2018 CRA Mentoring Workshop
Teaching

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Introduction

• Us: Two experienced faculty who passionately love teaching
  – Have improved methodically over time

• You: A range of experience and passion
  – From deeply apprehensive to exuberantly eager
  – Workshop aimed at all of you

• Focus: Perspective, mindset, framing, tips
  – Not much how to design lecture/homework/exam/syllabus

• Will assume “conventional” undergraduate courses, but much applies more broadly
Introduce ourselves

Hi! 😊
Topic #1

How are your students* different than you?

*The vast majority of them

[Hint: This matters a lot!]
Topic #2

“Tips of the Trade”

• Things to emulate
• Things to avoid
• Things we learned from experience

Could do 100s of these: these are our top $N$ that fit in 5-10 minutes
Ellen’s tips

• *Teaching* takes a lot of time. *Don’t* spend too much time on teaching. Bound it.

• Active learning is a *safe-to-fail experiment*. Some things will work; others will not. You get to try again next class.

• Your *intellectual excitement* for the material matters a lot. Show it! (See next slide.)

• It’s ok to say “I don’t know.” Then find out for next class.

• Oh, and *laptops*. 
From Teaching Engineering, Wankat&Oreovitz (pdf available online)

- Chart from Lowman 1985
- Two-D model: intellectual excitement, interpersonal rapport (e.g., open, warm, caring, know their names)

<table>
<thead>
<tr>
<th>Intellectual Excitement</th>
<th>Interpersonal Rapport</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Punishing</td>
</tr>
<tr>
<td>Moderate</td>
<td>3' Adequate Attacker</td>
</tr>
<tr>
<td>Low</td>
<td>1' Inadequate Attacker</td>
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</tbody>
</table>

TABLE 1-1  TWO-DIMENSIONAL MODEL OF TEACHING (Modified from Lowman, 1985)
Dan’s tips

• Do start from other’s materials and course designs
  – But don’t use others’ “slides” and such without deep editing to your style, taste, and understanding

• Never release a homework/exam you do not have a full, written, working sample solution for
  – It’s tempting. You’ll regret it.

• Be unfailingly courteous in all student interactions
  – Even when you don’t want to.
  – Even when you think they don’t deserve it.

• You have recently become scarier than you think
• You are more impactful than you think.
• You are “signaling” constantly. Try to remember that.
Bloom’s Taxonomy (Revised)

- **Creating**
  - Can the student create a new product or point of view?
  - assemble, construct, create, design, develop, formulate, write

- **Evaluating**
  - Can the student justify a stand or decision?
  - appraise, argue, defend, judge, select, support, value, evaluate

- **Analyzing**
  - Can the student distinguish between different parts?
  - appraise, compare, contrast, criticize, differentiate, discriminate, distinguish, examine, experiment, question, test

- **Applying**
  - Can the student use information in a new way?
  - choose, demonstrate, dramatize, employ, illustrate, interpret, operate, schedule, sketch, solve, use, write

- **Understanding**
  - Can the student explain ideas or concepts?
  - classify, describe, discuss, explain, identify, locate, recognize, report, select, translate, paraphrase

- **Remembering**
  - Can the student recall or remember the information?
  - define, duplicate, list, memorize, recall, repeat, state
Assessment

[This “obvious” logic took Dan about ~10-12 years to accept and he’s still not 100% “there”.]

1. You [and your students] should know your learning outcomes
2. Purpose of coursework is two-fold (impossible w/o step 1):
   a. Achieve the learning outcomes
   b. Assess the students’ mastery of the learning outcomes
3. Judge every exam/homework question by step 2
   – Not “like last year’s test”, clever, standard, easy-to-grade, …
   – Assessment goal: reasonable correlation between grade (partial credit) and mastery of learning outcomes
Meta

Key issues “above” the teaching and grading that will affect you

1. Student course evaluations
2. Students personal issues / mental health
3. Cheating
4. Rules and regulations
Q&A

You prioritize our last $N$ minutes

But first, we’ll end on a positive note 😊

Ellen: I’ll quote Jim Kurose (one of my research and teaching heroes: “research is what we do so we get to teach”. Jim is head of NSF CISE (see Dan’s note!)

Dan: research ≠ teaching, but the key research skills can transfer: clear goal, methodical communication, iterative refinement, passion for the topic
High-level points

1. Know your *context*: who are your students

2. *Skills* matter: What to emulate and avoid?

3. *Objectives*: What do want students to learn? Have explicit plans and goals

4. Be prepared for the meta-level challenges

5. Always room for improvement