

CSC 595

Research Methods for Computer Science

Fall 2020

Lecture 2

Creating the Literature Review



Topics

- Literature Review
 - Basics
 - Literature or where do I find my references?

Introduction

What is the purpose of a literature review?

- Define and limit the problem you are working on,
- Place your study in a historical perspective,
- Avoid unnecessary duplication,
- Evaluate promising research methods,
- Relate your findings to previous knowledge and suggest further research

Introduction

What is the purpose of a literature review?

- Shows

"The writer (you) have studied existing work in the field with insight"

- It is not enough to show what others in your field have discovered

- Essential component

- Your synthesis of the work and
- Your ability to tie it to your own work

Furthermore ...



- A literature review is
 - An exploration of an area,
 - At best provides
 - Definition and
 - Framework for a piece of research
 - Review should give an idea of the work that has been carried out in the subject area
 - Prepares the reader for the study that is to follow
 - Most students are not experts in their chosen field before they start their reading
 - Want to develop good working knowledge of research in a particular area

Literature Review Components

- An effective review both analyses and **synthesizes** material:
 - Comparison and contrast of different authors' views
 - Groups authors who draw similar conclusions,
 - Criticizes methodology,
 - Notes areas in which authors disagree
 - Highlights exemplary studies, Highlights gaps in research,
 - Shows how your study **relates to previous studies**,
 - Shows how your study **relates to the literature in general**,
 - Summarizes what the literature says

Problems with Lit Reviews



❑ A common problem with literature reviews

- Writers present material from one author, followed by information from another, then another....
 - No synthesis of the literature
- What does it mean to **synthesize** something?

Synthesis of the Literature

➤ So, what is synthesis?

- The main idea is that you should have *understood the literature* you have read
- Should show that you *understand the relationships* between items of literature.
- So, what came first in your field,
- **How** it influenced later work,
- **How** each step forward in the research improved upon what came before it, and **so on**.
- Will present your own view of the work you are describing
- Should be critical of literature
- Identify where shortcomings of the work are,
- How the work could be improved upon
- In particular how your work will improve on the current state of the art

Problems with Lit Reviews

Another major problem is

- Literature reviews are often written as if they stand alone
 - Few links to rest of thesis
- No clear relationship between literature review and hypothesis and methodology to follow

At the end of your review ...

- Include a summary of what the literature implies and relate it to your work

Reading Materials

➤ Step One

- First step towards good literature review is comprehensive literature search
- Should get a good range of available literature in your area of study
- Keep in mind as you are searching
 - Age of material is relevant
- One recommendation, is to start from most recent sources and work backwards

Asking Questions

➤ Step One - continued

As you read literature, keep a list of questions in mind

Why do this?

- Helps you as you read your material
- Otherwise, you are not analyzing the papers as you read them
- Easy to become lost in what the authors are or are not saying
- Following slide lists some sample questions looking at experimental methodology

Asking Questions

□ Sample Questions

- What were the authors trying to discover?
- Why is this research important?
- What was measured?
- How was the data collected?
- What were the results?
- What do the authors conclude and to what do they attribute their findings?
- Can you accept the findings as true?
- How can you apply these findings to your own work?

Asking Questions Continued

When results are conflicting, you might find it useful to ask the following questions:

- How similar were the research methods used?
- Were different measurement instruments used?
- How was the research evaluated?

Taking Notes

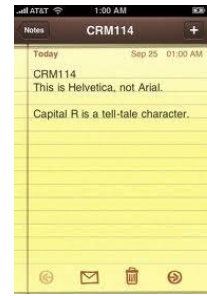
➤ Step 2 - Take Notes on Your Reading

Note taking should reflect your reading questions

- Comment on methodology
- Make connections between your project and what you are reading
- Make a note of what you think about the material
- Even comments like
"These arguments are confusing" or
"I don't understand this" may be useful

Taking Notes

➤ Step 2



It doesn't matter how you organize and write your notes as long as you:

- Keep track of difference between your ideas and those of other authors
- Make sure your notes are legible
 - Need to be able to read them back!!!
- Remember to provide clear references including page numbers in case you want to look at the original material again, or cite it in your review ...

This is important!!!

Constructing Your Argument

➤ Step 3

- To write a cohesive literature review, must present a clear line of argument
- Take those critical comments you made in your reading notes and use them to express an opinion
- A well argued literature review will demonstrate the following qualities:
 - A clear relationship between your arguments and the evidence
 - Your opinions are backed up with facts and theory in the literature

Constructing Your Argument

- Differing opinions are accounted for, rather than ignored
 - Makes some attempt to acknowledge opposing viewpoints
 - Opposing viewpoints will be common for nearly all problems
 - Present preferences rather than 'sitting on the fence' or leaving it to the reader to draw conclusions

The sections of the review are clearly connected

Literature Review Organization

- Develop an organization to the review
- Several ways to organize the review

1. Chronological

- From last to first or first to last by date
- Can talk about the latest research and more historical or reference papers

2. By Trend

- If there are significant trends in a field can discuss the trends

3. Methods

- Organize by methods of research

Language

- Academic language attempts to be objective - criticisms of other author's works need to be fair
 - It is important to avoid a personalized tone
- Even if you think researcher's method was sloppy, his research appalling and his arguments ridiculous, it is not appropriate to say:
 - " **this was terrible, sloppy research**"
- Use more neutral language
 - If you say
 - " **inconsistent sampling weakens the validity of the results**", your readers will understand what you mean

Questions you May Ask About Literature Reviews

- How many papers should I read?
- How long should the literature review be?
- Should I read books, articles, or ...?
- Is it OK to reference websites such as Wikipedia?
- Who will read my literature review and what can I assume about their knowledge of the area?
- We will attempt to answer these ...

Questions you May Ask About Literature Reviews

- ❑ **How many papers should I read?**
 - **No set amount of papers**
 - **Guided by the size of your topic**
 - How many papers have been published in the area?
 - How “old” is the topic, may have been around since biblical times – Ex. Cryptography
 - **Somewhat up to your advisor**
 - You may not be aware of a significant set of papers, or body of research – advisor will direct you to read this body of work
 - **Until you feel you have mastery over the topic**

Questions you May Ask About Literature Reviews

- ❑ How long should the literature review be?
 - Needs to cover the background literature, summarize it for the reader
 - No set size. I have mostly seen them less complete than more complete.
 - Somewhat up to your advisor

Questions you May Ask About Literature Reviews

❑ Should I read books, articles, or ...?

- Books give good overview
- Articles include both journal and conference proceedings
- Patents if relevant
- Technical Reports – from industry or published on Web Sites of research groups in academia
- Dissertation/Thesis – Great resources
- Websites and other Internet Resources

Questions you May Ask About Literature Reviews

- ❑ Is it OK to reference websites such as Wikipedia?
 - You can reference these popular websites mostly for definitions
 - You will use higher quality literature of peer reviewed quality
- ❑ Who will read my thesis and literature review and what can I assume about their knowledge of the area?
 - Known as Target Audience
 - Of course it is your advisor and committee, but also other technical savvy people who are interested in your topic

Sources of CS Articles

We have access to a lot of it through the Saudi Digital library