

Evidence Synthesis in STEM:

Expand your competence to serve your
emerging researchers

Dianna Morganti, MLS, PMP®

STEM Librarians South



Disclaimer

This presentation is non-Health STEM library workers who are novices in this area.

Everyone else – health sciences colleagues, and those with experience, please add your resources to learn from in the chat!



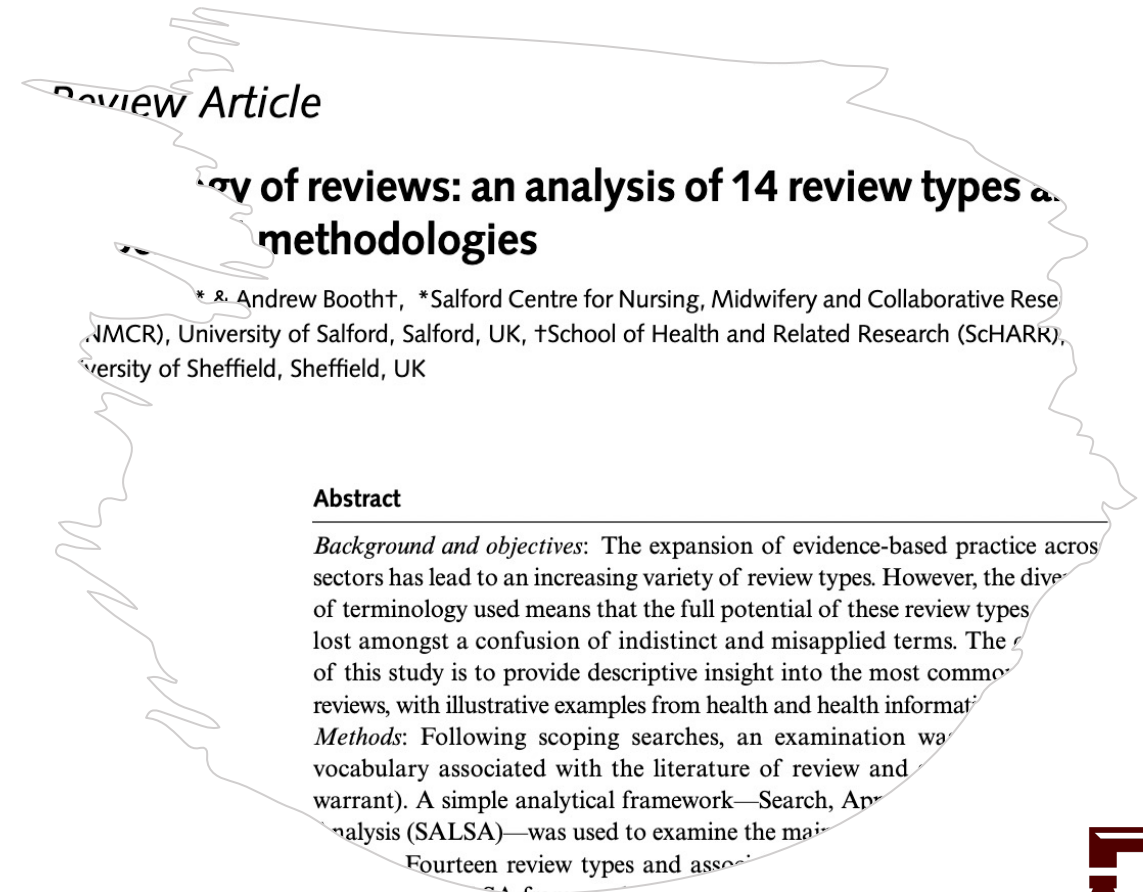
Inspiration

- STEM South 2021!
 - Baylor University: [See a need, fill a need](#)
 - UT Austin: [Systematic review services moving beyond health sciences](#)
- Moving to Texas A&M
 - Need to quickly up my competence
 - Existing/emerging services in STEM: [Systematic reviews training for librarians: planning, developing, and evaluating](#)
- Creating a Professional Learning Community



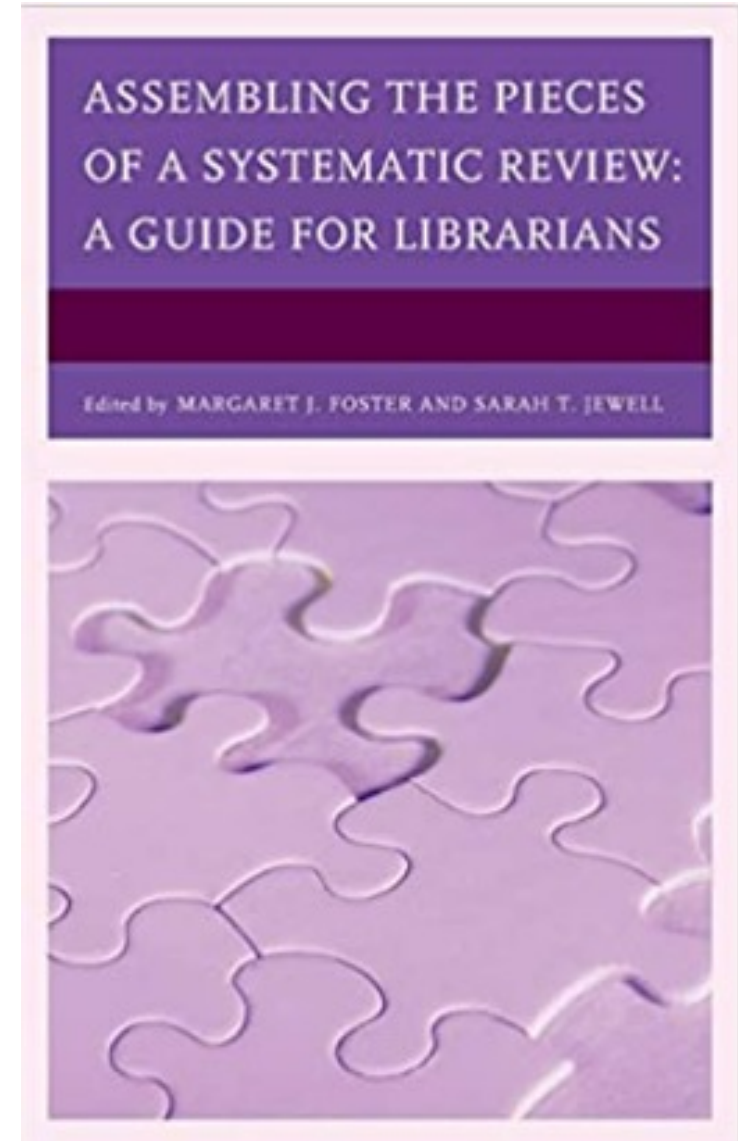
Definitions

- **Evidence Synthesis:** broad term that means taking evidence from multiple places and synthesizing it together into one, new, larger study. Standardized types include:
 - **Narrative Literature Review**
 - **Scoping Review**
 - **Systematic Review**
 - **Metasynthesis**
- [A typology of reviews: an analysis of 14 review types and associated methodologies](#)



Components of Evidence Synthesis

- Research question
- Search Strategy
- Chosen databases/sources – number of studies found in each
- Inclusion criteria
- Tracking of which studies you exclude and why
- Quality review
- Synthesizing important information from the given studies
- Published protocols – often missing in STEM!
- Presenting your findings



Evidence Synthesis methods in non-health STEM disciplines

- [Systematic Literature Reviews in Engineering Education and Other Developing Interdisciplinary Fields](#)
 - “State of the art” type review
 - FANTASTIC teaching tool, because methodology is detailed and critique provides guardrails
 - 440+ citations in GS
- [Guidelines for performing Systematic Literature Reviews in Software Engineering](#)
 - Led to [ACM SIGSOFT Empirical Standards for Software Engineering Research](#)
 - Adopted by many authors in other computer science or related engineering disciplines
 - 8780+ citations in GS
 - Kitchenham: 49,247 citations in GS



Other existing STEM Standards

- [Guidelines and Standards for Evidence Synthesis in Environmental Management](#)
 - [Exploration of adoption](#)
- [Application of systematic review methodology to food and feed safety assessments to support decision making](#)
 - [Exploration of adoption](#)
- **Do you know of more? Add them in the chat**

Evidence Synthesis in Health and Social Sciences

- Health Sciences: [Cochrane Handbook for Systematic Reviews of Interventions](#)
- Social Sciences: [Campbell Collaboration](#)
 - Business & Management, Crime & Justice, Disability, Education, International Development (including Nutrition), Knowledge Translation & Implementation, Social Welfare, and more

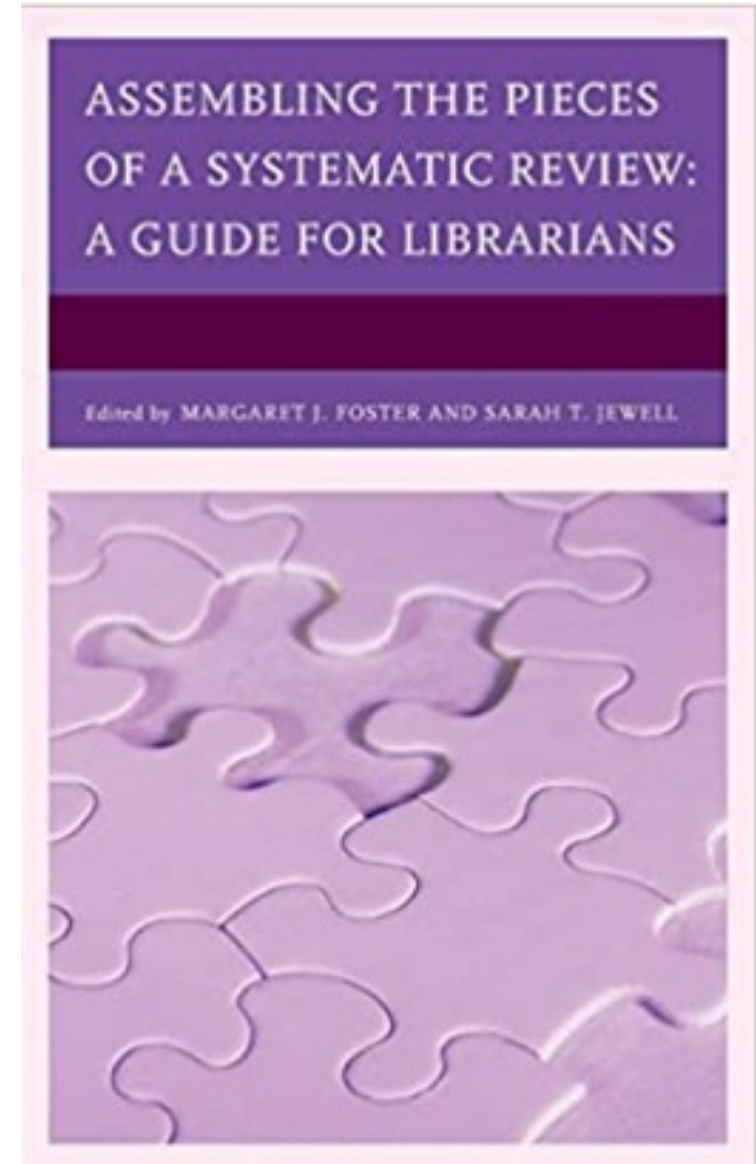


Library Services for Health: PIECES

12 Webinar Series by Margaret Foster:

<https://csrrs.library.tamu.edu/recorded-webinars>

Recommendation: check it out once you understand STEM first



Spaces to learn more about STEM Evidence Synthesis

- [Evidence Synthesis Institute](#): IMLS-funded institute for evidence synthesis in topics outside of the health sciences
 - 4-day workshops
 - Breakout groups by discipline
 - 33-month project started in 2020
- STEM-specific library conferences
 - STEM Librarians South
 - STEM Collaborative
 - Where else?
- LibGuides Community search: Systematic Reviews and [Discipline]



Tools of note

- Search strategy
 - [PRESS: Peer review of electronic search strategies](#)
- Citation Management
 - EndNote most common (Zotero often noted as difficult for Evidence Synthesis)
- Tools to help sorting through studies
 - Compendex, Rayyan, others (throw them in chat)
- Tools to help with synthesis
 - Any data gathering/analysis tools from Excel to Python, etc.
- Prisma Reporting: [Prisma flows](#) provide visualization of the evidence synthesis methodology
- Check out the [SR Toolbox](#) for lots more



Adapt your consults in Evidence Synthesis

- Start by asking what type of research are they conducting, is it an assignment, and is there a due date?
- Model creating Documentation and/or Vendor Accounts as you go.
- Considering adapting consultation request form to ask more detailed information.



Creating a “Service”

- Start by reading case studies – lots of libraries have published articles on how to (or why not to) start a service
- You MUST invite stakeholders, including both supporting and non-supporting colleagues to the conversation
- Almost always tiered – from simple consults to co-authorship
- Some case studies to check out:
 - [TAMU](#)
 - [Cornell](#)
 - [University of Minnesota](#)
 - [University of Sydney](#)
- HOT TIP: Check their website to see if they still offer it and how their descriptions have changed



Create your own gentle learning path

- Look for a systematic review of systematic reviews (umbrella review) in your field
- Look for standards
- Search for systematic reviews in your field
 - Refine for your institution
- Revisit a prior consultation topic you've had recently. Pretend it was a systematic review. How would you change it?
- Ask to shadow instruction
- Create your own library of materials, templates, etc.



Cited Sources 1/3

1. Grant, M.J. and Booth, A. (2009), A typology of reviews: an analysis of 14 review types and associated methodologies. Health Information & Libraries Journal, 26: 91-108. <https://doi.org/10.1111/j.1471-1842.2009.00848.x>
2. Chan-Park, C., Carriveau, K., & James, A. (2021). See a Need, Fill a Need. STEM Librarian South. [https://stemlib.figshare.com/articles/conference_contribution/See a Need Fill a Need pptx/15105672](https://stemlib.figshare.com/articles/conference_contribution/See_a_Need_Fill_a_Need_pptx/15105672)
3. Hannah, C. T., & Vetter, I. (2021). Systematic Review Services Moving Beyond Health Sciences: Librarians' Response at UT Austin. STEM Librarian South. [https://stemlib.figshare.com/articles/presentation/Systematic Review Services Moving Beyond Health Sciences Librarians Response at UT Austin/15142515](https://stemlib.figshare.com/articles/presentation/Systematic_Review_Services_Moving_Beyond_Health_Sciences_Librarians_Response_at_UT_Austin/15142515)
4. Foster M, Halling T, Pepper C. Systematic reviews training for librarians: planning, developing and evaluating. JEAHIL [Internet]. 22Jun.2018 [cited 26Jul.2022];14(1):4-. Available from: <http://ojs.eahil.eu/ojs/index.php/JEAHIL/article/view/248>
5. Jewell, S. T., & Foster, M. J. (2017). Assembling the pieces of a systematic review : a guide for librarians. Rowman & Littlefield.
6. Borrego, M., Foster, M. J., & Froyd, J. E. (2014). Systematic Literature Reviews in Engineering Education and Other Developing Interdisciplinary Fields. Journal of Engineering Education, 103(1), 45-76. <https://doi.org/https://doi.org/10.1002/jee.20038>
7. Kitchenham, Barbara. (2007). Guidelines for performing systematic literature reviews in software engineering (Vol. 5). Technical report, ver. 2.3 EBSE technical report. EBSE. https://www.elsevier.com/_data/promis_misc/525444systematicreviewsguide.pdf
8. Ralph, P., Ali, N. B., Baltes, S., Bianculli, D., Diaz, J., Dittrich, Y., ... & Vegas, S. (2020). Empirical standards for software engineering research. arXiv preprint arXiv:2010.03525.



Cited Sources, cont. 2/3

9. Collaboration for Environmental Evidence. 2018. Guidelines and Standards for Evidence synthesis in Environmental Management. Version 5.0 (AS Pullin, GK Frampton, B Livoreil & G Petrokofsky, Eds) www.environmentalevidence.org/information-for-authors [date of access]
10. Boice, J. (2019). An Exploration of Systematic Review Publication Trends in Conservation Biology Journals. *Issues in Science and Technology Librarianship*, (91). <https://doi.org/10.29173/istl2>
11. European Food Safety Authority; Application of systematic review methodology to food and feed safety assessments to support decision making. *EFSA Journal* 2010; 8(6):1637. [90 pp.]. doi:10.2903/j.efsa.2010.1637
12. Young, I., Waddell, L., Sanchez, J., Wilhelm, B., McEwen, S. A., & Rajić, A. (2014). The application of knowledge synthesis methods in agri-food public health: Recent advancements, challenges and opportunities. *Preventive Veterinary Medicine*, 113(4), 339-355. <https://doi.org/https://doi.org/10.1016/j.prevetmed.2013.11.009>
13. Cumpston, M., Li, T., Welch, V. A., Chandler, J., Page, M. J., Higgins, J. P. T., & Thomas, J. (2019). *Cochrane handbook for systematic reviews of interventions* (Second edition. ed.). <https://training.cochrane.org/handbook/current>
14. Campbell Collaboration. (2022). Better evidence for a better world. Retrieved 2022-07-26 from <https://www.campbellcollaboration.org/better-evidence.html>
15. Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., . . . Moher, D. (2021). The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ*, 372, n71. <https://doi.org/10.1136/bmj.n71>
16. Foster, M. J. (2017 and 2019). PIECES Webinar NNLM. Texas A&M University Libraries. Retrieved 12 webinars. from <https://csrrs.library.tamu.edu/recorded-webinars>
17. Foster, M. J., & Jewell, S. T. (2017). *Assembling the pieces of a systematic review: Guide for librarians*. Rowman & Littlefield.



Cited Sources, cont. 3/3

18. Evidence Synthesis Institute: <https://www.lib.umn.edu/about/evidence-synthesis-institute>
19. McGowan, J., Sampson, M., Salzwedel, D. M., Cogo, E., Foerster, V., & Lefebvre, C. (2016). PRESS Peer Review of Electronic Search Strategies: 2015 Guideline Statement. *Journal of clinical epidemiology*, 75, 40–46. <https://doi.org/10.1016/j.jclinepi.2016.01.021>
20. Systematic Review Toolbox: <http://systematicreviewtools.com/index.php>
21. Kogut, A., Ramirez, D., & Foster, M. J. (2022). Systematic Review Training Model for Education Librarians: A Case Study. *New Review of Academic Librarianship*, 28(2), 205-226. <https://doi.org/10.1080/13614533.2020.1784761>
22. Kallaher, A., Eldermire, E. R. B., Fournier, C. T., Ghezzi-Kopel, K., Johnson, K. A., Morris-Knowler, J., Scinto-Madonich, S., & Young, S. (2020). Library systematic review service supports evidence-based practice outside of medicine. *The Journal of Academic Librarianship*, 46(6), 102222. <https://doi.org/https://doi.org/10.1016/j.acalib.2020.102222>
23. Riegelman, A., & Kocher, M. (2018). A Model for Developing and Implementing a Systematic Review Service for Disciplines outside of the Health Sciences. *Reference & User Services Quarterly*, 58(1), 22–27. <https://www.jstor.org/stable/90025627>
24. J. Luca, E., & Ulyannikova, Y. (2020). Towards a User-Centred Systematic Review Service: The Transformative Power of Service Design Thinking. *Journal of the Australian Library and Information Association*, 69(3), 357-374. <https://doi.org/10.1080/24750158.2020.1760506>

