Conducting your First Systematic Review

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Hints and Tips

Conducting your First Systematic Review
Clare Howie

Systematic reviews are a type of literature review conducted through comprehensive, systematic searching and defined by premeditated eligibility criteria, according to guidelines. The manner in which these review are carried out ensures replicable research with explicit methods that are preregistered. Systematic reviews allow for the appraisal of evidence on a particular topic, which can be done through narrative synthesis, meta-analysis, and qualitative analyses. They are often considered to be the ‘gold standard’ in evidence synthesis (Evans, 2003).

During postgraduate study, conducting a systematic review can provide the opportunity to develop important research skills and allow you to gain in-depth knowledge in a certain aspect of your PhD topic while creating an original piece of research. The review may provide the basis for a thesis chapter, as well as a possible publication, so it is worth considering a systematic review for your own project.

Tip 1: Planning

Systematic reviews are suitable for both quantitative and qualitative research, but discuss with your supervisors if a systematic review is suitable for your research topic. There are many other forms of literature review may be more appropriate for your work and it is important to identify this at the beginning (Grant & Booth, 2009). Meta-analysis is only one aspect of systematic reviews – it is not possible to conduct this on heterogeneous outcomes and it is important to consider how you will present results. For outcomes of interest that are not homogenous, narrative synthesis allows the reviewer to describe their results systematically, perhaps with the aid of some statistical data.

If you have never conducted a systematic review, discuss this with your colleagues as they may have tips from conducting their own reviews and can advise on possible challenges you may face. I would advise identifying if there are training courses on systematic reviews available through your university or online. Cochrane offer online training courses (https://training.cochrane.org/interactivelearning) or there are other free courses available (https://www.coursera.org/learn/systematic-review). If you are considering submitting your systematic review for publication, check the potential journal guidelines to help guide the structure of your manuscript. Look at blog posts or Twitter, to see others’ experiences of conducting their reviews. They may have tips or identify things you may not have planned for. I found the ‘Meta-Evidence’ blog (Campbell UK & Ireland) to be a great resource, particularly during the planning stages.

Plan the timescale for doing your review and increase it! A systematic review is an original piece of research, and like other projects there may be challenges to overcome that can impede your timing. If this is your first systematic review, prepare to learn as you go along. You will need a second reviewer for the title/abstract screening and full-text eligibility stages, at the very minimum. Consider the second reviewer’s workload and how much time they can dedicate to the review process when planning your timeline. Allow plenty of contingency time when planning.
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Hint:

Do your research before you do your research. Read up on the PRISMA guidelines, look at Cochrane and Campbell Collaboration guidelines.

If your research is focused on a health topic, Cochrane Collaboration is a worldwide organisation focused on the dissemination of high-quality reviews for health research. They provide guidelines on their website on how to conduct reviews to their standards. They also have an online library of their reviews which may provide a starting point for your own search into reviews in your area (https://www.cochranelibrary.com/cdsr/reviews). Similarly, the Campbell Collaboration focuses on the production and circulation of systematic reviews in the area of social, behavioural, and education research (https://campbellcollaboration.org/).

PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-Analyses (Moher et al., 2009), provides an ‘evidence-based set of minimum items’ that systematic reviewers should use for reporting their review. They provide checklists on what should be reported at each stage of your review (for example, introduction, methods).

Tip 2: Formulating the research question

You may have a research question for your review already in mind, great! However, check that there hasn’t already been a systematic review conducted for the research question. If you are still planning your question, examining other systematic reviews in your area may also identify gaps in the research and help with identifying your review topic. Previous reviews may also help identify keywords or databases that can be included within your own search strategy.

Formulating your research question could be the most time-consuming aspect of the review, but it is arguably the most important. It will influence your search strategy, your inclusion and exclusion criteria, and your data extraction process, so taking care and attention during this time may reduce the chances of making mistakes and costing more time. Making use of the ‘Population Intervention Comparison Outcome’ (PICO) framework can greatly help with identifying your question as well as help influence the other stages of the review. While PICO is popular, it may not be suited to the question you wish to answer. Sample, Phenomena of Interest, Design, Evaluation, Research Type (SPIDER: Cooke, Smith, & Booth, 2012) and Setting, Population, Intervention, Comparison, Evaluation (SPICE: Cleyle & Booth, 2006) are other guides that may be more suited to both qualitative and quantitative reviews. SPIDER focuses more on study design and populations, whereas SPICE may be used for reviews focused on evaluations of interventions or services.

Once you have formulated the research question, you should register your review protocol. The review protocol should include your question, search strategy, data extraction process, and how you will report your outcomes. Discuss this process with your supervisory team to determine the best place to publish your protocol (e.g. Prospero, Cochrane, Campbell Collaboration).

Tip 3: Search strategy and the search itself

Talk to your subject librarian, if possible, as early as you can. Arrange a one-to-one meeting with them, as they are experts in using the databases that you may need to use. They can advise you on the best databases to use for your review, provide help with Boolean operators, and how to set up alerts on your searches. Don’t be afraid to ask for their help.

When considering what to include in your search strategy, a good starting point is identify key papers in the topic of interest. Published articles will typically have a number of keywords to help identify them in databases. Examine these keywords and consider if they may be useful for inclusion in your strategy. There may be other systematic reviews in your topic; it may be
beneficial to examine the search strategy they employed and determine if aspects of previous search strategies may be suitable to include in your own. The key to a good search strategy is to ensure your terms are specific enough to your research question, without missing out potentially relevant literature.

After conducting the searches, you should set up an alert on each database to notify you of new, potentially relevant papers. Most importantly, make sure you save your search strategy! You will need this to report how you conducted your search, as well as rerunning searches at a later date. When you have run your searches, make sure you keep detailed notes of dates, strategies, and the number of results from each database.

You may wish to consider using grey literature databases. Grey literature is used to describe evidence not published in ‘commercial publications’ (Paez, 2017). These can include government reports, theses and dissertations, and conference papers. They are some databases dedicated to identifying grey literature, such as ‘OpenGrey’ or ‘EThOS’ (an online library of UK-based doctoral theses). The inclusion of grey literature is recommended in systematic reviews; they can provide further insight into your topic that you may not have identified through traditional database searching.

**Hint:**
Consider how you are going to manage and screen your search results. Will it be an Excel spreadsheet or will you store it all on a reference management software? There are different options for this and some systematic review management software programmes offer free trials, or introductory prices. These can significantly streamline the screening process, but research before using as they may not have some functionalities that are required for your review. For example, I was using Covidence for my own review and found out at the end of the screening process that they do not calculate the inter-rater agreement. It does keep a voting history on each article, so crisis nearly averted, however it added much more time onto this aspect of the review.

**Tip 4: Inclusion and Exclusion Criteria**
Inclusion and exclusion criteria for your review will determine what studies will, or will not, be included for analysis. The criteria will be based around your research question, and the use of PICO, SPICE or SPIDER will help forming the reasons for inclusion or exclusion. Depending on your review question, it may be beneficial to include exclusion criteria such as study type (may only wish to include randomised controlled trials), year of study (the topic of interest may not have been developed before a certain year), population (may exclude certain ages, genders, characteristics), or type of intervention. Your inclusion and exclusion criteria need to be clear to ensure replicability of your systematic review.

For example, in my own review I examined screening to detect individuals at-risk of developing psychosis in educational settings. My population of interest was individuals in educational settings, such as schools or colleges, aged 14 – 35 years (as this is the age range of the phenomena of interest) and I included any screening tools for psychosis-risk. As this area of research is still developing, I chose to include all study types and did not limit the years of study, as I did not want to exclude potentially relevant studies from the small pool of evidence that is available. Exclusion criteria for my review were studies that had individuals already engaged in mental health services and studies that were not available in English (due to limited resources for translating). I found the use of the PICO framework to be crucial for establishing my criteria, and I chose to keep my exclusion criteria limited to ensure I captured all evidence for my question, however this will not suit all reviews.
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Tip 5: Don’t panic!

This is the first systematic review you have conducted, be prepared to make mistakes. Taking your time in preparing your question and search may ensure you don’t make major mistakes, but there may be some bumps along the way. Share these with your supervisory team straight away – they are seasoned researchers and may know the solution to potential challenges.

Good luck!

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References


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Commented [A1]: You give some very helpful guidance in this article which will definitely benefit first time systematic reviewers.

To further improve this article, I would recommend including an additional section covering inclusion and exclusion criteria, and how this is unique to systematic reviews. If you would be happy to give an example from your own work, I think an applied example would really help make this tangible to readers.