University of Michigan's Systematic Reviews: Opportunities for Librarians (Conte, MacEachern, Mani, Townsend, Smith, Masters & Kelley, 2015) or the former Systematic Review Workshop: the Nuts and Bolts for Librarians (<https://www.hsls.pitt.edu/systematicreview>), are available to assist health sciences librarians develop their knowledge and skills to support SRs. Workshops focused on systematic reviews outside of the health sciences are available (e.g., Minnesota Library Association, 2019), but are not as prevalent as they are in the health sciences. As part of the Association of College and Research Libraries (ACRL), the Systematic Reviews and Related Methods Interest Group

(SRRMIG) is available to offer advice to community members, but they do not have formal training opportunities.

Additionally, health sciences librarians have a robust literature base to draw from to continuously learn and improve their knowledge in regards to SRs. This includes studies focused on databases to search (e.g., Bramer, Rethlefsen, Kleijnen, & Franco, 2017; Burns, Shapiro, Nix, & Huber, 2019), search techniques (e.g., Bramer, Giustini, Kleijnen, & Franco, 2018), development of database search filters (Golder, Wright, & Loke, 2017; Wilczynski & Haynes, 2006), and use of software (Bramer & Bain, 2017). In contrast, the published literature for education librarians includes resources for librarians to review in regards to conducting SRs in the social sciences (Kocher & Riegelman, 2018) and guidance on how to develop a search for a SR focused on education (Campbell, Taylor, Bates & O'Connor Bones, 2018).

The health sciences training and literature can assist education librarians in developing a basic understanding of the SR process, but not all of the content directly relates to the work of education librarians in supporting SRs. Subject-specific support for learning how to collaborate on SRs is needed because of disciplinary differences between the health sciences and education. The primary education database, ERIC, is not structured the same way as MEDLINE, and most of the health sciences training is focused on searching MEDLINE. Expert searching has a tradition in health sciences (Lasserre, 2012), but in our experience, education librarians do not learn how to search the same way medical librarians are taught how to search. For example, medical librarians are taught to search using medical subject headings (MeSH), but academic librarians typically do not emphasize the use of subject headings in the development of all searches. Finding specific study designs in the education literature is more difficult. Research study designs are more varied in the education discipline, and education journal abstracts are not

consistent with how the study design is reported. Although standards are available (e.g., Campbell, Evidence for Policy and Practice Information and Coordinating Centre (EPPI-Centre)), there is no generally agreed upon standard for conducting an education systematic review. This means that researchers sometimes use review types (e.g., systematic, scoping) interchangeably both with working with a librarian as well as in published reviews.

Libraries have taken various approaches to train librarians to support systematic reviews. The University of Minnesota started with in-person systematic reviews training from an expert and embedded training into their service model (Riegelman & Kocher, 2018). Bracken Health Sciences Library used a multi-faceted training approach, including review of search strategies, group in-person training sessions, monthly discussion groups, email discussion lists, group viewing of webinars, and mentoring comprised of observation and discussion (McKeown and Ross-White, 2019). Virtual mentoring has also been used as a method for learning how to conduct systematic reviews (Fyfe and Dennett, 2012). These articles provide descriptions of training approaches but provide limited discussion on how these training approaches meet the needs of education librarians.

Librarian preferences for learning SRs is critical to the success of a training program but has not been fully explored in the literature. Some medical librarians preferred the learning by doing method in which they worked on an SR in order to learn the process (Varman et al., 2015). Mentorship or learning from colleagues with more experience is another training method that librarians found valuable (Fyfe & Dennett, 2012; Nicholson, McCrillis, & Williams, 2017; Varman et al., 2015). These characteristics informed the design of our training model, but the available literature did not provide enough details for developing our own training program.

More education librarians are collaborating with clients on systematic reviews, but our literature review demonstrates that there is limited guidance on how to learn the skills necessary to support systematic reviews in the education discipline. This article describes the training model developed and used at one library to help education librarians acquire the skills and knowledge needed to support and collaborate with SR clients in education.

Training model for systematic reviews

First, we describe how we developed the model and the theoretical basis behind the components. Then, each component of the model is described, and we provide our reflections on how this method worked in our context. Finally, we examine the model as a whole.

Development of the model

Our training model developed out of a need to address the dramatic increase in requests for SR research consultations by clients outside of the health sciences, particularly in education.

Education librarians needed to develop a broader understanding of evidence synthesis methods beyond that required by the traditional literature review consultation. In order to develop the foundational knowledge, skill sets, and self-confidence required to support and collaborate on SRs, we needed a training model that went beyond a one-day workshop and independent reading.

The goal of the training was to move librarians through the levels of systematic review service delivery as described by Foster, Halling, and Pepper (2018):

- Level 1: Educate clients on definition and process of systematic reviews
- Level 2: Develop and report the search including collaborating on review question by finalizing eligibility criteria
- Level 3: Collaborate on determining appropriate review method, design review question, and demonstrate study selection process

- Level 4: Collaborate across all levels of the review process

The process of SRs was defined through the PIECES acronym: Plan; Identify; Evaluate; Collect and combine; Explain; and Summary (Foster & Jewell, 2017). Each of these steps has potential roles for librarians, especially during the planning and identifying steps, which focus on determining the research question and developing a search (see Table 1). We used the Campbell Collaboration MECCIR (Methods Group of the Campbell Collaboration, 2017a, 2017b) standards for searching as these were the most relevant to education and social sciences.

Table 1. Potential roles of librarians across PIECES steps for review process

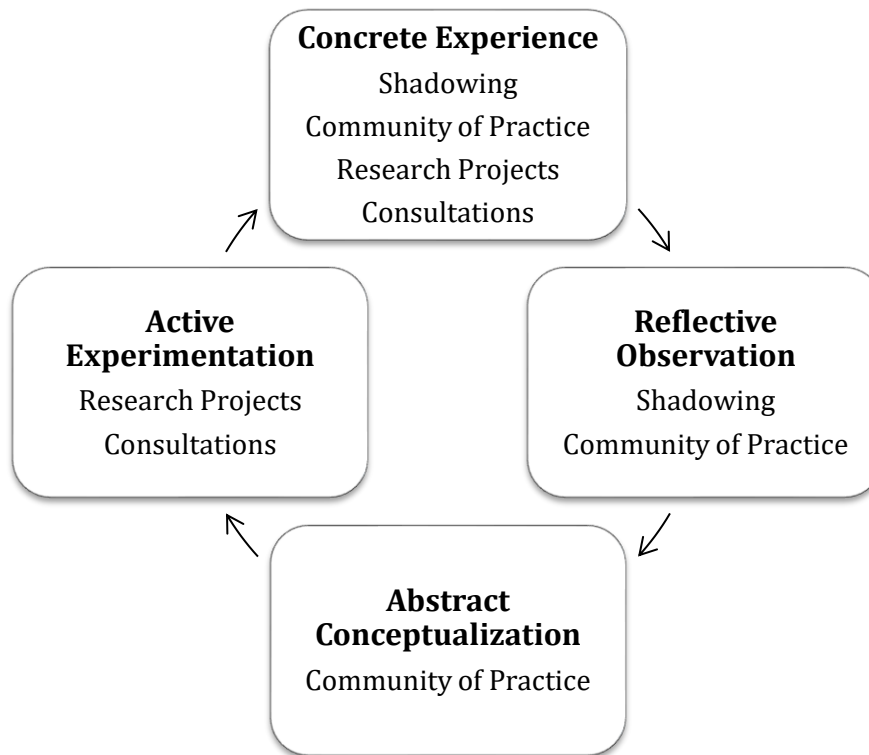
Step	Overview of tasks	Potential librarian role
Plan	Develop research question; Determine scope; Start project management	Conduct reference interview; Collaborate on data plan
Identify	Design high recall search for published and unpublished material to minimize publication bias; Seek cited and citing references of included studies and related reviews	Determine appropriate resources; Develop searches; Download citations and remove duplicates; Update search as needed
Evaluation	Screen abstracts; Select full text studies; Assess risk of bias in study methods	Suggest and/or demonstrate software for screening; Provide list of validated risk of bias assessments
Collect data, combine, and explain	Collect and/or code data from included studies; Synthesize information into tables; Conduct meta-analysis, if possible	Provide potential lists of data elements and/or coding forms; Suggest software for coding and/or meta-analysis
Summary	Report review according to standards; Select appropriate conferences and/or journals to publish in	Write search methods and/or create PRISMA flowchart; Write about potential publication bias for discussion section; Suggest journals; Advise on open access and predatory journal issues

Kolb's experiential learning theory (Kolb, 2014) informed the development of our training model. Learning through the evaluation and integration of experiences is emphasized in Kolb's experiential learning theory (Kolb, Boyatzis, & Mainemelis, 2001). According to the theory, learning occurs through a four-part cycle: concrete experience, reflective observation, abstract conceptualization, and active experimentation (Kolb et al., 2001). Throughout the learning process, the learner has experiences, reflects on their experiences, forms an idea or develops an understanding from their experiences, and then uses their new conceptualizations in new situations (Kolb, 2014).

The training model was originally conceptualized as having one component, shadowing. Two additional components organically developed out of the need to reinforce foundational knowledge and skill development as well as the librarians' learning style preferences. Kolb's experiential learning theory supports the expansion of the training model to include the two components, community of practice and research projects.

The training model and our work conducting consultations align with Kolb's experiential learning cycle (See Figure 1). The three training components and providing consultations offered new concrete experiences. The community of practice and shadowing methods facilitated reflection on our experiences, and the community of practice stimulated the development of new conceptualizations from those experiences. The research projects and providing consultations enabled active experimentation with the ideas developed from the community of practice and shadowing.

Figure 1. Training model alignment with Kolb's Experiential Learning Cycle.



Shadowing

The first component in our training model undertaken by the education librarians involved shadowing the expert SR librarian during her consultations with clients. The shadowing component relates to the modelling teaching method of cognitive apprenticeship, where the learner observes the expert in an authentic situation (Collins, Brown, & Newman, 1987). Shadowing lasted for about a year and a half, beginning summer 2017 and continuing through fall 2018.

The expert SR librarian created a spreadsheet of consultation appointments and shared it with the education librarians via Google Drive. These appointments were often scheduled as many as two months in advance, due to the growing number requests by clients and limited

number of openings in the schedule of the expert SR librarian. She classified the appointments into three categories roughly corresponding to a broad stage of the SR process:

- Stage 1: Planning the scope of the review
- Stage 2: Developing the search strategy
- Stage 3: Processes following the search, such as screening and data extraction

Each education librarian signed up to shadow multiple consultations representing each of the three stages during the shadowing training period. Many of the face-to-face consultations took place at the expert SR librarian's office in the medical library. Some of these consultations were scheduled at an office in the main campus library, which is located near the building where education students attend classes. This arrangement was also more convenient for education librarians whose offices are located in the main campus library. A conferencing software program, called Zoom (Zoom Video Communications, 2020), was used for the remainder of the consultations to offer some clients a more convenient way to meet with the expert SR librarian. This also provided additional opportunities for librarians to shadow when it was not convenient to travel from the main campus to the medical sciences library for appointments.

Outcomes

Shadowing during live consultations allowed the education librarians to observe the practices and techniques utilized by the expert SR librarian as she negotiated the various stages of the SR process with each client. We were able to observe the subtle distinctions between conducting a SR consultation and that of a more traditional research consultation. We witnessed how she conducted the initial reference interview to determine if the client could use the SR method for their particular research question and project or whether the client should employ a related, but more appropriate, type of evidence synthesis. Additionally, we observed how the interview

process was used to define the client's topic in terms of scope and study eligibility criteria. Other observations included the translation of the client's criteria into a search strategy and the documentation process necessary for reporting the search. Finally, we were able to see the ways in which software tools and various strategies were used to efficiently manage the SR workflow.

Strengths and weaknesses

Shadowing, as a training method, presented a variety of strengths and weaknesses. One of the most important strengths of shadowing was the ability to observe how the expert SR librarian navigates, or interprets and applies, the SR standards and guidelines during the consultation. Another strength was the ability to see, in real-time, how the expert SR librarian handles questions that typically are not asked by clients during a traditional research consultation. Some of these questions necessitated educating the client on various aspects of the SR research method or explaining how to execute searching and reporting as required by standards and guidelines. A final strength of this training method was the opportunity to debrief the expert SR librarian immediately following a consultation when questions related to specific situations remain fresh in your mind.

The most important weakness presented by shadowing was that of learning style preferences. Some skills cannot be thoroughly experienced or learned through observation. Another weakness was the possibility of making some clients feel uncomfortable. We noticed that having an additional librarian physically present during the face-to-face consultations made some clients feel uneasy, even though we did not interrupt with comments or questions of our own. Using Zoom was less likely to cause this unease, because the observer is not physically present, and thus out of sight, during the consultation. At the beginning of the online session, the expert SR librarian explained to the client that an additional librarian would be joining the

consultation as a training opportunity. Being an inconspicuous online presence made it much easier for the client to relax and ignore the observing librarian.

Most of the remaining drawbacks to shadowing encompassed scheduling issues, for both the expert SR librarian and the librarians-in-training. Creating a training schedule was very labor- and time-intensive for the expert SR librarian. She must classify each client appointment according to the stage of the SR process and transfer her appointment schedule to a Google Doc for sharing with librarians-in-training. She must also keep the schedule updated in the case of new appointments and cancelations.

Scheduling issues for the librarians-in-training centered around the SR process. For example, even though the appointments were classified into the three broad stages of the SR process, consultations did not usually fit cleanly into three distinct stages. Sometimes the expert SR librarian communicated with the client outside of the appointment structure, usually as a response to an email question posed by the client following a consultation. This meant that some pieces of the consultation process that normally occur during a specific stage were missing and deprived the librarian of observing and understanding the full stage. In most cases, it was not possible to follow the same client through all stages of the SR process due to availability of the librarian-in-training. Another scheduling issue was the ability for librarians to sign up for appointments allowing them to progress from stage one through stage three in a timely manner. Due to differences in the number of clients conducting SRs across the various education departments, at times throughout the shadowing training period, there was a limited number of clients matching each subject librarian's area of specialization. Occasionally, there was a lag of several weeks between appointments with clients that matched a librarian's particular subject specialty. The opportunity to debrief with the expert SR librarian following each appointment

often did not materialize due to appointments running over-time and the necessity of scheduling back-to-back consultations to meet the demand.

Community of practice

For our second training method, we formed a community of practice that met weekly. A community of practice provides an environment for learning about a topic through regular meetings of a group of individuals interested in a topic (Wenger, 2011). The three education librarians and the expert SR librarian were the core members of the community of practice. The education librarians' department head attended meetings when his schedule allowed. The meetings provided an opportunity to discuss issues with SRs, share experiences, provide advice, and learn from each other.

Logistical issues related to the community of practice included deciding on a meeting time and location. Each semester the group discussed the best day and time to have the recurring meeting with the understanding that other obligations, such as instruction sessions, can take precedence. The meeting invite was then sent out as a recurring calendar appointment so that the time was blocked off on our calendars. The education librarians were in the same office area and met in-person in one of their offices. We also had a Zoom link available for any members to join virtually. Throughout the process, we learned that we needed a convener to organize the meeting and notify group members if a meeting was cancelled.

The topics of discussion for each meeting were flexible to accommodate pressing questions and emerging issues. When we first began meeting, our discussions were more like training sessions where we discussed what steps make up an SR, the librarian's role in an SR, the standards and guidance for conducting SRs in education (Kugley et al., 2017), and how to use software programs, such as LibCal (Springshare, 2020) or Rayyan (Ouzzani et al., 2016). LibCal

is an online calendar software provided by Springshare that allows students to book consultations with a librarian. Rayyan is a cloud-based program for screening references. Other discussion topics included our experiences with SR consultations, sharing topics provided by clients, discussing how to develop a search strategy, and reviewing reporting standards, such as PRISMA (Moher, Liberati, Tetzlaff, Altman, & the PRISMA Group, 2009). The Appendix lists other documents we discussed at our meetings.

As we became more comfortable with our knowledge of the SR method, our discussions started to focus on how to develop an SR service. This included what information to provide on an education and social sciences SR LibGuide and what an SR service looks like in our university context (i.e., mission statement, what we would do as part of the service). Another discussion topic related to our role as educators: How do we balance the amount of support given to students working on SRs to meet degree or course requirements? A year after we began our community of practice, we started a shared Google doc to keep an ongoing list of discussion topics for our meetings.

Outcomes

The community of practice provided us with an opportunity to hear what others were doing and reflect on our experiences. As the expert SR librarian has a background in the health sciences, our discussions provided us with a venue to critically discuss what an SR looks like in the education discipline, how this is different from the medical context, and what these differences mean for developing an SR service for education and social sciences disciplines. This sharing of information increased our awareness of the different ways that librarians can contribute to SRs with clients and helped us develop our understanding of the SR methodology.

Strengths and weaknesses

By developing a community of practice, we created a safe space where we could admit the things that we did not know in a supportive environment. The flexibility of our agenda allowed us to accommodate the most pressing concerns. The frequency of the meetings was both a strength and a weakness. Because the meetings occurred weekly, thinking about SRs was constantly on our minds and helped to reinforce learning. On the other hand, scheduling a weekly recurring meeting made it easy to cancel any given meeting knowing that we could continue our discussion the following week without having to reschedule.

This training method had other weaknesses. The level of engagement in SRs varied for each of the departments that we support. Therefore, not everyone had the same number or types of experiences to share with the group. As we were learning from each other, after our discussions we were still left with a feeling of not having a definitive answer. Members of the community of practice were working on other projects together, so sometimes the general SR discussion was co-opted by discussion of our research projects.

Research projects

To experience the SR method, the education librarians worked with the expert SR librarian on research projects that analyzed the search methods in published SRs on education topics. We evaluated the searches based on the guidelines from the Campbell Collaboration for conducting and reporting SRs (Methods Group of the Campbell Collaboration, 2017a, 2017b), which helped us develop a general working knowledge of the Campbell standards. We also used the Peer Review of Electronic Search Strategies (PRESS) checklist to evaluate the searches in published SRs (McGowan et al. 2016). As a team, we worked through all steps of the SR – research question development, search strategy design, screening, data extraction, and reporting.

Outcomes

The research projects provided us with firsthand experience of all stages of the SR process. By conducting our own project, we were able to work through the steps of an SR where a librarian might not typically be directly involved, such as developing the coding form, screening, and coding the articles. This project also gave us the experience of working on a SR team, so that we could better relate to the team dynamics that our clients experience. Additionally, applying the Campbell standards made them more integrated into our practice.

Strengths and weaknesses

The greatest strength of this method was the practical experience in conducting an SR. This experience increased our understanding of what steps need to be taken to conduct an SR and how an SR is written for publication. The group development of the search strategy not only helped us learn how to develop a comprehensive search for an SR, but also techniques and database quirks that each of us knows. Evaluating the search strategies in published SRs on an education topic boosted our confidence in our own ability to develop comprehensive searches for education SRs. Use of the Campbell standards and the PRESS checklist helped guide our evaluation and made us aware of the things that we should pay attention to when we are designing searches for clients. For example, what types of keywords should be included in the search, how keywords should be grouped, and use of proximity operators. While working on the research projects, we had the freedom to make mistakes as we explored and discovered the SR method.

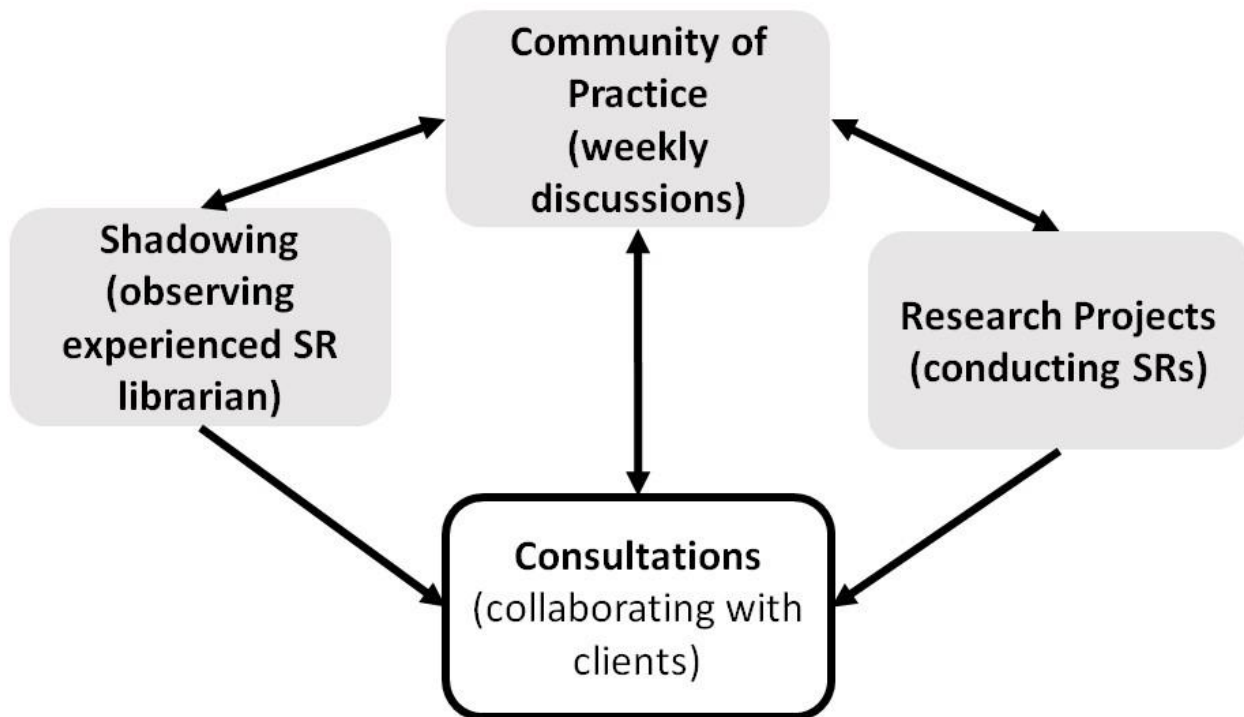
This training method had two primary weaknesses. The first one being the focus of our analysis was different from a typical SR research question because our research project evaluated the search methods used. This meant that we did not have experience developing a traditional SR research question. Additionally, we did a selective appraisal of the included studies, not a full appraisal for risk of bias as one would when adhering to the SR method. The second one being

research projects using the SR method take as long as a typical SR. We spent over a year working on the project from topic development to initial journal submission. While beneficial, this method does not offer quick learning experiences. The need to get an article out for review by a specific deadline has the potential to minimize learning opportunities.

Synergy between methods

Participation in the three training methods simultaneously provided a more complete understanding of the SR method. Developing our own training program allowed for a more personalized approach than would have been possible attending existing programs or workshops. The different training methods allowed the education librarians to view the SR research process from different perspectives. Overall, each method contributed to the others and informed our consultations (see Figure 2).

Figure 2. Synergy between training methods.



Shadowing an expert SR librarian helped us learn the SR method, an expert librarian's perspective, and client expectations. After observing the expert SR librarians' consultations, we could apply what we learned directly to our work with our own clients. If time was not immediately available to discuss the shadowing experience, the community of practice provided a forum for bringing up questions.

The community of practice contributed to our shadowing, research projects, and collaborations with clients. Our community of practice discussions allowed us to talk through solutions to issues that were generated while shadowing and conducting our research projects. For example, we discussed questions about why certain terms were chosen as keywords or the history of the Campbell Collaboration. Additionally, the community of practice provided us with guidance for working with clients and with a forum for asking questions that originated from our interactions with clients as we conducted consultations on our own. We found it advantageous to have this time set aside each week to focus on SRs.

Our experiences working on research projects allowed us to utilize our first-hand experiences when working with clients. The experience conducting SR projects developed our understanding of the SR process, different challenge points in the process, how a librarian can contribute to an SR, and reporting expectations for education journals. Because our research projects were based on SR standards, the practice applying the standards helped us recall the standards when we worked with clients. Discussion topics that were out of scope for our research project could also be brought up during the meeting of our community of practice.

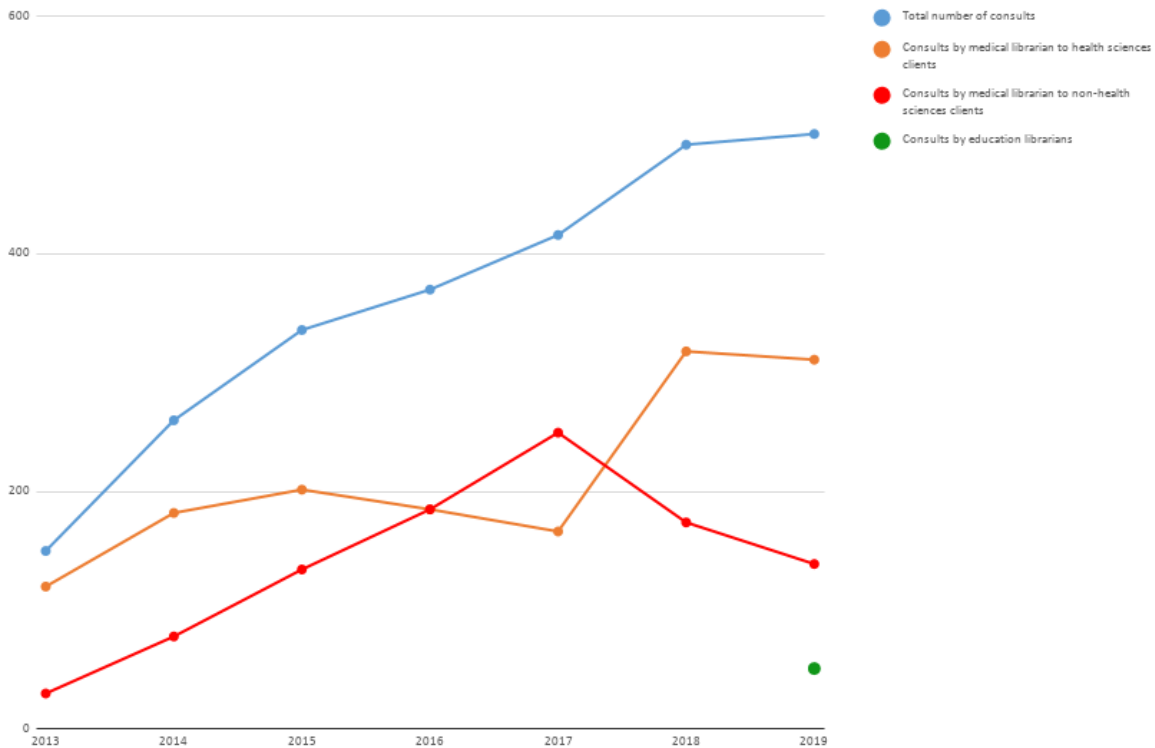
Throughout the training, we were actively providing research consultations and working with clients. Working with clients conducting SRs helped us see what additional things we needed to discuss in our community of practice and consider when planning an SR service.

Knowing that the effort invested in learning about SRs will help students and faculty clients provided a tangible outcome for the training.

The expert SR librarian also gained a great deal from this experience, especially in observing the benefits of the synergy between the various methods. First, in working with librarians outside of medicine, the medical librarian learned more about the education databases and education faculty's research questions. This informed her consultations and searches. Second, questions presented by the librarians and experience gained further informed training sessions given to other librarians. Lastly, ideas for new research projects were generated based upon our collective experience.

After participating in this training, the education librarians had more self-confidence when working with clients on SRs. After using this model for a year and a half, we dropped the shadowing component and continued the community of practice and research projects. These two components will allow us to continue to develop our knowledge and skills as the landscape of SRs changes and develops. Our training has sparked multiple ideas for research projects that we continue to work on. Additionally, the number of consultations for the systematic review service demonstrate that the training resulted in a decreased burden on the expert SR librarian, while increasing services to the education clients offered by the education librarians (see Figure 3).

Figure 3. Number of consultations from 2013-2019 by library.



Practical implications

This training model was developed in our unique context, but aspects of the model can be applied to other libraries. While the training model focused on the education discipline, many of the resources utilized can be expanded to support SRs collaborations in any social sciences discipline. For instance, the Campbell Collaboration (<https://campbellcollaboration.org/>) focuses on SRs relating to the effectiveness of social interventions. In addition to Education, Campbell's Coordinating Groups include social sciences areas such as Crime and Justice, International Development, Social Welfare, Disability, and Business and Management. Many of the same databases used to search the literature on education topics, such as ERIC, APA PsycInfo, Academic Search Ultimate, and Sociological Abstracts, are also used by other social sciences disciplines.

In scaling SR training to the institution level, individual preferences for learning should be taken into account. We valued face-to-face opportunities that were responsive to our immediate needs and concerns, but others might prefer more asynchronous methods. Having some written guidance to read, such as standards set by relevant groups, policies of the service, and handouts for teaching others could help learners who would rather read. A list of links to recorded webinars could be shared with librarians to view on their own time. These resources could then be collected into a toolkit to refer back to as well as a starting point for training new librarians.

Not all libraries will have an experienced social sciences SR librarian, but we believe the shadowing training method could still be utilized with modifications. For institutions that have separate health sciences libraries, the health sciences librarians could be potential partners for learning about SRs. Conducting consultations with another inexperienced colleague and debriefing immediately after consultations can also provide a shadowing experience. Additionally, shadowing can be integrated into the existing SR service. For example, Riegelman and Kocher (2018) incorporated an *apprentice* role that “assists the Lead throughout the entire process and helps develop the search strategy” (p. 24). If there are no experienced SR librarians available at your institution, you can utilize electronic mailing lists, such as ACRL’s SRRMIG, to ask questions or find a mentor. Look beyond librarians, to faculty or student researchers, who might offer the opportunity to collaborate on an SR project.

Another option for developing an SR service is to start small, gradually building upon the basic skills that are familiar to most subject librarians. Rather than training with the goal of supporting the entire SR process, you could start by addressing how to assist the client in the

search stage. Then, as you acquire additional understanding of the SR method and new skill sets, gradually incorporate support for additional pieces of the SR process.

Scheduling meetings and finding time to devote to this initiative can be challenging. The support of administrators for SR training is vital for allowing the program to reach its full potential. Time is not only needed for official training components, but also for reflection on the training. For the community of practice, it is important to collaboratively decide on the frequency of meetings that would work best for the group and the group's goals. Meeting every other week, once a month, or a specific number of times over the semester all can provide dedicated opportunities to learn from each other. When starting a SR research project, discuss timelines in the initial stages, so all team members can plan accordingly. The most difficult part of this training model for the expert SR librarian was finding the time to participate in all of these methods. The management of the shadowing method was the responsibility of the expert SR librarian, since clients contacted her directly for appointments based on her availability. Integrating the management of this training method into her workflow automatically carved out the time for her to participate. The benefit of having more librarians capable of consulting on reviews far outweighed the challenges.

Numerous research questions could be answered by conducting an SR. While we chose to focus on critical analysis of the search methods, any research question could be used as a way to gain experience with all the steps of the SR process. Examining library practice is another avenue for developing SR research questions. For example, library and information science journals have published SRs on information literacy instruction (Phillips, Van Epps, Johnson, & Zwicky, 2018), diversity employment practices (Kung, Fraser, & Winn, 2020), international

students (Click, Wiley, & Houlihan, 2017), and e-books (Blummer & Kenton, 2018). The community of practice discussions were beneficial for brainstorming potential research ideas.

As with learning any new skill, the initial training is only the beginning. More work will need to be done to continue to develop knowledge and skills, especially as the landscape of evidence synthesis methods in education and the social sciences continues to evolve. For us, the community of practice and research projects provided the best way to continue our learning. However, the interactive nature of this model allows librarians to choose which method(s) will provide the best opportunity for continued learning in their unique context.

Conclusion

This model demonstrates a way for librarians outside of the health sciences to learn about SRs. Using three interactive training methods is one approach to developing the knowledge and skills needed to support education clients conducting SRs. This model is flexible enough that it can be modified to work in different library contexts and adapted to different social sciences disciplines. We found this model worked well for our institution and achieved our goal of preparing the education librarians to support the needs of our clients with respect to SR consultations.

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Appendix

Training Resources

The following are standards, guidelines, books, and tools used during our training process.

Standards & Guidelines

- [MECCIR \(Methodological Expectations of Campbell Collaboration Intervention Reviews\) Standards](#) - Standards for conducting and reporting systematic reviews in education and the social sciences; based on and adapted from the Cochrane MECIR standards for interventions in healthcare.
- [Campbell Systematic Reviews: Policies and Guidelines](#) - Guidelines for preparing, submitting, and publishing a Campbell Review.
- [Searching for Studies: A Guide to Information Retrieval for Campbell Systematic Reviews](#) - Guidance on all aspects of the search process.
- [What Works Clearinghouse - Procedures Handbook](#) - Standards for reviewing studies reporting the impact of interventions on education; produced by the Institute of Education Sciences (IES) within the U.S Department of Education.
- [EPPI-Centre](#) (Evidence for Policy and Practice Information and Co-ordinating) - Develops methods for SRs and research syntheses in education and social sciences; based within the department of Social Science, University College London.
- [PRISMA Statement](#) (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) - Minimum set of items for reporting SRs and meta-analyses involving randomized trials and interventions. Consists of a [checklist](#) and [flow diagram](#).
- [PRISMA Elaboration and Explanation](#) - Provides examples and explains the meaning and reasoning behind each of the items on the PRISMA checklist.

- [PRESS Checklist](#) (Peer Review of Electronic Search Strategies) - Guidelines for use by librarians to evaluate search strategies; developed by the Canadian Agency for Drugs and Technologies in Health (CADTH).

Books

- Booth, A., Sutton, A., & Papaioannou, D. (2016). *Systematic approaches to a successful literature review* (2nd ed.). Los Angeles, CA: SAGE Publications.
- Foster, M.J., & Jewell, S.T. (Eds.). (2017). *Assembling the pieces of a systematic review: A guide for librarians*. New York, NY: Rowman & Littlefield.
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Software Tools

- [Rayyan QCRI](#) - Free web application developed at Qatar Computing Research Institute (Data Analytics) to help authors manage, screen, and collaborate on SRs.
- [PRISMA Flow Diagram Generator](#) - template used to generate a flow diagram (graphical representation) documenting the number of citations in the various steps of the SR searching, collecting, deduplication, and screening process.
- [SR Toolbox](#) - a catalog of tools that can be used to support the SR process.

Suggested Further Readings & Resources

These are additional resources that may be of use in learning about SRs.

- Boland, A., Cherry, M.G., & Dickson, R. (Eds.). (2017). *Doing a systematic review: A student's guide*. (2nd Ed.). Los Angeles, CA: SAGE Publications.
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