A collaborative assessment: Evaluation of an advanced searching workshop

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Abstract

The University of Alberta Library (UAL) offers a systematic review searching workshop, primarily attended by health sciences graduate students. Despite high attendance, librarians noted a recurring pattern of students seeking one-on-one consultations to cover content already provided in the workshop. In response, the Health Sciences Librarians collaborated with the newly established Assessment and Insight Team (AIT) to evaluate the workshop's instructional design and identify gaps in student learning.

This assessment, conducted from October 2022 to March 2023, used surveys and knowledge checks to evaluate participants' retention of workshop material and delivery preferences. Results showed that students preferred virtual synchronous sessions, with fewer, focused lessons. However, gaps in practical application persisted, particularly in translating learned skills to real-world projects.

Informed by these findings and a literature review, key changes were implemented. The workshop series was reduced from four to three sessions, with a stronger emphasis on core search strategies. Asynchronous resources were also revamped using Articulate 360, enhancing accessibility and learner engagement. The redesigned workshop aims to decrease the need for repetitive individual consultations and better support student learning.

This project underscores the importance of continuous assessment in academic library instruction and highlights the evolving role of librarians in teaching complex research skills, such as systematic review searching.

Topics/keywords (3-5 keywords): collaborative assessment; systematic review; advanced searching, online learning

Introduction

Non-curriculum based instructional library workshops at the University of Alberta Library (UAL) are conducted frequently throughout the year and are open to all members of the university community, predominantly staff, faculty and students. One of the most highly attended of these workshops is a multipart monthly workshop series that introduces systematic reviews and searching skills required to support these types of projects. Attendees are mostly graduate students in the College of Health Sciences which includes the Faculties of Kinesiology, Sport and Recreation, Medicine & Dentistry, Nursing, Pharmacy & Pharmaceutical Sciences, Public Health, and Rehabilitation Medicine. The purpose of the workshop is to teach foundational skills necessary to complete a systematic search, including how to design, execute, and report a robust, comprehensive search strategy appropriate for publication in a systematic or scoping review. However, despite the regular delivery of the workshop and high attendance throughout the year, as well as availability of accompanying online asynchronous lessons, librarians were consistently being asked by students to meet for research consultations that addressed the same content within the workshop. As a result of this, the Library's Head, Faculty Engagement (Health Sciences) approached the newly formed Library Assessment and Insight Team (AIT) to engage in a project that asked the question: Why do students who attend the systematic review and searching skills workshop not retain the content they are being taught? A subteam was struck and a plan to evaluate the delivery method and content of the workshop was designed and implemented. The results of this evaluation resulted in a restructuring of the workshop to address the evident learning gaps experienced by the workshop students so that they could initiate their search strategy without first consulting with a librarian.

The request to evaluate the instructional design of this workshop came from the Geoffrey & Robyn Sperber Health Sciences Library. They sought a collaborative approach to evaluate the workshop's instructional design, and potentially the teaching effectiveness, and perceived impact for attendees. A small working group with two members of the AIT and two health sciences librarians was established to conduct this assessment project. The request came shortly after AIT had formed, and would mark the team's first collaborative assessment project. As such the project also served as a pilot for how cross collaboration between the AIT and library units could function.

The development of AIT was part of an organizational shift within UAL to a team based structure. AIT's mandate is to support responsive, evidence-based decision-making practices at all levels of the library. It is a cross-functional library team that seeks to demonstrate the value of library services as a key part of the campus community and student experience. The inclusion of the word "insight" into the name of the team was deliberate in order to underscore the importance of assessment in the library's decision making process.

Prior to this assessment project, the workshop consisted of four one-hour synchronous sessions offered on consecutive days in a single week and the workshop series was offered each month. Pre-Covid, it was offered in-person in a computer lab close to the health sciences library and accommodated about 20 attendees per session. Following the restrictions implemented during

the pandemic that forced all teaching and learning activities online, the workshop series was delivered online using the video conferencing software, Zoom, and could accommodate up to 300 attendees. Additionally, an asynchronous online module was developed during the pandemic and made available for anyone to access should they not be able to attend the workshop or needed to access information afterward. The asynchronous module was made up of several video recordings of content covered during the synchronous workshop sessions and was also supported by various library guides on systematic reviews. After 2020, the workshops averaged 900 registrations per year, although the online asynchronous module saw little use. Despite high workshop attendance rates and readily available resources on the topic, health sciences librarians still conducted a large number of one-on-one consultations with researchers completing systematic review searches. During consultations, librarians noticed that they were discussing nearly identical content to what was covered in the workshop, making them repetitive and time consuming. Additionally, these consultations often seemed unproductive since there was not always sufficient time for librarians to include the design of the search strategy for the review during a one-hour appointment, leading to multiple consultations for a single project. It was clear that an assessment of the workshop's instructional design and the teaching effectiveness was necessary.

The working group outlined three main goals for the project:

1. Determine how well students were learning the foundation skills required to conduct the initial steps of a systematic search as part of a larger systematic or scoping review
2. Determine the delivery preference for learners
3. Understand the knowledge gap between the theory of advanced searching and the application of this information to complete a systematic search

Literature Review

The literature on librarians teaching advanced searching skills for synthesis review projects has been growing in recent years, reflecting the increasing role of academic librarians in supporting these projects in higher education settings. These types of projects are increasing across disciplines, however they remain especially prevalent in the health sciences. A review of the literature exposed several themes: the expanding role of the librarian, creating partnerships with faculty, pedagogical approaches, student skill development and capacity building, impact on research quality, and technology integration.

Since the development of synthesis reviews, librarians have often been involved with these projects in some capacity. Librarians are frequently collaborators or co-authors on these projects, working with the research team to conduct the searches and ensure accurate and transparent reporting of the strategies employed. Librarians also frequently offer one-on-one consultations with researchers who are working on knowledge synthesis projects. Sometimes these are researchers, but increasingly, graduate students have been heavy users of consultation services. Lenton and Fuller provide an example of this at the University of Toronto where graduate students are strongly encouraged to include a knowledge synthesis review as a component of their theses.[1] This resulted in many one-on-one consultations where students

clearly had no formal training in synthesis review search methods, something that has been frequently noted at several institutions.[2] Several studies noted that librarians are increasingly offering instruction on topics beyond their traditional role as an expert searcher, rather they are also frequently called upon to instruct learners about the whole methodological process of conducting a synthesis review.[3]

One limitation of the literature on librarian instruction is that it often centers around descriptions of programs and assessments of instructional services or initiatives;[4] this limitation holds true in the realm of synthesis review searching instruction. There are a variety of approaches highlighted in the literature - workshops (with and without credit), for-credit courses or classes, one-on-one instruction in the form of research consultations, online (live and asynchronous delivery), in-person, flipped classrooms, videos, tutorials, and so on. However, there is a distinct lack of literature identifying formal pedagogical frameworks or approaches employed by librarians teaching synthesis review searching - akin to the *Framework for Information Literacy for Higher Education* from the Association of College & Research Libraries (ACRL).[5] This sentiment is echoed by Bradley-Ridout et al. whose recent study exploring librarians' practices when teaching advanced searching for knowledge synthesis found that "librarian's application of formal pedagogical approaches while teaching knowledge synthesis may be under-utilized, as most respondents did not report using any formal instructional framework".[6] Bradley-Ridout et al. go further to explain the inherent problem with this particular gap, "[s]earching for evidence to include in SRs involves unique skills that correspond with, but do not exactly mirror, fundamental information literacy (IL) skills for general information retrieval nor evidence-based practice (EBP) skills of finding, evaluating, and integrating research evidence into clinical practice".[7] Focus on program descriptions and evaluations tells us *how* we might conduct an instruction session, however they offer limited understanding as to *why* certain programs are successful or not.[8] For example, the literature suggests that the following topics are frequently incorporated into librarian-led instruction for synthesis review searching: understanding the difference between review types; tools and resources for proper reporting and management of the review; strategies for turning research question into searchable question (PICO); development of inclusion/exclusion criteria; selecting databases to search in the review; structured method for developing search strategy including use of controlled vocab, text words, and advanced search techniques; apply the search strategy in OVID Medline; translating searches to other databases; grey literature searching and supplementary search techniques (eg reference list searching); search documentation and reporting according the guidelines, such as PRISMA and PRISMA-S.[9]

In addition, as highlighted by Campbell, Kung & Dennett in 2016, literature focusing exclusively on the search skills instruction for synthesis review projects is sparse.[10] Teaching search skills development is often bundled into workshops or courses that explore the entire methodology of a synthesis review - of which searching for evidence is just one component. A scoping review by Premji et al. explored how knowledge synthesis methods are taught to students from various disciplines and institutions across the globe.[11] This review found that the most taught step of the synthesis review process was "searching the literature" which all 17 included articles touched on. However, librarians were not the only ones teaching this content, frequently faculty and

teaching assistants (TAs) were involved in delivering this content, sometimes assisted by a librarian.[12]

Literature on best practices for delivering advanced searching skills training, specifically the skills required for conducting knowledge synthesis review searches and important topics to ensure are included in the instruction is emerging but remains fairly limited. This review highlighted that common assessment methods of student learning for workshop style instruction sessions included pre and post tests, as well as post-workshop reflection questionnaires.[13] However, it should be noted that several studies included in the review also lacked any form of assessment of student learning for the workshop.[14]

We also identified literature that focuses on one-on-one consultation instruction.[15] This is a common method of providing education about synthesis review search methods to researchers, however it is outside the scope of our analysis since we were focused on group based instruction.

Methods

This project was conducted between October 2022 and March 2023. The working group decided that they wanted to try and evaluate the workshop series in two ways: 1) assess student learning and practical knowledge applied after attending the workshop; 2) assess student learning of skills taught during the workshop and evaluate delivery preferences and content retention of learners. The theory behind assessing the knowledge of prior workshop attendees was that this group may have had a real chance to practically apply the skills taught during the session as many students who attended would have completed their assignments or protocols where the skills were needed

The AIT members of the working group conducted a brief literature review that guided the development of an assessment approach. The team identified best approaches for conducting an assessment of learning while being conscious of making the workload manageable for librarians delivering the workshop series. As well, it was important to consider what data would be most meaningful to librarians after the assessment so that decisions could be well informed by the evidence collected. The assessment strategy was survey based and comprised of three parts:

1. A post-test style survey was used to assess the learning of attendees who took the workshop in the three months prior to this assessment project (August to October 2022). This survey included "test your knowledge" style questions as well as questions about demographics and mode of delivery preferences.[1]
2. In class problem-based learning style quizzes were delivered at the end of the daily workshop sessions January to March 2023, and data was collected to determine which concepts learners were struggling with and which were clear. These quizzes took

[1] See Appendix 1 for survey instrument

approximately 5 minutes for learners to complete and were promoted as a good way for learners to test their own learning during the sessions.[2]

3. A follow up survey was distributed to attendees who attended January to March 2023. The survey asked questions about demographics, mode of delivery preference, and "confidence" with skills taught at the workshop. These confidence questions were adapted from *Fresno Tests* and "researcher-readiness" assessment literature.[16]

Surveys were distributed using the survey software, Qualtrics and daily quizzes were implemented using Google Forms. Assessment had been done for the pre-covid in-person version of this workshop series however it focused on satisfaction with the workshop rather than measuring if attendees had learned cores skills

Results

Data gathered included results from a survey distributed after each of the instruction sessions, as well as knowledge checks completed within the instructional sessions.

Survey results

Of a possible 51 respondents, a total of 24 answered some or all of the survey questions. All questions were optional and therefore the number of responses is not consistent across all questions.

A total of 15 respondents answered the demographic information in the survey. Of the respondents, eight were graduate students or postdoctoral fellows, two were faculty members and five were 'Other' (research assistant, academic staff, research associate). Eight of the respondents were from the Health Sciences Faculties, four from the Social Sciences, two from Natural and Applied Sciences and one from 'Other'. The role and faculty affiliation are as we would expect for the course, and consistent with previous review of attendees. A slight majority (53%) had completed a systematic, scoping or other type of review previously while 47% had not completed any type of knowledge synthesis review. It was somewhat surprising to know how many attendees had completed knowledge synthesis activities previously.

Format preferences

Of 24 responses, the greatest number preferred virtual synchronous instruction (n=10) as the mode of delivery, followed by hybrid (n=6), virtual asynchronous (n=3), Face to Face (n=3) and lastly, a flipped classroom approach (n=2). Shorter (one-hour) sessions spread out over a single week were noted to be preferable (n=13), compared with a longer 3-hour session (n=3) or 1 hour sessions over a longer period (n=1). Respondents were evenly split in either not knowing about the asynchronous SR modules (n = 6) or not reviewing them either before or after (n = 6). Two respondents said that they reviewed the asynchronous modules before the workshop and only one respondent reviewed the modules both before and after the workshop series. It is not surprising that the many respondents did not know about the asynchronous modules as they

[2] See Appendix 2 for daily knowledge check questions

are not heavily promoted. Many respondents (8) indicated that they preferred to have learning materials (such as slides and handouts) made available ahead of time, which is interesting given that a flipped classroom approach was the least preferred mode of instruction.

Confidence check

Of 13 responses to this section of the survey, the majority of respondents either somewhat agreed (n = 7) or strongly agreed (n = 6) they were confident they would be able to develop a structured search strategy using PICO and Boolean operators. Ten respondents said they were somewhat confident in selecting the most appropriate research methodology to suit their research question and only two said they were strongly confident. Most respondents said they were either somewhat (n = 6) or strongly (n = 5) confident that they would be able to develop a comprehensive search in Medline and complete necessary database translations. The majority of respondents said they felt somewhat (n = 7) or strongly (n = 6) confidence they would be able to transparently report their search process and strategy in accordance with PRISMA-S.

Knowledge checks

The number of responses decreased each day due to fluctuating attendance during the week, which is typical of the attrition noted previously during multi day teaching sessions. From the daily knowledge check quizzes, overall the responses demonstrated a stronger understanding of the technical aspects of searching, such as truncation and Boolean logic compared to the more complex or theoretical concepts covered. For example on Day 1, 88.6% of respondents correctly identified the correct use of truncation, 80.4% correctly identified the appropriate Boolean operator to use, and 84.3% identified the correct Boolean operator within a search string. This compares to 56.9% correctly identifying whether a research question was appropriate for a systematic review and 66.6% correctly identifying a source to search for systematic review protocols. There were two questions with a notably high number of incorrect answers: one question related to the inclusion of subject headings (MeSH) in the search strategy (36.1% correct) and the other was about selecting the most appropriate review methodology for a research question. This was not unexpected as Sperber Librarians frequently discussed both of these concepts during one-on-one research consultations.

Comparing the confidence questions to the knowledge checks, there is some inconsistency noted. Respondents felt confident in creating a Medline strategy, whereas only 36.1% were able to accurately identify which field the MESH heading was located in. Similarly, the majority felt confident that they were able to identify an appropriate methodology for their research question, but identifying the most appropriate review type was one of the most poorly answered knowledge check questions. This does call into question the utility of confidence questions to assess learning, as learners may overestimate their knowledge, or there may be acquiescence bias at play.

Discussion

The results of this assessment were helpful to inform evidence-based changes to the systematic review searching workshop offered by librarians at the Sperber Health Sciences Library. Based

on the data collected for this project and data collected from the literature review, the following recommendations were implemented:

- Maintain virtual synchronous one-hour workshops as the mode of delivery. Our results strongly showed that attendees preferred a virtual delivery format for this type of content and that continuing to offer these one-hour sessions in the same week was preferred. This is understandable as many attendees were graduate students and researchers who are often off-campus during the week so attending sessions in-person on-campus is less convenient. One challenge librarians may have to contend with in the future is how to incorporate hands-on learning practice into this format.
- Reduce the workshop series from four days to three. From our literature review, it was noted that similar search skills workshops cover content in just three sessions,[17] therefore making the teaching load more manageable for the librarians delivering the workshop. To achieve this, health sciences librarians used data from the confidence and knowledge checks to redesign the curriculum by realigning content and removing extraneous pieces on the systematic review method more generally. The workshop content is now highly focused on the process of conducting a systematic search.
- Learning materials are distributed ahead of the session and supporting resources are made available after the workshop series is completed. Feedback from attendees indicated that it was highly preferable to receive handouts and slides ahead of the workshop sessions. Additionally, one workshop series per term is recorded and these recordings are made available to learners after attending.

Further, the lack of awareness and use of the asynchronous modules led health sciences librarians to completely revitalize and update this content to make it more accessible. The asynchronous modules assessed in this project were a collection of video recordings and library guides that were not well integrated into a single platform which made for a confusing user-experience as users had to jump between the videos and supplement with resources from the library guides. Librarians recognized that the content covered in the three-day workshop series is very complex and many of the skills taught at the workshop benefit from supporting materials that provide additional explanation, reference, or demonstration. The asynchronous modules had many links to essential reference material such as various handbooks, reporting guidelines, and other documents that support systematic reviews and systematic searching and could be made more readily utilized if included in a single asynchronous search skills tutorial. Additionally, an asynchronous search skills tutorial could be used to support learners at their point of need and allow those learners who are unable to attend the workshop series due to scheduling reasons to access this valuable content. Additionally, it could be used by librarians as a teaching tool during their one-on-one research consultations or to prepare students for these consultations and make meetings between students and librarians more productive. From the literature review, we found this approach was implemented by [cite] with success. To complete the refresh of the asynchronous search skills tutorial, librarians at the Sperber Health Sciences Library have worked with a new career librarian who is part of the "Library Resident" initiative at UAL. The library resident was supported and supervised by a health sciences librarian at UAL. Librarians decided to use Articulate 360 to develop the new asynchronous search skills tutorial. This platform was selected for its ease of use and ability to seamlessly

integrate a variety of resource types, such as videos, links, text, etc., and allow for some user interaction and knowledge testing.

Conclusion

The assessment of the systematic review searching workshop series at the University of Alberta revealed valuable insights into both instructional design of the series and learner needs. The evaluation highlighted that, despite high attendance, there were notable gaps in students' retention and application of the workshop content, often resulting in repeated consultations with librarians. The collaborative approach taken by the Health Sciences Librarians and the newly formed Assessment and Insight Team (AIT) proved instrumental in identifying specific areas for improvement, such as streamlining workshop content and enhancing accessibility to asynchronous resources.

Key changes, including the reduction of sessions from four to three and the revitalization of asynchronous materials, were implemented based on both the literature and feedback from learners. These modifications aim to increase the effectiveness of the instruction and decrease the need for repetitive individual consultations. Moreover, the shift to a more integrated and user-friendly asynchronous platform, developed using Articulate 360, is expected to provide students with ongoing support in applying their learning beyond the workshop. This work not only informs the future development of systematic review instruction at the University of Alberta but also offers valuable lessons on adapting library services to meet the evolving needs of students in health sciences.

Ultimately, the project underscores the importance of continuous assessment and collaboration in enhancing the delivery of critical research skills in academic library settings.

Endnotes

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Appendix 1 – Survey Questions

"Confidence" Questions

Note: Questions were answered using a five-point Likert Scale raning from 0 = strongly disagree to 5 = strongly agree

1. I am confident I will be able to develop a structured search strategy using PICO and Boolean operators
2. I am confident I am using the most appropriate research methodology (systematic review, scoping review, integrative review, etc.) for my research question
3. I am confident I will be able to develop a comprehensive search in Medline and complete necessary database translations
4. I am confident I know how to transparently report my search process and strategy in accordance with PRISMA-S

Delivery Preference Questions

1. Please select your preferred delivery format(s) for workshops (select all that apply to you):
    a. Face-to-Face (In-person)
    b. Virtual Synchronous (Online live)
    c. Virtual Asynchronous (Recorded, self-paced)
    d. Hybrid (Face-to-Face and Virtual Synchronous)
    e. Flipped Classroom (Virtual Asynchronous followed by Face-to-Face)

2. Did you review the asynchronous online systematic searching modules either before or after attending the workshop?
    a. Yes, before
    b. Yes, after
    c. Yes, before and after
    d. I didn't know about these modules
    e. No

3. I prefer to receive learning materials, such as slides and videos, in advance of the workshop
    a. Yes
    b. No
    c. Neutral

4. I like workshops being recorded and made available so I can review the content again and again
    a. Yes
    b. No
    c. Neutral

5. I prefer workshops that are (select all that apply for you):
    a. A single 3+ hour session that takes place on a single day
    b. 1-hour sessions spread out over a single week
    c. 1-hour sessions spread out over the course of a month

Appendix 2 – Daily Knowledge Check Questions

Day 1

As it currently stands, is this research question suitable for a systematic review?

What is known about compassionate care and digital health technology, specifically in the context of nursing?
Yes
No
Not sure
Answer: No. This is an exploratory question, therefore scoping review methodology is likely a better fit.

Select a source you might use to search for systematic review protocols or register your own systematic review protocol
Prospero
PubMed
Scopus
Google Scholar
Not sure
Answer: Prospero. You can search the other resources listed for published protocols and reviews but you cannot register your own

What is the correct placement of the truncation symbol (*) to find terms such as immunized, immunization, immunising, etc.
Immuniz*
Immunis*
Imm*
Immuni*
Not sure
Answer: Immuni*. Imm* is too short - will also find phrases like immigrant. Immuniz* will miss the UK/CAD spelling with an S and vice versa for immunis*

Which Boolean operator expands your results to give you more?
AND
OR
NOT
Not sure
Answer: OR gives you more

You want to find studies about Canadian nursing homes, what is the correct combination of the search terms to complete this search?
Canad* AND "nursing home*"
Canad* OR "nursing home*"
"Nursing home* NOT ("United States" or USA)
Not sure
Answer: Canad* AND "nursing home*"

Day 2

True or false: I only need to search 1 or 2 bibliographic databases to complete my review
True
False
Not sure
Answer: False, usually search 5 or more

True or false: Subject headings, like MeSH, are searched in all fields of the record including the title and abstract
True
False
Not sure
Answer: False, MeSH are only searched in the subject heading field. Keywords are searched in all fields of the record

What is the most appropriate Boolean operator to combine a MeSH line search and keyword line search for the same concept?
AND
OR
NOT
Not sure
Answer: OR, the search for MeSH and keywords for the same concept are really just two sides of the same coin.

Day 3

What are subject headings called in Scopus?
Scopus headings
Scopus terms
There are no subject headings in Scopus
Not sure
Answer: There are no subject headings in Scopus, keywords only.

In CINAHL and Scopus, which keyword search will present more relevant results?
"Emergency room"
Emergency room
Not sure
Answer: "Emergency room" - quote are important for adding context in CINAHL and Scopus

True or false: Subject headings, like MeSH, are expressed identically across all databases (eg they are the same phrase(s) in Medline as they are in CINAHL)
True
False
Not sure
Answer: False, the phrasing of subject headings, even availability of some, can be different from one database to another. This is why we go through the process of search translation.

Day 4

Is this statement true: according to PRISMA-S, I need to include all of my search strategies for each database verbatim (usually as an appendix or supplementary file).
True
False
Not sure
Answer: True

What file type is compatible with Covidence?
.RIS
.PDF
.DOCX
Not sure
Answer: .RIS

Which of the following types of literature is NOT considered grey literature?
Academic Books (eg Textbooks)
Government reports
Conference materials eg. abstract or presentation
Theses and dissertations
Clinical Trials
Not sure
Answer: Academic books are not considered grey literature

True or false: Some databases, like CINAHL and EMBASE, include grey literature in the search results
True
False
Not sure
Answer: True. CINAHL contains reports and theses/dissertations, EMBASE includes conference materials and clinical trials