# 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)

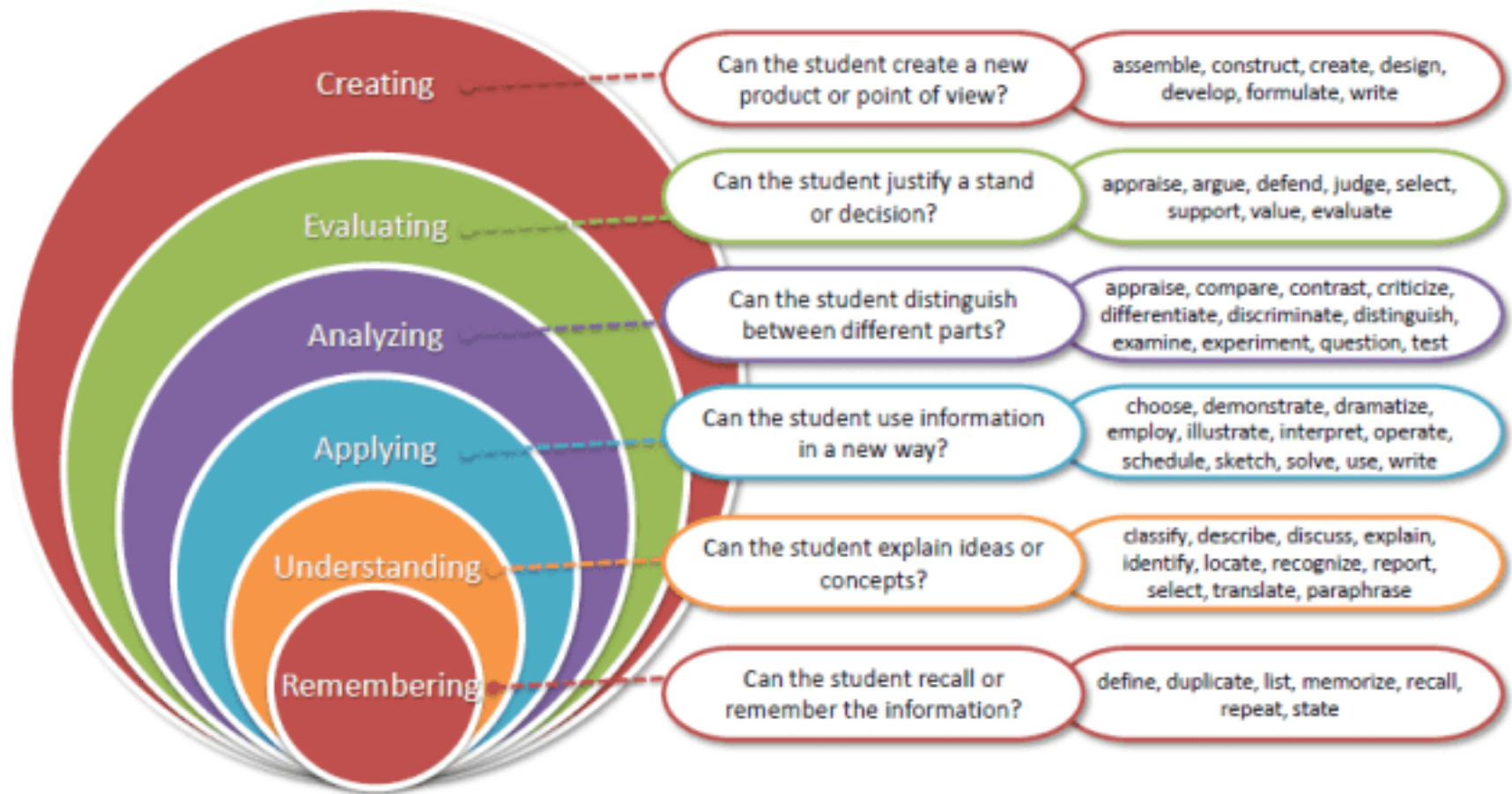**TABLE 1-1**  TWO-DIMENSIONAL MODEL OF TEACHING  (Modified from Lowman, 1985)

| Intellectual Excitement | Interpersonal Rapport | | | |
|---|---|---|---|---|
| | **Punishing** | **Low** | **Moderate** | **High** |
| High | 6'. Intellectual Attacker | 6. Intellectual Authority | 8. Masterful Lecturer | 9. Complete Master |
| Moderate | 3'. Adequate Attacker | 3. Adequate | 5. Competent | 7. Masterful Facilitator |
| Low | 1'. Inadequate Attacker | 1. Inadequate | 2. Marginal | 4. "Warm fuzzy" |

# *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