

Teaching Knowledge Synthesis Methods through Online Research Consultations

A Story of Invisible Labour

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Article abstract

Requests to meet with academic librarians for support on knowledge synthesis (KS) projects have escalated due to an increasing number of learners embarking on KS projects as part of their course work, along with the recommendation in KS methods guidance to consult with a research librarian to ensure a comprehensive search. While there are program descriptions and evaluations of library-led and other KS methods training for groups or self-directed learning opportunities, little evidence examines the teaching practices of academic librarians in individual KS research consultations. The objective of this research is to explore teaching encounters during online KS research consultations and describe the often invisible aspects of that labour through the findings from an online-mediated, focussed ethnographic study. The study draws on data from focus groups, observations and interviews, as well as autoethnographic sources. We use a sociomaterial lens to analyze the stories in the data and illuminate the complexities of the virtual, synchronous teaching encounter between academic health librarians and learners. We present a composite narrative elaborating on the social, technical, and material elements assembled before, during, and after an online KS methods consultation to emphasize the invisible and affective labour of librarian teaching practices about comprehensive searching and KS methods.

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Teaching Knowledge Synthesis Methods through Online Research Consultations: A Story of Invisible Labour

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ABSTRACT

Requests to meet with academic librarians for support on knowledge synthesis (KS) projects have escalated due to an increasing number of learners embarking on KS projects as part of their course work, along with the recommendation in KS methods guidance to consult with a research librarian to ensure a comprehensive search. While there are program descriptions and evaluations of library-led and other KS methods training for groups or self-directed learning opportunities, little evidence examines the teaching practices of academic librarians in individual KS research consultations. The objective of this research is to explore teaching encounters during online KS research consultations and describe the often invisible aspects of that labour through the findings from an online-mediated, focussed ethnographic study. The study draws on data from focus groups, observations and interviews, as well as autoethnographic sources. We use a sociomaterial lens to analyze the stories in the data and illuminate the complexities of the virtual, synchronous teaching encounter between academic health librarians and learners. We present a composite narrative elaborating on the social, technical, and material elements assembled before, during, and after an online KS methods consultation to emphasize the invisible and affective labour of librarian teaching practices about comprehensive searching and KS methods.

Keywords: *academic librarian · ethnography · knowledge synthesis methods · qualitative research · online teaching*

RÉSUMÉ

Les demandes de rencontre avec des bibliothécaires universitaires pour obtenir un soutien dans le cadre de projets de synthèse des connaissances (SC) ont augmenté en raison du nombre croissant d'apprenants qui se lancent dans des projets de SC dans le cadre de leur travail de cours, ainsi que de la recommandation, dans les conseils sur les méthodes de SC, de consulter un.e bibliothécaire de recherche pour garantir une recherche exhaustive. Bien qu'il existe des descriptions et des évaluations de programmes de formation pour des groupes et des méthodes d'apprentissage autonome offerts par les bibliothèques, peu d'études examinent les pratiques d'enseignement des bibliothécaires universitaires lors de consultations individuelles. L'objectif de cette recherche est d'explorer, par le biais d'une étude ethnographique focalisée et médiatisée en ligne, les rencontres pédagogiques qui se produisent lors de consultations de soutien aux projets de synthèse des connaissances et de décrire les aspects souvent invisibles de ce travail. L'étude s'appuie sur des données provenant de groupes de discussion, d'observations et d'entretiens, ainsi que sur des sources auto-ethnographiques. Nous utilisons une lentille sociomatérielle pour analyser les thèmes qui y ressortent et éclairer les complexités de la rencontre virtuelle d'enseignement synchrone entre les bibliothécaires de santé universitaires et les apprenants. Nous présentons un récit composite qui explore les éléments sociaux, techniques et matériels assemblés avant, pendant et après une consultation en ligne sur les méthodes de SC afin de souligner le travail invisible et affectif du travail d'enseignement des bibliothécaires qui se produit lorsqu'ils enseignent les méthodes de recherche exhaustives et de synthèse des connaissances.

Mots-clés : *bibliothécaires universitaires · enseignement en ligne · ethnographie · méthodes de synthèse des connaissances · recherche qualitative*

THE work of supporting knowledge synthesis research is frequently included in academic health sciences librarian job postings, role descriptions, and performance evaluations. The specifics, however, of the instructional labour this work entails have not been detailed in the professional or scholarly literature. The competencies and roles of librarians regarding knowledge synthesis (KS) methods and systematic searching have been explored and described (Spencer and Eldredge 2018; Townsend et al. 2017) and other authors have emphasized the invisible labour that goes into developing and conducting comprehensive searches for KS projects (Ross-White 2021). Nonetheless, little research has been done to clarify the teaching role of academic librarians in relation to the skills that learners use for comprehensive searching in their own academic projects. The first author's doctoral research aims to address this gap by examining the instructional practices of academic health librarians who teach KS methods in online environments.

Many individual librarians have built expertise related to comprehensive searching and associated methodologic knowledge over recent decades, especially

in the health sciences where standards and guidance for systematic reviews have a robust grounding. Numerous publications describe the competencies librarians bring to KS research and training opportunities to build those competencies (Conte et al. 2015; Foster, Halling, and Pepper 2018; Townsend et al. 2017). Similarly, academic librarians' work in information literacy instruction and health librarians' involvement in evidence-based practice instruction are well documented (Alcock 2017; Grabowsky and Weisbrod 2020; McGowan 2019; Nevius et al. 2018; Swanberg et al. 2016; Weightman et al. 2017). Meanwhile, at the intersection of KS methods training and academic health librarians' teaching, librarians have published opinion pieces (Hanneke 2018), program descriptions (Fuller et al. 2021; Lenton and Fuller 2019; Poole 2021), and scans of the environment and literature related to KS instruction (Lee et al. 2021; Parker et al. 2018; Premji, Hayden, and Rutherford 2021). However, little research has been published on the instructional practices and labour of librarians engaged in teaching comprehensive searching and related KS methods skills to learners in academic contexts, suggesting that the nuances of this work may be largely invisible to librarians and library administration alike.

At the same time, acceptance of research syntheses as academic outputs has increased in recent decades, resulting in more frequent student-led KS projects (Cobus-Kuo, Gore, and Kloda 2014; Dotto et al. 2020; Felizardo et al. 2020; Puljak and Sapunar 2017). Since systematic review standards and guidance, such as the Cochrane Handbook and JBI Manual, recognize the search expertise of information specialists and recommend consulting or collaborating with librarians (Aromataris and Munn 2020; Higgins et al. 2019), the increasing trend of student KS projects has led to a corresponding escalation of requests for academic librarians to support learners working on KS projects as part of their program and course work, mirroring the increased demand from other researchers to collaborate on reviews (Campbell and Dorgan 2015). This educational support has traditionally focussed on helping learners build the skills to search databases in a systematic and comprehensive manner, while also touching on elements of project, data, and citation management (Hanneke 2018). Librarians and others have also developed in-person (Premji, Hayden, and Rutherford 2021) and web-based instructional programs related to KS methods and the search skills needed for comprehensive reviews, including webinars, workshops (Fuller et al. 2021; Hayden and Premji 2022; Poole 2021), and asynchronous digital learning objects (DLO), such as LibGuides (Lee et al. 2021), video tutorials, or online modules (Parker et al. 2018).

Though these reviews and descriptions provide details on some instructional interventions, we know little about the teaching practices of librarians when supporting learners working on KS projects, particularly in the online environment.

This gap may be attributed in part to the immaterial nature of much of the work involved in these practices, since teaching KS methods consists of digital and knowledge-based labour of the academic library that has been described by others (Nicholson 2022; Sloniowski 2016).

Immaterial and affective labour have been extensively discussed in the contexts of academic libraries (Nicholson 2022; Sloniowski 2016; Popowich 2019; Allison-Cassin 2020) and others have connected that work to burnout (Demetres, Wright, and DeRosa 2020). Specifically, Demetres and colleagues have examined burnout among librarians who support systematic reviews and found that those who devote the majority of their time to review support and regularly used review management software had lower levels of burnout, suggesting that the ability to explicitly and visibly focus on the necessary skills and have access to supportive technology could be protective factors (2020). Meanwhile, similar to how Huet, Alteri, and Taylor position digital humanities librarians at the juncture of multiple methodologies, disciplines, and embedded digital work in a 2019 special issue of *DHQ: Digital Humanities Quarterly* on invisible labour, academic health librarians teaching KS methods juggle various professional identities and the corresponding effort of communicating their efforts and value both internally and externally to the library. In this paper, we suggest parallels in our work with the conversations about invisible work that Star and Strauss describe as “disembedding background work [consisting of] circumstances where the workers themselves are quite visible, yet the work they perform is invisible or relegated to a background of expectation” (1999, 8:15).

Previously, invisible and undervalued work in medical education, higher education, and academic librarianship has been explored and theorized using sociomaterialist research sensibilities and related theoretical frameworks. For example, Star and Strauss’s concept of articulation work has been used to foreground the invisible labour of information technology staff and others as well as various technologies in the context of distributed medical education (MacLeod et al. 2017). Other scholars have taken advantage of the shift to remote, online teaching and learning in response to the COVID-19 pandemic to ask “the question ‘what does technology do in this class?’ [which] triggered a reconceptualization of bodies, material things, and pedagogic space as a dynamic intertwinement of vital agencies” (Pischetola, de Miranda, and Albuquerque 2021, 16). In the context of teaching in academic libraries, Lihosit argues that academic law librarians can advance the status of their profession and make their contribution to legal education more visible by using the related theoretical construct of Latour and Callon’s Actor Network Theory to build a nuanced understanding of the needs of learners at law school (2014).

We report a web-mediated ethnographic study aiming to expand on the descriptions and evaluations of librarians' efforts in teaching KS methods in order to disembed this background work by tracing the assemblages of social and material actants, mediators, and networks. We address the following research objective: to examine the invisible labour of academic health librarians when teaching individuals or groups on KS methods in online environments by exploring the relationships and networks of librarians, learners, technology, methods guidance, digital resources, academic and methodological expectations, and organizational structures.

Methodology

We report here on select findings from the first author's doctoral research, an instruction-oriented, online-mediated ethnographic study. We use the data collected throughout that study, along with post-human and practice theories (Pickering 2001), to describe changes in the first author's instructional practices as an academic health librarian supporting KS research. Through reflexivity and autoethnographic methods, we present the ways in which the first author's professional practice within the field of study has informed the research plan and subsequent interpretations. We bring together a brief description of the contexts of the doctoral research and KS instructional practices by highlighting the theoretical framework and selected findings from that research.

We present a composite narrative of observed and autoethnographic instructional practices of academic health librarians working with learners who are completing KS projects as part of their academic work. While the larger project examines both group instruction and instruction in the context of individual research consultations, we focus on the latter, since examples of the invisible labour can be more clearly traced through the course of the online consultation for a particular student project.

Research Design

As a doctoral candidate and advisory committee, we planned an ethnographic research study and obtained institutional ethics approval to collect data via online focus groups, observations of synchronous web-based librarian research consultations, and videoconferenced interviews with academic health librarians. We draw mainly on the latter two data collection techniques for this narrative, using stories from Zoom-based interviews with Canadian health sciences academic librarians and memos from observations of online KS research consultations with those librarians and learners. The two videoconferenced focus groups had a total of eleven librarians, who responded to questions mainly related to online group instruction of KS methods, though some references to teaching practices in

individual consultations were considered in relation to this narrative. The overall research design was informed by the tenets of focussed ethnography, drawing on our insider perspective and professional networks to focus the research lens, the questions to be explored, and recruit participants (Knoblauch 2005). Therefore, while formal engagement in the field and data collection was limited to less than a year, interpretation of the data and production of this narrative is strongly informed by over a decade of experience working in the same field and within the context of the research problem. It is with this consideration that we are also influenced by principles from autoethnographic research, drawing on immersion in the field and reflections on personal experience with the phenomenon of investigation (Holt 2003). In particular, having taught KS methods to groups and individuals in a combination of in-person and online environments for over ten years, the first author used the opportunity of her doctoral research to examine in depth the practices she had developed and consider them in relation to the instructional practices observed of, and reported by, other librarian participants in the study. Furthermore, using the sociomaterial research perspective described below, we explored the practices in the context of the various organizational, social, technological, and material elements that affect the teaching encounter regarding KS methods.

Theoretical Framework

We are interested in the instructional encounter itself, rather than learner outcomes or research outputs, and therefore we use a sociomaterialist theoretical framework informed by Actor Network Theory (Fenwick 2010; Latour 2005; MacLeod et al. 2019) and theories of practice (Pickering 2001). These sociological theories, in conjunction with the post-humanist lens of sociomaterialism, shift the research emphasis from individual experiences to the work practices and the networks of human, non-human, material, and non-material elements that contribute to those instructional encounters (Fenwick 2014; Fenwick and Edwards 2011). This weighting of the social, organizational, and material aspects of instructional practices has the potential to illuminate the interplay of power, individual agency, and collective efforts that are involved in the teaching and learning of KS methods (Fenwick and Nimmo 2015). Furthermore, the research perspective in sociomaterial studies focuses on disruptions and breakdowns in the materials, technologies, and practices to help unpack the hidden processes and make visible the invisible knowledge, skills, and behaviours of the work of library instruction (Lihosit 2014). We followed Fenwick's directive regarding sociomaterial explorations in medical education by

attending to minor, even mundane, fluctuations and uncanny slips; attuning to emerging ideas and action possibilities – the intra-actions of ongoing mattering processes; noticing one's own and others' effects on what is emerging; tinkering amidst uncertainty, and

interrupting black boxes of practice to hold open their controversies and disturbances.
(2014, 51)

The observed research consultations were recorded for the purposes of analysis and ongoing reflection. During subsequent semi-structured interviews, excerpts of the recordings that showed complex dynamics between the librarian, learner, mediating technologies, and KS methods were played back to the same librarian participant to elicit video-reflexive ethnographic discussions of the interactions depicted (Ajjawi et al. 2020). With these methodological and theoretical frameworks in mind, we addressed research objectives pertaining to the invisible labour of academic health librarians who teach KS methods, including comprehensive searching, in an online environment.

We tell stories of how librarians share their searching expertise with health sciences learners to illustrate the sociomaterialist complexity of various interactions and relationships (also known as assemblages). The narrative below, produced through a constant comparison approach for qualitative analysis (Booth et al. 2016; Wolcott 1994), elaborates the invisible labour seen through observations of the librarian participants in online research consultations, described in the context of the interviews, and reflected upon in light of the first author's experience of teaching KS methods to learners in an online environment.

Findings: Teaching Encounter Narrative

The following narrative of the research findings draws on the first author's experience as well as the observations of five librarians from five different institutions while they supported eleven learners in eight online research consultations. The narrative weaves together observed practices, quotations from the librarians during subsequent interviews, and reflections on how the theoretical framework serves to disembed the instructional practices of academic librarians when providing online support for learners engaged with KS projects. The findings are presented in subsections based on the sequence of events as they occur for individual research consultations: before the consultation, during the online research consultation, and beyond the research consultation. The role of materials is foregrounded, as they influence the instructional practices, by looking for the frequently unremarked interactions and relational impacts of various technologies at each point in the sequence.

Before the consultation

While the starting point may appear to be the moment when the librarian receives a request for a research consultation, either via email or an online booking system, in

fact the impetus for the meeting is very much a part of the assemblage that impacts other aspects of subsequent interactions. The request for support does not come out of nowhere, although the librarian does not always explicitly know how the learner has become aware that there is a health sciences librarian with the ability and availability to respond to questions, provide guidance, and address uncertainty in the knowledge synthesis process. Through her observations and experience, the first author has seen that perhaps the librarian has worked with other students supervised by the same faculty member, who now regularly recommends that learners embarking on a systematic or scoping review set up an appointment with the librarian who liaises with the department, such as the case of a librarian who had supported a review project on a similar topic in collaboration with the supervisor of the student requesting help. Or perhaps the librarian has an embedded role in a graduate-level course focused on knowledge synthesis and other research methods, teaching one or more sessions throughout the duration of the course, and working with the learners as they build their skills and work towards the course deliverables, as a librarian with 14 years' experience noted during a focus group discussion. In other scenarios, a learner will be directed to, or incidentally come across, the library's knowledge synthesis research guide and will click the integrated scheduling widget that opens the LibCal (Springshare) booking system for all available librarians, as described by one librarian who indicated they pick up two to four appointments per week from the pool of requests. Selecting through the options describing the type of support needed and details about the learner and project, while selecting an agreeable time, the learner navigates through the digital booking system to generate an electronic invitation that goes to their own and the librarian's email and calendar.

Each of these scenarios builds on pre-existing relationships and technological affordances that enable the learner to reach out to the librarian, initiating first (or subsequent) contact. Often that contact is via email, with a cursory request to help the learner in relation to the systematic review they are starting and need to complete before the end of their program, or sometimes before the end of the term. The email request frequently omits details regarding the topic of the research and may identify a limited scope of assistance, such as help selecting search terms. Increasingly, since most libraries and librarians converted their research consultation services to online at the start of 2020, the requests will come in via an online booking system such as Microsoft Bookings or Springshare's LibCal, which is integrated with the librarian's work calendar and email as well as the institutionally supported videoconferencing software, such as Zoom or Microsoft Teams.

To schedule a research consultation, the librarian participants in the study reported either negotiating a time to meet via email or, more frequently, the use of

the online, integrated booking system. In some cases, the learner will send an initial message via email and then immediately be directed by the librarian to the booking system via a link either emailed to the learner or embedded on the library website or library research guide to which the students are directed. Some of the librarians work at institutions with a formal KS support service, which includes an intake form as part of the initial booking process. All librarian participants who used an online booking system to schedule research consultations with students expressed appreciation for how the system saves them time and effort in the scheduling process and decreased confusion about the final time selected or means to connect, as a synchronized invite is sent to both the librarian and learner emails and usually includes the link to the videoconferencing software for the meeting. Thus, the materials (i.e., technology) used for booking replace or reduce the administrative labour previously done by the librarian, which has been shown to often spill over into unpaid time (Clarke et al. 2022).

In addition to facilitating the scheduling, librarian participants reflected on a range of information collected and administered through the booking system that allowed them to (1) do some exploratory work in preparation for the consultation, (2) assign pre-work to the learners in advance of the meeting, (3) track the number and some characteristics of the learners (such as program and academic status), and (4) refer to previous bookings as a reminder in the case of follow-up sessions with the same learner. Some libraries used intake systems that required more extensive details from those requesting support, such as a draft protocol or information about additional team members, while others used the initial contact, either via a standard electronic form or via email, to assign preliminary work to the learners. Examples of preliminary work include requesting that the learner formulate their research question according to the PICO or other format, assigning video tutorials that cover the steps of the review process or searching in various health literature databases, identifying a few example papers that may meet the final inclusion criteria, and drafting a review protocol. While librarian participants reflected on the benefits of having some information about the requester and their project in advance of the scheduled meeting, allowing the librarian to check for existing reviews or do an initial scope of the literature, they also noted that they generally are cautious about putting in work themselves before the first encounter with the researcher.

While discussing the preparatory work she does and what she expects of requestors, one librarian, who supports undergraduate and graduate learners in nursing, psychology, and other health disciplines, commented during the interview that there can be a lot of variation in the level of preparedness of the researcher. Even

in the cases of researchers who have sent a protocol or research question, she noted that she limits the amount of work she puts in prior to discussing the project directly.

I won't do a lot before the first meeting, just because I don't want to . . . trust my interpretation of their email or their contact to a lot of invested time. But . . . I will do a little poking around. And then we'll meet and I'll generally get an assessment of where they are, what they need, how things are going. (Participant 06, interview)

Examples of resources sent to learners in advance of a meeting include a link to a set of questions about the type of review (for example, the website that evolved into the Right Review tool, <https://rightreview.knowledgetranslation.net/>), video tutorials on comprehensive searching (e.g., the Yale tutorial series, <https://library.medicine.yale.edu/tutorials/subjects/systematic-searches>) or tutorials on searching within specific databases (e.g., MEDLINE through Ovid, Embase, or CINAHL through EBSCOhost), and their own or another institution's research guide on knowledge synthesis methods or comprehensive searching (e.g., <https://dal.ca.libguides.com/systematicreviews> or <https://guides.library.utoronto.ca/comprehensivesearching>). Some librarians noted that the opportunity to assign pre-work allows them to assume a baseline level of knowledge and competence going into the first research consult with a new student, ultimately saving time and effort during the time with the student. The librarian phrases the request to review the suite of KS methods resources as an opportunity for the learner to gain an overview of the process they will undertake or, alternatively, as a review of the concepts if they have previously worked on a knowledge synthesis project. For example, during the first focus group, one participant described her response to emails asking for review support.

[I send them] links to the [Yale] video. And then I actually have five questions that I pulled off of the Mayo Clinic's lib-blog. It's like five really simple yes/no questions. And if you answer No to any of the first four questions, you're not doing a systematic review. And it's a really nice, . . . I can send the link to this block—basically it's a box on [the] LibGuide that I can send the link to the box and be like, "Before I meet with you, if you please watch this seven-minute video." (Participant 04, focus group 1)

This incorporation of assigning pre-work and referring the requestor to the materials linked on the library's KS guide reflects the effort to streamline the initial meeting by setting expectations of baseline knowledge and a shared understanding of what methods are essential for systematic reviews.

During the online research consultation

Based on informal conversations with colleagues across the country, the first author's experience, and the responses from interviewees in the spring of 2022, academic librarians are continuing to hold the majority of research consultations

with learners for knowledge synthesis projects in online settings. By the time of data collection in 2021–2022, librarians had adapted to using the videoconferencing software supported by their institution for their research consultations, generally either Zoom or Microsoft Teams. All the research consultations observed as part of this research were held via Zoom (five observations of three librarians) or Teams (three observations of two librarians). Librarians expressed preferences for videoconferencing platforms, some of which did not align with the software supported at their institution. Regarding the choice of meeting platforms, Microsoft Teams can be less functional for people who are joining from outside the institution, such as residents working from hospitals. One librarian noted that offering the option of a Zoom call can facilitate ease of use for the learner, though that also involves additional labour from the librarian to set up and allow screen sharing on both ends.

So then I started offering on my LibCal: just asking whether they wanted a Microsoft Teams . . . meeting or Zoom. And I'd say 50% were fine or would chose Zoom. So providing the option, I think, of something that they're more familiar with . . . it's just a little bit more awkward, because you always have to remember to add them as a co-host so that they can share their screen. (Participant 02, interview)

The first author's experience mirrors that of this participant; she maintains a professional Zoom account with professional development funds for research purposes, but has often sent link to a Zoom meeting through a Teams chat when the Teams connection or functionality on her own or the learner's computer is not sufficient for the research consultation. This readiness to accommodate technological glitches and work around incompatible systems represents another way that librarians expend effort and financial costs on their own initiative to provide support on behalf of the institution, similar to what others have described in academia generally as well as libraries (Clarke et al. 2022; Gray 2022).

From the moment the librarian and student join the call on the videoconferencing software, the research consultation is customized to suit the needs of the learner (Hanneke 2022). When it is a first meeting, the consultation usually starts with either the librarian or the learner recapping the request. This opportunity to confirm a shared understanding of the starting point sometimes leads to a course correction, for example, when the email or booking application included a request for support on a knowledge synthesis project and then the learner acknowledges that they actually need help with a less formal literature search for an assignment or the literature review component of another study. While these types of information requests are not the focus of this research project, their inclusion in the observations reflect the blurred boundaries between the levels of help sought by learners; it is not uncommon for undergraduate or even graduate students to have an unclear understanding of the distinction between knowledge synthesis projects and other literature search needs.

In these initial and subsequent encounters, the librarian must determine the level of understanding held by the learner(s), assess what can be accomplished in the 30- to 60-minute encounter, and decide how to balance sharing conceptual knowledge about KS methods and the goals of comprehensive searching with the technical skills required to develop and run comprehensive searches in electronic databases. In one observed 30-minute consultation with Participant 06, that balance was reflected by approximately half the time spent discussing the overall objectives of the medical student, checking their baseline understanding of the project and the search, and reviewing the material that had been shared prior to the start of the meeting. In this instance, the learner was picking up a project that had been started by another individual working with the same supervisor, and the librarian and learner referred to a previous draft of a search strategy that had been started by that previous student. The consultation then segued into demonstrating some specific skills related to navigating to the database (MEDLINE through Ovid) and looking up the appropriate Medical Subject terms (MeSH). The remainder of the meeting was spent ensuring that the student saw how to combine MeSH and text word terms in the search history and addressing questions about other software to help facilitate the review process, including citation management software and Covidence, a review management software provided by the institution. The latter involved reference to, and showing of, a library guide with information on the software. In the follow up interview, this librarian noted that the library did not at that time provide training or workshops on the review management software, but that referral to the related library guide and the help resources provided by the company seemed to provide sufficient support for learners.

By sharing their screen, the librarian can simultaneously view the library or database website and the student's video feed and, likewise, the student is viewing the action on the librarian's screen directly through the videoconference interface. Decisions about how to balance the instructional session, including the volume and type of content, are frequently made on the fly, in response to often subtle indicators from the learner about their ability to take in more information. This consultation with Participant 06 consisted of a sequential split of time dedicated to conceptual and technical components, whereas other observations involved more integrated shifting of focus back and forth between concepts related to KS methods or search methods and the procedural skills of applying those concepts to the search process. Librarian Participant 01, whose research consultations followed the latter model, noted in their interview that they gauge the capacity of the learner by having the student share their screen and actively apply the search guidance during the consultation.

Watching the student navigate the database interface and conduct the search allows real-time feedback about whether they understand the librarian's instructions. However, the affordances of technology do not always permit an easy sharing of screens in both directions. For example, the first author has noticed that the security settings for learners using Microsoft Teams on Mac computers (the brand of choice of many medical students and residents) lead to challenges for learners to share their screen, resulting in lost time in the research consultation while troubleshooting the technology, such as checking and changing settings or exiting and rejoining the meeting. As a result of these technological barriers, the librarian may revert to sharing her screen and demonstrating the search skills, despite knowledge that best practices are for the learner to "drive" (Hanneke 2022). This illustrates the sociomaterial tracing of how the technology employed can enhance and simultaneously disrupt teaching practices.

In the case of KS consultations that build on previous encounters between the learner(s) and librarian, the meeting will start by picking up where both parties left off, either in a previous meeting or via email. This can look like referring to a shared draft of a search or review protocol and addressing the questions raised by the learner preceding the meeting, often in the booking email or form. For librarians who use a personal booking link, learners will generally book subsequent meetings directly via the booking system. On the other hand, librarians working in systems with a shared booking system may receive a direct email to schedule a follow up meeting, to ensure continuity, or the librarian will assign themselves to the meeting, if possible, when they recognize a learner's name with whom they have previously worked. In response to a clarification question about their centralized request system, one librarian noted that students requesting follow up help may email her directly or "sometimes I'll see someone that I already helped pop up in the consultation forum, then I'll try to grab that one" (P05, interview). Continuity between librarians providing support was not guaranteed despite the affordances of the shared electronic booking system, but Librarian Participant 05 recognized that consistency could make the learner's experience less disjointed than dealing with different teaching styles.

When the librarian and learner have previously met, either in a prior consultation or a group instruction session, the session can begin with a shared understanding of the background, such as the learner's research context, the topic of the project, and the intent of the research. Repeat meetings give more opportunities for the learner to ensure comprehension of the key concepts, report on feedback from meetings with a supervisor or other team members, and scaffold their knowledge and skills with each successive consultation. Similarly, the librarian has a chance to check in on the learner's progress, provide feedback on search strategy drafts, add guidance

related to KS methods documentation, such as the use of PRISMA (Page et al. 2021) or PRISMA-S (Rethlefsen et al. 2021), and reinforce the conceptual linkages between the searching step of the KS process and other stages, such as the research question formulation, screening based on inclusion and exclusion criteria, and the reporting of the review. Throughout the data collected, references to the methods texts and standards demonstrated the interconnectedness of the steps of the review process when a librarian assisting with the search development would draw on documents covering other aspects of the methods.

If the initial meeting was restricted to conceptual instruction regarding the review question, the nature of comprehensive searching, and preliminary collection of search terms, a subsequent meeting might apply the searching skills to build the search for one or more topics in a single database, review the steps of exporting citations and using citation or review management software, and point the learner to resources to help them understand how to translate the search from the first search interface (for example, MEDLINE through Ovid) into a database on a different platform (for example, CINAHL through EbscoHost). Given sufficient time, and if the learner has the capacity, the librarian might demonstrate some steps of the conversion process. For instance, the librarian could show the learner how to find the thesaurus of index terms in the new interface, showing the CINAHL Heading term that corresponds with the MeSH term used in MEDLINE, and illustrating how the hierarchy of terms appears in CINAHL and how the searcher can include the narrower terms, if applicable. To demonstrate the impact of exploding the index term to retrieve citations indexed with the more specific terms, the librarian might show the number of results and review the relevancy of the citations both with and without the box selected to turn on the explode feature. The librarian might also provide an example of the search syntax for searching across the title and abstract of the citations and describe possible justifications for modifying the fields that are searched in a different interface (e.g., searching title and abstract only in CINAHL as opposed to title, abstract, and keyword terms in MEDLINE). In addition, the librarian could illustrate how to test the impact of modifications to the search, either to expand or focus the approach. This is often done by testing the retrieval of known “seed” papers that would meet the inclusion criteria, or by contrasting the retrieval of a broader set against a more precise set using the operator NOT to present the unique articles brought in by the more sensitive terms tested.

Whenever we are making these choices though . . . we should be testing them. So I'll show you how we do that testing of choices. We actually use that NOT operator to test what was the impact of our choice in that search. (Participant 01, observation 2).

In cases where there is not enough time for the librarian to provide a demonstration across multiple search interfaces and as a reference for what has been shown during the meeting, if applicable, the learner will frequently be directed to a combination of learning resources, such as video tutorials, a page of a KS library guide (either at the same institution or an external), or a handout linked from the guide or sent via email showing the search syntax across the commonly used search interfaces at the institution. The student may have attended a workshop that covered the process of searching across multiple databases and interfaces and may be referred to the recording posted to the library KS guide and the handouts used in the group instruction session. Likewise, the librarian will remind the student that PRISMA-S, the guidelines for reporting search approaches and results, requires that the database and the interface be documented and reported in the final manuscript (Rethlefsen et al. 2021).

Beyond the consultation

Referring to other digital learning objects (DLO) and methodological guidance, such as the workshop material or PRISMA-S checklist (Rethlefsen et al. 2021), happens throughout the KS methods consultation and extends the librarian's instructional impact beyond the time spent together. Librarians create, use, and repurpose video recordings and worksheets from workshops, instructional tip sheets and methods handbooks and articles linked on library KS guides, and material from published reviews, protocols, and methodological articles. This requires the librarian to maintain, at minimum, a current awareness of what DLO and methods resources can be found, when they are appropriate to reference, and where they are stored, whether that is in personal files, from their own or another institutional library guide, another website, or to be searched from within a bibliographic database or library catalogue. Further creation or modification of DLOs related to the searching and methods processes may be necessary to customize instruction for learners at their own institution or in response to the institution-specific setup of the databases and search interfaces.

In addition to using and referencing methods documents and other learning resources during the consultation, the librarian concludes the 30- to 60-minute research consultation with directions for next steps, frequently by pointing the learner to the corresponding methodological documentation and additional tools to support their work. For example, when offering to review a draft of the search strategy, the librarian tells the learner how they may capture their search drafts and final strategies in the database in a format that can be reviewed for feedback. The first author has included on her library KS guide some tips for saving search strategies as

outputs from various search interfaces in formats that can be transferred to a Word document. However, another librarian participant's approach was to suggest that a learner could send screenshots of their work:

If you build your search in another database, and you want me to just review how you've put it together with your keywords and everything. And I can take a look and make sure you're understanding all the concepts, you can just email me a screenshot. (Participant 05, observation 2)

Although the first author's request to avoid sending screenshots stems from the added labour required to test the search approach when terms or lines used in the search cannot be copied and pasted, and the fact that screenshots are not generally included for documentation in published reviews, she recognizes that additional effort and instruction is needed to teach learners how to otherwise save their searches. When instructing the learner how to capture the search strategy directly from the search interface for feedback, the librarian may also provide the learner with the tools to accurately generate a search history that can be included in the appendix of the final review, thus meeting the required reporting standards for transparent and comprehensive searches (Rethlefsen et al. 2021). During another observation, the librarian created an Ovid account within the database on behalf of the learner in order to save the search from the librarian's computer that they had worked on together during the consultation (Participant 07, observation).

Finally, the librarian wraps up the KS methods consultation by informing the learner of the means by which they can follow up for further assistance.

I want a gift bag at the end for my researcher. I want them to have a search they can come back to or I want them to have a plan. And that, you know, where are they going to go next? What are they going to look at next? What is the next step? So that's . . . an important part for me. (Participant 01, interview)

That continued support takes place variously through booking again using the online scheduling system, emailing the librarian directly with a request to meet again or with specific questions, or dropping in to the library's in-person or virtual reference support service (Participant 01, observation 1). In contrast to traditional reference consultations, KS methods consultations are frequently part of an ongoing series of engagements with the learner. As one participant noted, they will meet several times with a learner, covering one or a few parts of the advanced searching skills and KS methods knowledge at each encounter.

So it's a lot of—I want to say short meetings, but it's more like 45 minutes with me—talk with me, go away and do something, then come back, and we'll talk about it. And I'll give you the next step. So I do a fair bit of that. And it's been really, really effective . . . in that,

like, you really can't cover everything in one meeting, it's never going to work. And it gives them a chance to process and think and engage with material. (Participant 06, interview)

This ongoing relationship with learners working with KS methods, especially for the first time, is a common characteristic across the data collected for this study. Participants clearly communicated that learners were presented with multiple means of virtual contact and follow up with librarians as they worked through the comprehensive search methods, representing the significance of care and the recognition of the importance of the relationship between learner and librarian. Interviews and observations, as well as the author's teaching practices, emphasized the importance to the librarians that the learner leaves the research consultation with a clear plan of action and understanding of the next steps in the searching and review process.

Discussion

This composite narrative of the processes and practices of academic health librarians engaged in research consultation instruction with learners depicts the myriad of elements that constitute the encounter. With this description and in keeping with sociomaterial research approaches, we put the focus on the materials used and technologies mediating the teaching consultation, thereby pulling the attention away from the individual experiences and perspectives of the librarians and learners to consider the ways that the assemblages of human knowledge and skills come together with and through non-human mediators (MacLeod and Ajjawi 2020). This perspective adds depth to the existing evaluation literature regarding both academic library research consultations generally (Stapleton, Carter, and Bredahl 2020) and virtually (Maddox and Stanfield 2019), while contributing an empirical base to the current conversation around online research consultations (Hanneke 2022).

Our findings support what others have discussed in the context of librarianship and library instruction: consideration for, and care of, the learner's experience of the instruction and the technology adds significant burden to librarian work (Allison-Cassin 2020; McLay Paterson and Eva 2022; Nicholson 2022). We illustrate the many ways that the technical skills and methodological knowledge of the librarian are mediated by the teaching approach, technological interface, and learner expectations. As Gray (2022) has described in the context of university work and the switch to digital teaching and research, the invisible affective labour of ensuring the experience of learning in the online environment is significant and significantly gendered, much as is librarian labour is in general.

Ross-White (2021) has argued that the contributions of information specialists in KS research is frequently taken for granted and invisible and we extend that

claim to the labour of academic librarians involved in teaching learners to search comprehensively. Similar to the emotional work described by Ross-White in regards to navigating research team dynamics, we observed affective labour in gauging learners' often unstated objectives and determining their cognitive capacity for the conceptual and technical skills involved in comprehensive searching and KS methods overall.

Furthermore, as is demonstrated by the methodological content of the research consultations, academic librarians strive to ensure learners can achieve a degree of searching and reporting rigour similar to that of an expert searcher, all in the span of a few hours of instruction. This involves drawing on extensive and often unrecognized labour to create, collect, and communicate asynchronous digital learning objects related to comprehensive searching and KS methods. Similar to the manifesto set out by Huet and colleagues regarding the work of librarians working in digital humanities, academic health librarians supporting learners on KS projects live in the hyphenated world of being a search expert, review technology mediator, teacher, and KS methodologist (2019).

While the descriptions and evaluations of KS methods workshops and courses reflect the pedagogical challenges of teaching this type of content (Hayden and Premji 2022; Parker et al. 2018; Poole 2021; Premji, Hayden, and Rutherford 2021), we have unpacked the complexities of delivering individualized instruction in an online environment and of conveying the highly conceptual and advanced technical processes of comprehensive searching. The literature on library research consultations reflects the ongoing demand for the personalized, task-specific learning that occurs during individual instruction (Fournier and Sikora 2015; Hanneke 2022; Stapleton, Carter, and Bredahl 2020), yet librarians grapple with issues of burnout and competing priorities that impact the time and energy they can commit to supporting KS methods in the face of increasing demand (Demetres, Wright, and DeRosa 2020; McKeown and Ross-White 2019). A key step to understanding what contributes to burnout is unpacking the types of effort involved in supporting KS research. As Clarke and colleagues observe, the trend to put value on library services in general assesses library workers' contributions in terms of quantitative outputs, either of the library or the research institution, renders much of the labour invisible, and conflates a range of types of labour into a single category under salary expenditures (2022). Likewise, control over the conditions of work can impact feelings of burnout. Yet the selection and configuration of the booking system, videoconference platform, and even library databases, are mainly determined at the university or library level, despite the fact that each has significant impact on how librarians and learners engage, both with each other and with the training content.

Impact on practice

Personal impact

Observing other academic health librarians provide KS methods instruction throughout this study has fundamentally altered the ways the first author thinks about and conducts research consultations with learners. By attuning to the less obviously significant, seemingly banal elements of online instructional practices (Fenwick 2014), she finds that she is more mindful of the choices she makes at each step of the encounter and the ways that non-human actors, such as Teams meeting software, the database search interface, and KS standards and methods guidance, impact decisions and actions, in both positive and challenging ways. This, in turn, has offered her the opportunity to consciously select practices among these assemblages, being more aware of possible effects on the learner and their navigation of new skills and knowledge.

Implications for knowledge synthesis support in academic libraries

This research has highlighted numerous aspects of the invisible labour that academic health librarians contribute when supporting learners to apply rigorous methods in KS projects via online, personalized instructional sessions. Thus, much as Lihosit suggested for law librarians in the context of legal research skills, we simultaneously describe and unpack the black box of teaching students KS methods to make this work more visible (2014). This complexity helps to understand the burnout reported regarding KS support in health libraries (Demetres, Wright, and DeRosa 2020) and aligns with the descriptions of invisible and unpaid work done in other areas of digital humanities and academic librarianship (Logsdon, Mars, and Tompkins 2017; Clarke et al. 2022). Academic libraries can minimize these inherent challenges by adopting and leveraging review software, responding to instruction librarian concerns regarding technical barriers presented by teaching and communication software options, and supporting professional development in both online pedagogy and KS methods. Furthermore, experiencing the benefits of reflecting on the first author's own and others' teaching practices has emphasized the importance of having a reflexive community of practice at the intersection of teaching and KS methods.

Limitations and Future Research

Although collecting data for this research through online means was well-suited to both the pandemic era in which the study was conducted and the digitally-mediated nature of KS research itself, it did limit the scope of view allowed by video conferenced interviews and video capture of research consultations. This has particular implications on our ability to observe some aspects of the materiality of

practice, including the physical environment of the participating librarians and any digital work not captured in the screen share or reflected in response to interview questions.

These findings are a selection from a doctoral study that encompasses individual and group instruction. Findings from the ethnographic study related to KS methods instruction delivered to groups of learners will be reported elsewhere, including in the first author's doctoral thesis. Other research building on the rich data available from this qualitative study could survey librarians regarding their instructional practices to get an inventory of a broader cross-section of academic librarians from more institutions across Canada and beyond.

Conclusion

This narrative has shown how the levels of technological and pedagogical complexity in the online KS research consultation interact with the content expertise shared by the librarian in ways that are not entirely within the librarian's control. For example, in order to facilitate booking individual research consultations, a librarian may set up an online booking system linked to their virtual calendar so that learners can self-select from available times. The system then automatically generates a videoconference link embedded in a calendar invite. When librarians or learners, respectively, share or discover the booking link, meet through a videoconference platform, demonstrate or observe search techniques in various online databases, and recommend or follow searching and documenting practices, they interact with dozens of material (e.g., technological and textual) actors while affecting and responding to numerous social constructs.

With this paper, we add to the scholarly literature concerning how, in the context of KS methods, academic librarians contribute invisible labour through instructional practices, navigating organizational systems, and exploring the sometimes competing identities of expert searcher and teacher. Librarians who provide this type of instruction maintain content expertise for the search and overall review methods, including staying aware of externally-produced educational resources and methodological guidance, while simultaneously remaining agile to accommodate the learner's specific needs and any limitations or disruptions from the teaching and review technologies. By walking the reader through the processes and introducing the social, technical, and material actors involved when a librarian meets virtually with learners in personalized research consultations, we highlight the complex dynamics and inter-relationships between the various influencing factors.

ABOUT THE AUTHORS

Robin Parker, MLIS, works at the WK Kellogg Health Sciences Library as a liaison librarian for the Faculty of Medicine at Dalhousie University and she is the Evidence Synthesis Librarian for Dalhousie Libraries. Currently an Interdisciplinary PhD candidate finishing her dissertation, Robin's research explores academic health librarians' contributions to teaching and supporting evidence synthesis research. Robin lives in Kespukwitek, a district of Mi'kma'ki along the Bay of Fundy and is grateful to live in the rural community where she was born on the traditional and unceded territory of the Mi'kmaq people. In consideration of the Treaties of Peace and Friendship signed in Mi'kma'ki and our collective responsibilities as Treaty people, Robin encourages researchers to incorporate disparate voices and types of knowledge into evidence syntheses and to include those impacted by the issues we research in the entire research process.

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