

INFO 4990: Information Technology Research Methods

Guide to the Research Literature
Lecture by A. Fekete
(based in part on materials by J. Davis and others)

**“If I have seen further, it is
only because I have stood
on the shoulders of
giants”.**

Attributed to Sir Isaac Newton



The literature

- Literature can help in finding a research problem
 - identify clear “next step” or “gap”
- It can also help you solve a problem
 - show how the field works (so you fit in)
 - provide evidence you can quote without repeating the work
 - provide the motivation to show importance
 - eg our performance is better than that of [Cite]
 - eg [Cite] defined the following concept, about which we prove ...
 - eg [Cite1, cite2, cite3] have all worked on systems like this.
- Critical (yet generous) reading.

Reading the literature

- Keep an annotated bibliography from the start
 - Complete bibliographical reference (including pages, dates)
- Detailed notes on each work
 - even if it seems irrelevant to your thesis
 - what is claim, what evidence, what argument, any doubts?
- Don't rely on second hand summaries! Go to the original source always!
 - Get attributions right in your own writing
 - (don't just accept citations from other work, even with full reference!)
- Use comments and keywords to organise your thoughts.

Why literature review?

- Demonstrate that you know the field
- Justifies your research, provides the rationale for the research
 - how does your work differ from previous work
 - how does your work connect to previous work
- Allows you to establish the conceptual framework and methodological focus

Organising the literature

- Isolate issues and highlight the findings and contributions that are central to your research
- Group together papers that deal with a common or related theme or issue
- Use diagrams, tables, concept maps to organise the materials
- Try out different structures for organising; they should be most relevant to the goals of your research
- Chronological order is not particularly useful
 - but citation chains are useful
- Warning: papers often don't use common terminology, or focus on common issues, or explain relationships fairly
 - Clarifying these aspects is a key contribution you can make

Understanding the literature process

- We summarize how work comes to be published
 - So you can recognize implied strengths and limitations in what you are reading
- We hope you will plan your work so it can itself be published
 - usually after the thesis is finished

Conference paper

- Call for papers (about 1 year before meeting)
- Submission (due 4-8 months before meeting)
 - page limit (say 10 pages)
 - details often omitted (eg proofs, design technicalities)
- Reviews by Program Committee
 - check reasonableness, significance, originality, readability
 - selection based mainly on interest to the community
- Final version for proceedings (due 3-4 months before meeting)
 - revise by author in light of reviews
 - but not checked again (except for a few top systems conferences)
- Oral presentation at meeting

Workshop paper

- Sometimes a workshop paper is just like a conference paper
- Other workshops are more preliminary
 - can publish “position paper” (draft of an idea without evidence, or proposal for future work)
 - not reviewed
 - mainly to allow a community to gather

Journal article

- Submitted
 - often based on a conference paper with additions, corrections, improvements
 - usually an account of a contribution, but sometimes a survey that integrates a field
- Refereed
 - at least 3 referees, experts in the field
 - they spend months on the job, checking details etc
- Revision, more refereeing
- Accepted
- Published
- Time lapse variable, but sometimes 3-4 years!

Technical report

- Issued by the authors department, with a number and date
- May be based on a conference paper
 - Include all the boring details, that are omitted from conference due to space limits
- Used to establish priority
 - eg produce TR before submitting work to others

PhD or MSc Thesis

- Very extensive account
 - show much of the research process
 - extensive survey of the literature
 - very complete evaluation of the author's work
 - establish the author is ready to become independent researcher in the community
- Typically checked by 2 or 3 readers

Monograph

- An author can offer a coherent and unified account of a whole research agenda
 - often combine their own results with other peoples
 - often revisit several papers with uniform notation, better exposition, etc
 - publisher may get reviewers, but their focus is “will it sell” not “is it correct”!
- Sometimes a book is just a collection of papers from a conference or workshop
 - usually not much more checking or detail than for conference itself!

Warnings

- Except for journal articles, very little checking has been done of the correctness of the claims
 - you can't rely too much on the truth of what you read!
- Journal articles are usually *archival*
 - the field has moved on
- Some communities are very clique-dominated
 - unpopular opinions not welcome
 - clique leaders can publish anything, even half-baked ideas without evidence

The research communities

- A community has places of high prestige where they read and publish
 - they meet often, and each knows what others are doing
 - you must place your work into context of some community
- Divided by subdiscipline in a hierarchy
 - eg “Systems” contains “Networking” contains “Wireless networking”
 - eg “Theory” contains “Algorithms” contains “Graph Drawing”
- Divided geographically
 - often Europe vs Asia vs America
 - sometimes separate schools (eg Wisconsin database group)
- Divided by approach or background
 - eg “neat AI” vs “scruffy AI”