Teaching for Research - CSS Bootcamp 2022

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1 You're going to be teaching, damnit

- Onboarding/Mentoring Colleagues
- Explaining new approaches
- Presenting results and problems
- Writing research papers and final reports
- Applications (e.g. grants, grad school, cover letters)
- "So what do you do?"
- When you inevitably go back to school for your Linguistics Ph.D

2 Good and Bad Teaching

2.1 Discussion: What works well? What works well *for you*?

2.2 Discussion: What doesn't work well?

2.3 Discussion: How have you seen teaching go wrong?

3 Generally useful tips for teaching anything

1. **Consider your audience's background knowledge**
    - What do people know that will work for (and against) them as they learn?
    - Gauge or estimate prior knowledge
    - Specifically target unhelpful intuitions or knowledge
2. **Think about how what you're sharing fits into schemas**
    - Segment things, explain them clearly, summarize, then build on that
    - Teaching is a house, built on foundations upwards
    - Giving a pattern is better than giving 100 facts
    - Use boundary cases to explain the boundaries
    - *"Here is how you should organize what I'm telling you"*
3. **Think about the story and narrative arc and explain it**
    - The order in which you present things has very real effects
    - You're telling a story here, so think about where it starts, ends, and goes in the middle
    - Manipulate surprise, expectation, and emotional state to positive end
    - Explain your structure, regularly, and repeatedly
    - Give pauses where it makes the most sense
4. **Choose the best approach for what you need to teach**
    - *Micro level*: Graphs vs. Text vs. Tables vs. Statistical Tests
    - *Macro level*: Paper vs. Slides vs. Poster vs. Discussion vs. Website vs. Video
5. **Make people give a damn**
    - If people don't understand why they're learning, they'll do a worse job
    - Make what you're sharing relevant from the get-go

    - Situate learning in their lives and needs
    - Show you value them as humans and see their needs
6. **Active Learning is helpful**
    - Most people learn better when they have to *do* things with what they learned
    - Keep people engaged, rather than passive
    - Consider adding activities (e.g. direct application, targeted discussions, practicum)
    - Making people teach makes them learn, and group work forces teaching
7. **Make hard decisions about how much to teach**
    - Breadth vs. Depth
    - Adding content does not always add learning
    - Consider what they need to *know* vs. what they can look up later
    - 'What needs to go in long term vs. working memory?'
    - You're often well served by reducing the scope
8. **Steal from the folks you respect**
    - You won't feel like a good teacher until long after you are one
    - Ask yourself 'How would [my favorite professor] talk about this?'
    - 'What would Lise Menn do?'
    - Figure out where your style needs to diverge from their
9. **Mind the power gradients**
    - Consider backgrounds, traumas, fears, and concerns as you design your materials
    - Remember that 'light correction' lands differently for different people
    - Remember that some students are very afraid to have questions or need help

For more information on how people learn, I recommend 'How People Learn' from *Transforming STEM Teaching* at UCB, 2017

4 Strengths and Weaknesses of Teaching Types

For each of the below, let's consider strengths and weaknesses, best approaches, and other details:

- One-on-One Mentoring/Training
- Small Group Seminars (<10 people)
- 'Boardwork' style slide-less teaching
- Slide-based presentations
- Creating an interactive website
- Writing a research paper or project report for dead-tree publication
- Making a video (e.g. YouTube, TEDTalks)

5 Tips for different teaching types

5.1 One-on-One Mentoring

- Give yourself a bulleted agenda to organize what you're teaching
- Prepare examples and 'practice' problems ahead of time
- Start by figuring out what they already know
- Be prepared to flex from the agenda as needed

- Use slides sparingly

5.2 Seminars and Small Discussions

- Pose questions, rather than giving answers
- Elicit *more* from the students, rather than less
- Don't fear silence, give people time to think
- Stay engaged
- Don't try and steer too much
  - Just use the gas and brakes where prudent
  - If a student's taking things in a productive direction, egg them on
  - If a student's off doing their own thing, digressing, or dominating, nudge back and ask for other voices
- Jump in to correct mistakes, resolve arguments, and move things on
- Consider a handout (digital or analog)

5.3 Poster Presentations

- Keep it quick
- Prepare explanations with narrative arcs of different lengths
  - 2-4 minute full walkthrough
  - 30 second overview
- Don't hold hostages
- Less words is generally better
- Your poster needs to work even with you not at it.
- Make it visually interesting

5.3.1 Short Talks

- Know your audience
  - How specialized are they?
  - How much background knowledge do they have?
  - Do they know the literature?
- Know your story
  - You need to be purpose driven
  - 3-5 take-away points
  - Explain the plan in an early slide
  - Wrap up by summarizing
- Thin your talk
  - Say as little as possible
  - Polish your plots
  - Complicated plots slow you down
  - "If you'd like to talk about this part of the study, come grab me afterwards"
- Use the Mic if provided
- Plan for common questions
- Demo your talk

  - A few times alone, once for a group, then a few more times alone
  - Make sure you're consistently hitting the time target
  - Leave time for questions
- Keep some back-pocket slides

5.3.2 Presentation Design

For much more of this, see my Thoughts on Effective Presentation Design.

Executive Summary:

- Consider how you use slides
  - 'Many short slides' vs. '5 ten minute slides'
- Use animations, images, and video only in service of the talk
  - If it's not helping, it may be hurting
- Steal styles, ideas, and structures from people whose teaching you respect
- Use humor where prudent, and consider your teaching persona
- Aim for legibility and accessibility, and use formatting consistently
- *DO NOT* just read from your slides or presenter notes
  - Perform your notes, don't read them

6 Writing Effective Papers and Reports

6.1 Discussion: What makes a readable paper?

6.2 Discussion: What makes an unreadable paper?

6.3 Writing papers should be teaching, damnit

- Still consider background knowledge
- Explain concepts the first time they're used
- If a method isn't well-known in your world, teach a bit about it first
  - Be explicit that you're doing this, and lean into it
- Still consider structure and narrative arc, and make structure explicit
  - "In this section, we'll establish that shark attack cause increased ice cream sales, such that we can then measure the effect of the movie 'Jaws' on Ice Cream Maker production in 1975…"
- Don't hesitate to do weird things if it helps the learning
- Think about proving your point in many ways
  - There's no harm in showing the effect in a graph, then solidifying it with a statistical test
  - Reinforce your point(s) in the intro, conclusion, and interim summaries
- Leave people with the 'important takeaways'
  - Don't lose track of the forest for the trees
- *Teach until somebody makes you stop*
  - There's very little harm in writing readable, well-explained text

6.4 General Advice

- A good paper is like a ninja: Small enough to move quickly, but big enough to pack a punch

- Always make clear what we already know and how we got there
  - Citations should be easily followable
- Look to the papers you've examined for structures that work well
- Break sections apart to minimize working memory use
  - Make your case in parts, rather than trying to do everything at once, and refer back
  - "As we established in Section 2.4, shark attacks cause increased ice cream sales…"
- Consider using LaTeX, Markdown, or other approaches to make formatting/numbering/citing automatic
  - … and because they're strictly better than Microsoft Word and GUI Editors

6.5 Formatting details

- Use (any) sane format
  - Sometimes journals or companies specify a style guide
- Make your formatting mean things
  - Differently formatted text should be a different kind of text
- Make your graphs relatively easy to understand
  - Several sparse graphs may be easier than one rich one
- Somebody will always complain about how you present your stats
  - 'Supplementary Materials' are a beautiful thing ('See Supplementary Materials, Section 10 for full model specification and output')
- Consider colorblindness and black-and-white printing when making graphs

7 Your Teaching Presentation

For Thursday, you're being asked to teach us about your research or research interests. Potential topics could include:

- Tell us about project you've worked on before that's along the lines of what you want to keep doing, with a bit of background, method, and result.
- Talk to us about the questions you want to ask, with background on the area(s) they're based in and why they're interesting
- Teach us a few basic fundamentals about your favorite methodology or subfield (e.g. signal detection theory, or sociolinguistics)
- Tell us about a particularly interesting phenomenon related to your research interests (e.g. vowel nasality)

You're effectively emulating the Ph.D Mentor presentations, with a bit more diversity of topic. You can present however you'd like, using a discussion, boardwork, a handout, or slides. Plan to teach for around 5 minutes, and then we'll talk about how it went with a focus on helping you grow.

It's OK if you feel nervous, this is a safe space, we're all here to learn.