Evidence Based Library and Information Practice

Research Article

A Content Analysis of Systematic Review Online Library Guides

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Received: 10 Aug. 2020 **Accepted**: 15 Jan. 2021

DOI: 10.18438/eblip29819

Abstract

Objective – Online library guides can serve as resources for students and researchers conducting systematic literature reviews. There is a need to develop learner-centered library guides to build capacity for systematic review skills. The objective of this study was to explore the content of existing systematic review library guides at research universities.

Methods – We conducted a content analysis of systematic review library guides from English-speaking universities. We identified 18 institutions for inclusion using a Scopus search to find the institutions with the highest number of systematic review publications. We conducted a content analysis of those institutions' library guides, coding for the types of resources included, and the stage of the systematic review process to which they referred. A chi-square test was used to determine whether the differences in distribution of the resource types within each systematic review stage were statistically significant.

Results – The most common type of resource was informational in content. Only 24% of the content analysed was educational. The most common stage of the systematic review process was conducting searches. The chi-square test revealed significant differences for seven of the nine systematic review stages.

Conclusion – We found that many library guides were heavily informational and lacking in instructional and skills focused content. There is a significant opportunity for librarians to turn their systematic review guides into practical learning tools through the development and assessment of online instructional tools to support student and researcher learning.

Introduction

In systematic, scoping, and other related knowledge synthesis reviews, researchers use transparent procedures to find, critically appraise, analyze, and synthesize the results of relevant research. Systematic reviews became established in the health sciences literature in the late 1990s, with an exponential increase since 2011 (Page et al., 2018). Systematic reviews are also becoming common in disciplines outside of the health sciences, such as business, ecology, education, the social sciences, and humanities. In 2018, Visintini et al. conducted a scoping review investigating research support in health sciences libraries. They determined that "support for systematic reviews was another highly represented service" (p. 63) and that providing this support was described in numerous articles (25 out of 75). Instruction, "training, developing search strategies, running searches, managing search results, obtaining full-text reports, and providing methods write-ups" (Visintini et al., 2018, p. 63) were some of the specific supports provided.

Over the last several years, academic librarians at our institution have seen an increase in requests to teach graduate students and research assistants how to conduct a systematic review. These students often required considerable support, and requested multiple individual consultations with a librarian. We determined that we needed to develop a more efficient way of providing this support to respond to the increasing demands and build students'

knowledge and skills. In consulting the literature to inform our own practice, we hoped to find guidance on how to incorporate asynchronous instructional content into our online library guides, rather than simply offering them as repositories of information.

McKeown and Ross-White (2019) described the development of a service designed "to build capacity for increased librarian support and to maximize librarians' time and expertise in providing this support" (p. 2). We similarly recognized that libraries need to build capacity for systematic reviews, but it appears that the capacity-building is most often focused on the librarian. We wanted to build capacity, expertise, and knowledge amongst our students and researchers, to foster more independent learning and make consultations with librarians more effective, and perhaps less frequent. To that end, we received a Teaching and Learning Grant from the University of Calgary to develop asynchronous online instructional tools relevant to systematic review methods.

We began by surveying the field to determine what instructional resources to which we could link and which we would have to develop ourselves. This content analysis of library resources supporting systematic reviews at other academic libraries is part of the process. We wanted to focus on those common skills or tasks (e.g., translating a search, saving .ris files, de-duplication in EndNote) that are best demonstrated with video or step-by-step instructions and alleviate the need to teach these skills during one-on-one consultations.

Literature Review

Systematic Review Support and Instruction

As demand for systematic review support increases, supporting this area becomes a challenge. In one study, researchers estimated that the median amount of time spent by librarians on all systematic review-related tasks (interview, search strategy, search translation, documentation/writing, and team instruction) is 18.5 hours per review, but can vary greatly (Bullers et al., 2018). The same researchers also found librarians with more experience in systematic reviews are more likely to spend time providing instruction on this topic. Spencer and Eldredge (2018) identified 18 roles or functions that a librarian may fulfill in systematic review support. These included activities such as search filters and hedges, searching, source selection, question formulation, planning, reporting and documentation, deduplication, and technological and analytical roles. They did not include roles such as screening, nor data management beyond traditional citation management; however, we have been asked to provide instruction and support in these areas, and communication with librarians at other institutions suggested that this is a wider trend. This was echoed in a commentary by Roth (2018), who established a systematic review service that was initially very searching-focused, but who "quickly learned that researchers were seeking more training about other aspects of the systematic review process" (p. 514). Accordingly, Roth developed a learning outcomes model that incorporated training librarians in other parts of the review process, so that librarians can teach these skills.

As knowledge synthesis matures as a field, the involvement of librarians in this area grows more complex, and demand for librarian assistance increases. Haddaway et al. (2015) noted that systematic review methods can be used in traditional literature reviews to help mitigate bias, increase transparency, provide consistency and objectivity, and critically appraise the evidence (i.e., the literature). Students who are inexperienced in these methods are often directed to librarians for advice and assistance.

Developing online training is a potential solution to some of the increasing demands for librarian instruction and support. Parker et al.

(2018) conducted "an environmental scan and assessment of online systematic review training resources in order to describe available resources and to evaluate whether they follow current best practices for online instruction" (p. 2). These researchers assessed the quality of 20 training resources and determined an average grade of only 61% based on content, design, interactivity, and usability. This scan also found that the highest-scoring resources were courses that required a time commitment of more than five hours. Of note, Parker et al. only assessed those online training resources that included at "least three of six systematic review steps" (p. 2). The researchers did not investigate online training or tutorials that focused on singular tasks required for systematic reviews, such as how to deduplicate in Endnote. Rather, their study focused on more comprehensive and holistic online training for systematic reviews. There appears to be a gap in the literature investigating online training and instructional resources focused on individual skills or tasks required to conduct systematic reviews. Given the recent suspension of in-person assistance and instruction in many academic libraries due to the COVID-19 pandemic, online library resources are now even more critical to student success.

Online Library Guides

Online library guides, such as LibGuides hosted on the Springshare platform, have become ubiquitous in academic libraries. Library guides are often used as subject pathfinders, course-integrated and class assignment resources, and instructional supports. Baker (2014) noted that LibGuides have a tendency toward providing "too much information: what might be termed the 'kitchen sink' approach" (p. 110). Essentially, librarians include links and annotations to all possible resources and services. As Baker noted, LibGuides can result in cognitive overload for students.

Bergstrom-Lynch (2019) noted that the majority of research on LibGuides has focused "almost exclusively on issues of usability, resulting in best practices that are user-centered but not necessarily learner-centered (i.e. designed to support the special needs of learners)" (p. 205). German (2017), an instructional design librarian, also believes that we need to shift to a learner-centered perspective. German suggested that once we change our focus, we will view "LibGuides as an e-learning tool" (p. 163). The focus should be not on what resources to include in a guide, but how the guide can help students be successful learners (German & Graves, 2016). Bremner (2019) defined learner-centred education as a "teaching approach in which learners cease to be passive receivers of knowledge and become more active participants in their own learning process; learning is contextualised, meaningful, and based, wherever possible, around learners' prior knowledge, needs and interests" (p. 54). Online library guides that are learner-centred provide opportunities for active learning, are meaningful, encourage learner/student engagement, and, most importantly, meet the needs of the learner.

Stone et al. (2018) contended that library guides should be designed pedagogically, "where the guide walks the student through the research process" (p. 280). They noted that most research on library guides can be categorized in one of three ways: best practices and design, student use of guides, and guides used for instruction. The researchers conducted a pilot study where two LibGuides were developed for two first-year courses, and student learning was assessed. One guide was a traditional pathfinder which focused on resources, and the other was pedagogical, organized as a research process. Content was the same for both guides. Stone et al. discovered that "a pedagogical guide design, organizing resources around the information literacy research process and explaining the 'why' and 'how' of the process, leads to better student learning than the pathfinder design" (p.

290). Lee and Lowe (2019) recently conducted a study also comparing guide design (pathfinder or pedagogical) to determine which design would best support "the student information learning experience outside of a classroom setting" (p. 205). The pedagogical guide utilized a "visually attractive infographic" (p. 211) of the research process (question, background, find materials, evaluate, refine topic, organize, and so on) rather than a format approach (books, reference materials, articles, current awareness, for example). Further, the guide included sequential numbering of each component of the research process, which, the researchers suggested, reduced students' uncertainty and encouraged them to review the entire guide. Although no statistical difference was found between guide types, the researchers concluded that student engagement with a pedagogically designed guide is enhanced. Specifically, students reported "a more positive experience" (Lee & Lowe, 2019, p. 221) when using the pedagogical guide, spending more time interacting with the content and consulting more resources.

Aims

There is a need for evidence about the types of content included in systematic review online library guides to help librarians move toward learner-centered guides. We were interested in locating more skill or task-focused, point-of-need resources that could be delivered as short, 5-to-10-minute videos, or other interactive modules, particularly for mechanical tasks such as deduplication of results. However, we were unable to locate any existing literature that described or assessed this type of instructional resource for systematic reviews; therefore, we decided to conduct a content analysis of systematic review online library guides at research universities.

Our research sought to examine the content available in existing systematic review library guides and to determine the degree to which the guide content was learner-centered and provided instruction on specific systematic review skills.

Methods

We conducted a content analysis of systematic review online library guides. Content analysis "is a highly flexible research method that has been widely used in library and information (LIS) studies with varying research goals and objectives" (White & Marsh, 2006, p. 22). Kim and Kuljis (2010) established that content analysis methods were appropriate for examining web-based content. These researchers suggested that content analysis is a fairly straight-forward research process to perform, can be done at the convenience of the researchers, and ethics approval is not required as web-based content is usually publicly posted.

Our methods were informed by Yoon and Schultz's (2017) content analysis that investigated libraries' research data management websites. Their study examined library research data management websites focusing on four main areas: service, information, education, and network. These areas were developed a priori. Their content analysis "categorized content displayed on the webpages into different types based on the purpose of the content" (Yoon & Schultz, 2017, p. 923). We approached our content analysis in a similar fashion. Prior to collecting data, we identified types of resources, based on Yoon and Schultz's categories. We adapted their definitions for service, information, and education content and added a new category of tool (see Table 2).

Sample

Assuming that universities publishing the most systematic reviews would have the most demand for support from their libraries and librarians, and that the support would be in the form of an online library guide, in January 2018,

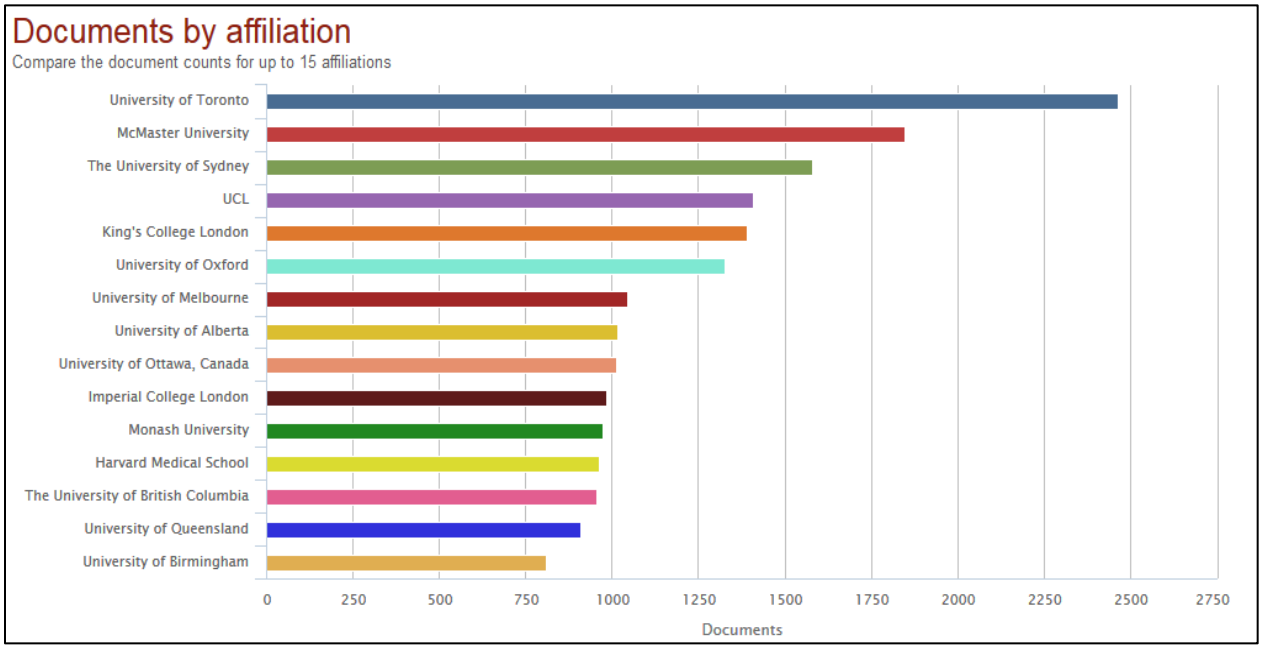

Figure 1

Number of systematic and scoping reviews published by university: initial Scopus search. Note: UCL is University of College London; Scopus outputs the abbreviated name.

we searched the Scopus database for the most prolific universities in two phases. As this is not a systematic review with a comprehensive search across multiple databases, no other databases were searched. Institutions were identified using the keywords "systematic review" OR "scoping review" in the title field. Since these are the most common knowledge synthesis review types, the results would reflect the most prolific universities. Every author affiliation is counted in Scopus and is summed up as a list of institutional affiliations. From this list, the top 15 English-speaking universities were identified according to the number of results (Figure 1). In order to focus on university sites, search results were excluded if no affiliation was mentioned; the publication was affiliated with a non-university institution, or the affiliated institution was a non-English speaking institution.

Surprisingly, this search resulted in only one institution from the United States (U.S.). To reflect the prominence of the U.S. in research, we conducted a second search of Scopus, where the search results were limited to U.S. universities. The top five U.S. universities were included from this search, excluding Harvard Medical School which was identified in the initial search (Figure 2).

After we identified the top 20 universities in terms of number of systematic reviews published, we then searched for their published online, library-produced systematic review guides. Two universities—University of Birmingham and Johns Hopkins University—were excluded because they did not have these library-produced guides. The total number of university systematic review online library guides included in our content analysis was eighteen ($N = 18$), which was feasible for us. Of the universities included in our analysis, four were from Australia, five were from Canada, four were from the United Kingdom, and five were from the U.S. (Table 1).

Data Collection and Analysis

The contents of systematic review online library guides were coded in the winter of 2018. The research team developed a deductive, directed coding procedure for content analysis of the included guides (Hsieh & Shannon, 2005). First, we established a set of code definitions (Table 2). The research team discussed, and came to consensus on, any emergent codes in an iterative process as data collection and analysis occurred.

One of the researchers (HP) coded initial samples. Two members of the research team (KAH, JL) then met to review the coding, clarifying as necessary. HP coded all subsequent samples. Based on Yoon and Shultz's (2017) definitions, we developed the following codes for categorizing the type of resource included in each systematic review guide: *Information*, *Education (internal)*, *Education (external)*, *Service*, *Tool (educational)*, and *Tool (informational)*. We considered resources coded under the education

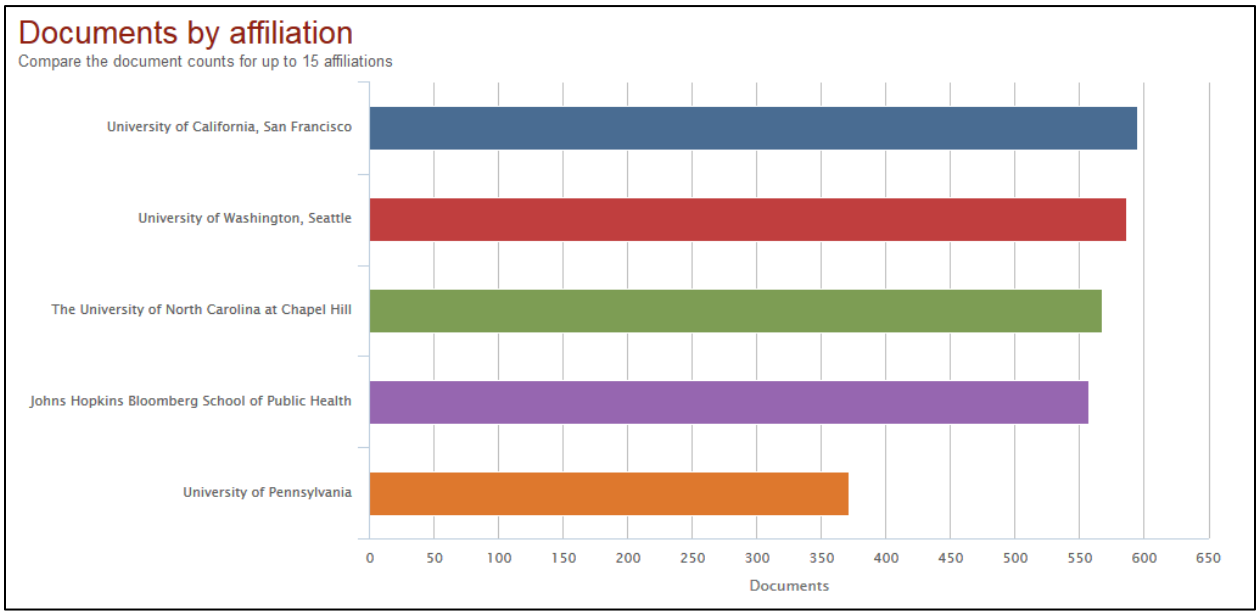

Figure 2
Number of systematic and scoping reviews published by university: Scopus search limited to U.S. universities.

Table 1
Included Universities (*N* = 18)

Australia	**Canada**	**United Kingdom**	**United States**
University of Sydney	University of Toronto	UCL (University College London)	Harvard University
University of Melbourne	McMaster University	King's College London	University of California San Francisco
Monash University	University of Alberta	University of Oxford	University of Washington, Seattle
University of Queensland	University of Ottawa	Imperial College London	University of North Carolina at Chapel Hill
	University of British Columbia		University of Pennsylvania

Table 2
Descriptions of Codes Used for Content Analysis

Code	Description
Type of Resource	
Education (External)	"the library's educational efforts: that is, whether the libraries offer any educational services to the faculty, staff, and students at their institution" (Yoon & Shultz, 2017, p. 923). Only includes online resources. Includes detailed instruction, tutorials, quizzes, case studies, annotated screen captures, video tutorials. External: An educational resource developed by any institution that is not the institution that developed the library guide (e.g., a case study in the University of Toronto guide developed by the University of Pennsylvania).
Education (Internal)	"…the library's educational efforts: that is, whether the libraries offer any educational services to the faculty, staff, and students at their institution" (Yoon & Shultz, 2017, p. 923). Only includes online resources. Includes detailed instruction, tutorials, quizzes, case studies, annotated screen captures, video tutorials. Internal: An educational resource developed by the institution that developed the library guide (e.g., a video tutorial in the University of Toronto guide developed by the University of Toronto)
Information	"…when libraries only provided descriptions … offering information about what it is and how researchers can do it, this study considered these passive services and coded them under the information category" (Yoon & Shultz, 2017, p. 923). This includes links to non-educational resources (e.g., a database, the PRISMA or Cochrane webpage), definitions (e.g., defining "systematic review"), and descriptions (e.g., describing PICO, describing a search strategy, but without instructions)
Service	"…active library engagement with intended users (researchers) to help them and provide necessary information" (Yoon & Shultz, 2017, p. 923). Services will include in-person services offered by the library to faculty and students conducting systematic reviews. Includes consultations, co-author, facilitated searches.
Tool (Educational)	A resource that can be used to ease the systematic review process. For example, software to help with reference management, screening, critical appraisal, or data management. Tools will be coded as educational if they provide instructions about how to use the tool.
Tool (Information)	A resource that can be used to ease the systematic review process. For example, software to help with reference management, screening, critical appraisal, or data management. Tools will be coded as informational if they provide descriptions or links without instruction.
Stage of Systematic Review (SR)	
Introductory	Definitions of SRs or other related review types (e.g., scoping review), overviews of process or stages, rationale for conducting a systematic review, timelines, or team members appropriate for a systematic review
Planning Phase	Question development (e.g., PICO) but NOT search terms, consulting with a librarian during this phase, protocols (e.g., references to PROSPERO), or developing protocols
Guidelines	Standards for systematic reviews, though NOT standards for reporting

	(e.g., CRD, Cochrane, Campbell, JBI, IOM). Can include mentions of books about the entire process.
Conducting Searches	Lists of databases to consider or search, database-specific or general filters/hedges that can be applied for searching, government documents, conferences, clinical registries, definitions of grey literature, search mechanics, Boolean operators, saving searches on databases, creating appropriate search terms, search alerts
Reference Management	Exporting searches to reference management software, de-duplicating searches, exporting references to Excel, or interlibrary loan
Screening	Software or tools for screening abstracts or full texts, inclusion/exclusion criteria
Data Extraction	Extracting of qualitative or quantitative data from studies for analysis
Critical Appraisal	Quality assessment
Reporting	PRISMA, other standards for reporting, writing of results, search documentation

categories to be "learner-centered." We also identified codes for the stage of the systematic review process: *Introductory*, *Guidelines*, *Planning Phase*, *Conducting Searches*, *Reference Management*, *Screening*, *Data Extraction*, *Critical Appraisal*, and *Reporting*.

We imported content from each library guide into NVivo 11, a data analysis tool that allows researchers to assign codes to text and to portions of web pages. Each page of a guide was downloaded as a PDF and then imported into NVivo. The contents of all guides were coded for both type of resource and stage of the systematic review. For example, if a guide suggested Covidence for title and abstract screening, and linked out to the tool, that portion of the page was given the resource type code of *Tool (information)* and the systematic review stage code of *Screening*. However, if the guide provided instructions on how to screen using Covidence, that portion of the page would be coded with the resource type of *Tool (educational)* and the stage code of *Screening*. These would be counted as one occurrence each for *Tool (educational)* and *Screening*. If the same guide provided instructions on how to screen using Covidence in more than one place, each occurrence was counted.

Data from NVivo was exported as a comma-separated value (CSV) file using NVivo's Matrix Coding Query feature, which cross-tabulated the coding between the type of research and stage of the systematic review. The resulting file was imported into Excel for descriptive statistical analysis. We counted the guides that had content pertaining to a stage and to a resource type. We calculated the proportion of resource types per guide. Chi-square tests were used to compare the differences in distribution of the resource types within seven of the nine SR Stages (*Introductory*, *Planning Phase*, *Guidelines*, *Conducting Searches*, *Reference Management*, *Data Extraction*, and *Reporting*) to an expected hypothetical even distribution. A chi-square test "is formulated to determine whether the difference observed was due to a chance occurrence" (Gordon, 2018, p. 269). If, for example, a stage was comprised of many more occurrences of one resource type than another, the results of the chi-square test would be significant. Expected values for the Screening and Critical Appraisal stages did not meet the conditions for a chi-square test, so the test was not run for those categories. Minitab was used to run the chi-square tests. A value of $p < .05$ was considered significant.

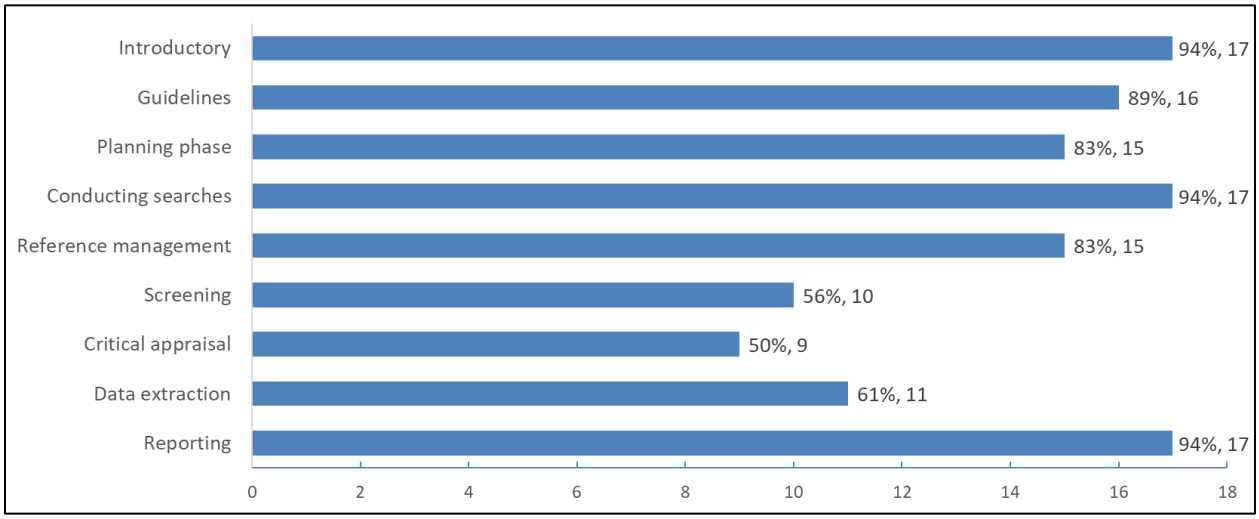

Figure 3
Number of guides by stage of systematic review (N = 18).

Results

Systematic Review Stages

No online library guide provided content on every stage of the systematic review. The most common stages included were *Introductory*, *Conducting Searches*, and *Reporting*. These stages were included in 17 of the 18 guides. The stage covered by the fewest LibGuides was *Critical Appraisal* which was addressed by nine guides (Figure 3).

Resource Types: Proportions by Guides

Most of the guides included text, infographics, embedded videos, links to external resources, and screenshots. However, University College London and McMaster University only offered a single webpage of text and links.

For 17 of the 18 guides, *Information* comprised over half of the resource types coded. In the case of one university (McMaster), it was the only type of resource. Only four guides included more than 30% of their guide dedicated to internally developed education resources. None of the guides had any content coded as *Tool (educational)* (Figure 4). Every guide had content coded as *Information* (Figure 5).

Content

A total of 689 occurrences were coded across the 18 guides. The *Conducting Searches* stage had the most occurrences, 286 (42%), while *Critical Appraisal* had the fewest, 17 (2%) (Figure 6).

Of the 689 occurrences coded, most (458, 66%) were coded as *Information* resources. Interestingly, 20% (136) of the occurrences focused on internally developed education. This indicates that, to a small extent, locally created instructional resources are incorporated into systematic review online library guides. *Education (internal)* and *Education (external)* resources comprised 24% of the occurrences coded. Apart from *Tool (educational)*, for which there were no occurrences coded, *Service* had the fewest number of occurrences (19, 3%) (see Figure 7).

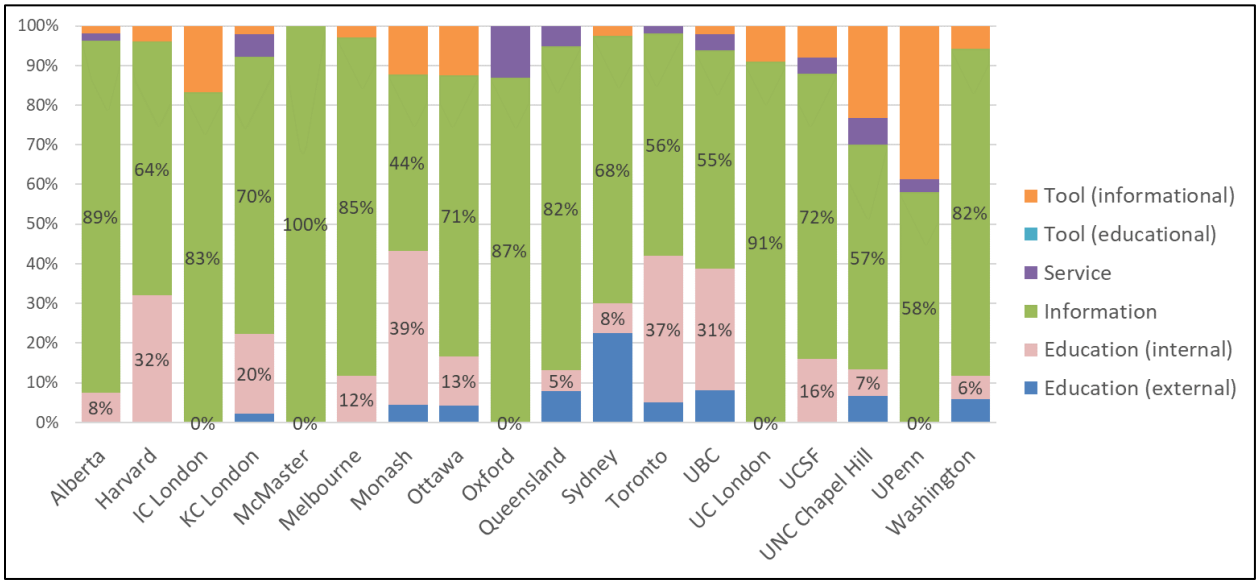

Figure 4

Proportion of resource types by guide (*N* = 18). Values are included for the resource type: *Information* and *Education (internal)*; percentages of all resource types within each column add up to 100.

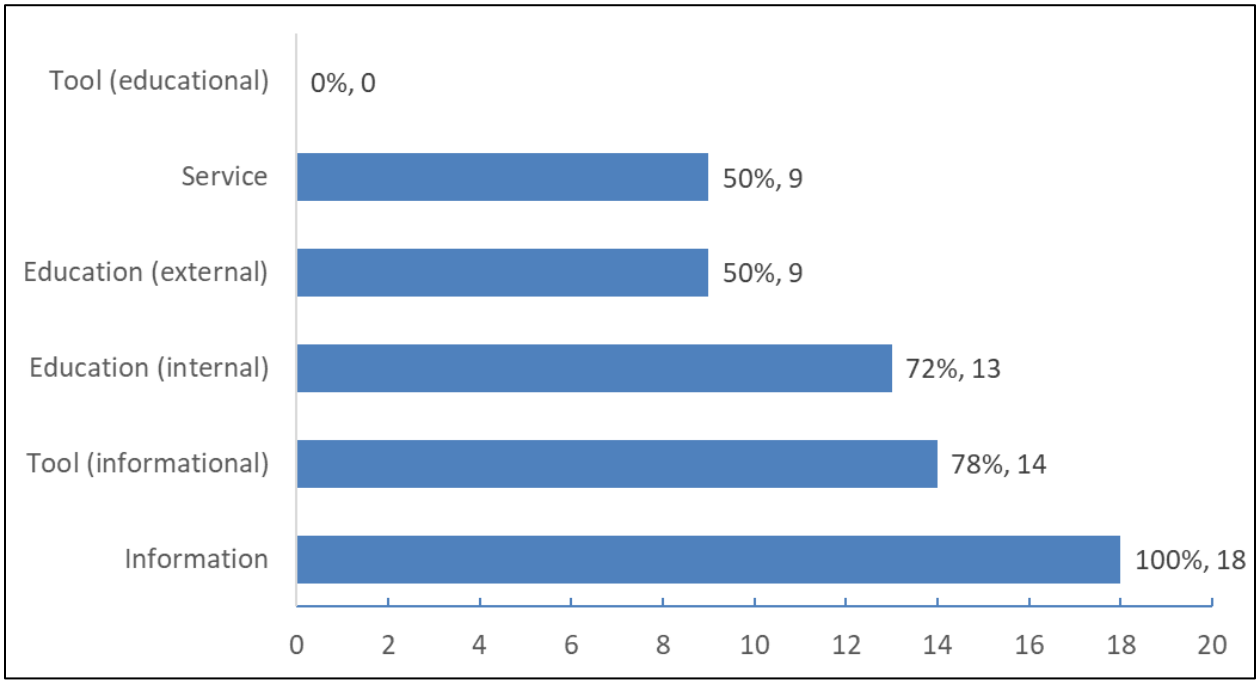

Figure 5

Number of guides with each resource type (*N* = 18).

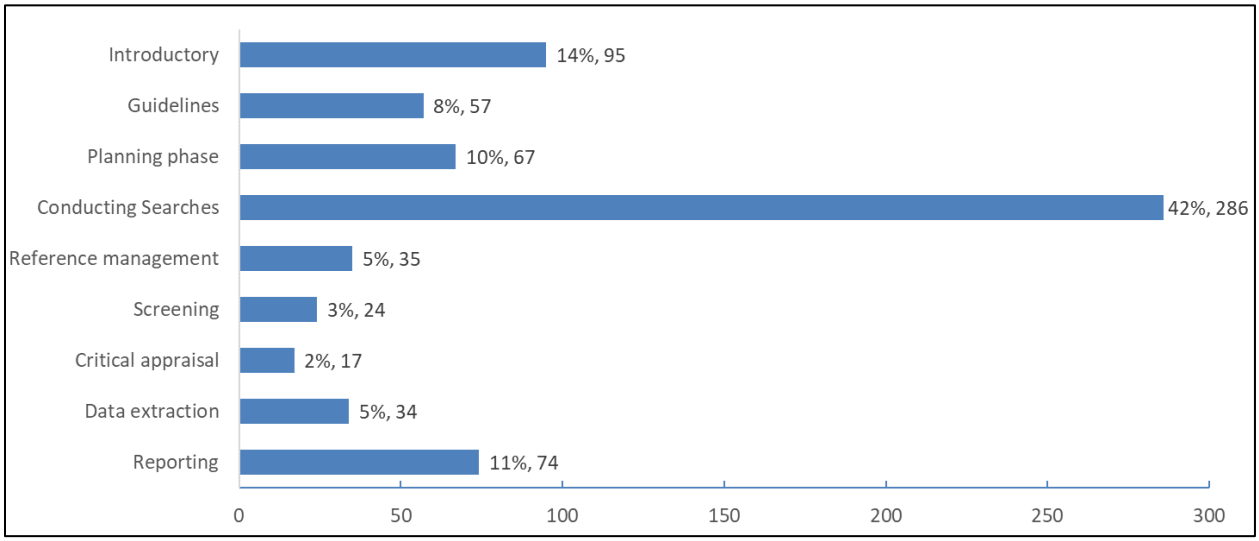

Figure 6
Number of occurrences coded: stage of systematic review (*N* = 689).

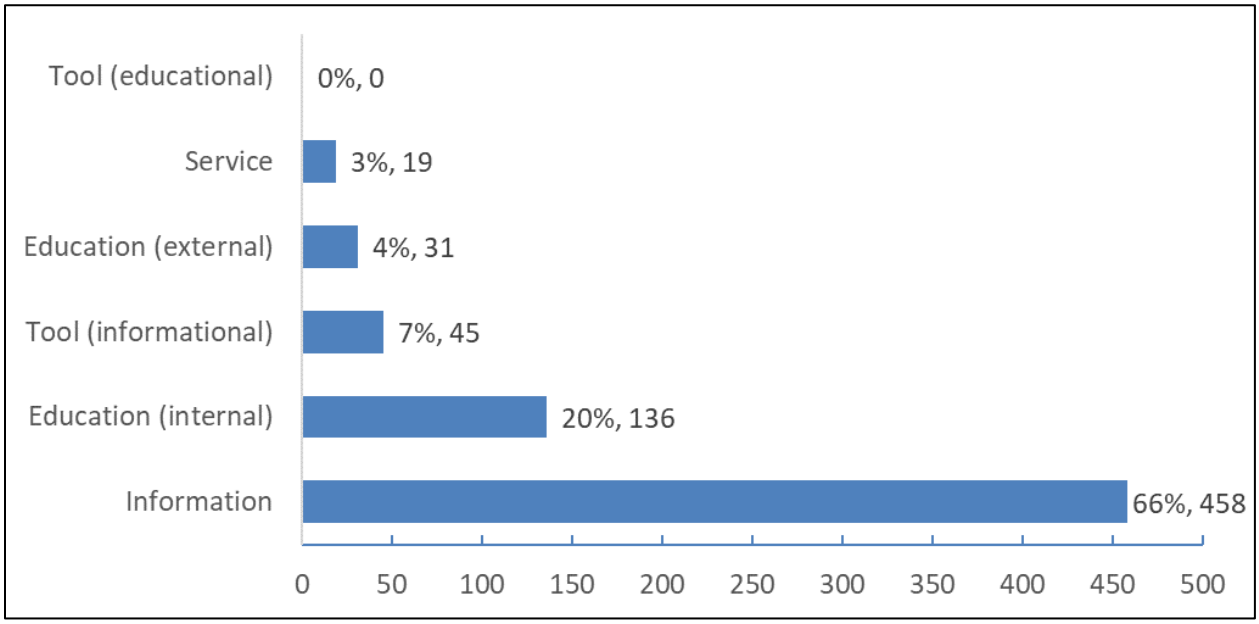

Figure 7
Number of occurrences coded: resource type (*N* = 689).

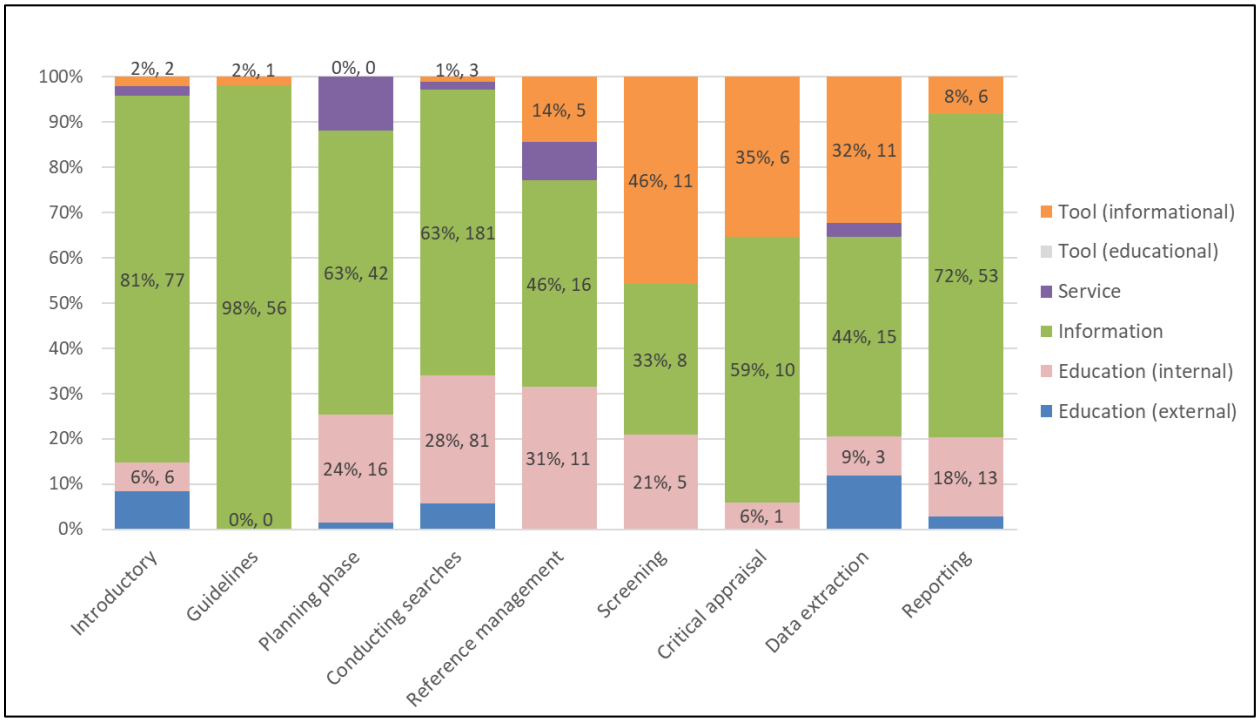

Figure 8

Proportion of resource type by stage of systematic review ($N = 689$). Percentages for only the relevant stages *Tool (informational), Information,* and *Education (internal)* are shown for readability; percentages of all resource types within each stage add up to 100. Note that *Tool (educational)* is included in the legend; however, no stage included that resource type.

Table 3

Significant Differences in Distribution of Resource Types within Systematic Review Stages[a]

Stage	χ^2	p
Introductory	286.28 (5, $n = 95$)	< .001*
Guidelines	273.21 (5, $n = 57$)	< .001*
Planning phase	119.72 (5, $n = 67$)	< .001*
Conducting searches	545.02 (5, $n = 286$)	< .001*
Reference management	35.45 (5, $n = 35$)	< .001*
Screening	See note	
Critical appraisal	See note	
Data extraction	32.65 (5, $n = 34$)	< .001*
Reporting	171.70 (5, $n = 74$)	< .001*

[a] The calculated expected values for the *Screening* and *Critical Appraisal* stages did not meet the conditions for a chi-square test so the test was not run for those categories.

*$p < .05$, statistically significant.

Within the stages of the systematic review, *Information* comprised between 33% (*Screening*) and 98% (*Guidelines*) of the resource types. In many of the stages, *Information* comprised the largest proportion of the resource types. The exception was the *Screening* stage, where *Tool (informational)* comprised 46% (11) of the occurrences. *Tool (informational)* comprised between 1% (*Conducting searches*) and 46% (*Screening*) of the resource types within a stage. The *Education (internal)* resource type comprised between 0% (*Guidelines*) and 31% (*Reference management*) of the resource types within a stage (Figure 8).

Table 3 displays the p-values for the valid chi-square tests. Significant differences in distribution were found within the following stages: *Introductory*, *Guidelines*, *Planning phase*, *Conducting searches*, *Reference management*, *Data extraction*, and *Reporting*.

Discussion

The stages most addressed by the systematic review online library guides aligned with the roles identified for librarians by Spencer and Eldredge (2018). The most common stages included in the guides were *Introductory*, *Conducting Searches*, and *Reporting*. The *Conducting Searches* stage described in our study included Spencer and Eldredge's roles of Search filters and hedges, Searching (including subcategories of Databases and other resources, Grey literature, and Search strategies), and Source selection. Spencer and Eldredge's Planning role and General subcategory of Searching is included in our *Introductory* stage, and their Reporting and documentation role is included in our *Reporting* stage. Their analysis of librarians' roles in systematic reviews based on the literature is borne out, in part, by our analysis of library content on library guides. We found that the stage included by the fewest number of guides was *Critical Appraisal* (found in nine of 18 guides). Interestingly, critical appraisal was also not included in Spencer and Eldredge's 18 roles. This may be because critical appraisal, as a part of the systematic review process, should be covered by a guide, but is not a librarian role because it requires content expertise.

Our chi-square tests showed that there was a significantly uneven distribution of resource types within seven of the nine stages. Therefore, the resource types are distributed significantly differently from a hypothetical even distribution, and the difference is not due to chance. This can be seen especially within the *Introductory* and *Guidelines* stages, where the majority of the content is coded into one resource type. These results align with our initial observations that there is a preponderance of content in one resource type (*Information*) over the others.

While all online library guides provided detailed information about systematic reviews, as well as some instructional resources on how to conduct systematic reviews, no guide provided instruction on how to use the tools related to the process. The resource type *Information* comprised the majority of the resource types for almost all of the guides. In one case, it was the only resource type on the guide. It was also the only resource type that was found in all guides. Therefore, the guides we found are lacking in instructional and teaching resources.

Our content analysis showed that other institutions' systematic review online library guides are similar to our own: focused on information and links instead of on the instructional content to develop systematic review skills (tutorials, videos, step-by-step guides, and others) suggested by Stone et al. (2018). This was most evident in regards to instruction on how to use various tools and software programs to carry out systematic reviews. This suggests that library guides on systematic reviews currently serve as information repositories rather than teaching tools.

Despite the lack of learner-centered guides, two exemplars showcased a relatively high proportion of skills-focused resources in their systematic review guides. The University of British Columbia (2021) linked educational worksheets in their library guide for researchers and students to develop their research questions, identify search terms, and create a PRISMA flow diagram, among other skills. Monash University (2021) included an interactive case study tutorial about a student working through the stages of a systematic review. These two guides provided different approaches (worksheets and case studies) for educational resources.

We believe that libraries need to evolve their systematic review guides to better support and incorporate instruction grounded in pedagogical approaches. It appears that many librarians are designing guides as an informational supplement to in-person instructional sessions. While this serves a purpose, we believe that librarians should develop online instructional components for a few reasons:

- To align with the larger move to asynchronous online learning (including flipped classrooms) that is occurring more broadly in post-secondary education (Brown et al., 2020);
- To make such learning more widely accessible to those whose schedules make attending in-person workshops challenging; and
- To relieve the workload on librarians who are repeatedly required to teach clients how to use tools to carry out processes, rather than focusing on the higher-level skills required for a review.

The COVID-19 pandemic, which resulted in the mass shutdown of the physical spaces of universities and their libraries worldwide, and the resulting rapid transition to online learning, illustrated the urgent need for libraries to evolve their online guides further in the direction of educational rather than primarily informational resources. While not something the authors considered when embarking on this project, we have been grappling recently with how to move our instruction online, either live via platforms such as Zoom, or in the form of video tutorials and step-by-step guides that can be accessed at the point of need by remote learners. Such tutorials can either stand on their own as a resource for clients who need to learn a particular task or tool, or supplement and reinforce synchronous instruction, face-to-face or online.

Limitations

Our assumption was that prolific universities would have online library guides that supported systematic reviews, including providing some form of online instruction. However, none of the 18 guides we looked at included any educational tools. The 18 guides were by no means representative of all systematic review library guides. The small sample size, 18, was the most feasible for us; however, it is a limitation. This study focused on university library guides; however, future studies may involve seeking out other, specific guides that contain educational tools, with the intent to analyze the stages that those tools support.

Another limitation is that our content analysis did not evaluate the quality of the systematic review library guides. We did not make judgements as to whether the appropriate or correct information was included in any guide. Further, we did not assess usability of the guides. A future study could investigate students' and researchers' perspectives and expectations when using a systematic review library guide.

Conclusion

We undertook a content analysis of systematic review library guides in order to inform our own development of skills focused on

instructional tools for those undertaking systematic reviews. We sought to determine what stages of the systematic review process libraries were supporting, and what educational resources already existed. We found that many guides reflected the state of our own: heavily informational and lacking in instructional and skills content.

We had hoped to avoid reinventing the wheel as we developed our own instructional tools; however, what we found was that the wheel appears not to have been invented. We suggest, as a future direction for systematic review instructional research and practice, that there is significant opportunity for librarians to turn their systematic review guides into learning tools through the development of online instructional tools to support student and researcher learning in this area.

Acknowledgements

Thanks to Tak Fung, PhD, Mathematical/Statistical Consultant, University of Calgary for statistical advice; and Margy MacMillan and others, for feedback and comments.

Author Contributions

Heather Ganshorn: Funding acquisition, Writing – original draft, Writing – review & editing **K. Alix Hayden**: Conceptualization, Funding acquisition, Methodology, Project administration, Supervision, Writing – original draft, Writing – review & editing **Jennifer Lee**: Formal analysis, Funding acquisition, Methodology, Validation, Visualization, Writing – original draft, Writing – review & editing **Helen Pethrick**: Formal analysis, Investigation, Visualization, Writing – original draft, Writing – review & editing

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