

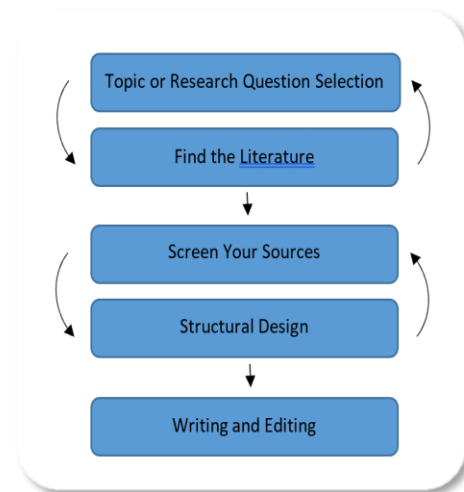
Starting Your Line of Research with a Literature Review – the Basics

While it is well worth the time to think deeply about your prospective line of research *before* reading all about it, there is much to be said for doing a thorough literature review on the line of research that you would like to undertake. In the spirit of “you don’t need to reinvent the wheel”, it is worth knowing if your “wheel” (line of research) already exists. If you already know the field well, you may be able to write a review that reveals shortcomings in the “wheel” that may have been missed by others.

At its most basic, the purpose of a literature review is to understand the current state of the field and to provide new insights into it. However, you might want to be more focused than that. You could be trying to review one aspect of the field, for instance. So how does one do this successfully? There are tried and true steps to follow, as shown in the figure below and in Randolph (2009), Webster and Watson (2002) and Pautasso (2013). Also, a good approach for systematic literature review in engineering education is given in Borrego (2014).

Step 1: Pick a Topic or Research Question

A key issue is “how focused is your topic/question”? Broadly speaking, there are three types of papers and other resources on your topic. There are ones on your exact topic (subject matter and context match), there are ones closely related (right subject and wrong context, usually) and there are ones peripherally related (related subject). If you have a choice, which you may not, you want to focus your topic/question such that you have a manageable number of core sources plus a healthy number of closely related ones. Focusing may involve considerations discussed in Step 2.



Step 2: Finding the Literature

Start with popular journals like JEE, conference proceedings like [CEEAA-ACEG](#), databases such as ERIC, or helpful search engines like Google Scholar with engineering education in an appropriate field as applicable. When you find good papers, then start using the “snowball” method: i.e., look at the references of your favourite sources to find others. If your topic isn’t too broad, they will *eventually* cite papers that you already know and have. One of the key points in this step is to record every detail of where and how you look for references. A tool, such as RefWorks, EndNote, or Zotero can be helpful here, for which your institution may have a license. Just as good science is reproducible, a good literature review should provide enough details on the search method (databases, keywords, etc.) to also be reproducible. If you have less than 20 core sources, consider broadening your scope if you can. If you have more than ≈50, consider focusing more. If you have a big topic, one of the ways you can limit the scope of your review is by being selective amongst the broader literature. This can be done by only using references from a certain (recent) time period or from certain journals or databases.

Step 3: Screening Papers

You probably identified your resources in Step 2 by reading titles and/or abstracts. However, titles can be misleading. Besides, you need to start thinking about the structure of your paper. So, an initial screening of your found literature is necessary and valuable. A very useful tool at this stage is an annotated bibliography. Basically, read the papers and make notes on them as you go. Include key ideas, themes, findings, methods, contexts, and conclusions. These are worth their weight in gold.

Step 4: Your Review's Structural Design

Your primary goal in this whole "lit review" exercise is to provide insight to readers on the literature that you have reviewed. Your job is to see the forest for the trees. Most reviews achieve this with one of three structures. Chronological reviews look at the evolution of ideas. The chronological sequencing may provide insights and/or may suggest directions for future work. Other reviews will break the literature into themes, characterize them, and then comment insightfully on them. Another type of review proposes a framework for analyzing the literature, puts the literature into that framework, and then discusses implications of that framework. The framework is often the big insight in this approach.

Step 5: Writing/Editing

The last step is writing and editing. There are many resources providing recommendations on this topic, but suffice to say that a common approach that works well is to get all your ideas down first (i.e. do not try to write each sentence perfectly). Like design, good writing is iterative. Much like sculpting, this may be done coarsely at first, and in more detail later. Remember you are trying to convey new insights with your review. Are you extending concepts or frameworks, developing new perspectives, or identifying gaps that deserve attention? If you feel that you have identified a real gap, just make sure you were thorough in your review!

There is much to master in each of these steps, but even if this is your very first literature review, you are likely to do well with it if you follow these basic steps and concepts.

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