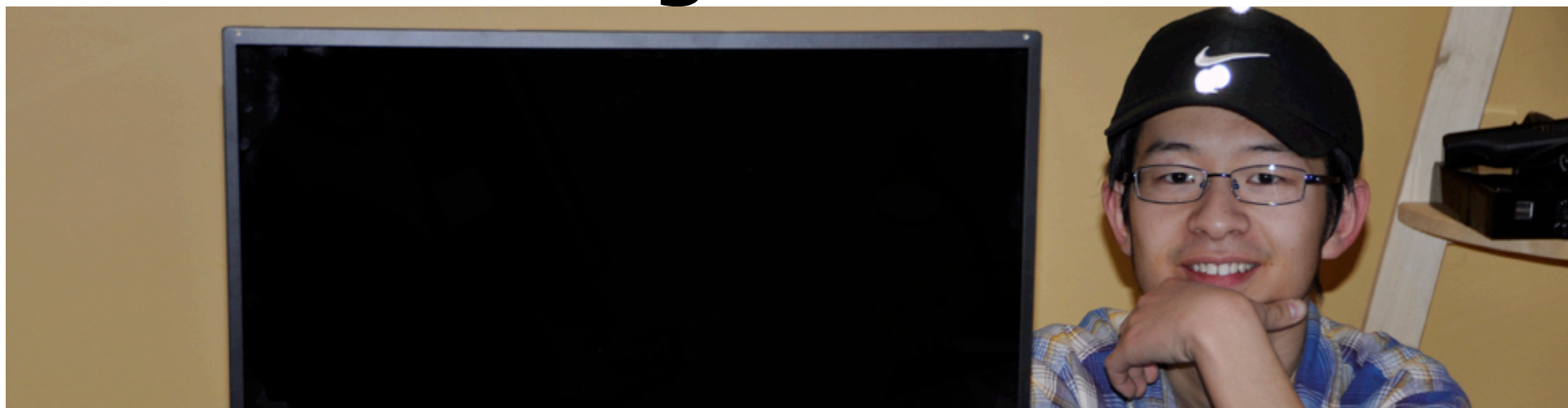


Saul Greenberg



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How To Write A Literature Review

The purpose of a literature review

Your job when writing a literature review is to add value to all those papers you have read, where you explain how the many salient ideas of others (often gathered from many disparate sources) have led up to and have contributed to your research problem. Let me say that again: a good literature review adds value. It is not just a catalog of papers you have read.

Perhaps the most critical point is that your literature review must frame your work. It will give the reader sufficient background to motivate your work, to understand what has influenced your work, what others have contributed to it, and --- most importantly --- how your work and the problems you propose to solve add to that literature.

Here are some other things that literature reviews do

1. Show you know the literature
 - o there is far too much literature for you to be exhaustive, so you must be selective
2. Gives your readers background to understand your work
 - o this includes both readers who are specialists in your area, and readers who know nothing about it (e.g., external examiners). Its a delicate

balancing act

3. Gives a historical perspective
 - shows how ideas arose and evolved over time
4. Leads into the problem you wish to tackle in your thesis
 - what others have done before within this context, what is being done now, what problems have been identified, what has not been worked on, how your own work builds / adds onto this
5. Describes related work
 - illustrates other ideas related to your research idea i.e., how they are in common and how they are different
 - explains why your idea or perspective is new
6. Gives a new view of the problem / solution space
 - Synthesis: combines together the literature in a way that adds something new i.e., the whole is greater than the sum of the parts
 - birds eye view: as a reader of the literature, you now have a better perspective than any individual author may have had (particularly earlier authors who have not seen later work). You can now 'step back' and give a coherent overview of all that has happened
 - framework: fits all the pieces together into an organization that relates all the parts

How to start

1. Identify a few key papers (e.g., 7-10). You can do this by asking your supervisor, by sending email to knowledgeable people in the area
2. If you cannot do the above, try again. Surely there are some people who can point you to a few good places!
3. If you are really stuck and cannot find any primary sources, start doing on-line searches, go to the library, browse the abstracts of relevant proceedings and journals, etc. This is HARD. The problem is that you may find many fairly weak papers and waste time on them instead of the strong ones. One way around this problem is to look at each paper's references; if you see ones that seem to recur, these are probably key papers in the area. Get those, and pay attention to what they cite.
4. When you have found the key papers, read them carefully. Then read them again. Then look at the references within those as ways to find the good prior art.
5. Then go on line (e.g., to the ACM Digital Library) and see what authors cite those key papers. The papers now become a 'forward citation' into the ideas that have built on them. Again, there may only be a few gems in the midst of many weak papers.
6. Print out those papers and keep them in a binder. Mark them up, use postits, highlighting pens, etc. You may see a great idea as you read a paper, and you should mark it. You really don't want to have to read that 30 page paper all over again 4 months later just because you cannot remember which page it is on!
7. Some people prefer to have their papers on line i.e., by copying from digital libraries or by scanning them. This is up to you --- I prefer pencil and postits myself as its really easy to do. Of course, the best solution is to have both, but that is a lot of work.
8. Whenever you go to a conference or meet a visitor who knows the area, ask them what papers they think are the most relevant to your idea.
9. Don't try to read everything. When you reach the point of diminishing returns i.e., you have to do a huge amount of reading to do anything new, its probably time to get going with your own work.
10. Read many literature reviews in other theses. Ask your supervisor for good examples. Don't be afraid to copy someone's literature style if its

well done!

Types of Literature reviews

Several literature styles are described below. Of these, the best literature reviews are usually organized around ideas and concepts. Use the other styles only if you have a strong reason.

By Annotated Bibliographies

An annotated bibliography is typically a list of papers ordered by some means (perhaps alphabetically or by topic), where each paper is represented as a reference plus a summary paragraph.

Benefits

- very useful way for you to track your own readings as you read them... it becomes an annotated index to your thoughts and ideas collected as you read papers
- for others, ideally, an annotated bibliography brings together papers from different fields or publications;
- this is especially valuable in new areas where the literature is scattered, or in areas that synthesis research from several other disciplines
- they are also very valuable for others seeking papers who wish to scan a relevant list of papers and summaries on a topic
- they are best when you sift out the chaff from the wheat i.e., if you include good papers and filter out the weaker ones.

Limitations

- Annotated bibliographies do not add value to the individual work i.e., they do not try to assimilate the material or generalize from it
- Current electronic bibliographies with good search capabilities can automatically produce something akin to an annotated bibliography, especially if they include abstracts
- Because they are just a 'list', they require constant updating as new relevant papers come out

Bottom line

- Great way to annotate the papers you read while gaining background in the area, but a poor way to do a literature review for a thesis

By Summaries of Project and Paper

One common way to do a literature review (especially in systems-oriented research) is by project. For example, each sub-section may describe / summarize a particular project in detail and give the most significant references to it.

Benefits

- lets you summarize / describe the most salient details about a project.
- you can collanse several naners into a single project summary

- you can describe the evolution of a project over time
- you can omit repetitive / early papers that are covered by later more mature ones

Limitations

- its easy to get bogged down on project descriptions/details that have little to do with your main thesis interests; i.e., you may end up having to add much detail to set the context instead of concentrating on that part of the project/system that is of fundamental interest to you.
- some ideas are common across many projects, and consequently you are forced to either repeat yourself, or introduce the idea in one project will only briefly mentioning it (or omitting it) in others
- if there are many projects/systems related to your work, you may end up writing a very long exhaustive chapter to get complete coverage; this may actually take away from the impact of your review
- Finally, there will always be a system you missed, or another one just being built around the corner. Does this mean you have to keep adding descriptions? If you omit one, does this leave you open to the challenge in your defense about "how come you omitted System X" when (perhaps) you never heard of it or neglected to include it.

Bottom line

- A reasonable way to describe the current state of the art if its fairly new, but can quickly become overwhelming

By Concepts and Ideas

A very good way to do a literature review is by reviewing ideas, and then bringing in various projects and citations relevant to that idea. Ideas are typically abstractions that you may have made after reading many papers / project descriptions, and so on. That is, they are the essence / core of what makes something work. Ideas may be presented either as a set of subsections of related ideas (where one will flow from the next), or even better as a framework that shows the inter-relations between ideas as well as their structure.

Benefits

- you can concentrate on only the ideas salient to your research
- you can bring in other works / projects by showing how they relate to that idea i.e., so you do not have to go into depth on less relevant parts of those other projects. That is, you can emphasize key points of other systems rather than unnecessary detail.
- when you come across new projects / papers, you can examine how they relate to those ideas, and only include them if they add value
- if you are asked in a defence about a particular system/project that you had not mentioned, you can relate it back to your idea i.e., to say that you have in fact reviewed the idea covered by the system, and then show how that fits into it.

Limitations

- requires thinking! Unlike project summaries and annotated bibliographies, its up to you to distill the

essence of what is important in your readings.

Bottom line

- This is what you should strive for, as you are adding value by abstracting key concepts from the literature. But it does require some thinking! If you only bring out shallow ideas, your literature review will feel shallow as well.

By History

Another nice way to do a literature review is as a historical perspective.

Benefits

- useful if you wish to show the evolution of ideas over time.

Limitations

- only works if this evolution really does lead into your research problem. Thus you may have to consider carefully if this is the approach you should take as your main organizing principle.