ACS

Chemistry for Life®

American Chemical Society

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Welcome to the New Faculty Workshop

Welcome!
We are glad you're here!

Thank you for participating in this workshop-we know your time is limited, and we appreciate your energy and engagement.

We will strive to make this a safe and inclusive environment

We encourage you to:

- Listen to learn
- Respectfully critique ideas, not individuals
- Experiment!
- Take an **active** approach to your own learning and development

We invite you to:

- Challenge yourself

Workshop Logistics

- Workshop-related inquiries can be directed to nfw@acs.org
- We will use a combination of
  - Zoom for workshop sessions
  - Google Drive for resource sharing
  - Email for communications
  - Gather.Town for Thursday networking

Workshop Logistics (cont.)

- We know you may not be able to attend all sessions. Zoom sessions will be recorded so that participants will be able to access the discussions in an asynchronous manner.
- You will hear more about the ‘teachable tidbit’, but essentially you’ll be running a 7-10 minute activity in small groups on Monday. Many of the early sessions will help you ‘build up’ to constructing this activity.
- Please be sure to
  - Complete any pre-workshop surveys you received
  - Complete any pre-work (eg before Assessment session on Friday)

Thank you to our facilitators

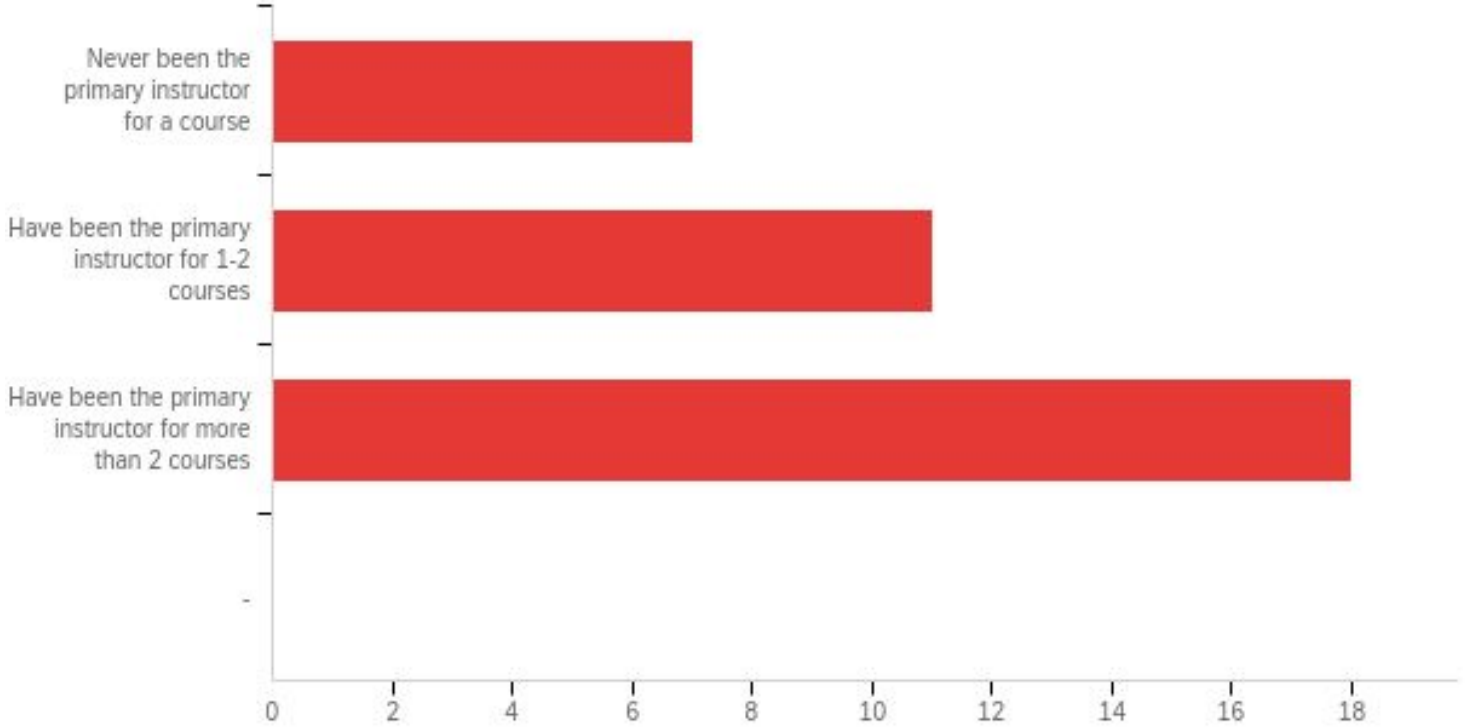
This workshop would not be possible without the work of our facilitators. Thank you:

- Laura Anna, Montgomery College
- Penny Beuning, Northeastern University
- Rebecca Eikey, College of the Canyons
- Andrew Feig, Research Corporation for Science Advancement
- Michelle Francl, Bryn Mawr College
- Peg Harbol, Cascadia University
- Amanda Hargrove, Duke University
- Melanie Harvey, Johnson County Community College
- Casey Londergan, Haverford College
- Samuel Pazicni, University of Wisconsin-Madison
- Rory Waterman, University of Vermont

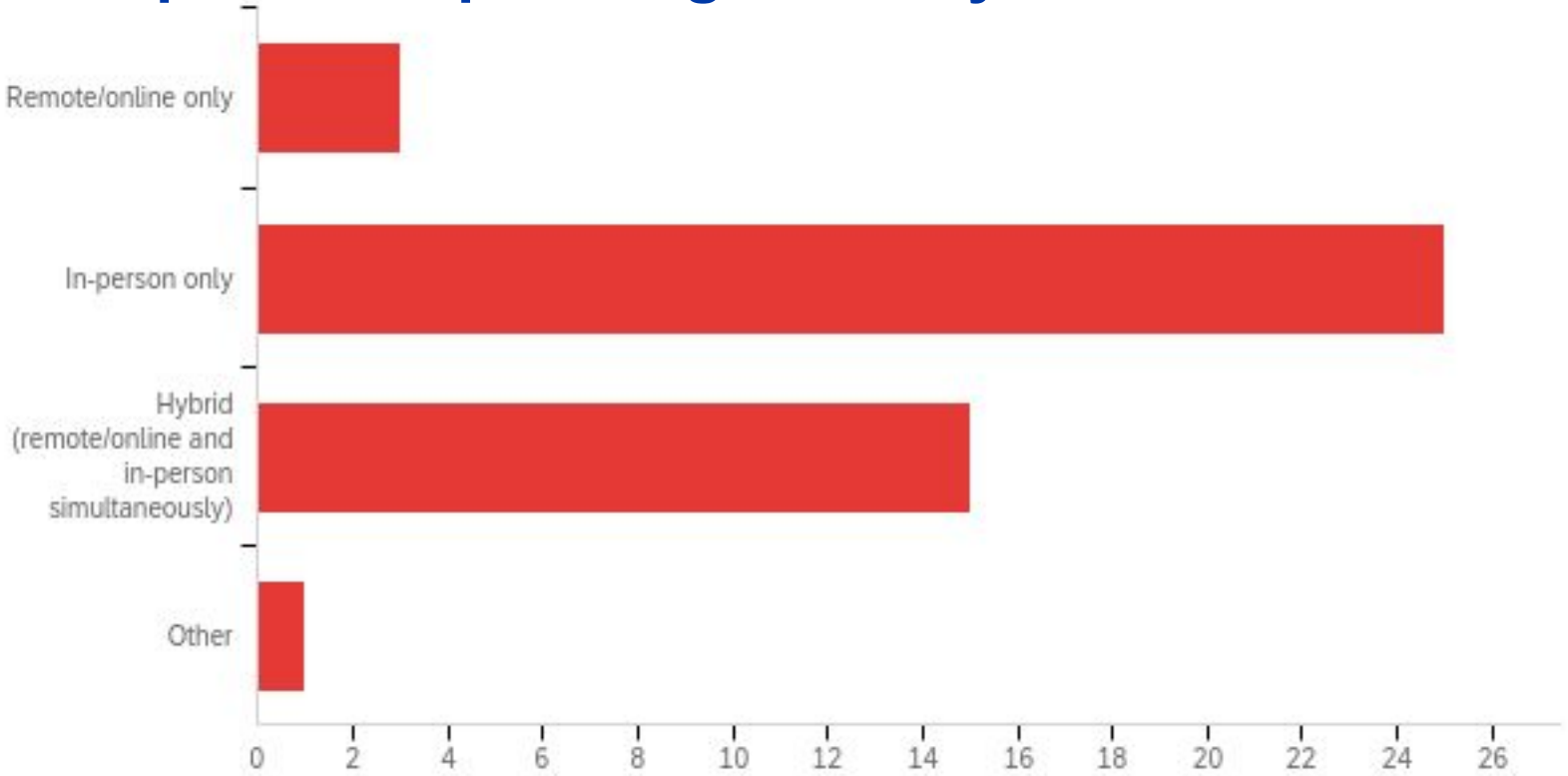
Thank you to our ACS coordinators

- Terri Chambers
- Shari-Joi Nicholson
- Ashley Donovan

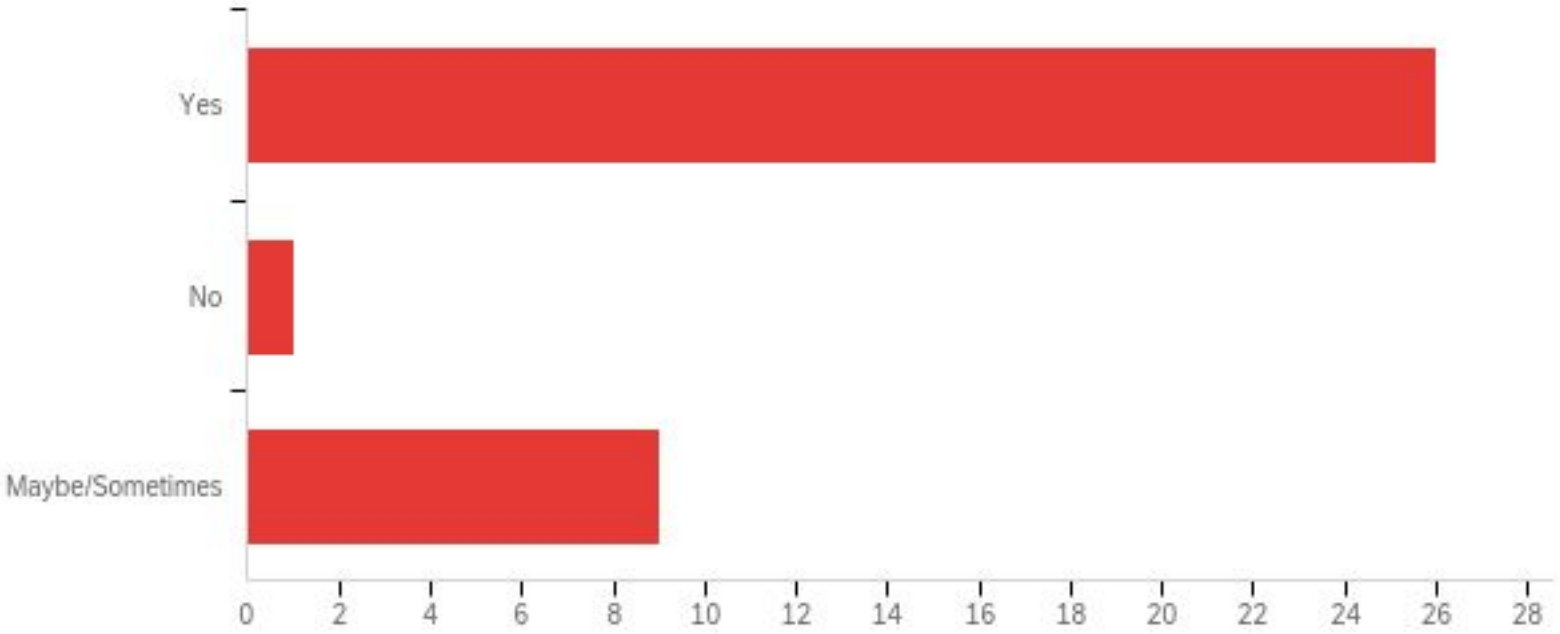
Your Just in Time Teaching survey responses: experience



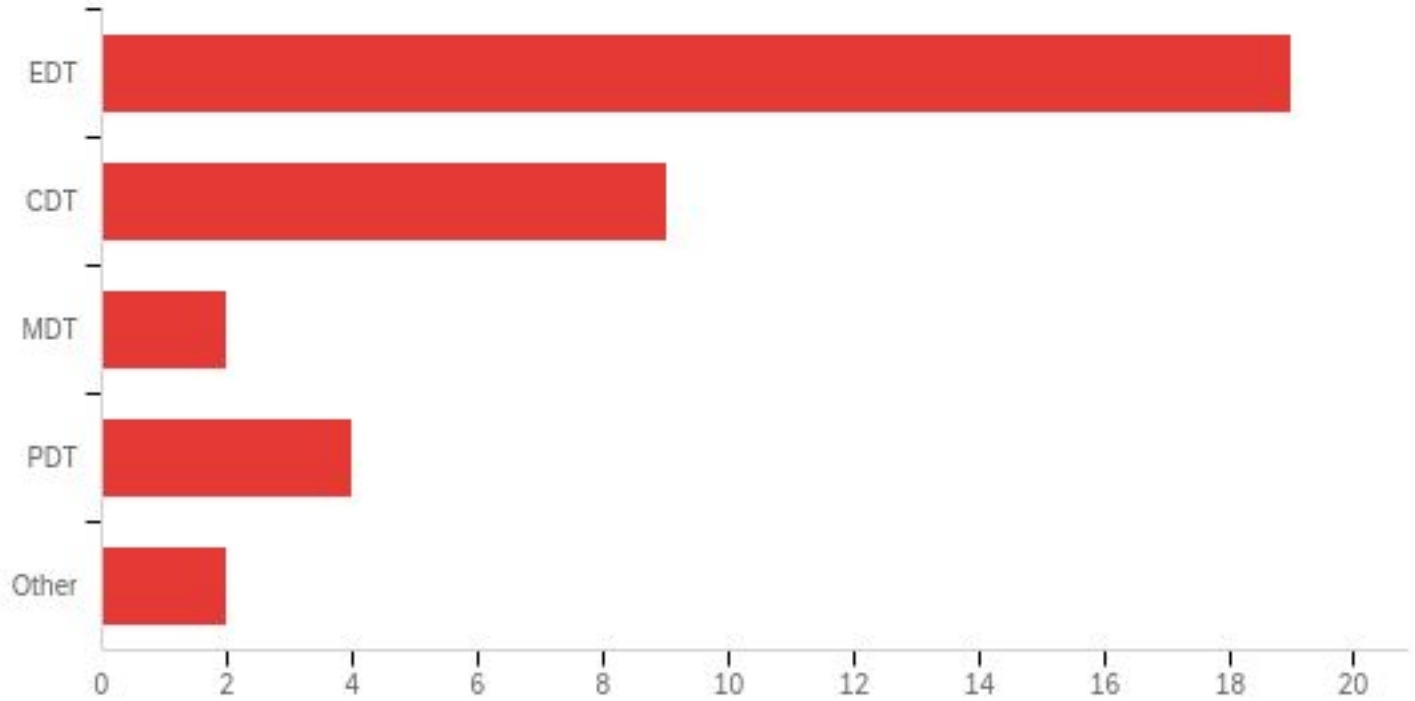
Your Just in Time Teaching survey responses: upcoming modality



Your JITT responses: quiet place to work and Zoom?



Your JITT responses: time zone



Your JITT responses: essential chemistry competency

JITT: open-ended questions (most important)

- Are you experiencing anything related to the pandemic that might affect your participation?

- What questions or comments do you have about this exercise?
  - (WTF?)

- What questions do you have about this workshop in a general sense? Is there one particular burning topic that you hope we will cover?
  - Grant writing; DEI; active learning (and student buy-in)

Group activity (in breakout rooms)

- Three jobs
  - Leader (latest calendar birthday)
  - Recorder (middle calendar birthday)
  - Reporter (earliest calendar birthday)
- Three tasks
  - List/discuss three barriers to success for new faculty
  - Identify one approach to how you personally will work to overcome one of these barriers

Group activity

Barriers include:

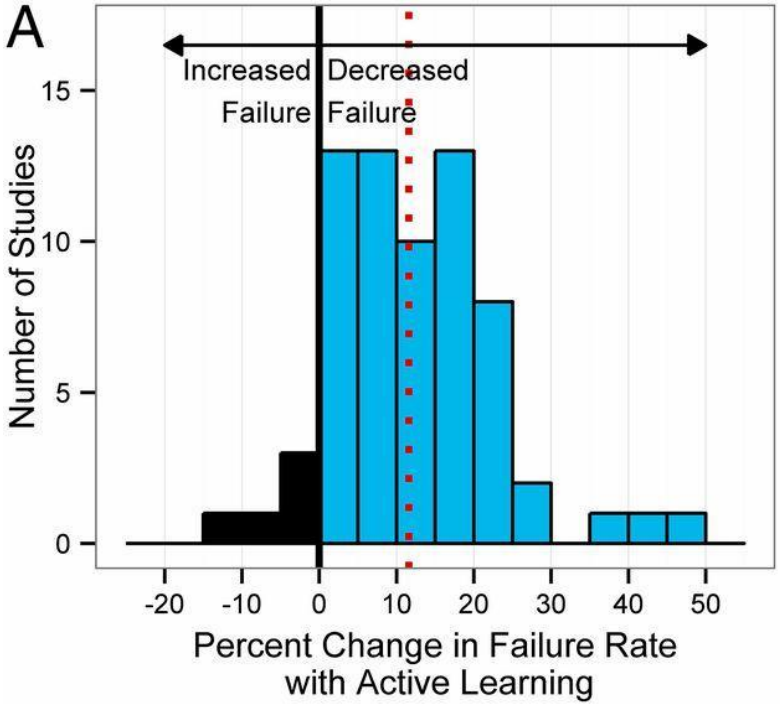
Approaches to overcoming include:

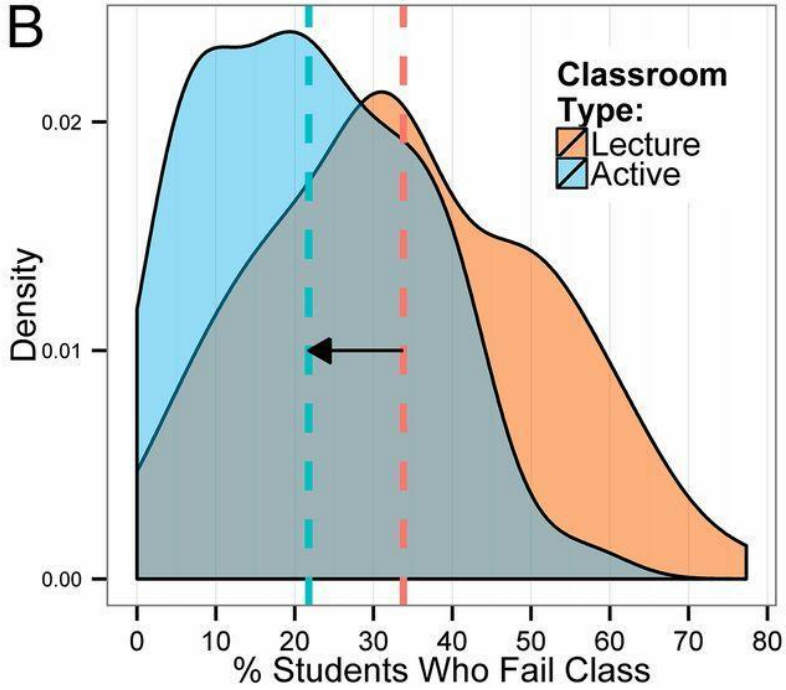
Your JITT survey responses: single biggest concern related to teaching

Teaching vs Learning

"I taught them that"

“Active learning” leads to more desirable student outcomes.

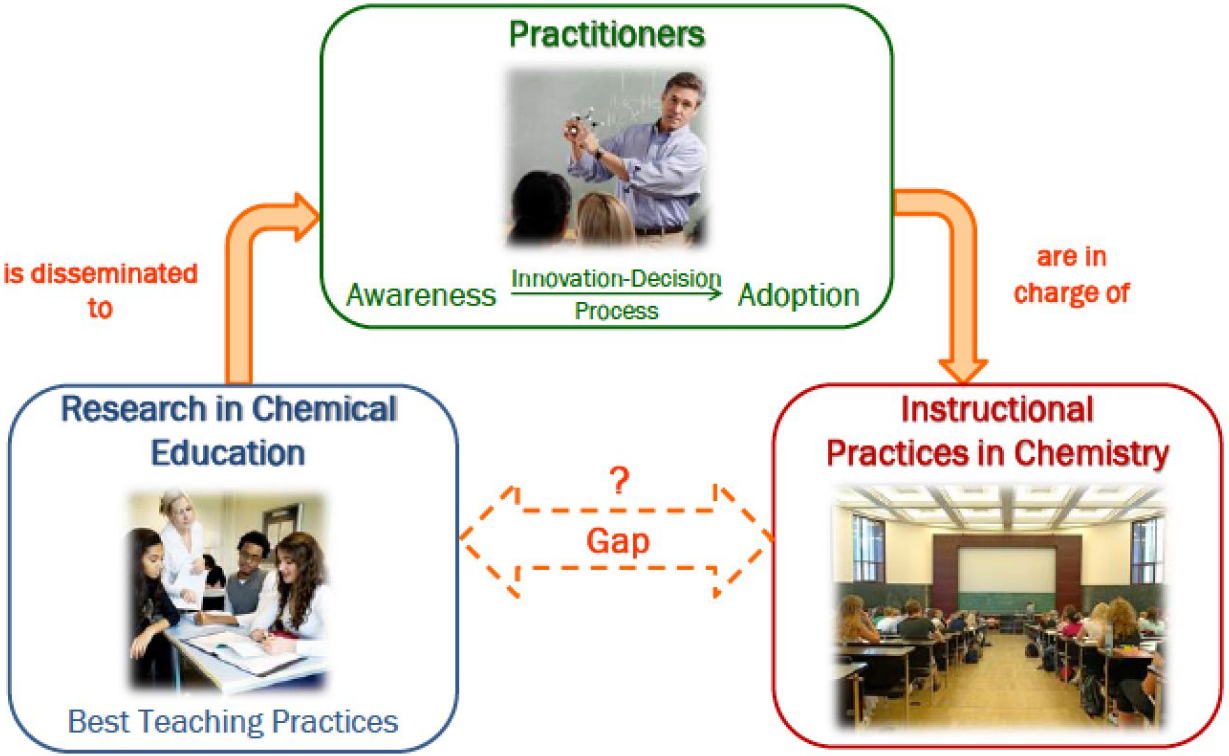




- *Active learning* was defined as anything other than continuous exposition by the instructor

Freeman, S.; Eddy, S. L.; McDonough, M.; Smith, M. K.; Okoroafor, N.; Jordt, H.; Wenderoth, M. P. Active learning increases student performance in science, engineering, and mathematics. *Proceedings of the National Academy of Sciences, USA* **2014**, *111*(23), 8410–8415.

Disconnected Practice



Graphic c/o Marilyne Stains, UVa

Reasons for Disconnected Practice (aka Lecturing All the Time)

- Defensive Teaching (Fear of Looking Stupid)
- Was Taught That Way
- Don’t Believe the Research
- Lack of Time
- Fetishization of Hyperspecific Material
- Structural Constructions Around Lecturing
  - Furniture and Physical Space
  - Previous Materials and Syllabi
  - Student Expectations

Learning-Centered Teaching vs Scientific Research

Active Learning:

- Engagement
- Collaboration
- Student agency
- Direct problem relevance
- Personalization and differentiation
- Direct and personal challenges
- Communication

Success in Research:

- Engagement
- Collaboration
- Mentee independence and agency
- Direct problem relevance of concepts and techniques
- Personalization and differentiation
- Direct and personal challenges
- Communication of results

You already know how to do this stuff.

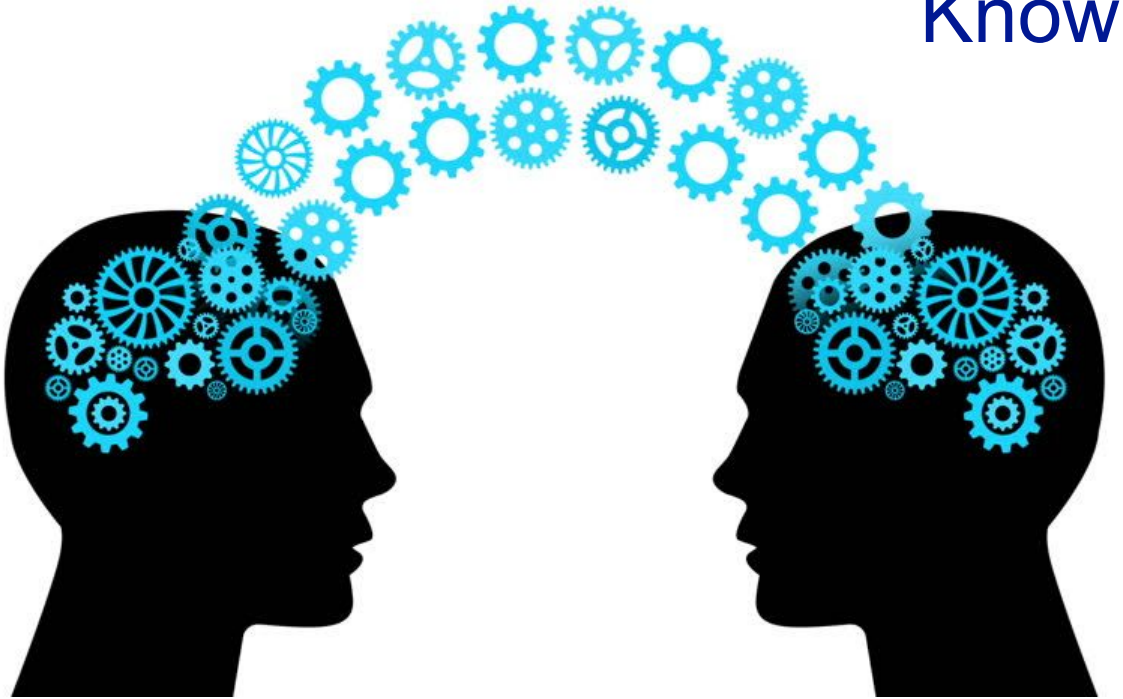
This is your training. You are going to be awesome, and your students will **learn**, if you use your native and developed skill set in a “teaching” environment.

Learning is Cognitive

Cognitive engagement stems from a willingness to engage in effortful thinking, purposiveness, strategy use, and self-regulation in the learning process.

Sinatra, G. M.; Heddy, B. C.; Lombardi, D. The challenges of defining and measuring student engagement in science. *Educational Psychologist* **2015**, *50*(1), 1–13.

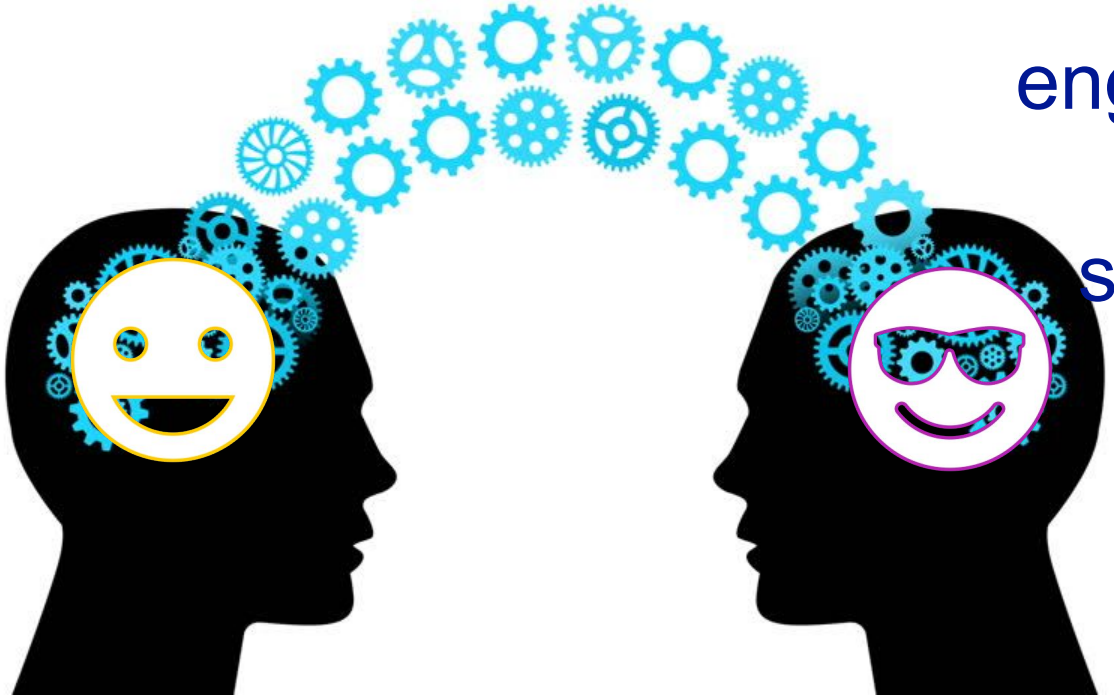
Learning is Social



Knowledge construction occurs in, and is shaped by, social contexts.

Sinatra, G. M.; Heddy, B. C.; Lombardi, D. The challenges of defining and measuring student engagement in science. *Educational Psychologist* **2015**, *50*(1), 1–13.

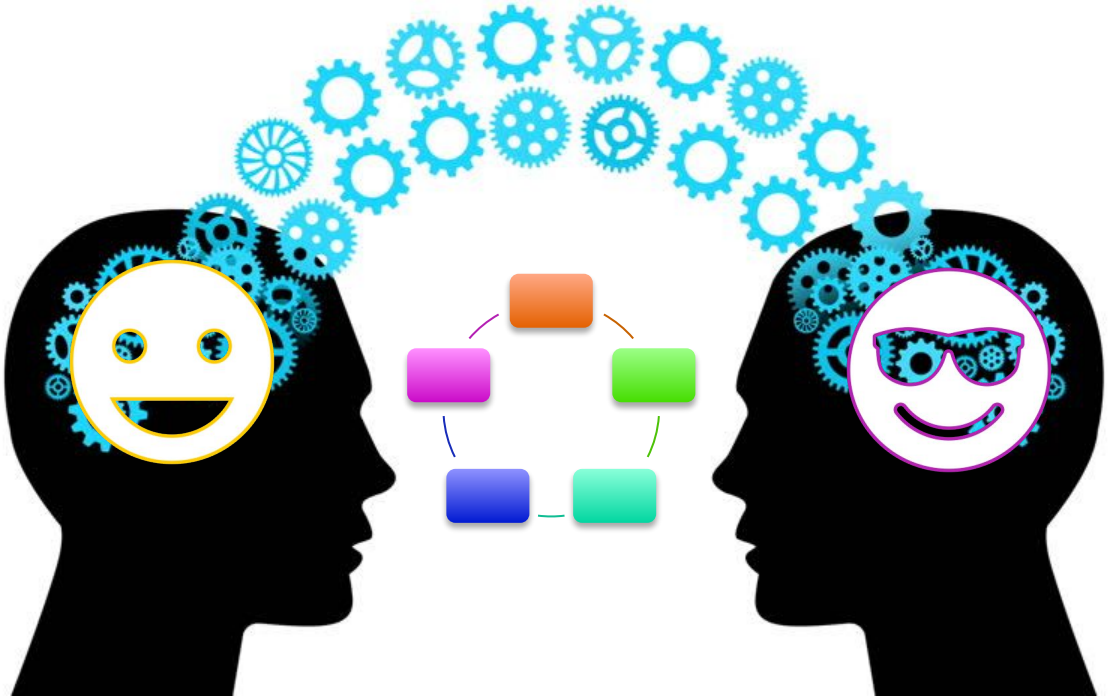
Learning is Emotional



Emotional engagement involves positive feelings, a sense of belonging, and perceptions of learning work as valuable.

Sinatra, G. M.; Heddy, B. C.; Lombardi, D. The challenges of defining and measuring student engagement in science. *Educational Psychologist* **2015**, *50*(1), 1–13.

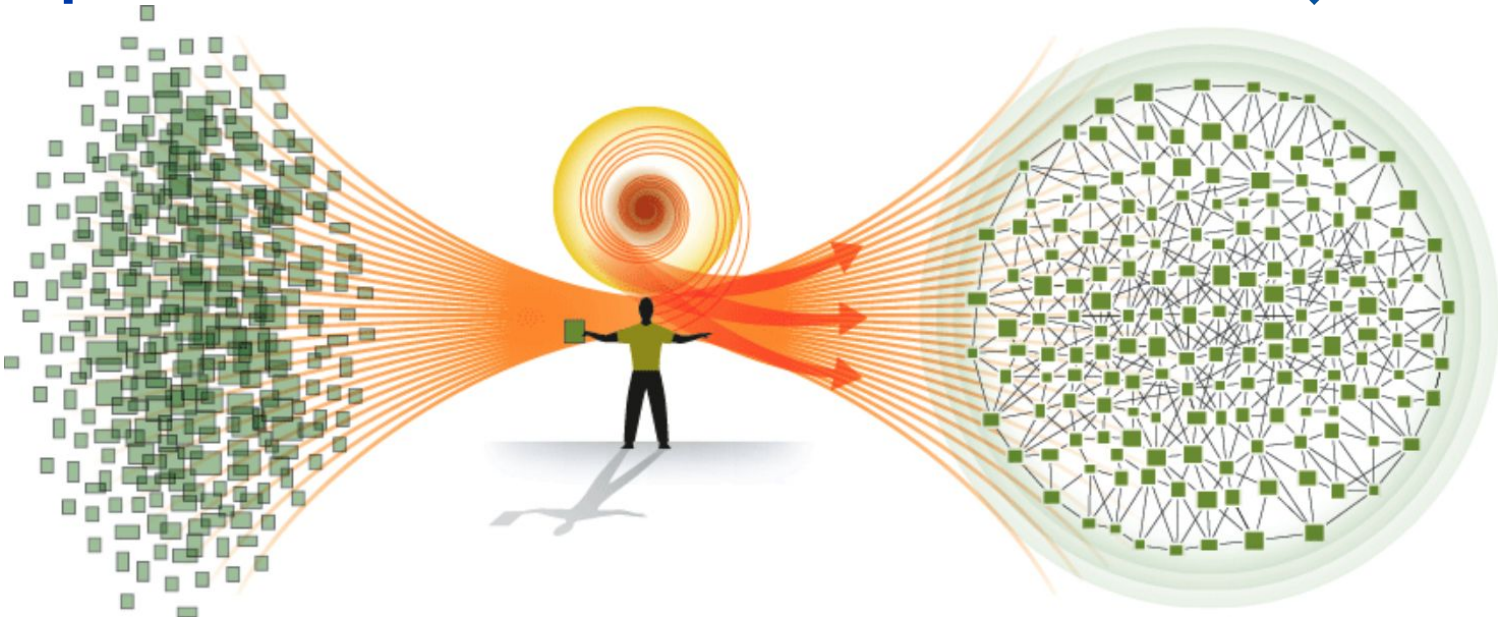
Learning Requires Agency



Learners recognize and implement their role as constructors of knowledge for both themselves and their peers.

Sinatra, G. M.; Heddy, B. C.; Lombardi, D. The challenges of defining and measuring student engagement in science. *Educational Psychologist* **2015**, *50*(1), 1–13.

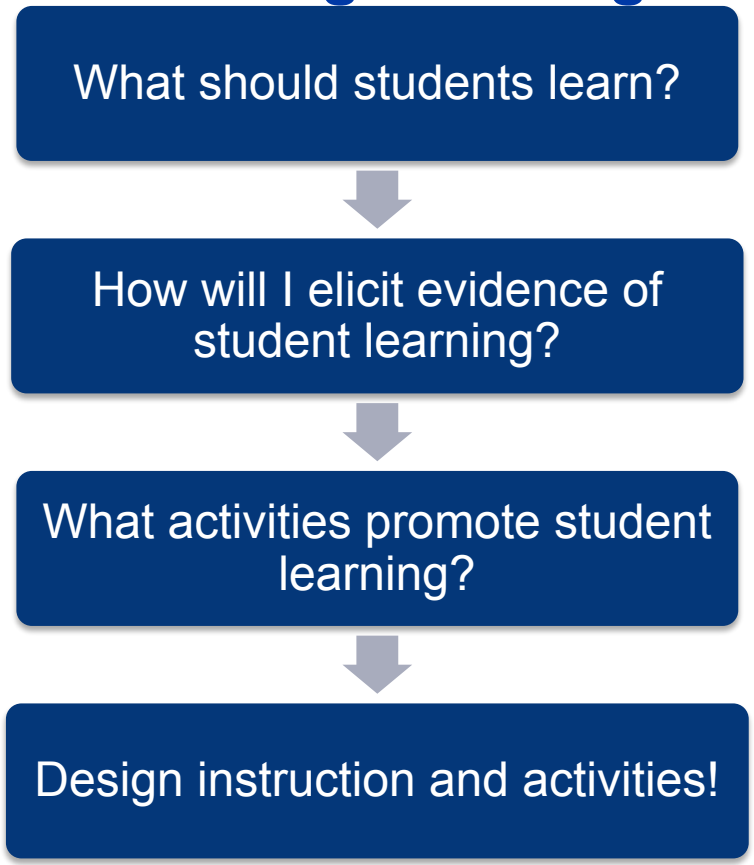
Importance of Instructor Guidance



- expert knowledge is organized, contextualized and useful
- novice knowledge is relatively disorganized, dynamic, and useful in *scaffolded* situations

National Academies of Sciences, Engineering, and Medicine. *How People Learn: Brain, Mind, Experience, and School: Expanded ed.*, 2nd ed.; National Academies Press, **2000**.

~~Teaching~~ Learning Tidbit Design



Consider what students should know and be able to *do* with that knowledge.

Constructive alignment of these ideas results in a coherent curriculum.

~~Teaching~~ Learning Tidbit Design

- choose a piece of content that is appropriate for a construction-of-understanding activity
  - your learning objective should be for students to DO something with the content, rather than just have it

develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy

This is chemistry.

vs

.

calculate an enthalpy change for a reaction using the following equation:

$$\Delta_r H^\circ = H^\circ(\text{products}) - H^\circ(\text{reactants})$$

This is math (at best).

In this workshop: enact your own learning agency.

- Take notes
- Use and save all of the available resources
- Work, and network, with your peers
- Get ideas, as facilitators model active learning modality
- Liberally borrow and adapt approaches from others
- Take risks, talk about them, and reflect on the outcomes

Online *vs* in-person *vs* hybrid…

- Learning principles remain the same, regardless of environment

Engagement Student Agency

Instructor Guidance Scaffolding and Structure

- Plan to meet your students where they are, and operate with grace and understanding. **Kindness** plays a key part in students' receptivity to their learning environments, especially for URM/FGLI students.