Systematic quantitative literature reviews
What are they and why use them?

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Instagram: Professor.pickering
Online supporting material

Search Systematic Quantitative Literature Review, Griffith
https://www2.griffith.edu.au/griffith-sciences/school-environment-science/research/systematic-quantitative-literature-review

Includes –
1. Youtube videos on each stage + advanced SQLR advise
2. Papers outlining the approach
3. Links to lots of papers published using the method
4. Youtube videos of students talking about the method
5. Youtube video on why publish during PhD
6. Example databases

Pass on link to others who may find useful!
Please cite our papers if you use the method -


e.g. it’s a buzz for us to read….

We conducted a systematic literature review following the approach outlined in Pickering and Byrne (2014).
Literature review

• **Process** – gain understanding of the existing literature and how your research will contribute to it.

• **Product** – demonstrate this in the document

Different audiences for literature reviews include – industry/company, academic, consultancy, government...

Relationship between thinking, knowledge production and writing...

But how many of you have had training in literature reviews?
Questions you may have today...

Literature Reviews – we all produce them, but...

1. What is my topic?
2. How do I do them?
3. What method are available?
4. How do the methods differ?
5. Why should I consider doing a...

Systematic Quantitative Literature Review?
General resources


Library has resources – check out:

• Systematic style reviews: https://www.griffith.edu.au/library/research-publishing/working-with-literature/systematic-reviews#review-type

• Systematic style literature reviews for education and social sciences https://libraryguides.griffith.edu.au/c.php?g=451351&p=3333115
Our publications and resources


Lots resources on our method at - http://www.griffith.edu.au/environment-planning-architecture/griffith-school-environment/research/systematic-quantitative-literature-review
Common things in reviews

- Define terms
- Justify selection of literature – it cannot be everything...
- So also...justify omissions
- Have a clear structure and let the reader know about it early in the text (could be historical, conceptual or methodological)
- Critique the literature
- Define the gap
- Link your work with the literature
Criteria for evaluating literature reviews

Coverage
- Is there well justified criteria for inclusion and exclusion of literature?

Synthesis
- Does it distinguish what done from what needs to be done?
- Does it place topic in broader scholarly literature?
- Does it place topic in historical context of field?
- Has the writer acquired and enhanced subject vocabulary?
- Articulated the important variables and phenomena?
- Synthesized and gained a new perspective on literature?
Criteria for evaluating literature reviews

(Boote and Beile 2005)
Methodology
• Identified main methods and techniques (advantages/disadvantages)
• Related ideas and theories to these
Significance
 - Practical significance of the topic
 - Scholarly significance of the research
Rhetoric
• Writing coherent, with a clear structure and style?
Let's start by working out what you are going to review

1. What's my research question?
2. What are the related broad discipline areas? & how do they fit together?
3. What literature do I need to read?
4. What is it an important topic & How do I structure/justify the topic?
1. What's my question?
2. What disciplines are involved?

- Broad discipline area
- Broad discipline area
- Your research

Three circles for structuring
3. What's the literature I need to review?

Relevance of papers
★★★★ Excellent
★★★ Good
★★ Ok
4. How do I structuring my literature review? Turning circles into a triangle

The literature to review

- Broad discipline area
- Broad discipline area
- Broad discipline area
- Your research

The text of the literature review

Aims

Three circles for structuring
4. why it is an important topic & the structure/justification of the topic

The literature to review

The text of the literature review
Stepped out argument
Leading to the aims

Your research

Aims

1

2

3

4
5. Allocate a word budget to each stage

The literature to review

Your research

1. Aims
2. How many words for each section?
3. 1
4. 2
5. 3
6. 4

Three circles for structuring
For larger documents may feel more like...
<table>
<thead>
<tr>
<th>Type</th>
<th>Details</th>
<th>Useful for</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cochrane</td>
<td>• Informs best-practice clinical practice and policy.</td>
<td>Determining the effectiveness of treatments, interventions and programmes.</td>
</tr>
<tr>
<td></td>
<td>• Empirical evidence that meets pre-defined criteria is identified, appraised and synthesised.</td>
<td></td>
</tr>
<tr>
<td>Integrative</td>
<td>• Gives a more complete picture of a situation or experience.</td>
<td>Understanding people's needs and experiences.</td>
</tr>
<tr>
<td></td>
<td>• Combines the findings of diverse types of research (that is, both empirical and theoretical).</td>
<td></td>
</tr>
<tr>
<td>Meta-analysis</td>
<td>• Combines data from multiple independent studies addressing the same question.</td>
<td>Providing a better estimate of the impact or effectiveness of an intervention or treatment.</td>
</tr>
<tr>
<td></td>
<td>• Requires empirical evidence in the form of randomised controlled trials.</td>
<td></td>
</tr>
<tr>
<td>Meta-synthesis</td>
<td>• Examines, interprets and integrates findings of several qualitative studies using qualitative methods.</td>
<td>Clarifying concepts and patterns, and refining existing models and theories.</td>
</tr>
<tr>
<td>Rapid</td>
<td>• Supports time-sensitive decision making.</td>
<td>Delivering answers in a shortened timeframe.</td>
</tr>
<tr>
<td></td>
<td>• Standard systematic review procedures are adapted by removing or modifying some steps.</td>
<td></td>
</tr>
<tr>
<td>Scoping</td>
<td>• Maps the size, breadth and characteristics of a research area, and identifies gaps.</td>
<td>Clarifying key concepts and determining what is known about a topic.</td>
</tr>
<tr>
<td></td>
<td>• Finds, tabulates and synthesises all relevant literature.</td>
<td></td>
</tr>
<tr>
<td>Systematic quantitative literature</td>
<td>• Finds, quantifies and codifies all relevant literature in a spreadsheet or table.</td>
<td>Quantifying the status and characteristics of literature relating to a research area, and identifying gaps.</td>
</tr>
<tr>
<td>Systematic</td>
<td>• Supports evidence-based decision making and informs future research directions.</td>
<td>Providing a comprehensive overview and interpretation of research on a topic.</td>
</tr>
<tr>
<td></td>
<td>• Identifies, evaluates and summarises the findings of all eligible studies.</td>
<td></td>
</tr>
<tr>
<td>Umbrella</td>
<td>• Brings together reviews that answer different questions which all relate to a shared topic.</td>
<td>Bringing together a large amount of diverse evidence from across the different disciplines.</td>
</tr>
<tr>
<td></td>
<td>• Finds, contrasts and synthesises the findings from other systematic-style reviews.</td>
<td></td>
</tr>
</tbody>
</table>
What methods are available?

Here will talk about

1. Narrative literature reviews
2. Meta-analysis (Systematic quantitative review)
3. Systematic Quantitative Literature Review (SQLR)
What about narrative style review?

It involves...

- Reading as much literature as possible
- Assessing its importance
- Constructing carefully argued narrative of your analysis of the current status of research

Review

Impacts of recreation and tourism on plant biodiversity and vegetation in protected areas in Australia

Catherine Marina Pickering*, Wendy Hill

Received 23 March 2006; received in revised form 30 October 2006; accepted 12 November 2006

Available online 17 January 2007
A method for qualitative/narrative reviews

- Define the aims of review
- Review questions
- Search for relevant literature
- Themes
- Appraisal of studies
- Can create summary database
- Synthesis of findings

More detail at
What about systematic approaches (to collecting what will be reviewed)?

- Rigorous
- Comprehensive
- Reproducible
- Clear rules for inclusion/exclusion of data/literature

E.g. Use a protocol to select data/literature

Could be Systematic review = effects or outcomes of interventions, polices, practise and treatments – e.g. meta-analysis

Or Systematic Quantitative Literature Review = systematic search for literature and then quantification of parts of the literature to support the analysis of the studies discussed.
Welcome to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) website!

PRISMA is an evidence-based minimum set of items for reporting in systematic reviews and meta-analyses. PRISMA primarily focuses on the reporting of reviews evaluating the effects of interventions, but can also be used as a basis for reporting systematic reviews with objectives other than evaluating interventions (e.g., evaluating aetiology, prevalence, diagnosis or prognosis).

Who should use PRISMA?

- Authors: PRISMA aims to help authors improve the reporting of systematic reviews and meta-analyses.
- Journal Peer reviewers and editors: PRISMA may also be useful for critical appraisal of published systematic reviews, although it is not a quality assessment instrument to gauge the quality of a systematic review.

Common protocol is PRISMA
Systematic approaches to finding literature/data

## PRISMA 2020 Checklist

<table>
<thead>
<tr>
<th>Section and Topic</th>
<th>Item</th>
<th>Checklist item</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TITLE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Title</td>
<td>1</td>
<td>Identify the report as a systematic review.</td>
</tr>
<tr>
<td><strong>ABSTRACT</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abstract</td>
<td>2</td>
<td>See the PRISMA 2020 for Abstract checklist.</td>
</tr>
<tr>
<td><strong>INTRODUCTION</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rationale</td>
<td>3</td>
<td>Describe the rationale for the review in the context of existing knowledge.</td>
</tr>
<tr>
<td>Objectives</td>
<td>4</td>
<td>Provide an explicit statement of the objective(s) or question(s) the review addresses.</td>
</tr>
<tr>
<td><strong>METHODS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eligibility criteria</td>
<td>5</td>
<td>Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.</td>
</tr>
<tr>
<td>Information sources</td>
<td>6</td>
<td>Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.</td>
</tr>
<tr>
<td>Search strategy</td>
<td>7</td>
<td>Present the full search strategies for all databases, registers and websites, including any filters and limits used.</td>
</tr>
<tr>
<td>Selection process</td>
<td>8</td>
<td>Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.</td>
</tr>
<tr>
<td>Data collection process</td>
<td>9</td>
<td>Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.</td>
</tr>
<tr>
<td>Data items</td>
<td>10a</td>
<td>List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.</td>
</tr>
<tr>
<td></td>
<td>10b</td>
<td>List and define all other variables for which data were sought (e.g. participant and Intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.</td>
</tr>
<tr>
<td>Study risk of bias assessment</td>
<td>11</td>
<td>Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.</td>
</tr>
<tr>
<td>Effect measures</td>
<td>12</td>
<td>Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.</td>
</tr>
<tr>
<td><strong>Synthesis methods</strong></td>
<td>13a</td>
<td>Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis item #5)).</td>
</tr>
<tr>
<td></td>
<td>13b</td>
<td>Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.</td>
</tr>
<tr>
<td></td>
<td>13c</td>
<td>Describe any methods used to tabulate or visually display results of individual studies and syntheses.</td>
</tr>
<tr>
<td></td>
<td>13d</td>
<td>Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.</td>
</tr>
<tr>
<td></td>
<td>13e</td>
<td>Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).</td>
</tr>
<tr>
<td></td>
<td>13f</td>
<td>Describe any sensitivity analyses conducted to assess robustness of the synthesized results.</td>
</tr>
<tr>
<td>Reporting bias assessment</td>
<td>14</td>
<td>Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).</td>
</tr>
<tr>
<td>Certainty assessment</td>
<td>15</td>
<td>Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.</td>
</tr>
<tr>
<td>Section and Topic</td>
<td>Item</td>
<td>Checklist Item</td>
</tr>
<tr>
<td>-------------------</td>
<td>------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>RESULTS</td>
<td>16a</td>
<td>Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.</td>
</tr>
<tr>
<td></td>
<td>16b</td>
<td>Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.</td>
</tr>
<tr>
<td></td>
<td>17</td>
<td>Cite each included study and present its characteristics.</td>
</tr>
<tr>
<td></td>
<td>18</td>
<td>Present assessments of risk of bias for each included study.</td>
</tr>
<tr>
<td></td>
<td>19</td>
<td>For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.</td>
</tr>
<tr>
<td></td>
<td>20a</td>
<td>For each synthesis, briefly summarize the characteristics and risk of bias among contributing studies.</td>
</tr>
<tr>
<td></td>
<td>20b</td>
<td>Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.</td>
</tr>
<tr>
<td></td>
<td>20c</td>
<td>Present results of all investigations of possible causes of heterogeneity among study results.</td>
</tr>
<tr>
<td></td>
<td>20d</td>
<td>Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.</td>
</tr>
<tr>
<td></td>
<td>21</td>
<td>Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthetic assessed.</td>
</tr>
<tr>
<td></td>
<td>22</td>
<td>Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.</td>
</tr>
<tr>
<td>DISCUSSION</td>
<td>23a</td>
<td>Provide a general interpretation of the results in the context of other evidence.</td>
</tr>
<tr>
<td></td>
<td>23b</td>
<td>Discuss any limitations of the evidence included in the review.</td>
</tr>
<tr>
<td></td>
<td>23c</td>
<td>Discuss any limitations of the review processes used.</td>
</tr>
<tr>
<td></td>
<td>23d</td>
<td>Discuss implications of the results for practice, policy, and future research.</td>
</tr>
<tr>
<td>OTHER INFORMATION</td>
<td>24a</td>
<td>Provide registration information for the review, including register name and registration number, or state that the review was not registered.</td>
</tr>
<tr>
<td></td>
<td>24b</td>
<td>Indicate where the review protocol can be accessed, or state that a protocol was not prepared.</td>
</tr>
<tr>
<td></td>
<td>24c</td>
<td>Describe and explain any amendments to information provided at registration or in the protocol.</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.</td>
</tr>
<tr>
<td></td>
<td>26</td>
<td>Declare any competing interests of review authors.</td>
</tr>
<tr>
<td></td>
<td>27</td>
<td>Report which of the following are publicly available and where they can be found: templates data collection forms; data extracted from included studies; data used for all analyses, analytic code; any other materials used in the review.</td>
</tr>
</tbody>
</table>
Maybe try a Meta-analysis?

• Statistical method for combining results from separate studies to assess effect size often using weighted average.
• Often need studies with similar methodology, similar subjects and similar response variables
• Common in health sciences and many other areas when enough suitable datasets.
• Can need team of experts and lots of time!
• Deals with issues of low sample sizes and voodoo correlations in some single studies

See interesting new meta-analysis of the literature assessing relationships between student evaluations of teaching (SET) and student learning including critiquing previous meta-analysis and conducting a much more rigorous one.

And basically, it says student satisfaction is NOT linked to leaning success

Examples of systematic reviews using meta-analysis

Cochrane Databases of systematic reviews (mostly health care but also social)

Campbell Collaboration – public policy interventions (crime, education, social welfare etc)


So what about using a systematic quantitative literature review?

Mapping the discipline...

1. **Systematic** = methods to survey literature and select papers to include are explicit and reproducible

2. **Quantitative** = measure of the amount (number of papers) of research within different sections of topic

3. **Comprehensive** = assesses different combinations of locations, subjects, variables and responses

4. **Structured** = working out what is important about the literature (categories/subcategories) - collecting, analysing literature, and writing follows clear steps
Easier step by step process for collecting, analysing the data and writing the review:

- **Step 1**: Define topic
- **Step 2**: Formulate research questions
- **Step 3**: Identify keywords
- **Step 4**: Identify & search databases
- **Step 5**: Read & assess publications
- **Step 6**: Structure database
- **Step 7**: Enter first 10% papers
- **Step 8**: Test & revise categories
- **Step 9**: Enter bulk of papers
- **Step 10**: Produce & review summary tables
- **Step 11**: Evaluate key results & draft results section
- **Step 12**: Draft methods
- **Step 13**: Draft introduction
- **Step 14**: Draft discussion & abstract
- **Step 15**: Revise document till ready for submission
## Summary of the different methods

<table>
<thead>
<tr>
<th></th>
<th>Traditional narrative</th>
<th>Systematic quantitative literature review</th>
<th>Systematic review (data) Meta-Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Who commonly does the reviews?</td>
<td>Experts &amp; new PhD students</td>
<td>PhD students &amp; others</td>
<td>Teams of experts</td>
</tr>
<tr>
<td>How can usually publish them</td>
<td>Experts</td>
<td>PhD students &amp; others</td>
<td>Teams of experts</td>
</tr>
<tr>
<td>How papers selected</td>
<td>Rarely systematic</td>
<td>Systematic</td>
<td>Systematic</td>
</tr>
<tr>
<td>Compiling data on papers</td>
<td>Rarely systematic</td>
<td>Systematic</td>
<td>Systematic</td>
</tr>
<tr>
<td>Comparing papers</td>
<td>Expert evaluation</td>
<td>Quantitative or expert evaluation</td>
<td>Expert evaluation</td>
</tr>
<tr>
<td>Statistical analysis</td>
<td>No</td>
<td>If want to</td>
<td>Yes</td>
</tr>
<tr>
<td>Gap analysis</td>
<td>Descriptive</td>
<td>Quantitative</td>
<td>Descriptive</td>
</tr>
<tr>
<td>Structure of the document</td>
<td>Narrative</td>
<td>Standard</td>
<td>Standard</td>
</tr>
<tr>
<td>Easy for updating</td>
<td>Limited</td>
<td>Easy</td>
<td>Re do statistics</td>
</tr>
</tbody>
</table>
Method with benefits...

1. Straight forward structure/process for undertaking and writing review
2. Maps the literature by – finding geographic, scalar, theoretical and methodological gaps
3. Identifies unknown unknowns
4. Can be rapidly turned into academic paper
5. Database can be easily updated
6. Database useful for intro/discussion of other papers/later research
7. Easier latter as do not have to re-read the whole literature again!
Systematic quantitative literature views works for students

Average 7.5 times as many citations as none review papers

Lots of them to use as examples
So how do you do it...

https://www2.griffith.edu.au/griffith-sciences/school-environment-science/research/systematic-quantitative-literature-review

Includes –
1. Youtube videos on each stage,
2. Papers outlining the approach,
3. Lots papers published using the method,
4. Youtube videos of students talking about the method
5. Youtube video on why publish during PhD
6. Example databases

Pass on link to others who may find useful!
Step 1: Define topic

Step 2: Formulate research questions

Step 3: Identify keywords

Step 4: Identify & search databases

Step 5: Read & assess publications

Step 6: Structure database

Step 7: Enter first 10% papers

Step 8: Test & revise categories

Step 9: Enter bulk of papers

Step 10: Produce & review summary tables

Steps 13: Draft introduction

Step 14: Draft discussion & abstract

Step 15: Revise document till ready for submission
Being systematic when fishing

Aim: need to catch all the specified fish, but not spend forever, and minimise bycatch.

Questions

1. **Why fish?** Aims and research questions
2. **What fish?** Papers vs books, thesis, reports and other grey literature, other languages etc
3. **What nets to use?** Are there keywords that work? Title+Keywords+Abstract vs whole paper?
4. **Where to fish?** Which Databases and how do they differ?
5. **How long to fish?** When have you found all the specified fish?
Step 1. Define topic

Works well for:

• Emerging/Rapidly expanding areas
• Topics where methods so diverse cannot do meta-analysis
• Trans-disciplinary fields
• Quantitative and qualitative literatures

Not where counting does not count, and not where keywords will not work.
Step 2. Formulate research questions

...e.g...

1. Who did the research and when?
2. Where was the research done? – geographical spread
3. What are the main themes?
4. What methods were used?
5. What subjects were examined?
6. What variables were measured?
7. What patterns were found in results?
8. What are the gaps and future trends?
Step 3. Key words

• Need to identify relevant literature, but not lots and lots of irrelevant literature
• Trial and error
• May need synonyms

Talk to university librarians

Example... (also use wildcards)


NB: check out bottom of this webpage to find out who is your expert librarian
https://www.griffith.edu.au/library/research-publishing
May want to use word clouds to help work out search terms based on papers/abstracts you already know are relevant
Some databases used in papers

1. Google Scholar
2. Web of Science
3. ProQuest
4. Research Gate
5. SCOPUS
6. Science Direct
7. Sage
8. EconLit
9. CINAHL
10. PsycINFO
11. PubMed
12. ERICMedline databases
13. CINAHL Plus
14. Business Source
15. Communication Source
16. Education Source
17. CiNii
18. J-STAGE
19. Emerald Insight
20. Wiley Online

Step 4. Search databases relevant to your field

Record info for PRISMA statement

Records identified through database searching (n = 745)

Additional records identified through other sources (n = 8)

Records after duplicates removed (n = 467)

Records screened (n = 467)

Records excluded (n = 382)

Full-text articles assessed for eligibility (n = 85)

Full-text articles excluded, with reasons (n = 38)

Studies included in quantitative synthesis (n = 47)
Step 5. Read and assess papers

For each publication:

- Is it relevant?
- Abstract for some, whole paper for others

Need criteria for inclusion – reproducibility

- Original research papers only? (may want to limit to certain types of research)

Use reference lists and citations of the paper to cross-check you have all (most!) papers – that its systematic.

How many relevant papers did you find?

- If <15 papers – narrative might be better, or broaden topic
- If >300 may need to narrow topic
Creating your own database

Step 1: Define topic

Step 2: Formulate research questions

Step 3: Identify keywords

Step 4: Identify & search databases

Step 5: Read & assess publications

Step 6: Structure database

Step 7: Enter first 10% papers

Step 8: Test & revise categories

Step 9: Enter bulk of papers

Step 10: Produce & review summary tables

Step 11: Evaluate key results & draft results section

Step 12: Draft methods

Steps 13: Draft introduction

Step 14: Draft discussion & abstract

Step 15: Revise document till ready for submission
Step 6: Structure database

Work out categories and subcategories...
This provides structure for the review
Include data on...
Who does research, where, using what methods, what response variables, what subjects, what types of analysis was used, what found?
Excel works well but can use other programs
• Each paper is a row
• Categories/subcategories are columns

<table>
<thead>
<tr>
<th>Ref No.</th>
<th>Author</th>
<th>Year of Pub</th>
<th>Title</th>
<th>Journal published in</th>
<th>Journal Discipline</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Science and Environment</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Policy</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Urban</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>Energy</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Development Studies</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Economics</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Building &amp; Engineering</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sustainability</td>
</tr>
</tbody>
</table>
May want to use word clouds again, but this time to help work out categories, terms and themes.
Categories about the paper

Full reference details: Authors names
Year, Journal title, Journal discipline, Article research discipline

Categories about geographic location of research

City, State, Country, Continent, Climatic zone, General habitat types, others
**Categories for subjects of research**

For Birds
- Number and name of bird species assessed?
- Conservation status of the birds?
- Type of foraging guild?

**Categories for response variables**

For birds
- Individual response? (physiological or behavioural),
- Population level response? (density/abundance),
- Reproductive response? (number of nests, number eggs laid, number of chicks that hatched or fledged)?
Categories about the methods used

What you include depends on the discipline...... Some examples...

• Observational vs experimental?
• Was it a BACI design or what.. What statistics were used....?
• Natural science, social science or mixed?
• Which qualitative approach(es)? (interviews, content and text analysis, case studies, observations, focus groups, archival research),
• Which quantitative approach(es)? (questionnaire surveys, field-surveys and samples, field experiments, GIS, remote sensing and satellite imagery)
• Which mixed approach? (including existing data base and records searches, or other literature analysis).
Weighting methods/studies.....

Weight studies by types of evidence?
1. Randomized control trails (number replicates, effect size etc)
2. Before, After, Control, Impact (BACI) experiments
3. Experiments with controls
4. Observational studies with ‘controls’, Quasi-experimental designs,
5. Observational studies without ‘controls’,
6. Cohort studies
7. Case studies

Can also use checklists to compare studies using similar methods – high, moderate and low quality....

Problem if interdisciplinary study in how to assess different types of evidence....
Categories for results

- Studied and discussed, or actually demonstrated?
- Outcomes positive, negative, neutral, mixed or other?
- More detailed results – Statistically significant, size effect/number of replicates, power of analysis?
- Others?
Step 7. Enter around 10% of papers

- **Step 1** Define topic
- **Step 2** Formulate research questions
- **Step 3** Identify keywords
- **Step 4** Identify & search databases
- **Step 5** Read & assess publications
- **Step 6** Structure database
- **Step 7** Enter first 10% papers
- **Step 8** Test & revise categories
- **Step 9** Enter bulk of papers
- **Step 10** Produce & review summary tables
- **Step 11** Evaluate key results & draft results section
- **Step 12** Draft methods
- **Steps 13** Draft introduction
- **Step 14** Draft discussion & abstract
- **Step 15** Revise document till ready for submission
Step 8. How well do the categories work?

• Are they to narrow or broad?
• Do you need additional values, new subcategories?
• Do the criteria apply to categories work in reality?
• Reflection now saves lots of time later!

Step 9: Enter rest of papers

• Again cross check your categories and criteria
• Check your database is comprehensive (reference lists)
Step 10: Produce and review summary tables so you can....

1. Check your database is accurate (entry errors)
2. Start to work out the most important results

A few examples of tables from papers...
Where studies?

<table>
<thead>
<tr>
<th>Country</th>
<th>Community Gardens</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>51</td>
<td>119</td>
</tr>
<tr>
<td>Australia</td>
<td>12</td>
<td>26</td>
</tr>
<tr>
<td>Canada</td>
<td>5</td>
<td>17</td>
</tr>
<tr>
<td>UK</td>
<td>8</td>
<td>18</td>
</tr>
<tr>
<td>South Africa</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Netherlands</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Singapore</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Spain</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Cuba</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Mexico</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Portugal</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Sweden</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Israel</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Brazil</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Other Africa</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Philippines</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>89</td>
<td>195</td>
</tr>
</tbody>
</table>

# papers on community gardens by countries and # countries authors from (based on author affiliations).

Figure 1. Location in USA of gardens in the literature.
## Definitions used in papers

<table>
<thead>
<tr>
<th>Category</th>
<th>Total</th>
<th>USA</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>Characteristics of gardens</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Definition</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>30</td>
<td>18</td>
<td>12</td>
</tr>
<tr>
<td>No</td>
<td>55</td>
<td>31</td>
<td>24</td>
</tr>
<tr>
<td>Typology</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Food produced</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>75</td>
<td>46</td>
<td>29</td>
</tr>
<tr>
<td>Food only</td>
<td>47</td>
<td>22</td>
<td>25</td>
</tr>
<tr>
<td>Food and flowers</td>
<td>25</td>
<td>23</td>
<td>2</td>
</tr>
<tr>
<td>Food &amp; revegetation</td>
<td>4</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>No</td>
<td>12</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>Not specified</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Methods used in papers

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<thead>
<tr>
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<th>USA</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methods</td>
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<td></td>
</tr>
<tr>
<td>Science</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>76</td>
<td>43</td>
<td>33</td>
</tr>
<tr>
<td>Natural science</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Mixed</td>
<td>9</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Methods</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interview</td>
<td>53</td>
<td>28</td>
<td>25</td>
</tr>
<tr>
<td>Case study</td>
<td>23</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td>Observation</td>
<td>26</td>
<td>12</td>
<td>14</td>
</tr>
<tr>
<td>Survey</td>
<td>27</td>
<td>18</td>
<td>9</td>
</tr>
<tr>
<td>Text analysis</td>
<td>14</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>Focus groups</td>
<td>13</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>Natural science</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>17</td>
<td>11</td>
<td>6</td>
</tr>
<tr>
<td>Type of data</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Qualitative</td>
<td>51</td>
<td>28</td>
<td>23</td>
</tr>
<tr>
<td>Quantitative</td>
<td>5</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Both</td>
<td>31</td>
<td>19</td>
<td>12</td>
</tr>
</tbody>
</table>
### Number of papers by discipline and results

<table>
<thead>
<tr>
<th>Journal discipline</th>
<th>Positive</th>
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<th>Neutral</th>
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<th>Mixed</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>US</td>
<td>Other</td>
<td>Total</td>
<td>US</td>
<td>Other</td>
<td>Total</td>
<td>US</td>
</tr>
<tr>
<td>Social</td>
<td>14</td>
<td>10</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td></td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Enviro. &amp; planning</td>
<td>16</td>
<td>5</td>
<td>11</td>
<td>2</td>
<td>2</td>
<td></td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Health</td>
<td>9</td>
<td>4</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Economy</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td>1</td>
<td>1</td>
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<tr>
<td>Education</td>
<td>7</td>
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<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>1</td>
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<tr>
<td>Geography</td>
<td>17</td>
<td>7</td>
<td>10</td>
<td>4</td>
<td>4</td>
<td></td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Biology</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>67</td>
<td>35</td>
<td>32</td>
<td>5</td>
<td>5</td>
<td></td>
<td>7</td>
<td>5</td>
</tr>
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<td></td>
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</tr>
</tbody>
</table>
Trends over time

Content of Social Science abstracts at conference over time
Cluster analysis of related theory/theorist

**Group average**

Resemblance: S17 Bray Curtis similarity
Leximancer analysis of themes


Map concepts by extracting and ranking a list of key words and phrases from source texts. Then uses intelligent algorithm to iteratively build a thesaurus of concepts from more than one or two keywords. Concepts are indexed and weighted.

Identify related concepts, but also topics missing
3. Writing the review

Step 1 Define topic

Step 2 Formulate research questions

Step 3 Identify keywords

Step 4 Identify & search databases

Step 5 Read & assess publications

Step 6 Structure database

Step 7 Enter first 10% papers

Step 8 Test & revise categories

Step 9 Enter bulk of papers

Step 10 Produce & review summary tables

Step 11 Evaluate key results & draft results section

Step 12 Draft methods

Step 13 Draft introduction

Step 14 Draft discussion & abstract

Step 15 Revise document till ready for submission
Although its a literature review it could have a standard (science) paper structure

<table>
<thead>
<tr>
<th>Sections</th>
<th>Order written</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstract</td>
<td>7</td>
</tr>
<tr>
<td>Introduction</td>
<td>3 (aims) 5/6 rest</td>
</tr>
<tr>
<td>Methods</td>
<td>1</td>
</tr>
<tr>
<td>Results</td>
<td>2</td>
</tr>
<tr>
<td>Discussion</td>
<td>5/6</td>
</tr>
<tr>
<td>Conclusion</td>
<td>4</td>
</tr>
<tr>
<td>Reference</td>
<td>8</td>
</tr>
</tbody>
</table>

More time thinking about what to say = less time writing
Step 11: Methods

Need details about
• Key words
• Databases searched
• PRISMA statement
• Criteria for using a paper
• Categories/subcategories – what, why and how values assigned
• Data analysis/issues examined
12: Writing the Results

Text match and highlight key results

1. How many papers?
2. Who publishes?
3. Where has research been done?
4. What disciplines do research on this topic?
5. What methods are used?
6. What's been found/demonstrated?
7. What's missing – gaps?
8. Results need to match research questions – so update as required
Revising your Aims so match the results

Update your aims. They are the last paragraph of the introduction – often a list of aims

This paper assesses....

1.
2.
3.
4.

Structure what you need to say in the rest of the paper before writing
13. Introduction

• Carefully stepped out argument from the most general to the most detailed – e.g. your aims
• ~4-5 paragraphs for a paper, longer for a thesis/report?
• Remember its a stepped argument, so everything needs to lead to the aims...
• Which need to be good and match what you actually did and found....
14a. Discussion

• Discuss the results in relation to the literature...
• For this literature review discuss the implications of what you found.

e.g. From Guitart et al. it was...

1. Community gardens literature is geographically limited
2. Community gardens literature is diverse
3. Current research reflects USA social-political context
4. Future directions
ABSTRACT

Globally, rapid urbanisation has substantially reduced the amount of viable agricultural land – a food security issue. Food security is bringing a renewed scholarly interest in community gardens. This paper reviews the extent of English academic literature on community gardens, including: who has undertaken the research, where it has been published, the geographical location of the gardens studied, and the various methods used to undertake the research. The characteristics of the community gardens are summarised, including what types of plants are grown, who is involved in the gardens, and who owns the land. The motivations, benefits and limitations of community gardening are also examined. Finally, potential directions for research into community gardens are highlighted. Academic literature on community gardens is dominated by studies investigating gardens in low-income areas with diverse cultural backgrounds. Research based in cities in the USA also dominates the literature. Scholars from a wide diversity of disciplines have examined community gardens but research is mostly concentrated in the social sciences. The natural sciences are notably under-represented, yet they have much to offer including assessing gardening practices to better understand the agro-biodiversity conservation potential of community gardens.
Step 15: Revise the paper till ready for submission

More practice = fewer drafts – but few people get it right first go as different drafts have different functions.

- Early-drafts are about getting the information on paper
- Mid-drafts are about working out a better way to convey the information
- Later-drafts are about checking it’s all there and polishing.
Adding a SQLR to a PhD thesis

<table>
<thead>
<tr>
<th>Chapters</th>
<th>Traditional</th>
<th>With SQLR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction</td>
<td>Introduction – shorter, general focus</td>
</tr>
<tr>
<td>2</td>
<td>Methods</td>
<td>SQLR</td>
</tr>
<tr>
<td>3</td>
<td>Results</td>
<td>Methods results/chapter/paper</td>
</tr>
<tr>
<td>4</td>
<td>Results</td>
<td>Methods results/chapter/paper</td>
</tr>
<tr>
<td>5</td>
<td>Results</td>
<td>Methods results/chapter/paper</td>
</tr>
<tr>
<td>6</td>
<td>Final chapter (discussion/conclusion)</td>
<td>Final chapter (discussion/conclusion)</td>
</tr>
</tbody>
</table>

Remember to check out website with lots of examples of this style of thesis including those using SQLR
So as you can see...

1. Straight forward structure/process for undertaking and writing review
2. Maps the literature by – finding geographic, scalar, theoretical and methodological gaps
3. Useful to demonstrate what you will do in your PhD
4. Can be rapidly turned into paper
5. Database can be easily updated
6. Database useful for intro/discussion of other PhD papers
7. Easier to use for final thesis without having to re-read the whole literature again!
Remember the supporting material

https://www2.griffith.edu.au/griffith-sciences/school-environment-science/research/systematic-quantitative-literature-review

Includes –
1. Youtube videos on each stage,
2. Papers outlining the approach,
3. Lots papers published using the method,
4. Youtube videos of students talking about the method
5. Youtube video on why publish during your PhD
6. Example databases

Pass on link to others who may find useful!
Our publications and resources


Lots resources on our method at - http://www.griffith.edu.au/environment-planning-architecture/griffith-school-environment/research/systematic-quantitative-literature-review
How to find the knowns and unknowns in any research

1 October 2014, 5.44am AEST

AUTHORS

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Professor at Griffith University

Jason Byrne
Senior Lecturer - Environmental Planning at Griffith University

DISCLOSURE STATEMENT

Jason Byrne has received consulting funding from the Queensland Government and US National Park Service. He is a member of The Greens and the Gold Coast and Hinterland Environment Council (GECKO) as well as the Planning Institute of Australia, Institute of Australian Geographers, Association of American Geographers, International Urban Fellows Association and Society for Human Ecology.

Catherine Pickering does not work for, consult to, own shares in or receive funding from any company or organisation that would benefit from this article, and has no relevant affiliations.

Science + Technology

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