CSC3031 - Research and Project Skills

Research Skills: Reading the Computer Science Literature

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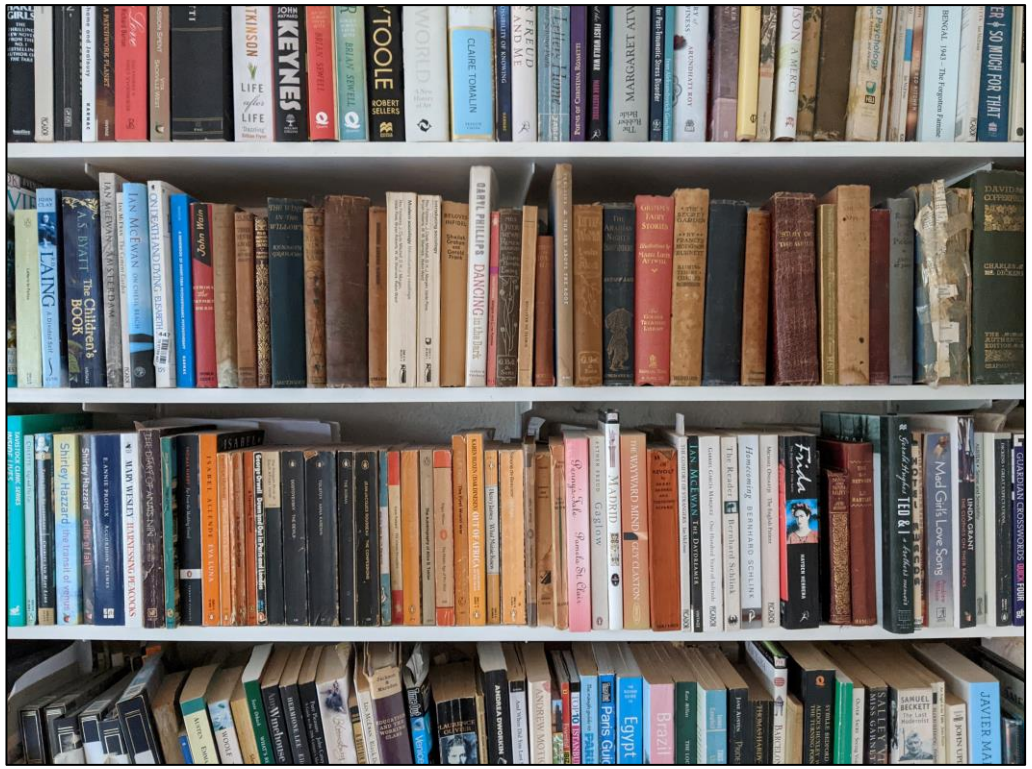
I am grateful once again to the Writing Development Centre, this time for material on "The Three Domains of Critical Reading"

Reading the CS Literature

- As you develop your project proposal, you are beginning to read around the Computer Science (CS) Knowledge base.
- In your final dissertation you'll extend your background review with more literature that you have accessed while executing your project.
- A professional computer scientist reads critically.
  - Question the authority of the source
  - Check its validity
  - Add value by assessing its strengths, weaknesses and relevance to your work



Reading the CS Literature

- How do you go about undertaking this kind of professional critical reading?
- The Writing Development Centre offers a model for critical review that encourages us to:

  'Interrogate the text as you read – on its own terms, in relation to other texts, and its relevance to your own work.'

Three Domains of Critical Reading

We consider three domains relating to the text:

Validity

Taken by itself, how good is this?

Synthesis

How does it fit with the whole field?

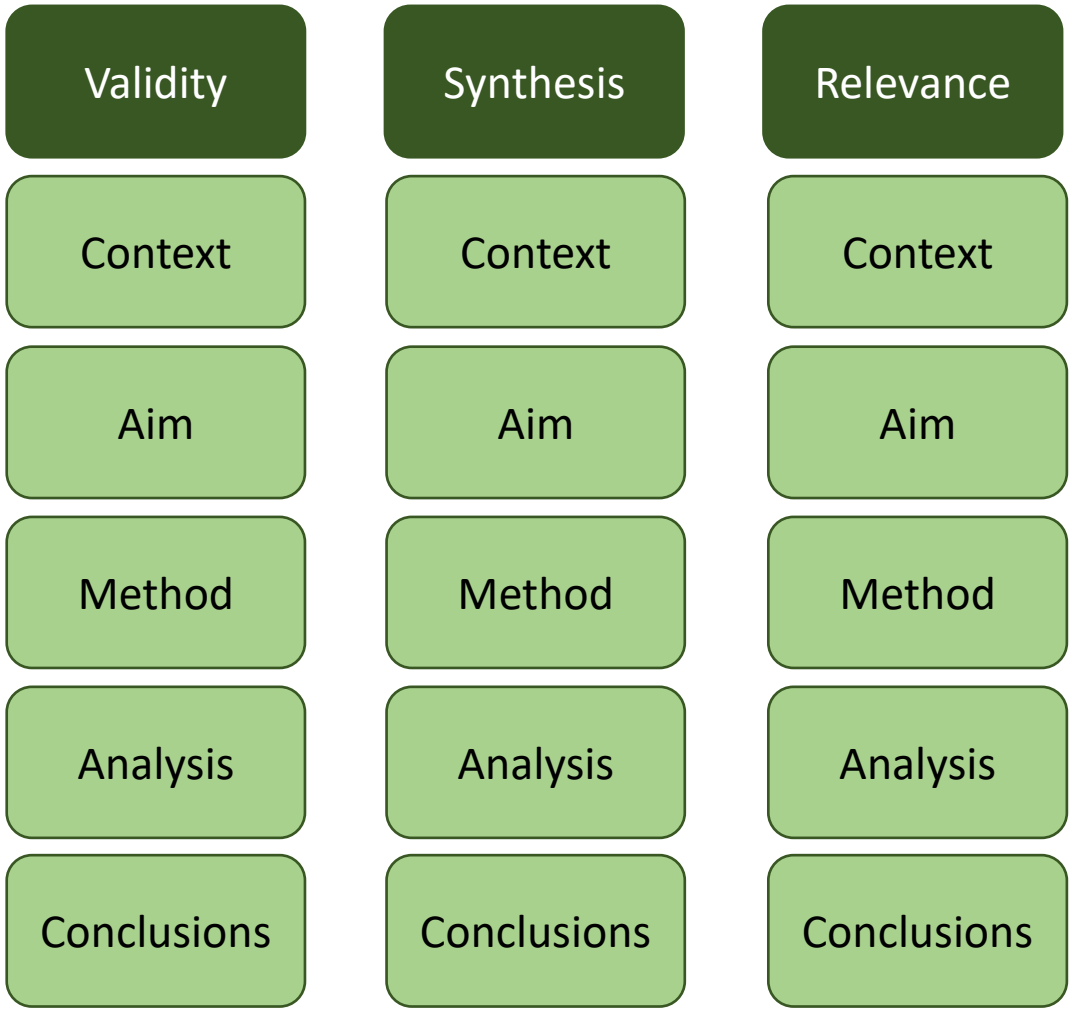
Relevance

How does this contribute to your own work?

Three Domains of Critical Reading

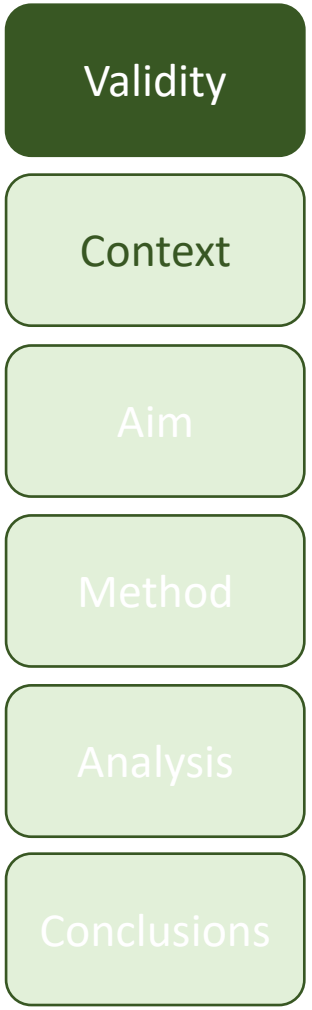
We consider three domains relating to the text:

In each domain, we ask questions relating to these five aspects of the text:



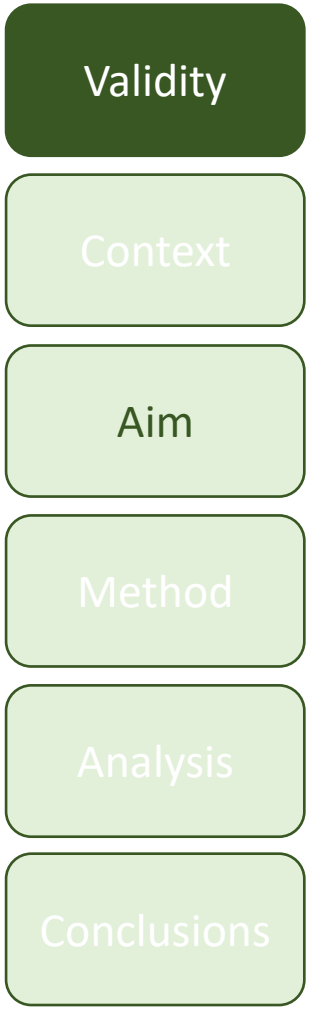
Validity: Context

- Discipline or Profession
  - Might this colour the paper's view?
- Authors
  - What else have they published – are they authoritative?
  - Are there any vested interests that might bias the report?
- Currency
  - When was it published?
- Bias
  - Not necessarily sinister, but differences in how a subject is treated or has evolved.



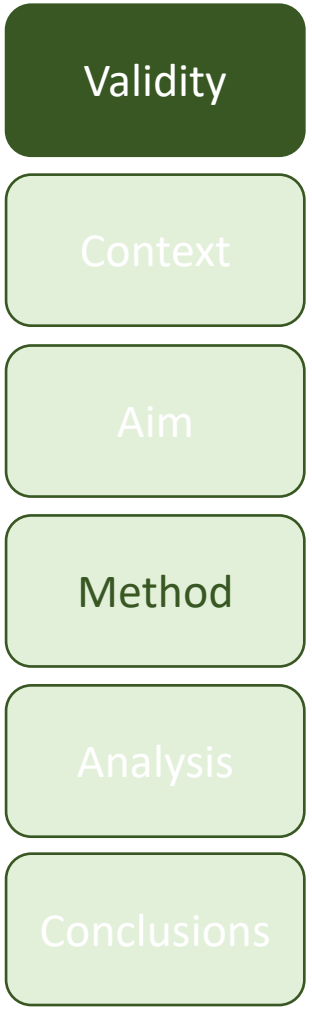
Validity: Aim

- Aims, Hypothesis or Research Question
  - Are the aims clearly stated? Are they vague?
  - Is the research question etc, valid or does it rest on bias/assumptions?
  - Is the question interesting/significant?



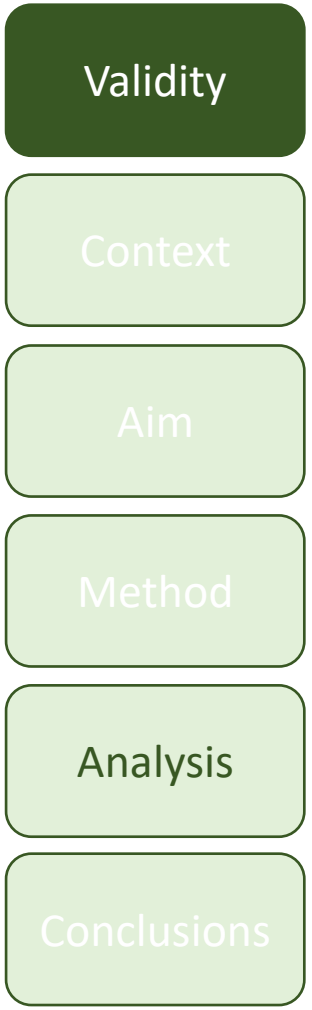
Validity: Method

- How did they go about their aim? Methods, models and materials.
  - Are any theories/models appropriate and accurately understood? Do they develop their own?
  - Are the methods used for data gathering/interpretation appropriate?
  - Is the data set well chosen?
  - There may be a “methodology” section where this is explicitly described, but that’s not universal in the CS literature.



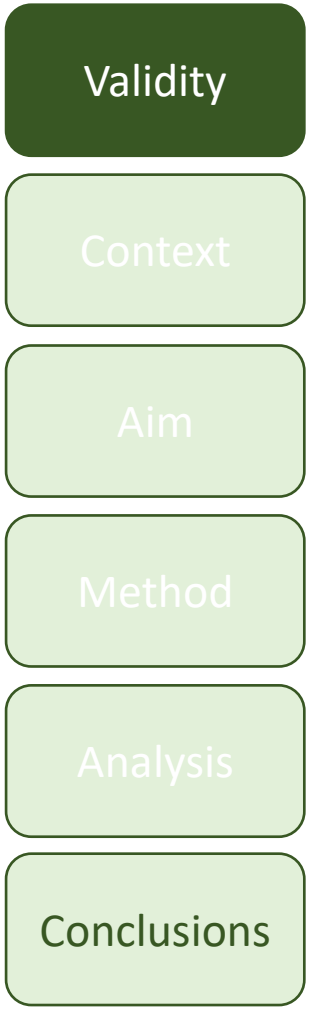
Validity: Analysis

- How do they know their results? Argument, evidence, logic and reasoning
  - Is their interpretation and analysis flawed or does it make logical sense?
  - Have they missed anything?
  - Do the results mean what they say they mean?



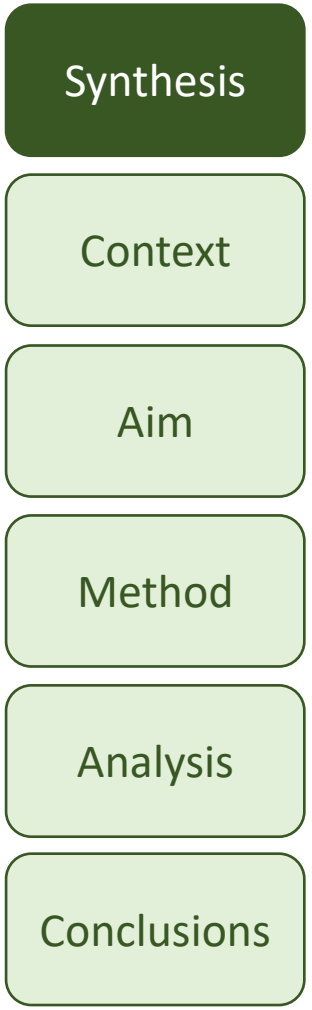
Validity: Analysis

- What do they say? Findings and conclusions
  - Are the conclusions actually related to their aims and results?
  - Are the conclusions drawn proportionate to the evidence presented?



Validity: Synthesis

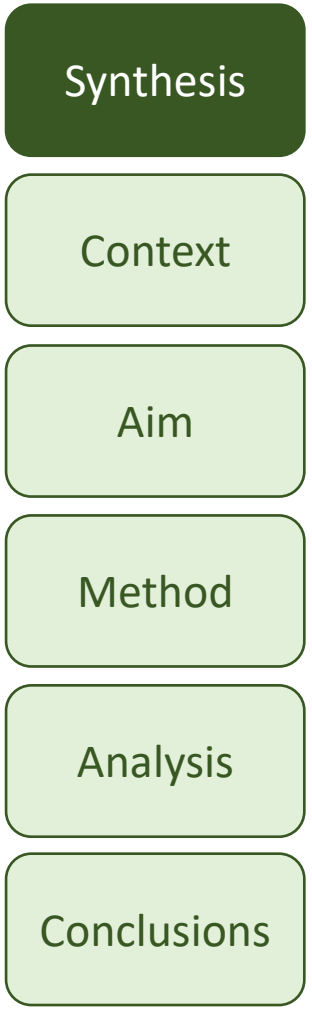
- Looking at Validity alone makes for a great in-depth study of a single text.
- If we are reviewing a whole field – many texts – we don't just want to produce a catalogue, but want to add value by linking the different texts.
- Synthesis is the task of bringing these individual texts together into a more coherent review of a whole field of work.



Validity: Synthesis

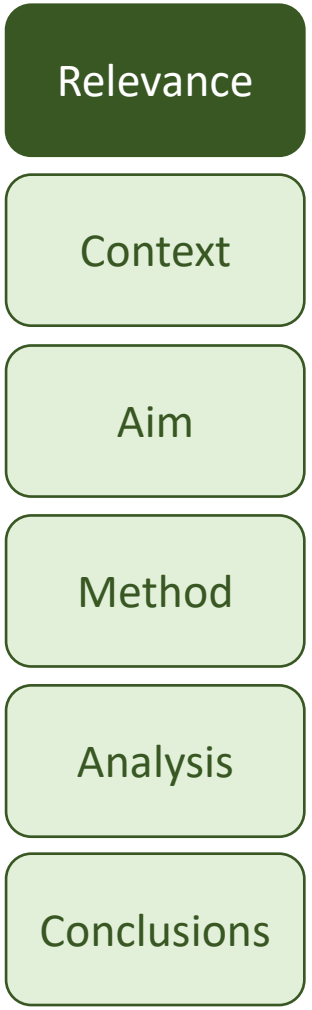
The five aspects still work for synthesis, e.g.,

- **Context**: how do your texts compare in terms of who wrote them, their backgrounds, professions or approaches?
- **Aim**: are the aims of the texts small, incremental improvements, or are some making big leaps forward while others build on them?
- **Method**: do the methods vary widely, or is there an established way of doing things, does a given paper take a radically different method compared to the others?
- **Analysis**: does the argument overlook work done by others, or were the arguments critiqued?
- **Conclusions**: does a paper confirm findings reported by others, or is it ground-breaking, or a useful if minor contribution?



Validity: Relevance

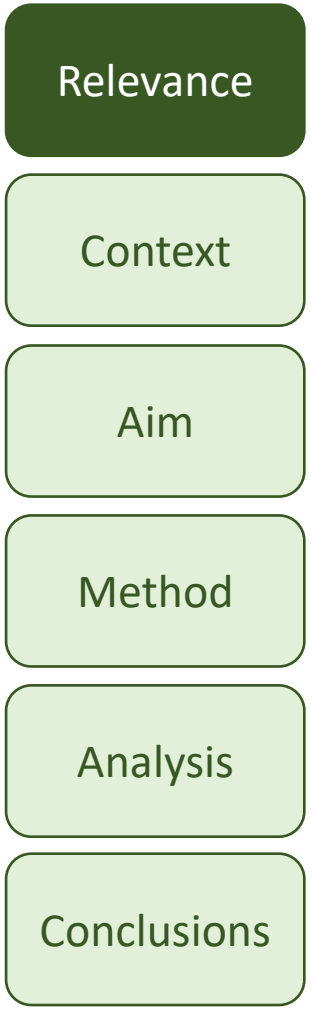
- You can lose track of your own research in all the detail of critically reviewing the work of others.
- Asking about the relevance of a text to your own work helps make sure you don't lose your way.
- This is actually the domain we often start with because we are searching for **relevant** work in the first place.



Validity: Relevance

The five aspects still work for relevance, e.g.,

- **Context**: do the researchers come at this from the same background as you. How do you align with them?
- **Aim**: are the aims similar to yours? Are you going to be adding something, e.g. taking their work further, confirming findings, or applying them differently?
- **Method**: will you be using the same method, adapting their, or taking a very different approach?
- **Analysis**: will you be improving on the argument already used in a text, or will you be citing their argument?
- **Conclusions**: do their conclusions help further your work or contradict it, or is there a flaw that you will be working to fix?



Three domains of critical reading

Newcastle University

Reviewing the literature and critiquing scholarship

	Validity: On its own terms	Synthesis: In relation to others	Relevance: Usefulness to you
Context: discipline/profession, authors, currency, bias	▪ When was it published? ▪ Where was it published? ▪ What profession or discipline are the authors? ▪ What else have they published—are they authoritative? ▪ Are there any vested interests which might bias research?	▪ Have others cited or drawn on this research? ▪ How influential has it been? ▪ Is it cutting edge/controversial or mainstream? ▪ Is this part of a debate and where does it sit?	▪ Are these authors coming at the issue from the same discipline perspective as you? ▪ What is your overall response to the article?
What are they doing? Research Question/Aims/Hypothesis	▪ Are the aims clearly stated? Are they vague? ▪ Is the research question etc valid or rests on bias/assumptions? ▪ Is the question interesting/significant?	▪ Is this a radically new area of research or a tweak or new angle on existing question or topic? ▪ How long have people been interested in this topic?	▪ How similar are their aims to your own? How does that affect your use of it? ▪ Is it still worth me doing my research?
How did they do it? Methods, Models and Materials	▪ Are any theories/models appropriate and accurately understood? Do they develop their own? ▪ Are the methods used for data gathering/interpretation appropriate? ▪ Is the data set well chosen?	▪ Are they developing a completely new method etc? ▪ Are the methods etc used standard and acceptable practice? ▪ Are they adapting or improving previous methods etc?	▪ Does this help me justify my own choice of approach? ▪ Can I adapt or improve their method? ▪ Do I agree that this is an appropriate method for research like mine?
How do they know? Argument, evidence, logic and reasoning	▪ Is their interpretation and analysis flawed or does it make logical sense? ▪ Have they missed anything? ▪ Do the results mean what they say they mean?	▪ Do they use other literature appropriately to help interpret their findings? ▪ Do later scholars criticise them?	▪ Is there anything I should be watching out for when reading my own work critically? ▪ Is there anything I can point to in order to save me having to explain it in full?
What do they say? Findings and conclusions	▪ Are the conclusions actually related to their aims and results? ▪ Are the conclusions drawn proportionate to the evidence presented?	▪ Are their findings confirmed by other literature? ▪ Are their findings significant and novel, compared to other literature?	▪ Can I rely on their conclusions to build my own argument? ▪ Do I disagree with their conclusions to some extent? Does that help justify my research? ▪ Any gaps/missed opportunities to help justify my research?

Interrogate the text as you read - on its own terms, in relation to other texts, and its relevance to your work.

Three Domains of Critical Reading

- This is a thorough framework, and few of us would ever use all of it unless conducting a major literature review, e.g. in a doctorate.
- No need to apply it all at once: use relevance first and if a paper appears relevant, examine validity, for example.
- In your proposal, there's an opportunity here to write some very brief analysis of your sources, using particularly these two of the three domains.

Skills Sessions Upcoming from the Library …

Listed in our Weekly announcement on Teams. Book via the Academic Skills Kit workshops pages (https://www.ncl.ac.uk/academic-skills-kit/events/)

- Wed 16th Feb, 1-2pm: Strategic note-takingThu 17th Feb, 12-1pm: Finding academic information for your literature review
- Thu 17th Feb, 4-5pm: Finding other stuff for your literature review
- Tue 1st Mar, 3-4pm: How to Google well
- Tue 8th Mar, 12-12:45pm: EndNote overview and drop-in
- Wed 9th Mar, 4-4:30pm: Referencing help and tips

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