Systematic searches: a new area of cooperation between the library and the social sciences

Best practice article

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Abstract

Recent years have seen increasing opportunities for libraries to participate in the research process of our patrons. Our skills in conducting thorough searches and documenting the search process in a transparent way, are highly sought after among researchers looking to write a systematic review article.

In this paper we will give an overview of how this service can be provided in an academic library setting, emphasizing the need for close collaboration between library staff and researchers. We discuss the advantages and limitations of the tools we use, with the aim that others interested in systematic searches can get workable advice. With the increase in information available, researchers need help finding, sorting, screening and documenting the systematic search process. As research librarians we are uniquely positioned to participate in this process. Libraries looking to start offering this service needs to invest in their staff, affording them time to acquire the skill set as well as the time needed for the work involved in the systematic search projects.

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Introduction

Systematic literature searches are a service the university libraries have offered their users for several years. At the Norwegian University of Science and Technology (NTNU) University library this has historically only been common in the medical field. In recent years we have seen an increased demand from the social sciences at our university, which has allowed us to collaborate on some of their projects.

Increased access to information requires good methods for retrieving relevant research results. A great amount of information makes it more complex to determine where and how the search process should be conducted. The systematic search is a research strategy for identifying previous research in a transparent way, while documenting the effort. A search strategy must be tailored to each project to find previous research in order to locate the research frontier. We have found that especially young researchers want help from the library in the search process. We think that this is a great opportunity because this enable us to integrate more closely with the academic communities, building long lasting ties.

Searching for social science literature can be complex, with a lot of search words and combinations, and it is demanding to make search strategies because the databases in the social sciences also cover interdisciplinary subjects. There is a bewildering variety in the terminology used in various fields within the broad social science field. In the absence of a controlled vocabulary like MESH, we are often forced to deploy very long search strings, keeping us as librarians on our toes. We often have to search several databases for our systematic searches in social sciences, as no single database covers the (often interdisciplinary) field of interest.

To ensure that the whole process from start to dissemination (and beyond) is a smooth one for all involved, we are dependent on close communication with the researcher(s). We are often in the unfamiliar position of being the experts in various niche aspects (search formulation, data stewardship etc.) of the overall process, while the other team members are the subject specialists. We need to clearly communicate the limits and possibilities of a systematic search: a common issue is the non-existence of the perfect search. Researchers (and their librarian helpers) looking to construct the perfect search, with no missing or superfluous references will be looking in vain. There are plenty of "how-to" guides for doing a systematic search (Bramer et al., 2018; Monroe-Gulick et al., 2013) but they typically do not dwell on the topic of communication in the team. Harris (2005) gives more attention to this issue, pointing out "[…] the librarian must possess an ability to interact with clinical investigators to identify the clinical questions and concepts required for the search" (p. 86). The search strategy must be a compromise between too much and not enough and making this clear at the outset will ease the whole process.

What is a systematic search?

It is important to define at the outset what the systematic search is. There are many definitions, but we have opted to follow Haraldstad and Christophersen when they say: "A systematic literature search is conducted in a planned and reasoned way, and is documented and verifiable" (2004, p. 117, our translation).

A systematic overview, aims to find, evaluate and summarise research in a field using planned and transparent methods. It is a search which is thoroughly vetted in all its details in close collaboration with the researcher(s).

But why do systematic searches? Leavy and Carven (2019) summarise it well: Systematic searching is one of the fundamental building blocks to using evidence in a rigorous way to make decisions on policy and practice. The search is a key component of a systematic review. A review cannot be systematic if it is based on evidence that has been identified through a partial unsound or incomplete search (p.1)

Systematic searching involves applying a clear rationale to seek out the best available evidence to address a research question (Stainsfield, 2019, p. 52). It's impossible to retrieve every relevant reference in one search, because the topic is most of the time so broadly-based that it's impossible to create a search and to find databases which cover all the references the researcher is interested in. Explaining the boundaries of the search to the researcher (and later, communicating these limitations in a methods chapter), are tasks that the research librarian needs to take care of.

The work processes

How do we work in these projects? The single most important point is having close contact with the research community. This contact can come in many shapes and forms: structured/formal meetings (department meetings etc.) or more spontaneous and random meetings; contact for our first review article (Weiss et al., 2018) was first made in a locker room(!) when one of us met what would become the principal investigator in that review article. Increasingly however, we find that word of mouth has been more than enough to keep us busy with this kind of work.

At the beginning of a project we have found it useful to discuss and clearly agree on the roles of all participants. Expectations from the researchers might not align with what we are prepared to do, so talking these things over early in the project can save a lot of confusion later. Examples here include deciding who runs the search and downloads the references, which reference manager to use and other issues of workflow. But also, more delicate issues such as co-authorship should be dealt with early.

The first part of the process is time consuming and requires meticulous attention to details. In this part of the process we work to build the search strategy and testing the results of

the strategy. A search strategy requires careful choices of where and how to locate research (Stainsfield, 2019). There are also articles which we find by hand searching. This often feels like an un-systematic element in the overall process, but it is often needed to capture all (or most) relevant references. To search for articles in Norwegian and other Nordic languages we must use each country's local search alternative, in Norway we use ORIA. This is a search tool which makes it difficult, or in some cases impossible to do an advanced search or to use a lot of search words. There is the added problem of bulk downloading references from this tool.

The search is usually done in one session, after the final search string has been tested and agreed upon by the whole group. The search session includes the search itself, but also the downloading of all the references into Endnote. This should be a completely mechanical task, and we as librarians should refrain from removing even the most obviously unnecessary references. After the search session, we start the screening process, write the log and fill out the flow chart. It is essential to write the log as each step in the process is completed. Failing to update the log makes it much harder to report accurately and transparently.

The screening process benefits from using Rayyan (or a similar tool), as this allows for easy reading of the title and abstracts for the include/exclude decision and for the quick import and export of data. Rayyan allows all participants to work on the same dataset, in real-time in a user-friendly interface.

Once the screening is done, the data is exported from Rayyan and into Endnote. At this stage we use Endnote to find the full text *.pdf files for the references. Not all references will be found this way: the University Library might not have access to all the references as full text, there might be technical issues etc. There will be some missing full text files, and these have to be found. Deciding who should do this (often tedious) work should be agreed upon early in the process. Once all the references needed are available, the articles need to be read. This is often done by the research(ers) who initiated the project. After the reading is done, they synthesis and summarise the main findings of the data. We (the librarians) often assist in the writing of the resulting article, in particular the methods part.

Finally, there is the task of communicating our results. Often researchers have a clear idea about where to publish, but very often we find that they are open to suggestions. Here we can urge them towards Open Access publishing, and also inform them about archival storage of their data. Increasingly, financiers demand researchers have a data management plan (DMP), another task we can help with.

Tools

In the following, we briefly discuss some of the tools we use in systematic searching. As mentioned earlier, the systematic search needs to be "[…] planned and reasoned […], and documented and verifiable" (Haraldstad & Christophersen, 2004, p. 117). The following table gives a quick overview of the tools, while also showing which part of the process they help with. N/A (not applicable) signifies that this is not the main purpose (as far as systematic searches are concerned) of the tool. The point of the table is not to give a detailed description of the tool, but to be an aid in finding an appropriate tool for the various tasks associated with doing a systematic search. The column "Tool" refers first to the general class of the tool (e.g. Reference manager) and to a specific example that we have successfully deployed in our work. Column "Planned" indicates whether the tool helps with planning the search. "Reasoned" refers to the ability of the tools to help the researcher to see the process of the search and how the various parts of the search (and search strings) change the outcome. "Documented" shows if the tool allows the researcher to document the work done. "Verifiable" deals with the ability helping others check and verify the work done in the systematic search.

Table 1. Useful tools for systematic searches

Tool	Planned	Reasoned	Documented	Verifiable
Reference manager (Endnote)	N/A	N/A	Yes	Yes, easily shared
Screening tool (Rayyan)	Yes, allows predefined inclusion/exclusion tags	NA	Yes, allows reporting of inclusion/exclusion tags	Yes, easily shared
Qualitative analysis (NVivo)	N/A	N/A	Yes, both full database and various reporting options	Yes, easily shared
Flow diagram (PRISMA)	Yes	Yes	Yes	N/A
Literature databases (Scopus; WoS; etc.)	Yes, some	Yes, some	Yes, but bare minimum	Yes

While it is possible to do a systematic search using only the literature databases (and writing the results down in a text file), doing so is very cumbersome. That is why we use these other tools to support the process. In the following we briefly go through the tools mentioned in the table (with the exception of the literature databases, which vary considerably and will be known to most of our readers).

We use Endnote for historical and institutional reasons: it is the reference manager most widely used in our institutional setting and our host institution has a site license for the software. Of course, there are other tools available: Zotero, Mendeley etc. We use Endnote to collect all the references in one place, to find and remove the duplicates and to gather the PDF files.

Rayyan is a tool we use to cooperate with the researchers to screen the references before full text reading. Rayyan is great for collaborative screening, and allows for include/exclude voting, tagging of articles and easy import/export of the data to/from Endnote.

NVivo is another tool that should go into the systematic search toolbox. NVivo is primarily a program for analysing qualitative data. In this context, we treat the dataset we have downloaded from Rayyan (the screened references) as a qualitative dataset. Using NVivo lets us annotate the literature (either on a document level (with file classifications) or directly in the text. Using NVivo, we can do simple bibliometric analysis of the search: which authors are most prolific? Which journals are most prominent in our search? These (and other attributes) can then be visualized easily. We can also make custom meta data: which method is used in the articles we are reading? Which populations are being studied? All this makes it easier to find patterns in the data, especially for identifying gaps in the literature. Moreover, it is available as off the shelf software, requiring little in the way of configuration and bespoke solutions.

The last tool we want to mention in this paper, is the humble flow diagram. Flow diagram gives a simple and easy overview over the process and the results, and it makes it easy for the reader to follow the whole process. There are several standards for flowcharts. Perhaps the most popular is the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) (See Moher, Liberati, Tetzlaff, Altman & The PRISMA Group 2009 and www.prisma-statement.org), and one which we use in most of the searches we are involved in (e.g Besnier, 2019; Weiss, 2018).

Project

Our first project started early 2017 when we started working with researchers from the Centre for Global Health Inequalities Research (CHAIN) at NTNU (https://www.ntnu.edu/chain/). This collaboration resulted in a publication the following year (Weiss et al. 2018), as well as planting the seeds for further work with CHAIN (Besnier et al. 2019; Besnier et al. 2020). These projects as well as others in earlier stages of the process have all been very demanding, but also highly rewarding. Our contribution varies based on the project requirements, but we usually participate in the formulation of the search, selecting databases, screening and writing the methods section of the publication.

Our next project brought us together with a diverse group of researchers from the Department of Education and Lifelong Learning as well as outside partners in the form of KUN Centre for Equality and Diversity. This effort resulted in a report (Langeland, Lorgen, Jensen & Solhaug, 2019), which was later used as part of the knowledge foundation for the Official Norwegian Report (NOU 2019:19). This project saw us expand our toolbox to include NVivo for extraction of data from the references. We also had to negotiate the Scandinavian library catalogues looking for sources in these languages, which turned out to be more challenging than one would expect.

Benefits and challenges

Collaborating on systematic searches is a new way of involving library staff with the projects of our patrons in the social sciences. This allows us to raise awareness of the skills found in the library, furthering the library's mission to help our patrons. Projects like these allow us to contribute on an equal footing with others in the academic environment, leading to closer integration of our services overall.

These projects also force us to stay up to date in our fields, keeping track of the databases with all their strengths and limitations. This demands resources, mostly in the form of time set aside, and commitment from us as participants in the projects, but also commitment from our leaders and colleagues. We could not do this work if our leaders and co-workers did not support our efforts.

Summary

The academic libraries have the knowledge and experience that are needed in this task. We have the experience in communicating with different academic communities and can quickly understand their needs. There is a need to invest in training in new tools and to allocate enough time for this work in the library, but this is an investment that is well worth making.

Close communication and cooperation are essential for research librarians in their roles in these projects. The academic librarian has knowledge which the researchers often lack, and this knowledge is a prerequisite to conduct a systematic review, which must start with a systematic search.

Clarifications of roles in a new project in the first meeting are very important, but can be uncomfortable. We enjoy this kind of work, but it can only be done as equal partners, with frank discussions of some potentially difficult themes: responsibilities for following through, quality assurance and co-authorship. If done correctly, this kind of collaboration can elevate the standing of the library in the broader academic world.

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