Using Google Scholar in Evidence Syntheses

For many people, Google Scholar seems like an answer to many of their research needs. It's free, familiar, and produces a lot of results. According to Google, *"Google Scholar provides a simple way to broadly search for scholarly literature. […] Google Scholar helps you find relevant work across the world of scholarly research."* It sounds perfect.

But, as Knowledge Synthesis Expert Sarah Bonato put it, it doesn't hurt to be "more of a skeptic than a cheerleader" when it comes to using Google Scholar in your knowledge synthesis project. Sure, it has a lot of strengths, and can be very useful under the right conditions, but it also comes with a lot of uncertainty and some weaknesses that are important to acknowledge and understand before deciding to use it in a review.

Google Scholar's Strengths:

It's free – not only is Google Scholar itself a free resource, it's also designed to point users towards free resources, offering links to open access research articles whenever they are available.

It has multiple publication types – while Google Scholar is designed and used primarily as an access point for peer-reviewed research articles, it also provides access to many other types of academic and scholarly resources, including theses, books, abstracts, and court opinions.

It can search the full text (sometimes) – Google Scholar is able to search the full text of articles when that full text is accessible to their web crawlers. This can be very useful in some cases where an important key concept is more likely to appear in the full text of an article than in the item's metadata.

It's interdisciplinary – this is a strength both in finding research on topics that are known to span multiple fields, but also in discovering connections between fields that might not otherwise be apparent in a traditional academic (disciplinary) database.

It's big – Google Scholar is massive and pulls in a huge number of results with every search. This can be helpful for topics that are very narrow in scope, although it can be overwhelming for broader topics.

Google Scholar's Weakenesses:

It isn't human mediated – most academic and scholarly databases have some form of human mediation that ensures that only academic content is added to the database; it also ensures that clear and consistent metadata (like controlled vocabulary) is included with each item added to the database, which has a significant impact on searching and search replicability. Google Scholar relies an algorithm to draw content in, resulting in pseudoscientific articles, works from bad-faith publishers, and user-generated content that may or may not have undergone peer-review.

It might be biased, but it's hard to tell – like Google's primary search engine, Google Scholar's search algorithm and platform details are proprietary, and researchers know little about them. It's unclear what the potential biases of the search algorithm might be. Does it favor larger publishers over smaller ones? North American journals over international content? It does appear to rank older, more highly cited research articles as being more relevant, and also appears to have a strong preference for English language research, but even those are mostly based on researchers' observations, as Google Scholar is very difficult to research.

It doesn't have a defined scope – while there are benefits to being interdisciplinary and including various resource types, it's unclear exactly what Google Scholar's searches encompass.

It doesn't seem to be getting better – unlike most academic and scholarly database providers, who are always looking for feedback and making improvements to their platforms, there is little evidence of this happening in Google Scholar. In fact, Google Scholar is becoming harder to even locate as the years go by. It's unclear whether this tool will continue to be supported in coming years, or if the academic community will be given any warning if it is going to be decommissioned.

It isn't replicable – one of the hallmarks of systematic searching and evidence synthesis is its replicability, and Google Scholar searches aren't reliably replicable. Overall content is likely to overlap, but, as previously mentioned, very little is known about the search algorithm used by Google Scholar.

It's hard to search precisely – Google Scholar searches retrieve a lot of results, but those results are noisy and precision is poor. A lot of what you get back from these searches just aren't relevant. This precision issue is made even more problematic for systematic searchers because Google Scholar limits you to searches of 256 characters or less, which is *significantly* less than would be used in even simple systematic searches.

It has a cap – That's right. Regardless of the number of results for your search, Google Scholar only allows you to review 1000 of them. This can be mitigated to a degree by doing multiple searches and limiting by date, but with Google Scholars' uncertain replicability, even this can be problematic.

It doesn't produce the most unique hits – one of the common arguments for using Google Scholar in general is that you find things there that you don't find other places, but at least in health research, that doesn't hold up well. Yes, you'll find unique content, but it's not the best place to find it. Research shows that you'll tap into more unique content from Embase, MedLine, and Web of Science, that you will in Google Scholar.

It has grey lit, but it's hard to find – Google Scholar has grey literature in it, but it's mostly made up of peer-reviewed research and research produced and distributed by publishers, making the grey literature in it difficult to find. It's often better to search specific sites *using* Google than it is to trust Google to identify those sites itself.

When it's Okay to Use Anyway:

So… When it comes to knowledge synthesis, Google Scholar has its weaknesses, and it has a lot more of those than it does strengths, but it *does* have a place in knowledge synthesis, at least in some cases. A review of 200 knowledge synthesis suggested that it's used in about 20% of reviews. Here are a few of the cases where it can be useful:

Citation searches – like major indexes Scopus and Web of Science, Google Scholar is an excellent tool for tracking article citations. Specifically, it also allows you to review the articles that have cited it since its publication, which is very useful in the hand searching phase of knowledge synthesis.

Hard-to-tap content – because Google Scholar is sometimes able to search the full text of articles, it can be used to tap into topics where the search terms might not appear in the title and abstract. It can also be good for research topics that are underrepresented in the academic literature, and in cases where standard systematic searches have failed to capture *known* articles on a topic.

Very narrow / focused research areas – in fields with little literature in them, Google Scholar's limitations regarding lack of precision and limited review of items are less significant, making them more viable options for including a search in Google Scholar.

Tips for Making the Most of Google Scholar:

While there is a notable lack of evidence in Google Scholar best practices for knowledge synthesis, we do have a few tips if you're going to use it:

Advanced search – take advantage of the advanced searching features to improve the precision of your searches. For example, limit searches to title searches only, or use commands (like site searching) to optimize your results.

Exclude major publishers – one of the features of Google Scholar's advanced search is your ability to exclude articles that include certain terms. Using this to exclude the names of major publishers (like Springer, Taylor and Francis, Elsevier, Wiley, NCBI, and Science Direct) will maximize your unique content by limiting results from those publishers (although the approach is imperfect as article meta data might name the journal but not the publisher).

Limit yourself – in reviews where Google Scholar is used, researchers often limit themselves to only reviewing the first 10 pages of results. Alternately, they may commit to reviewing results until they had gone through 2 pages without finding anything useful.

Alternative to Google Scholar:

If you decide not to use Google Scholar in your review, consider including other types of special resources, like:

Small, specialized databases – lots of fields have small and very specific databases that contain more diverse types of resources and are excellent sources of unique content. For example, indigenous topics may benefit from a search of the Native Health Database.

Site search – this one is HUGE. Take advantage of Google' (not Google Scholar) site search feature to use Google to search specific websites. Google's advanced search function allows you to specify the domain you want to search, so you can use Google to mine research from sites like the US government website (.gov), Canada government (.gc.ca and canada.ca), WHO (who.int), StatsCan (statcan.gc.ca) and more. You can also use this to search smaller publishers websites whose areas of publication overlap with your topic.

Repositories – many universities and research institutions have repositories for their scholarly work. These are excellent sources of both full-text peer-reviewed content and grey literature.

University library catalogues – also called 'discovery layers', library catalogues are excellent places to find a wide variety of research and resource types, but also allows for more precise searching than Google Scholar does.

Publication type sources – lastly, consider databases that specialize in specific publication types, as these are an excellent way to tap into relevant grey literature like clinical trials and dissertations.