

Research Methods in computer science

Spring 2020

Lecture 9

Omprakash Gnawali

February 12, 2020

Agenda

Paper Review

Assignment

Usefulness of Learning How to Review

Look at your paper as a reviewer

Answer potential reviewer questions

Reviewer psychology

Review a few to get a feel for it

Critique

Critique is a method of disciplined, systematic analysis of a written or oral discourse. Critique is commonly understood as fault finding and negative judgment, but it can also involve merit recognition, and in the philosophical tradition it also means a methodical practice of doubt. – (Wikipedia)

Coping with Criticism

Keep it professional

Don't take it personally

Understand it

Respond at the right time

Challenge as appropriate

<http://ckscience.co.uk/candidate/career-zone/work-place-advice/5-ways-to-deal-with-criticism-at-work/>

Do unto others as you would have them do to you. – (lots of places)

A Paper Review

“While the exercise is useful, the paper does not have any new concepts or implementation caveats that I think are worth publishing. All of the design description seems straightforward integration of existing systems. The evaluation is also very weak.”

--- excerpt from a review received by the instructor

A Paper Review

“Despite the limited practical applicability, I find the paper interesting for the sheer courage to try something out of the ordinary and to properly explore its limits.”

-- excerpt from a review received by the instructor

How to Review a Paper?

- Form and Content
- Parts of a paper
 - What do you expect in each paper?

How to Review a Paper? - Considerations

Novelty

Importance

Generality

Rigor

Insights

Typical Template

Summary

Strengths

Weaknesses

Detailed Comments

Justification for these sections?

Some additional opinions
on paper review by other scientists...

I almost never print out papers for review; I prefer to work with the electronic version. I always read the paper sequentially, from start to finish, making comments on the PDF as I go along. I look for specific indicators of research quality, asking myself questions such as: **Are the background literature and study rationale clearly articulated? Do the hypotheses follow logically from previous work? Are the methods robust and well controlled? Are the reported analyses appropriate? (I usually pay close attention to the use—and misuse—of frequentist statistics.) Is the presentation of results clear and accessible? To what extent does the Discussion place the findings in a wider context and achieve a balance between interpretation and useful speculation versus tedious waffling?**

I subconsciously follow a checklist. First, is it well written? That usually becomes apparent by the Methods section. (Then, throughout, if what I am reading is only partly comprehensible, I do not spend a lot of energy trying to make sense of it, but in my review I will relay the ambiguities to the author.) I should also have a good idea of the hypothesis and context within the first few pages, and it matters whether the hypothesis makes sense or is interesting. Then I read the Methods section very carefully. I do not focus so much on the statistics—a quality journal should have professional statistics review for any accepted manuscript—but **I consider all the other logistics of study design where it's easy to hide a fatal flaw**. Mostly I am concerned with credibility: Could this methodology have answered their question? Then I look at how convincing the results are and how careful the description is. Sloppiness anywhere makes me worry. **The parts of the Discussion I focus on most are context and whether the authors make claims that overreach the data. This is done all the time, to varying degrees. I want statements of fact, not opinion or speculation, backed up by data.**

- [Michael Callahan](#), *emergency care physician and researcher at the University of California, San Francisco*

Most journals don't have special instructions, so I just read the paper, usually starting with the Abstract, looking at the figures, and then reading the paper in a linear fashion. I read the digital version with an open word processing file, keeping a list of “major items” and “minor items” and making notes as I go. There are a few aspects that I make sure to address, though I cover a lot more ground as well. First, I consider how the question being addressed fits into the current status of our knowledge. Second, **I ponder how well the work that was conducted actually addresses the central question posed in the paper. (In my field, authors are under pressure to broadly sell their work, and it's my job as a reviewer to address the validity of such claims.)** Third, I make sure that the design of the methods and analyses are appropriate.

- *McGlynn*

First, I read a printed version to get an overall impression. What is the paper about? How is it structured? I also pay attention to the schemes and figures; if they are well designed and organized, then in most cases the entire paper has also been carefully thought out.

When diving in deeper, first I try to assess whether all the important papers are cited in the references, as that also often correlates with the quality of the manuscript itself. Then, right in the Introduction, you can often recognize whether the authors considered the full context of their topic. After that, I check whether all the experiments and data make sense, paying particular attention to whether the authors carefully designed and performed the experiments and whether they analyzed and interpreted the results in a comprehensible way. **It is also very important that the authors guide you through the whole article and explain every table, every figure, and every scheme.**

As I go along, I use a highlighter and other pens, so the manuscript is usually colorful after I read it. Besides that, I make notes on an extra sheet.

- [Melanie Kim Müller](#), *doctoral candidate in organic chemistry at the Technical University of Kaiserslautern in Germany*

I first familiarize myself with the manuscript and read relevant snippets of the literature to make sure that the manuscript is coherent with the larger scientific domain. Then I scrutinize it section by section, noting if there are any missing links in the story and if certain points are **under- or overrepresented**. I also scout for inconsistencies in the portrayal of facts and observations, assess whether the exact technical specifications of the study materials and equipment are described, consider the adequacy of the sample size and the quality of the figures, and assess whether the findings in the main manuscript are aptly supplemented by the supplementary section and whether the authors have followed the journal's submission guidelines.

- [Chaitanya Giri](#), postdoctoral research fellow at the Earth-Life Science Institute in Tokyo

I spend a fair amount of time looking at the figures. In addition to considering their overall quality, sometimes figures raise questions about the methods used to collect or analyze the data, or they fail to support a finding reported in the paper and warrant further clarification. I also want to know whether the authors' conclusions are adequately supported by the results. Conclusions that are overstated or out of sync with the findings will adversely impact my review and recommendations.

- [**Dana Boatman-Reich**](#), *professor of neurology and otolaryngology at Johns Hopkins University School of Medicine in Baltimore, Maryland*

I generally read on the computer and start with the Abstract to get an initial impression. Then I read the paper as a whole, thoroughly and from beginning to end, taking notes as I read. For me, the first question is this: Is the research sound? And secondly, how can it be improved? Basically, I am looking to see if the research question is well motivated; if the data are sound; if the analyses are technically correct; and, **most importantly, if the findings support the claims made in the paper.**

- *Walsh*

I generally read on the computer and start with the Abstract to get an initial impression. Then I read the paper as a whole, thoroughly and from beginning to end, taking notes as I read. For me, the first question is this: Is the research sound? And secondly, how can it be improved? Basically, I am looking to see if the research question is well motivated; if the data are sound; if the analyses are technically correct; and, **most importantly, if the findings support the claims made in the paper.**

- *Walsh*

The main aspects I consider are the novelty of the article and its impact on the field. I always ask myself what makes this paper relevant and what new advance or contribution the paper represents. Then I follow a routine that will help me evaluate this. First, I check the authors' publication records in PubMed to get a feel for their expertise in the field. I also consider whether the article contains a good Introduction and description of the state of the art, as that indirectly shows whether the authors have a good knowledge of the field. Second, I pay attention to the results and whether they have been compared with other similar published studies. Third, **I consider whether the results or the proposed methodology have some potential broader applicability or relevance, because in my opinion this is important. Finally, I evaluate whether the methodology used is appropriate. If the authors have presented a new tool or software, I will test it in detail.**

- [Fátima Al-Shahrour](#), head of the Translational Bioinformatics Unit in the clinical research program at the Spanish National Cancer Research Centre in Madrid

Paper review software
Sample reviews

Some Questionable Ideas...

- A paper addresses a problem that will become important?
- A paper will become important to a community?
- A paper has lots of graphs and data
- The authors did a lot of experiments

Some Easier Ideas...

- Technical Claims
 - What are the claims?
 - Have the claims been validated?
 - Experimental
 - Data
 - Theory
- Technical Correctness

HW4 – Paper Review

Pick a research paper that is considered important in your area of research.

Write a review for that paper

Summary

Strengths

Weaknesses

Details

Overall recommendation