

ISEE Professional Development Program (PDP)

Caitlin Casey, Adam McKay, Chao-Ling Hung, Aaron Smith

GSPS 4/29/2016

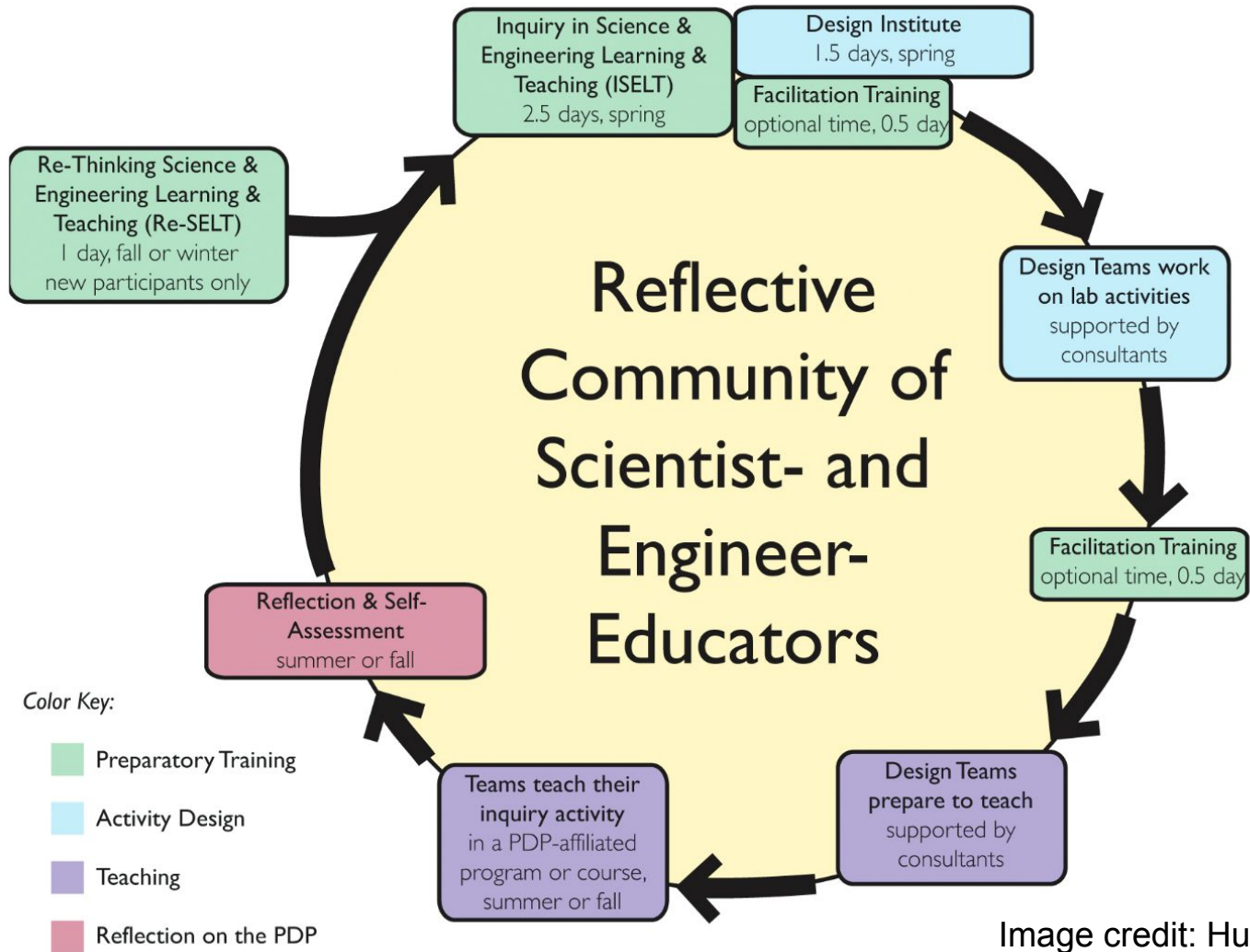
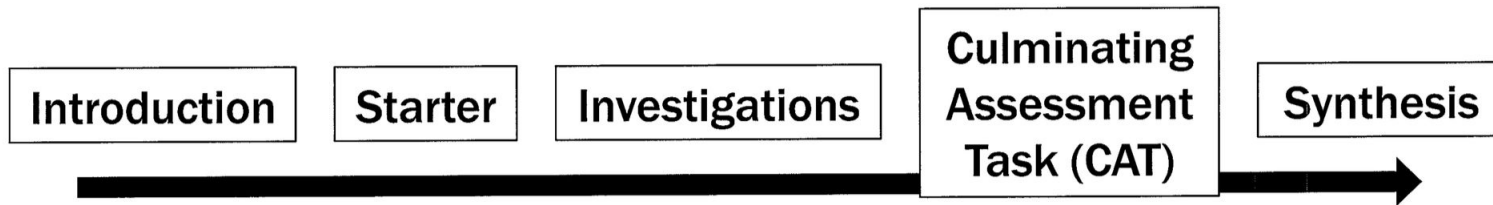


Image credit: Hunter et al.

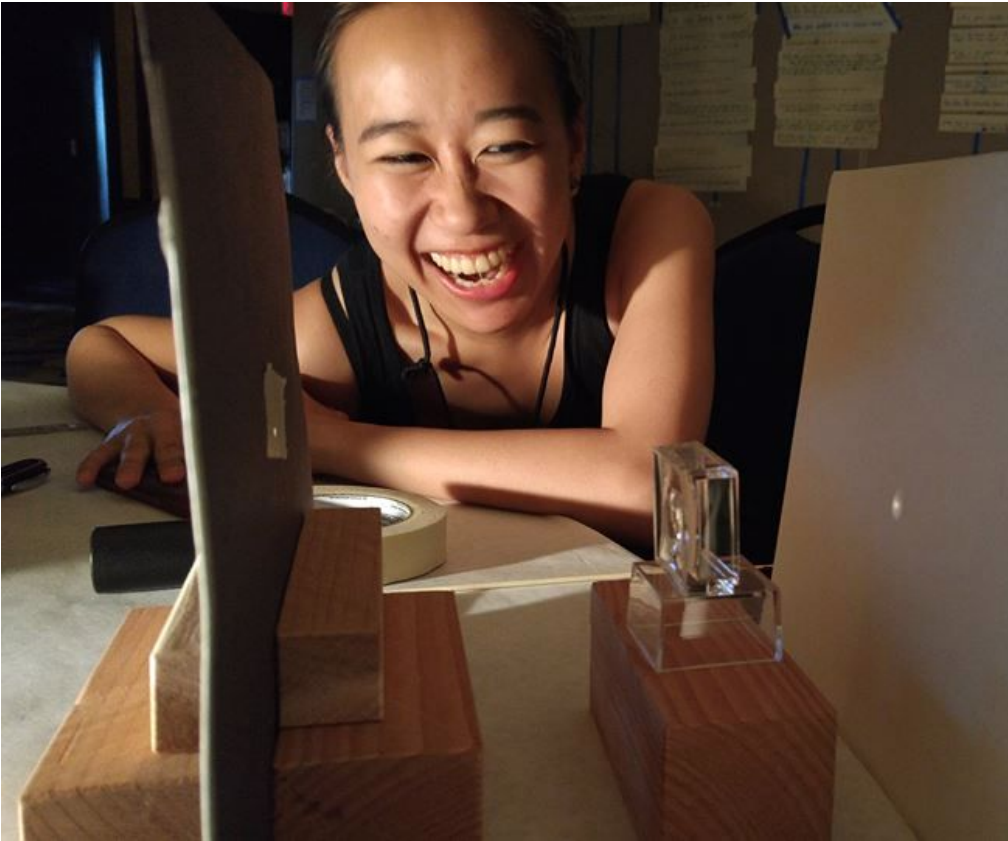
Inquiry Structure



Light & Shadow Components

		Gallery Walk, Group Formation	Assessment Prompt, Individual and Group Presentation Planning	Synthesis
Introduction to Light & Shadow	Starter Activities, Question-Raising, Rotation	Investigations	Poster Presentations	Reviewing Individual Explanation
		Thinking Tool: Holes in Foil		Reflection on Practices
		Further Investigation		

Light and Shadow Inquiry Activity



Presentations & Small Group Discussions



Poster Presentations



Design Institute

- mid-April at UC Santa Cruz
- Other institutes in Toronto and Hawaii
- Working with design team on an Inquiry activity
- Receive real time feedback
- Poster session at the end to discuss our progress and get suggestions from other groups

Equity and Inclusion: Fixed vs Growth Mindset

- Intelligence can be developed
- Fixed mindset - believe you can't change how "smart" you are
- growth mindset - believe you can become smarter with increased effort

Equity and Inclusion: Fixed vs Growth Mindset

- Self fulfilling prophecy - fixed mindsets tend to not make progress, growth mindsets will improve
- Important to facilitate a growth mindset in your students
- Important to challenge students, reveals growth mindset

Equity and Inclusion: Fixed vs Growth Mindset

- Better to praise effort rather than innate ability, helps facilitate a growth mindset
- Don't say "Wow, you must be really smart", instead say "Wow, you must have worked really hard"

Equity and Inclusion: Underrepresented Minorities (URMs)

- Stereotype threat
- Importance of recognition of science identity
- Understand the rationale for diversity in science
- We should actively address E&I in our classrooms

E&I: Physics Identity

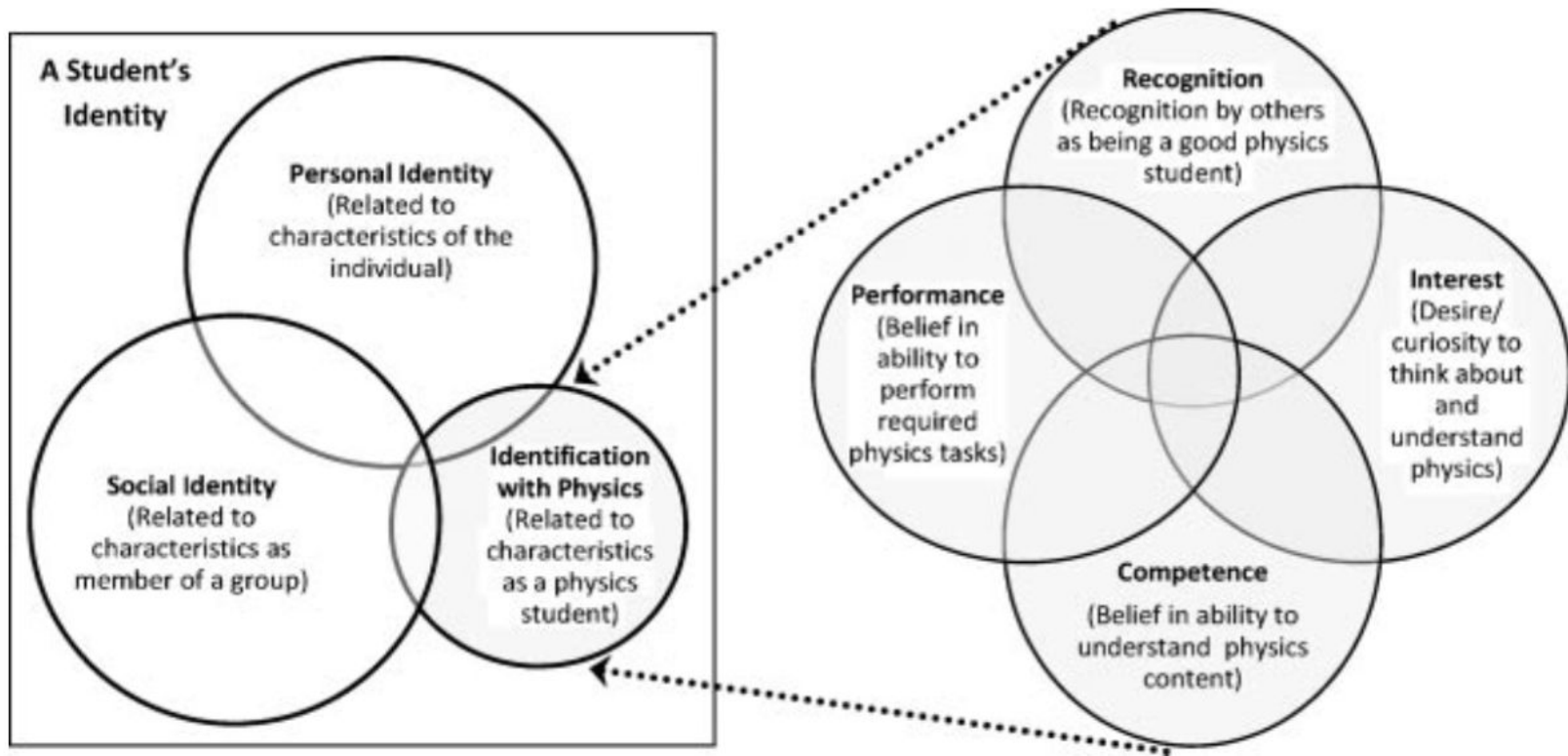
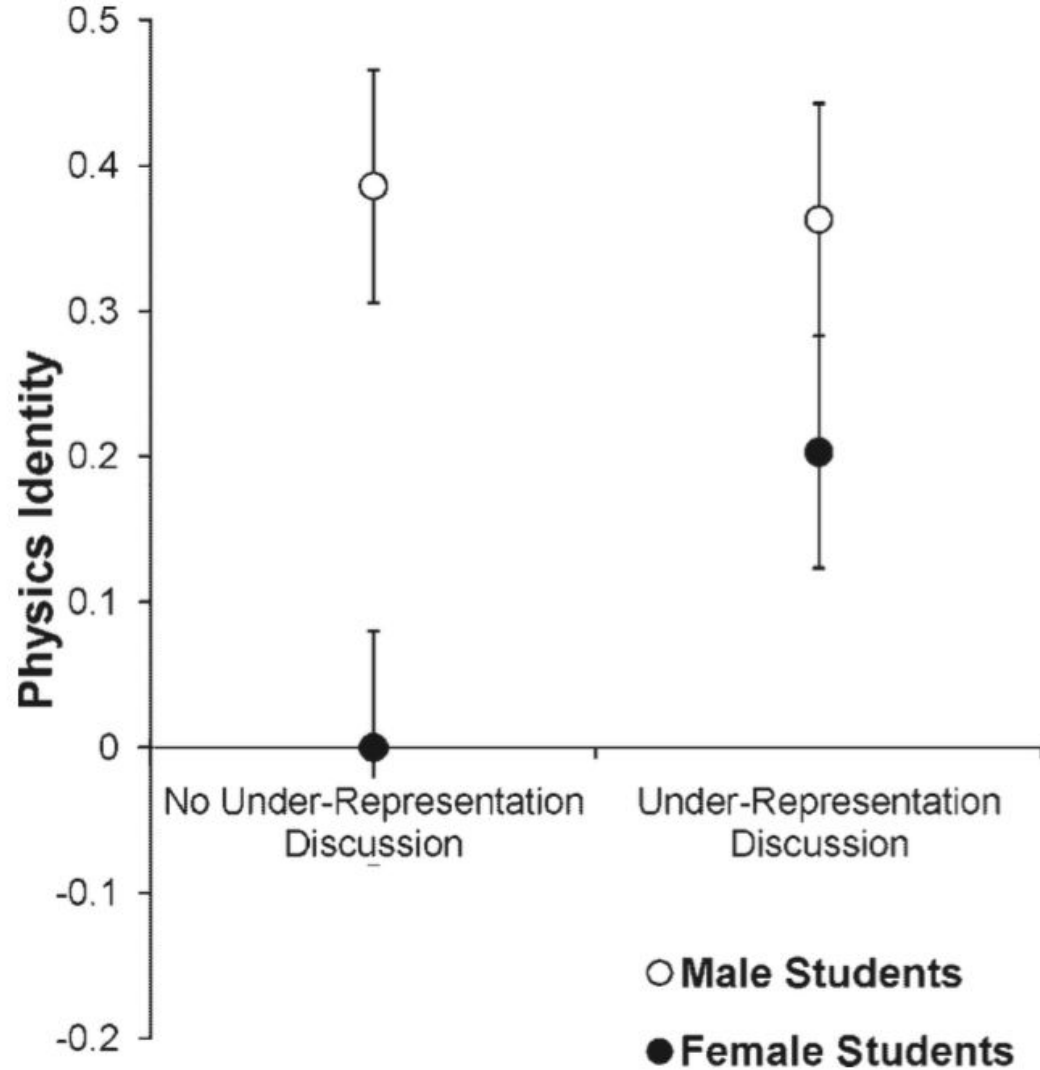


Figure 1. Framework for students' identification with physics.

E&I: High School Physics & Gender

- Statistically significant indicator was whether the physics teacher had an URM discussion
- Most things made little difference (e.g. women guest speakers, images, learning about successful female scientists, etc.)



Backward Design

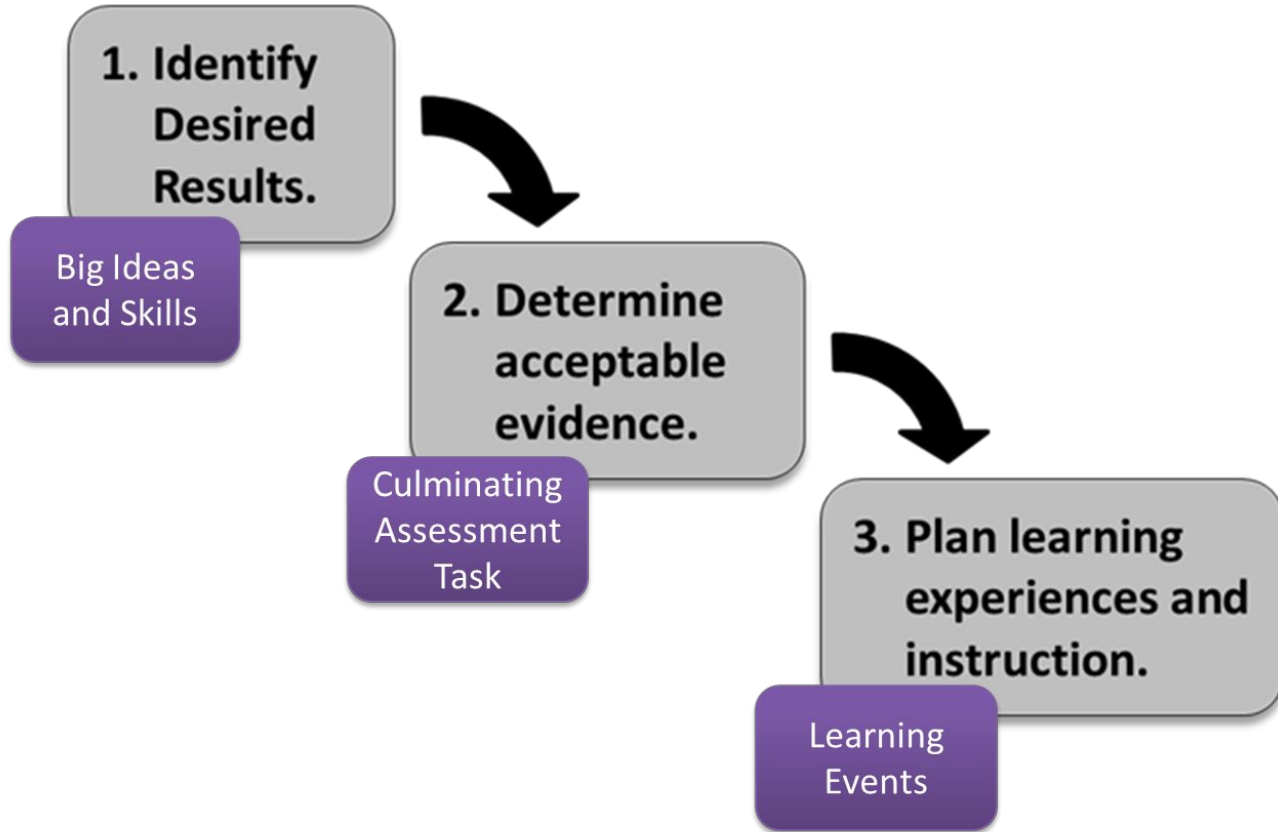
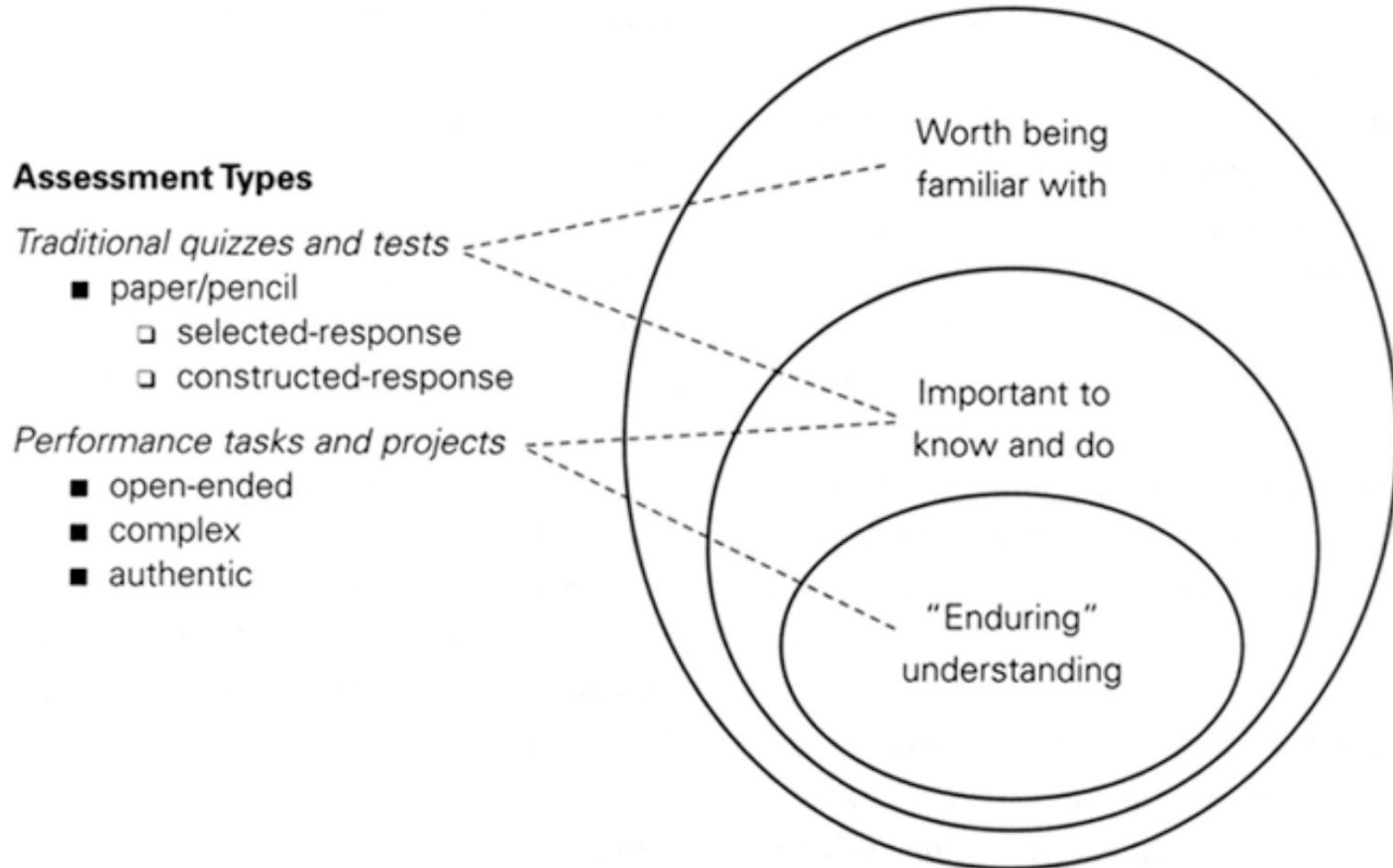


Figure 1.5. Curricular Priorities and Assessments

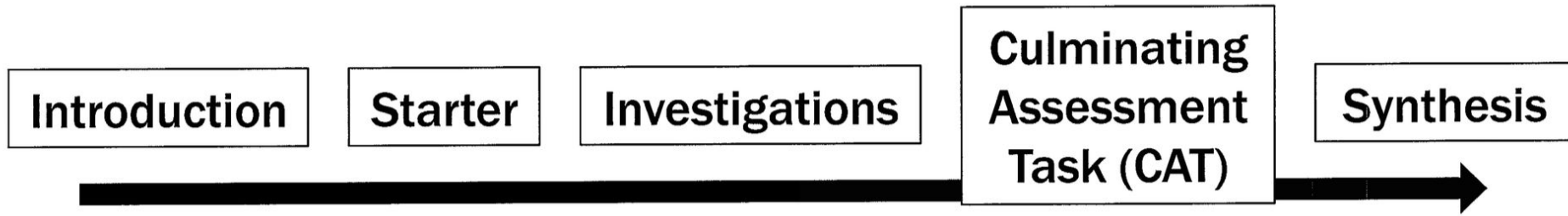


Texas Astronomy: University Research experience for Undergraduate Students (TAURUS) [www.as.utexas.edu/~taurus]

- 9 week program that will introduce undergraduate students to basics of astronomical research through individually designed projects and one-on-one mentorship
- Research: planets, stars, galaxies, and instrumentation
- Mini-workshops to discuss topics related to astronomy careers, programming, research, scientific writing, etc.

The TAURUS Inquiry Activity

- Tentative date: June 28
- Content goal: selection bias
- Plans to reach this goals: starter idea, investigation paths
- Inquiry structure: Introduction, Starter, Investigations, Culminating Assessment Task (CAT), Synthesis



- Introduction - present knowledge necessary for the activity
- Starter - activity designed to spark interest in the topic, usually involves getting the students to come up with their own questions
- Investigations - the main activity
- CAT - assessment of student's knowledge
- Synthesis - concluding discussion, summarizes what students should have learned
- Can also have a “thinking tool” to jumpstart the thinking process

The TAURUS Inquiry Activity

- For us:
- Introduction - in progress (Backward Design!)
- Starter - present students with datasets (e.g. galaxy luminosity function), have them come up with questions
- Investigations - will investigate data set they choose
- Thinking Tool: Demo with Sound
- CAT - poster discussing the question they addressed
- Synthesis - talk about flux limited selection bias, other forms of selection bias (inclination, timing, etc.)

The TAURUS Inquiry Activity

- Incorporate selection effects into their overall TAURUS experience
- Think about how selection bias applies to their project
- Observing trip to McDonald
- 2.7-meter (probably Coude) and 0.8-meter imaging
- Example: color-magnitude diagram of star cluster, magnitude cut-off will remove faint, red objects

Future Participant (note from Caitlin)

- Talk with Caitlin Casey if you are interested in participating in future years (Application deadline: December).
- There are few training programs like it in the country, especially with a focus on higher education in STEM fields.
- Interest in sustaining a more long-term participation from UT Austin would be great and help determine funding.

PDP is also about Community



Questions? Feedback?

isee.ucsc.edu/programs/pdp