# Managing Evidence Synthesis Services in Engineering Libraries

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## Introduction

The authors of this paper are managers who oversee evidence synthesis (literature reviews, scoping reviews, systematic reviews) as a service offered by science and engineering libraries. This paper will summarize strategies for effectively offering these services as shared in the library, information studies, and STEM education literature. Given that these services are time intensive to offer and require significant training, our goal is to identify best practices for managing these services while optimizing resource allocation.

The intention of this study is to fully understand the options for supporting evidence synthesis requests that have been implemented in academic libraries. The authors strive to surface issues and considerations that need to be addressed when designing locally customized services informed by expertise, staffing capacity, and other contexts. The authors seek to understand the professional development needs for staff engaged in this work, the customized software or licenses requirements for this work, and the library policies and practices that balance the work time of library employees with the needs of university researchers.

## Design

The authors choose to do a literature review for this study. Prior to devising a search plan, preliminary searching was undertaken using Google Scholar to better understand the terms used to describe evidence synthesis services and service development. Once the preliminary results were reviewed, the team determined that they would search general literature databases, engineering literature databases, and library and information studies literature databases for further results. The team determined search assignments based on each member's ability to access databases at their institution. The databases searched were:

- Dimensions*
- Web of Science
- Scopus
- Engineering Village, including Compendex and Inspec
- Library Literature and Information Science Full Text
- Library, Information Science and Technology Abstracts

Additionally, during the search period, one institution had trial access to the Scopus AI research assistant and the Web of Science AI Research Assistant which were used to find literature for this review.

The team developed a standard set of search terms to be used across the databases:

> Librarian (if non-LIS database)
> AND
> Systematic reviews OR Evidence synthesis
> AND
> (Management OR Service OR Research services OR Sustainable OR Burnout OR Professional development OR Skill building OR Workload)

*In the Dimensions database, the filter of "Library and Information Studies" was applied to further refine the search results.

And prompts for the AI research assistants:
- How do libraries manage systematic review services?
- What are the common challenges faced by libraries in managing systematic review services?
- What are best practices for libraries offering systematic review services?

As this is not a systematic review, the team agreed up terms to use across databases but did not develop a standardized search string.

The team performed searches in their assigned databases and manually reviewed the results in the database interface. The members then manually selected articles using individual judgement that related to the assigned topic and added them to a subfolder in Zotero labeled with the database searched. After the database searches were complete, and full text was found for most of the articles, the authors reviewed the articles found in the search process. At this point, authors manually rejected or excluded additional articles that did not meet the topic of the management of evidence synthesis services in libraries. The resulting list of articles selected is included in Appendix 1.

One author manually reviewed the abstracts of each article. If the article included information on systematic review services, training, or skill development, the author then read or skimmed each article. If the article did not mention those aspects, it was discarded. Another author loaded small groups of articles into an institutional subscription to ChatGPT-4o in a closed university research environment to produce summaries of the works. The team members then met to discuss their findings and the overall themes that were present in the literature.


**Results**
The literature searches produced results from multiple publications across several disciplines. The most common journals that published articles on the management of evidence synthesis and systematic review services were College & Research Libraries (3), Health Information & Libraries Journal (8), Journal of Academic Librarianship (8), Journal of Librarianship and Information Science (3), Medical Reference Services Quarterly (6), and Journal of the Medical Library Association (19), which published the greatest number of articles on this topic. Counts of articles by publication or by database are not included as the authors did not do a systematic

review of the literature in this project. From manual review, it was determined that there was a significant overlap in the articles retrieved between databases, confirming the similarities in the search strings used. Uploading small groups of articles to an institutional ChatGPT-4o instance produced similar summaries for each batch of articles.

Overall, the body of literature specifically addressing the management of evidence synthesis and systematic review services was sparse. Most of the articles found addressed broader topics, such as the importance of librarian participation in the evidence synthesis process, librarian training needs[1], and time management and expectation management for librarians participating in these services [2], [3]. When librarians are involved in evidence synthesis, the level of engagement typically goes well beyond a normal reference librarian interaction helping a person find information. For established services, the average time spent per review has been found to average between 14.7 hours and 26.9 hours [4], [5], and the amount of time varies dramatically for each review.

An additional topic found in the literature included how librarians outside the health and medical fields are increasingly offering systematic review services, particularly in social sciences, business, and management fields [6], [7]. This expansion into new disciplines has increased the visibility across librarianship for specific librarian training, establishing formalized services, often in addition to what may already be offered by a medical school library on the same campus, and navigating conversations around the impact of including a librarian on the review team and receiving appropriate recognition for the contributions of the librarian.

An additional theme for an area of skill development was the increasing use of tools that are specific to the work of systematic reviews and evidence synthesis, such as Covidence, Rayyan, DistillerSR, Abstrackr, and others. Having librarians take the time to learn the tools is crucial to enhancing the efficiency of the review process.

**Discussion**
As found by Phillips et al [8], systematic reviews in engineering disciplines have been growing rapidly with significant presence in engineering education. While this paper is not restricted to supporting engineers with this method, many of the themes are transferable to librarian participation in systematic reviews for all fields outside of the medical sciences. One of the biggest differences when applying the systematic review process outside of the medical and health sciences is realizing the significant differences in how the literature of a field is indexed and how a search interface is designed. These differences make it more difficult to craft highly focused searches that can be easily translated to a different database or different interface. For example, within the health sciences literature, it is possible to search for a specific type of study or one that engages with a population outlined by a clearly defined age range, where in most other fields the type of study being reported is not part of the indexing, and an age range might be limited to a level of education or broadly to children or adults, but not clearly and consistently defined by a specific age range. In engineering and many STEM fields, grey literature can be a significant portion of the literature that needs to be included in discovery, further expanding the areas that need to be searched, and the nuances of search engines to be learned and applied.

As managers who are tasked with overseeing evidence synthesis services in science and engineering libraries, the literature did not provide the authors with defined best practices for managing these services in libraries. The literature did provide options for tiered services [9], offering pilot services [10], [11], and shared tools for managing staff expectations [2] but did not share guidance related to managing the librarian workload issues that are caused by the time intensive nature of evidence synthesis work.

The literature calls for additional training for librarians supporting evidence synthesis work. Townsend et al. [1] have outlined a competency framework for these skills. There are a few professional development opportunities for librarians, including the University of Minnesota Libraries Evidence Synthesis Institute (https://www.lib.umn.edu/about/evidence-synthesis-institute), University of Pittsburgh Health Sciences Library (no longer offered), and the University of Michigan Library Systematic Reviews Workshop (https://www.lib.umich.edu/research-and-scholarship/library-workshops-and-credit-courses/systematic-reviews-workshop), to develop these skills through training, and the growing need for training is probably outpacing these existing programs. The development of formalized services outside of health sciences is a growing trend across academic libraries, and includes developing support teams, outlining defined roles for the librarians, and outlining appropriate levels of recognition based on the contribution.

As managers who also hold responsibility for their libraries' collections, the authors anticipated finding further discussion of the intersection of collection development issues and evidence synthesis practices. Most mentions of collections issues related to interlibrary loan services and the increased demand for these services from teams performing evidence synthesis. The authors did not find any discussion of evaluating database search functionality for their capacity to be used in the evidence synthesis process, patrons and library staff requests to change the interface of a database to better serve the needs of researchers performing evidence synthesis, or excessive use reports in e-resources triggered by research groups performing evidence synthesis searches and downloads. The authors of this paper have experienced all these issues in their own libraries and anticipated seeing further discussion of these issues.

An additional issue that presented itself during this project was the rapid expansion of AI search capabilities in literature databases and the nebulous policies related to the use of literature in third party AI tools. As mentioned previously, one author had trial access to the two AI research assistants during the literature searching period of this project which allowed for direct comparison of the two tools. When the developed prompts were asked of the Scopus AI research assistant, summaries were produced that referenced articles about systematic review services in libraries including an article on challenges of formalized services [12], team-based models [13], and systematic review competencies [14]. When the same prompts were asked of the Web of Science tool, results included blockchain use in libraries [15], library assessment [16], and the value of public libraries [17].

Furthermore, the authors had to review policies about uploading literature to AI tools for analysis and each author had different license agreement language and institutional policies that covered this type of work. The authors took care to only upload articles to tools in a closed university

research environment, but this work demonstrated that evidence synthesis practices will be greatly impacted by the proliferation of AI search and analysis tools and that libraries offering these services need to be prepared to understand how AI is and can be used in this method of work and to advocate for license agreements and institutional policies that facilitate evidence synthesis.

Finally, throughout the research process, the authors experienced a series of challenges that were reflective of their roles as managers rather than practitioner librarians. All authors struggled to open their Zotero libraries and experienced challenges in sharing the citations among the group of co-authors. While performing searches in literature databases, all the authors learned that the interfaces of the resources had changed since they had last performed any significant searches. They all had to consult with interface help information and revise their searches to meet the requirements of each interface. This served as a reminder to the authors that the tools and skills related to literature searching evolve rapidly and that constant staff training and skill refreshing in necessary for providing these types of services in science and engineering libraries.

## Conclusion

While the authors did not find the specific management guidance on establishing and running systematic review services, the themes found in the literature can provide the aspects to be addressed by a manager who is establishing and running a service. These aspects include ensuring the staff supporting the service have received adequate training to be comfortable providing support to researchers, that the staff understand the scope of the service that has been created and can coach a user through the different levels of service, and that staff are comfortable negotiating appropriate recognition for their participation in any published output from the research that is conducted.

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**Appendix 1: Full Bibliography**
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