Creative Approaches & Nudges for Educational Development

For academic professionals.

In this session, we will explore how to develop new, creative, and research-based ideas for supporting instructors and leading initiatives, with examples for inspiration and discussion.

Cassandra Volpe Horii, PhD
Founding Director
Center for Teaching, Learning, & Outreach

Caltech

Springborg & Horii 2016

Goals

In support of your educational development* efforts:

- Develop new approaches
- Tap into perspectives from different disciplines
- Build a framework for inquiry and decision-making

*For a working definition of educational development, see http://podnetwork.org/about-us/what-is-educational-development/

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Via three questions:

1. How… are you thinking—from what disciplinarily perspective(s)?

2. What… is the subtext of your population's questions and comments?

3. Where… does educational development happen?

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We'll approach our work through three questions:

1. How… are you thinking—from what disciplinarily perspective(s)?

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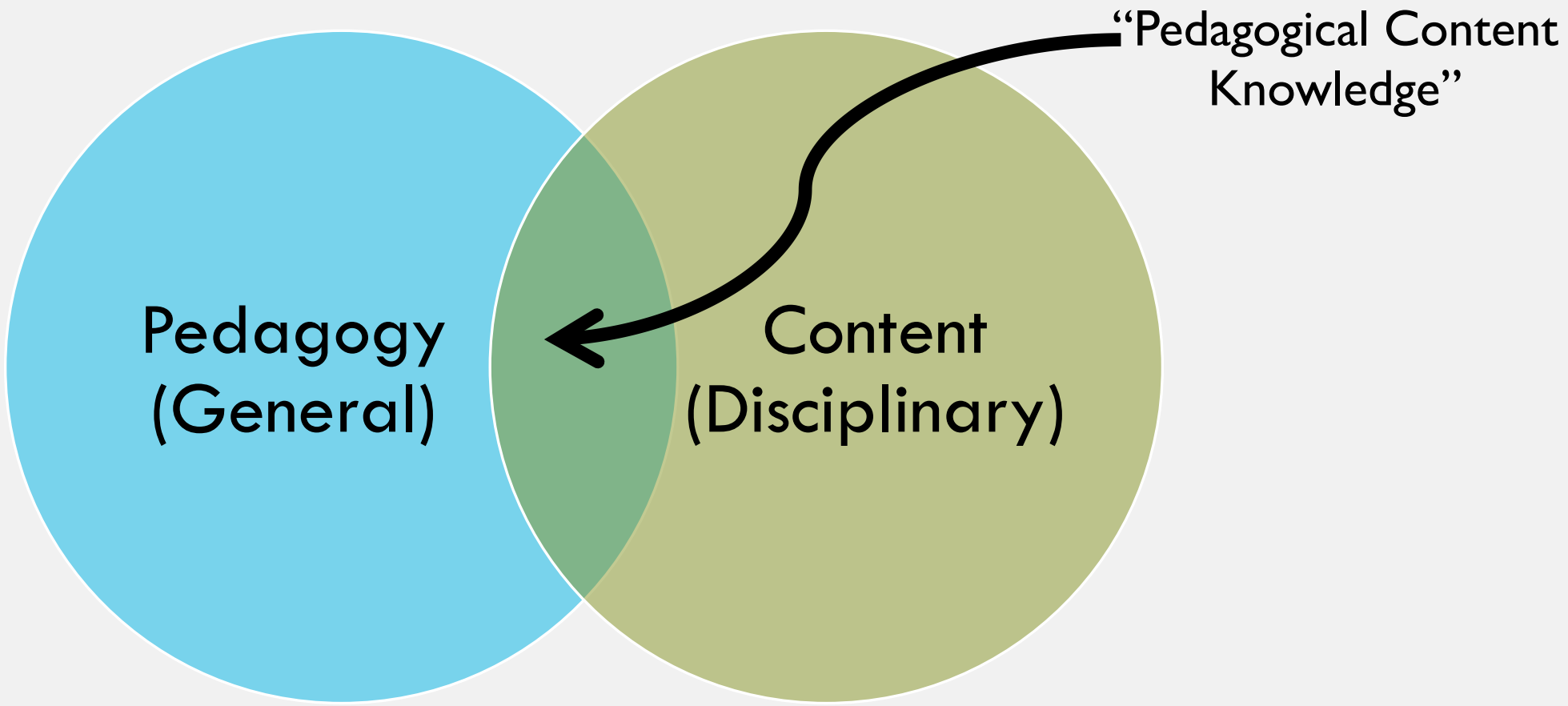
Higher Education "How" ~ Academic Discipline



Schulman 1986

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What About Educational Development?

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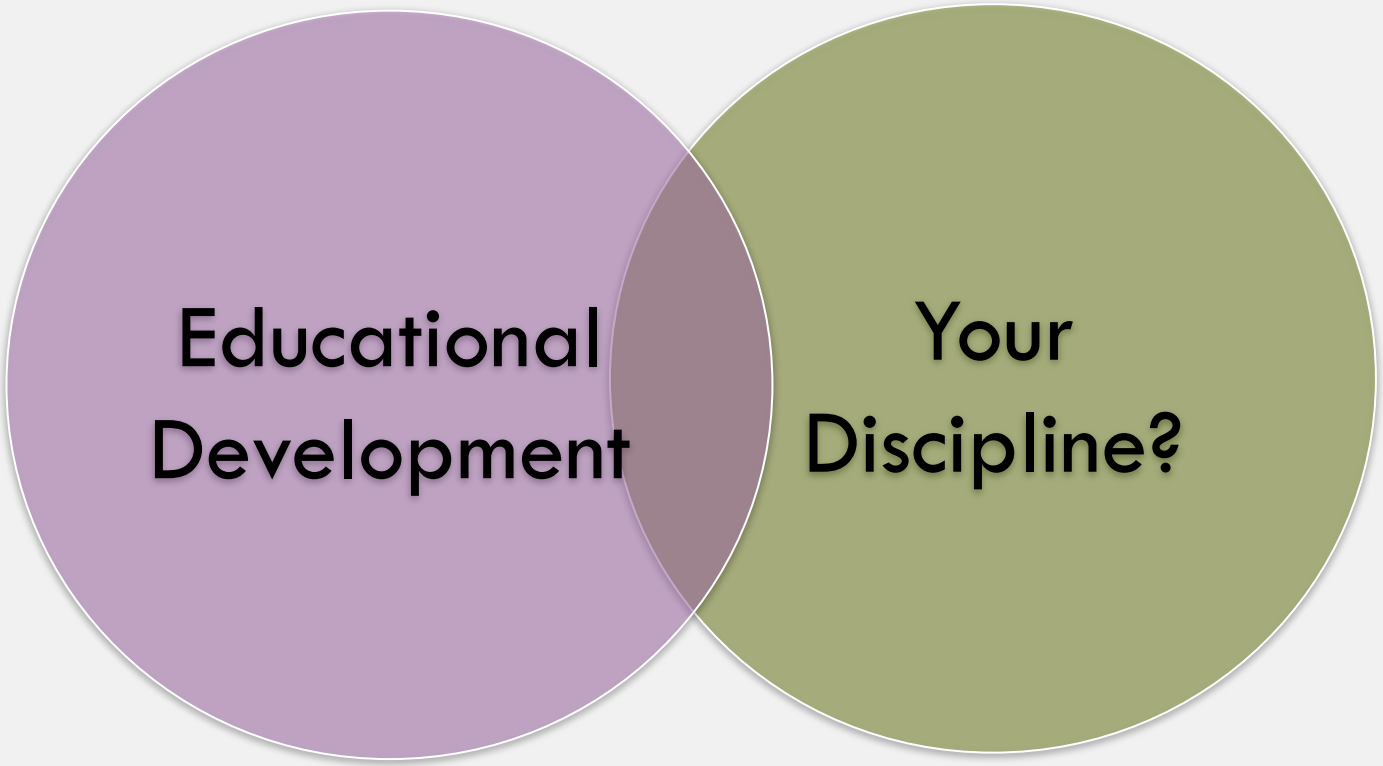
What About Educational Development?



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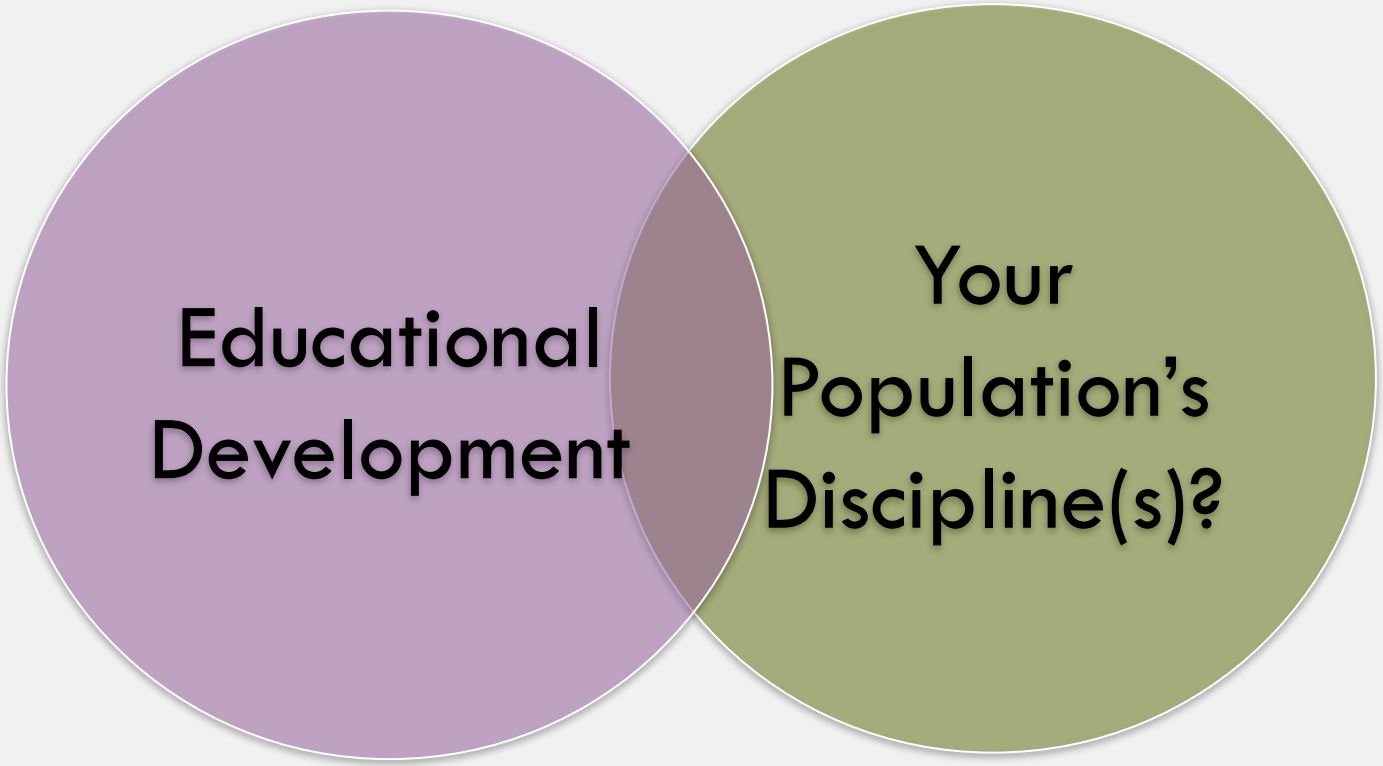
What About Educational Development?



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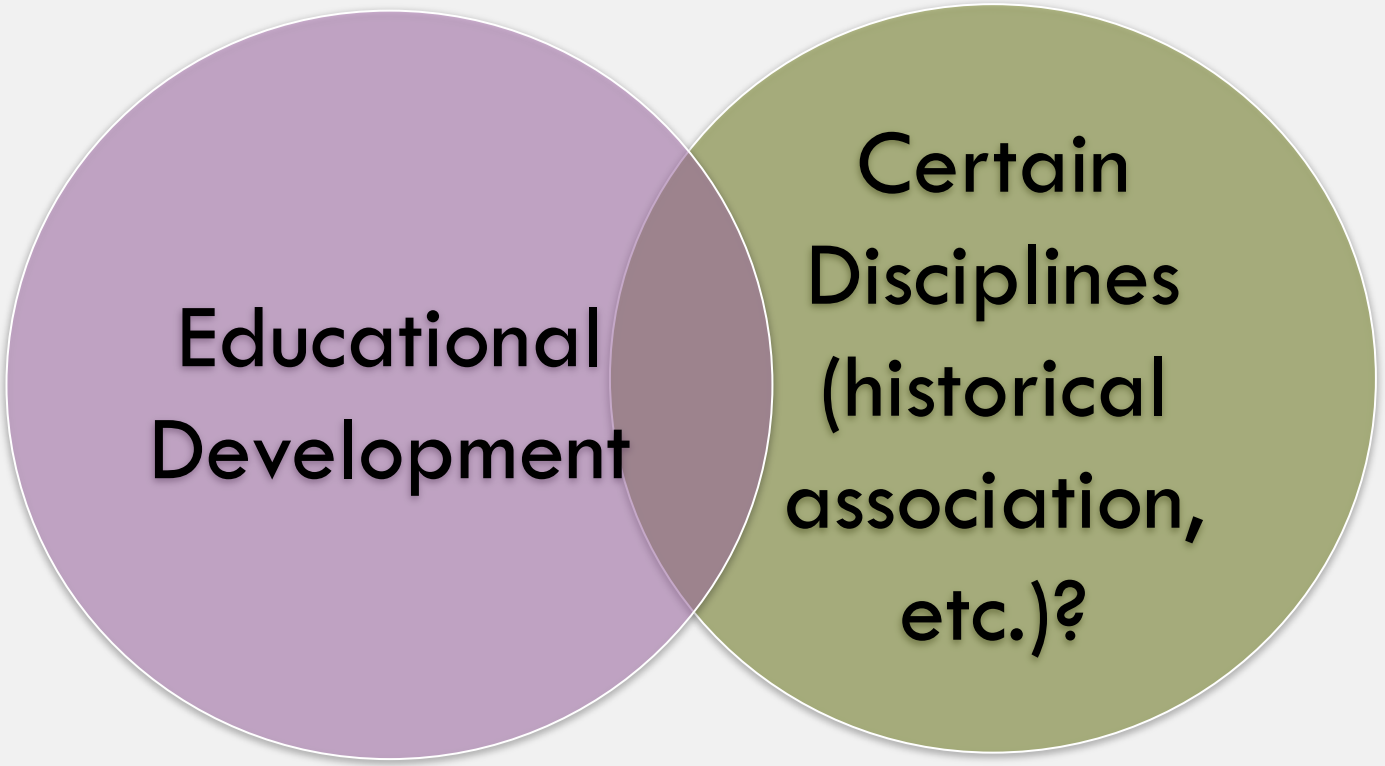
What About Educational Development?



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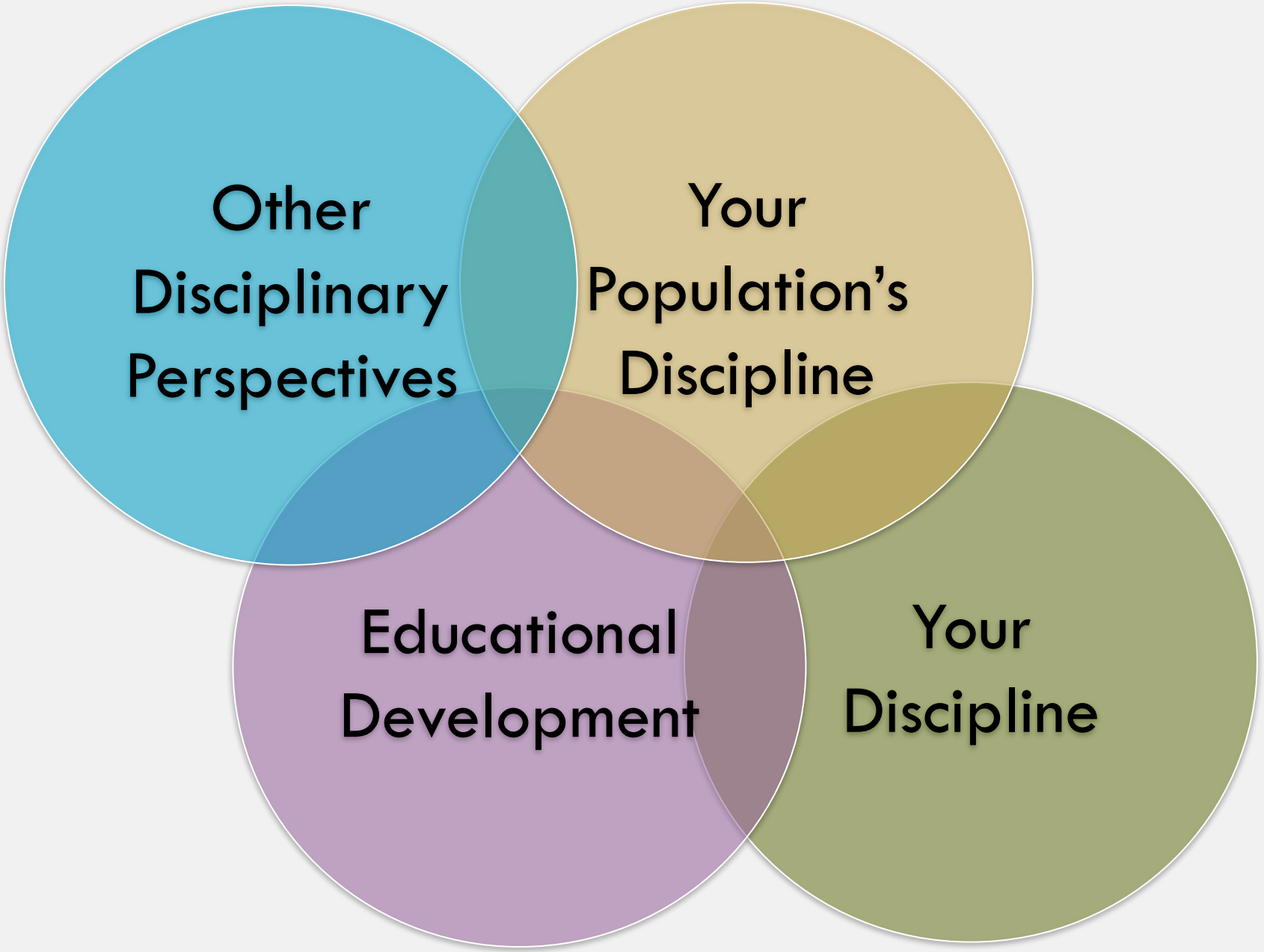
Accessing More Potential



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My academic disciplines story.

Physics undergraduate: “first principles”*

Martin Springborg

Elon Musk: http://jamesclear.com/first-principles

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My academic disciplines story.

Atmospheric Chemistry PhD: cycles & timescales

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My academic disciplines story.

Education: systematic approach to qualitative evidence

Martin Springborg

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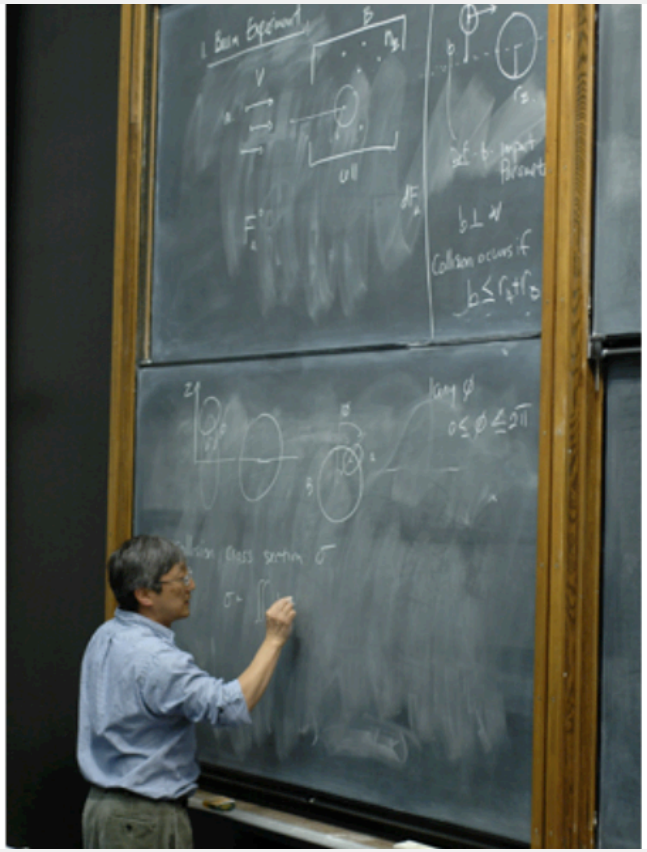
Organizational Story:

What images inform our models of teaching?



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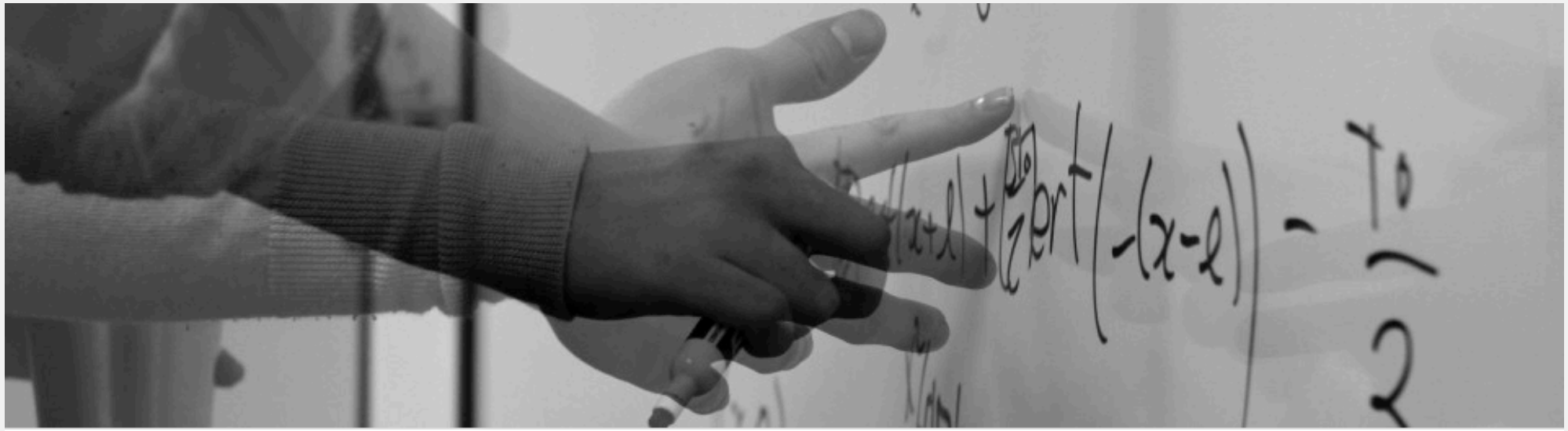
Filling the gap in higher education images:
The Teaching and Learning Project by Martin Springborg



Teaching and Learning

The Teaching and Learning Project is a photographic essay that I began in 2005, while teaching a beginning photography course. I gave my students and myself an assignment: to document in photographs our lives and the lives of our peers outside the safe confines of our studio

♣ SUBSCRIBE

- Entries (RSS)
- Comments (RSS)

♣ ARCHIVES

- July 2016

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Evolving Education

Training the scientists and engineers of the future starts with teaching for the future. by Andrew Allan

As any evolutionary biologist will tell you, if you don't evolve, you perish. Throughout time, this has proved true not just for entire species, but for societies, organizations, companies, nations, and—especially—institutions of higher education, where change is essential to reaching the widest variety of students and to remaining competitive in an ever-expanding field of educational options.

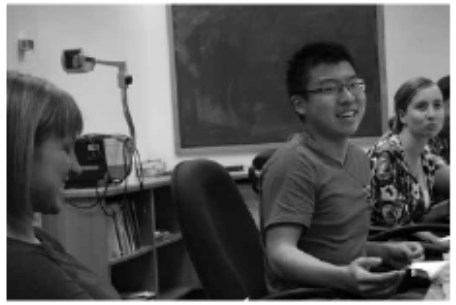
And so, by modernizing the undergraduate core curriculum, restructuring the campus's writing center, founding a dedicated center for teaching and learning, and using the online arena to expand the Institute's educational reach, Caltech is undergoing an educational evolution—an educational rewiring, if you will—that is changing the way students connect with faculty, faculty connect with students, and both interact with the information and ideas they're encountering together.

"One size fits all doesn't work anymore. We have a diversity of academic programs and a diversity of students, and the old way just isn't the solution," says Vice Provost Melany Hunt.

"There's a renewed vigor in the way we think about undergraduate education, and a commitment among the faculty to improve it," adds Jonathan Katz, chair of the Division of the Humanities and Social Sciences, who has been closely involved in Caltech's recent initiative to institute a series of changes to update its core curriculum. This sequence of general education requirements has not been revised for nearly two decades. "These changes have important implications not only for how our students will learn," Katz says, "but for how we as faculty will teach them."

In the midst of all this reworking and rewiring, Minnesota photographer and educator Martin Springborg came to Caltech as part of his work on a nationwide photographic essay he's compiling; he spent three days taking shots of faculty and students as they went about the business of teaching and learning. The photographs on the next few pages are from that look at a day in Caltech's educational life.

Cassandra Volpe Horii (left), director of the Caltech Center for Teaching, Learning, and Outreach, works with Professor of Biology and Geobiology Dianne Newman (on left at head of table, below) and her Principles of Biology course TAs to provide guidance in implementing the latest teaching methods, developing better lectures and more targeted homework assignments and exams, and obtaining and analyzing feedback from students.



At the Hixon Writing Center—under the leadership of campus writing coordinator and lecturer in writing Susanne Hall—students work one-on-one with professional and peer tutors to generate ideas, develop arguments, organize their thoughts, and enhance clarity in academic, technical, and personal writing.

Disciplinary Perspective: Photography

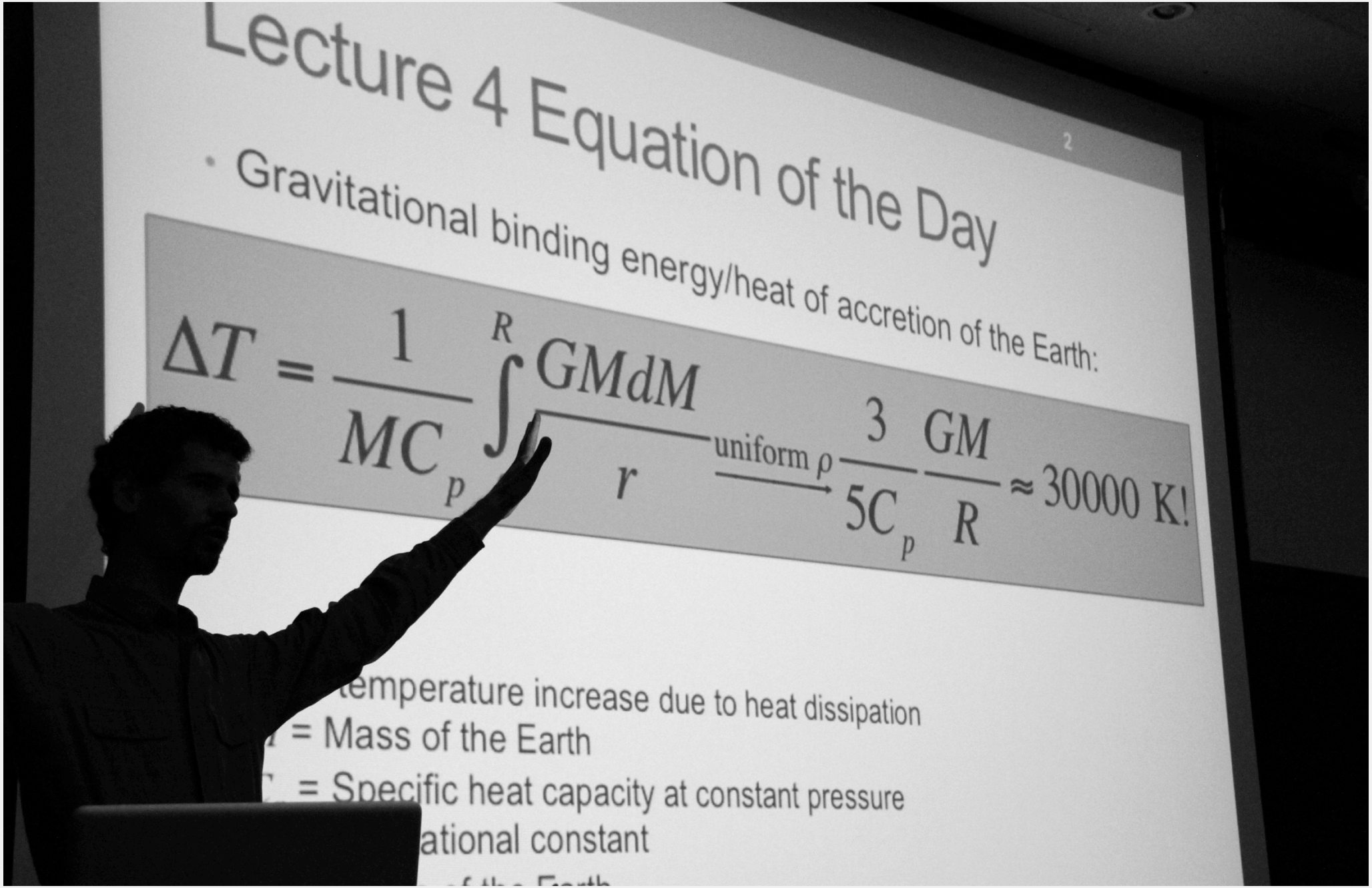
What do you see?

What is not shown?

"Photography is unique in its ability to divide an action into segments of time that otherwise we would not see, or stop to contemplate."

Ewald and Lightfoot, 2001

Consulting with faculty about photographs led to a formal study, now with ~25 participants from a variety of institutions: community colleges, research universities, liberal arts colleges, and technical institutes.



Martin Springborg

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Martin Springborg

"With the still images, I am able to look at interactions. I see the expressions on faces, the gestures, the relationships."

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Martin Springborg

Faculty noticed previously unseen aspects of their classroom spaces, how they moved and used their environments, and how materials functioned.

Martin Springborg

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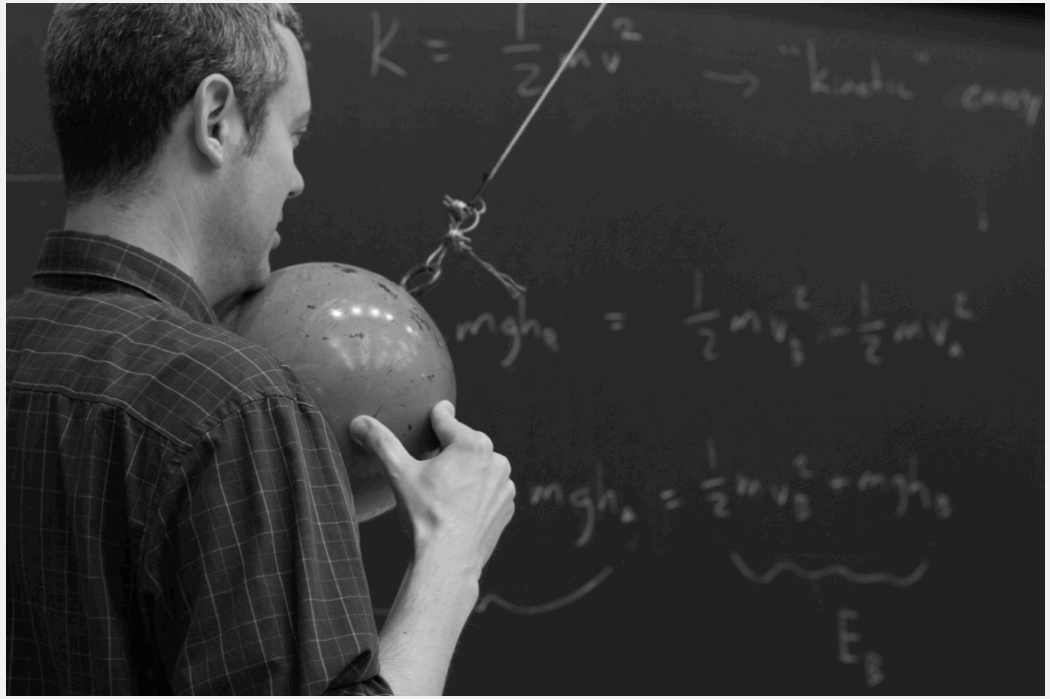
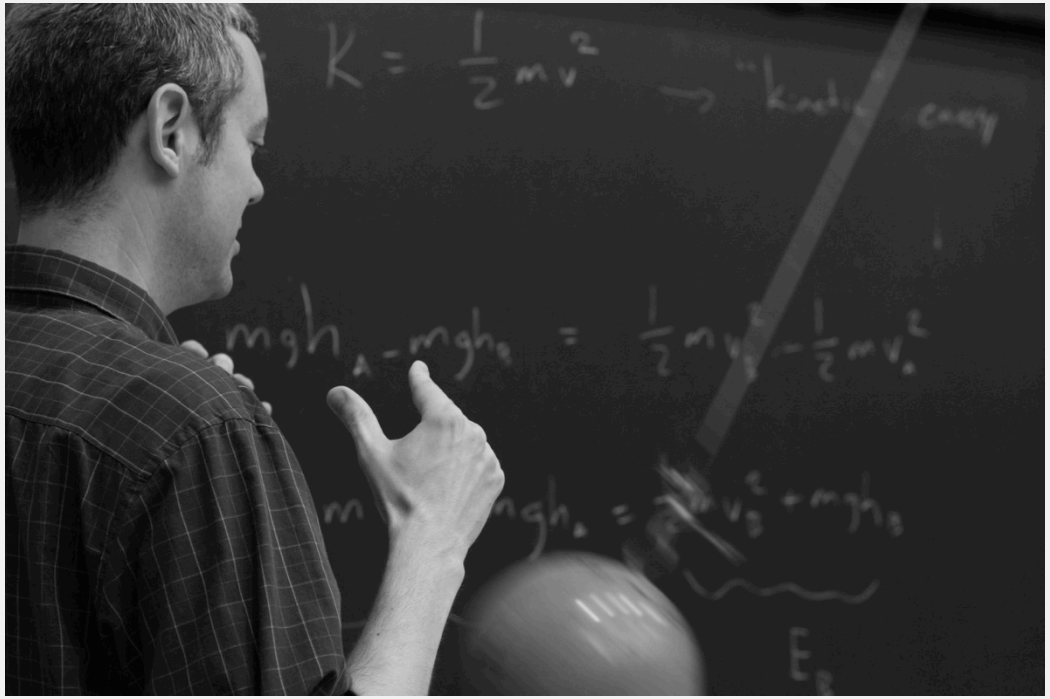
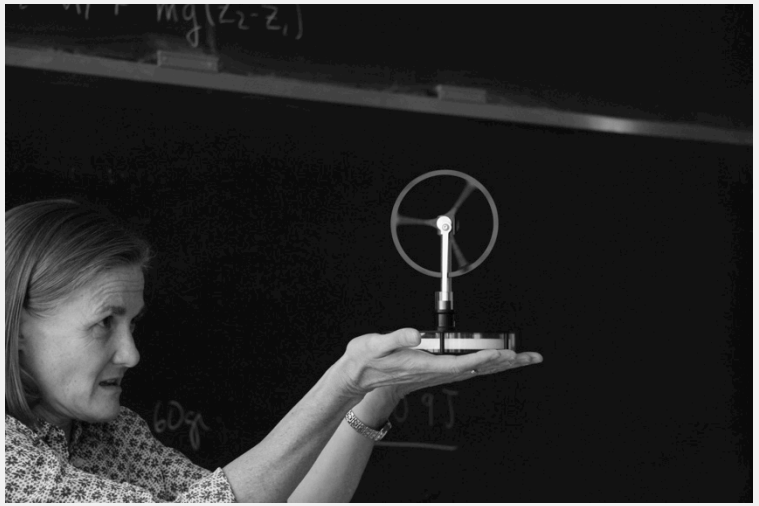
Instructors felt acknowledged:

The “pictures show…that part of what I feel is important about teaching.”

Many left with specific insights and plans to make changes to their teaching.







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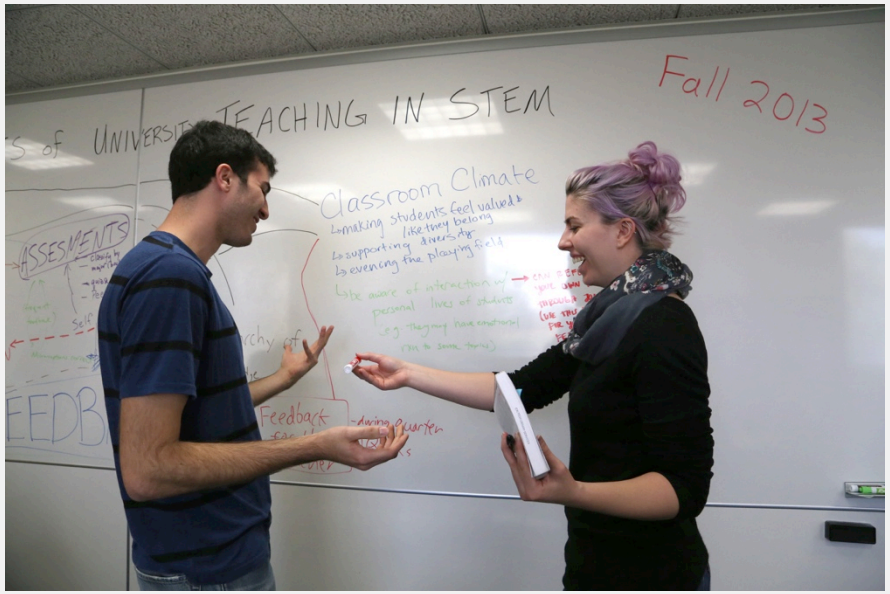
Martin Springborg

Other photographers continue this work:



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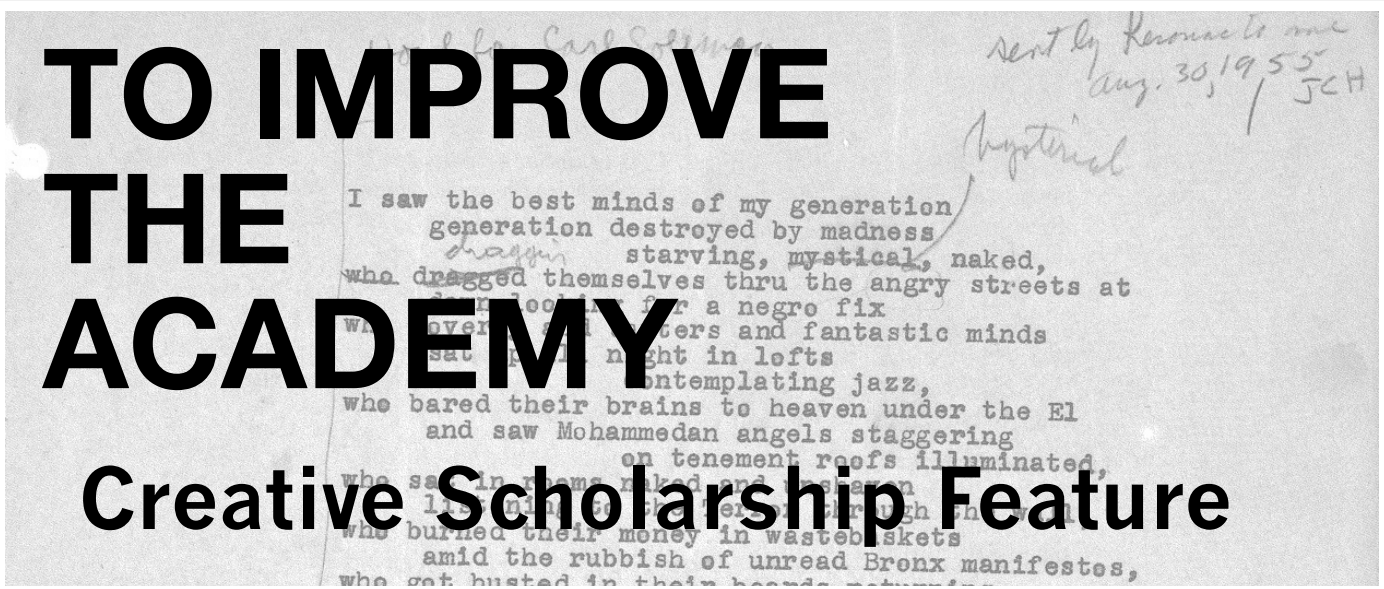
Left and Top: Cassandra Horii. Lower Right: Briana Ticehurst

Creative scholarship of educational development



June 2016

Volume 35, Issue 2
Pages 197–394

Guest Editors: Martin Springborg & Cassandra Horii

We published the method of instructional consulting based on photographs, and extended the idea of drawing on creative disciplines to inform educational development practices, scholarship, and representation in new ways. The special feature includes pieces applying theatre, song, improv, visual memos, and infographs, as well as articles exploring the nuances of educational development within the creative disciplines.

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Into practice:

How do we think about our work?

From what disciplinary perspectives?

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Examples:

Physics : First Principles. What are we sure is true, and how can we build on that?

- What if you were to use "first principles" as a scaffold for a new workshop or seminar series?

Atmos. Chem.: Timescales, cycles, interdependence.

- What if these concepts could provide a new framework for strategic planning in your area?

Comp. Science: Algorithmic thinking. Defining precise steps for solving problems.

- Perhaps algorithmic thinking could help you develop internal processes, or aid your work with instructors in thinking through their "algorithms" for effective teaching (i.e., protocols for approaching a lesson, class, or curriculum)

Photography: What do you see? What is not shown? What is the role of point of view?

Instr. Design: Analysis, Design, Development, Implementation, Evaluation (ADDIE).

Literature: Close Reading. Detailed observation + inductive reasoning.

Exercise:

Find someone near you whose academic background is different from yours.

Share: how do you think (approach problems, conduct inquiry, etc.) in each of your disciplines of origin?

Apply: how could your partner's disciplinary perspective inform a program, service, or aspect of your educational development work?

Debrief

New insights?

Discoveries?

Other thoughts?

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We'll approach our work through three questions:

1. How… are you thinking—from what disciplinarily perspective(s)?

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Free Writing Prompt

Write or concept map quietly for 3 minutes about **common and/or memorable questions and comments** you've heard from instructors with whom you work.

Try to keep going the whole time; continue recalling questions or comments you've encountered, recently or over time, even if you repeat yourself or include similar instances.

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Example:

Instructors redesigning courses around collaborative/project-based learning were asking us:

"What does that look like?"

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Martin Springborg

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Example:

Instructors articulating what they want to be different were saying:

"I wish students would have more fun."

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Workshop and Consultations: Bringing Joy into Your Teaching

by Chris Duffy

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Example:

Instructors adopting new methods are noticing:

"Making such a change is a bit terrifying."

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For Courage and Excellence in Education

Do You Know a Courageous Teacher?

Courage is an important quality not often recognized in teachers. The Christa McAuliffe Prize for Courage and Excellence in Education honors this special form of courage.

This prize is different than other "Teacher of the Year" awards. "Rewarding courage selects out a slightly different kind of teacher," said Dr. Gregg Wright, creator of the prize

Exercise:

Working with someone different than in Part I,

Share: any common or interesting themes from your writing, especially any subtext you notice, or themes you might usually overlook.

Discuss: what might it be like to make the subtext into the "main title"—a highlighted aspect of your educational development efforts?

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Where: Physical Location

- **Usual place for discourse:** make it normal to talk about teaching

- **Building community:** faculty & students discover shared interests in teaching on their "turf"

Cassandra Horii

Dr. Gabriela Weaver
Transforming Chemistry Education, Spring 2015, Caltech

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Dr. Eric Mazur, Physics Research Conference/TeachWeek, Fall 2015, Caltech

Leslie Rico

Open Classes

Caltech faculty, staff, and students are invited to sit in on open classes that span Caltech's divisions and levels. Each one features a distinct philosophy of learning and approach to teaching. Visitor seats in each class may be limited due to space and planned activities. RSVP online at **teachweek.caltech.edu**.

Tuesday, October 20

9:00–10:25 AM, Noyes 147
Ch 112, Inorganic Chemistry
Theodor Agapie, Professor of Chemistry

"We are using 3-D printers to produce chemical models for students to use during in-class problem solving. In the end, I hope students leave the class with a good ability to use symmetry to approach complicated problems in chemistry."

9:00–10:25 AM, Dabney Treasure Room
Hum/Pl 9, Knowledge and Reality
Frederick Eberhardt, Professor of Philosophy

"I have often found that students relish the freedom to challenge accepted or standard accounts and appreciate the new perspectives the exploration of alternatives gives them."

Tuesday, October 20 (cont'd)

2:00–3:55 PM, North Mudd 215
FS/Ge 16, Freshman Seminar: Earthquakes
Joann Stock, Professor of Geology and Geophysics

"In this class, we are grappling with the current understanding of the science, the efforts that have been made in earthquake and volcano forecasting, and real-time response to these events."

2:30–3:55 PM, Baxter 25
BEM 105, Options
Jaksa Cvitanic, Richard N. Merkin Professor of Mathematical Finance

"Last year, I turned BEM 105 into a MOOC in edX. This fall, I've adopted a 'flipped class' approach."

Wednesday, October 21

11:00–11:55 AM, Bridge Laboratory 201
Ph 1a, Newtonian Mechanics
Ryan Patterson, Assistant Professor of Physics

"At the end of the day, being able to take a real life physical system, break it down into its component pieces, and answer questions about it requires physical intuition--it's not simply a mathematical task. In Ph 1a, we build that intuition during lecture through demonstrations."

Where: Disciplinary/Organizational Location

Collaborating at the Centers

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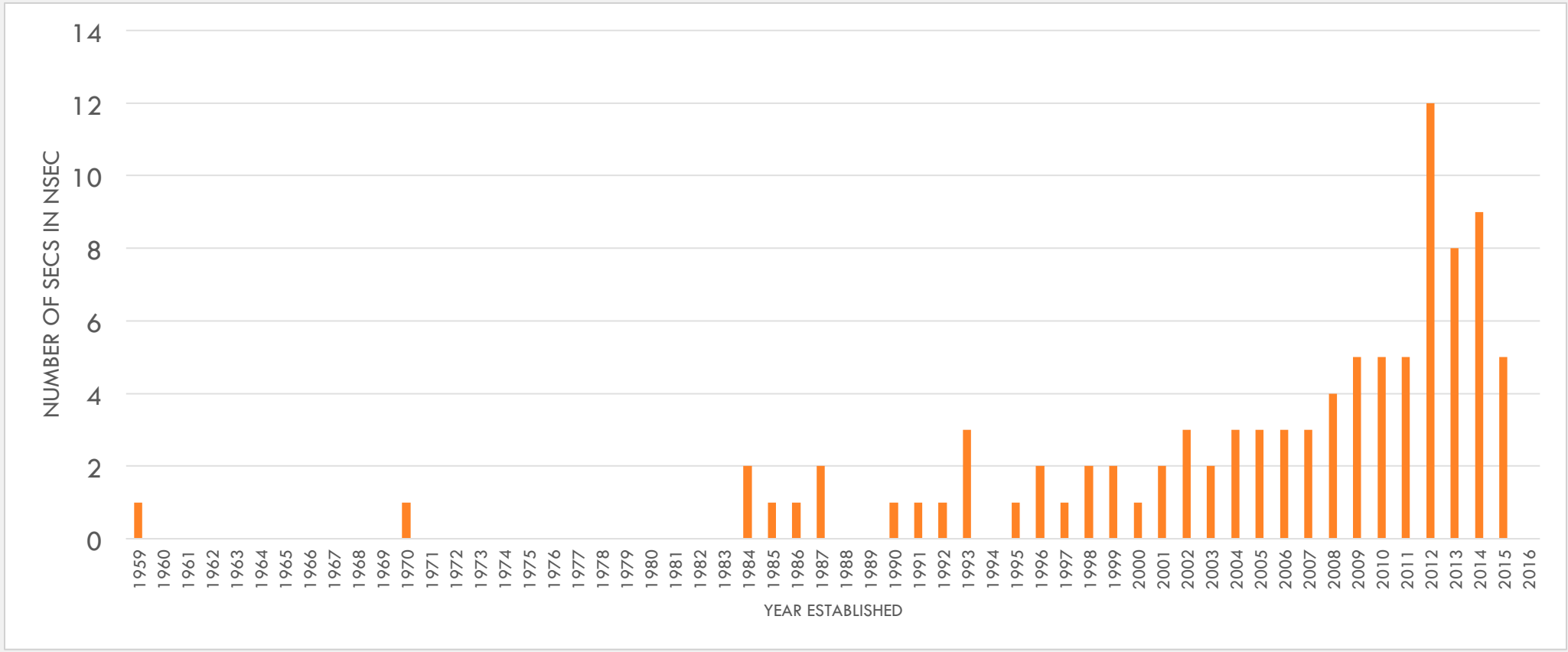
(NSF-1552540)

Growth of STEM Education Centers (SECs)



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Horii, Redd, Ouellett, et al. 2016

SECs & CTLs (Centers for Teaching & Learning)

Complementary Strengths/Expertise Collaboration Strategies

http://podnetwork.org/connecting-centers-for-teaching-learning-with-stem-education-centers/

Horii, Redd, Ouellett, et al. 2016

Where: Host and Role

Caltech Student-Faculty Conference

Student committees host and set agendas

Alternate years: Undergraduate & Graduate

Morning: Shared topics, data, discussion (classes cancelled)

Afternoon: Departmental discussions about curriculum, student input, etc.

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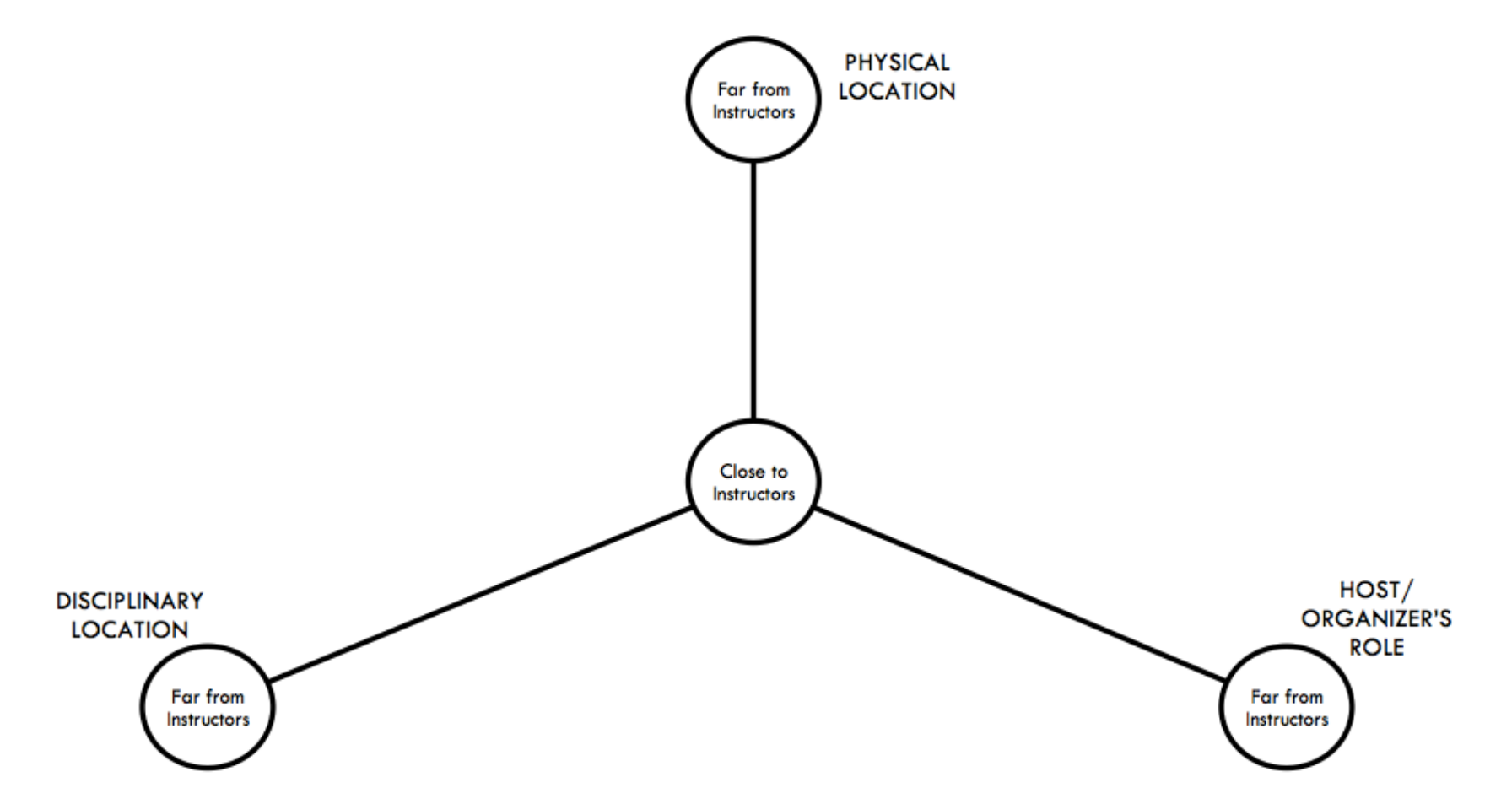
Exercise: “Where” does your educational development work happen?



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Discussion

Patterns?

Opportunities?

Other thoughts?

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Is this a helpful framework?

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2. What… is the subtext of your population's questions and comments?

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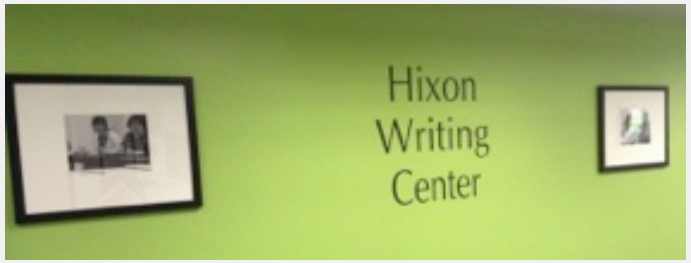
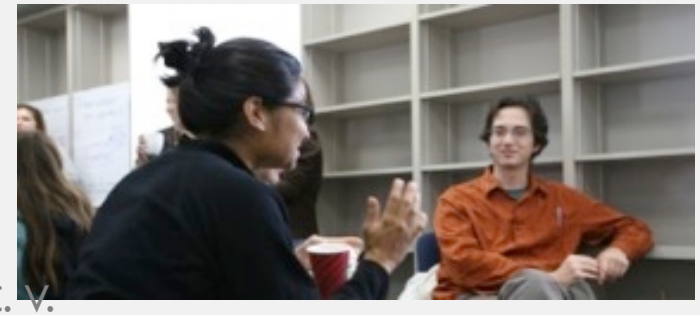
Center for Teaching, Learning, & Outreach
Started in Fall 2012. Co-located with Writing Center.





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Left and Top: Cassandra Horii. Lower Row: Briana Ticehurst

CTLO Vision & Mission

Our **vision** is for **teaching and educational excellence** at Caltech to parallel our renowned research excellence.

Our **mission** is to work toward this vision by:
supporting instructors
enhancing student learning, and
developing educational outreach.

We are committed to fostering **innovation** and relying on **evidence** in all of our programs and services.

Caltech is a small, private, research-intensive university with approximately 1000 undergraduates, 1200 graduate students, and 300 faculty.

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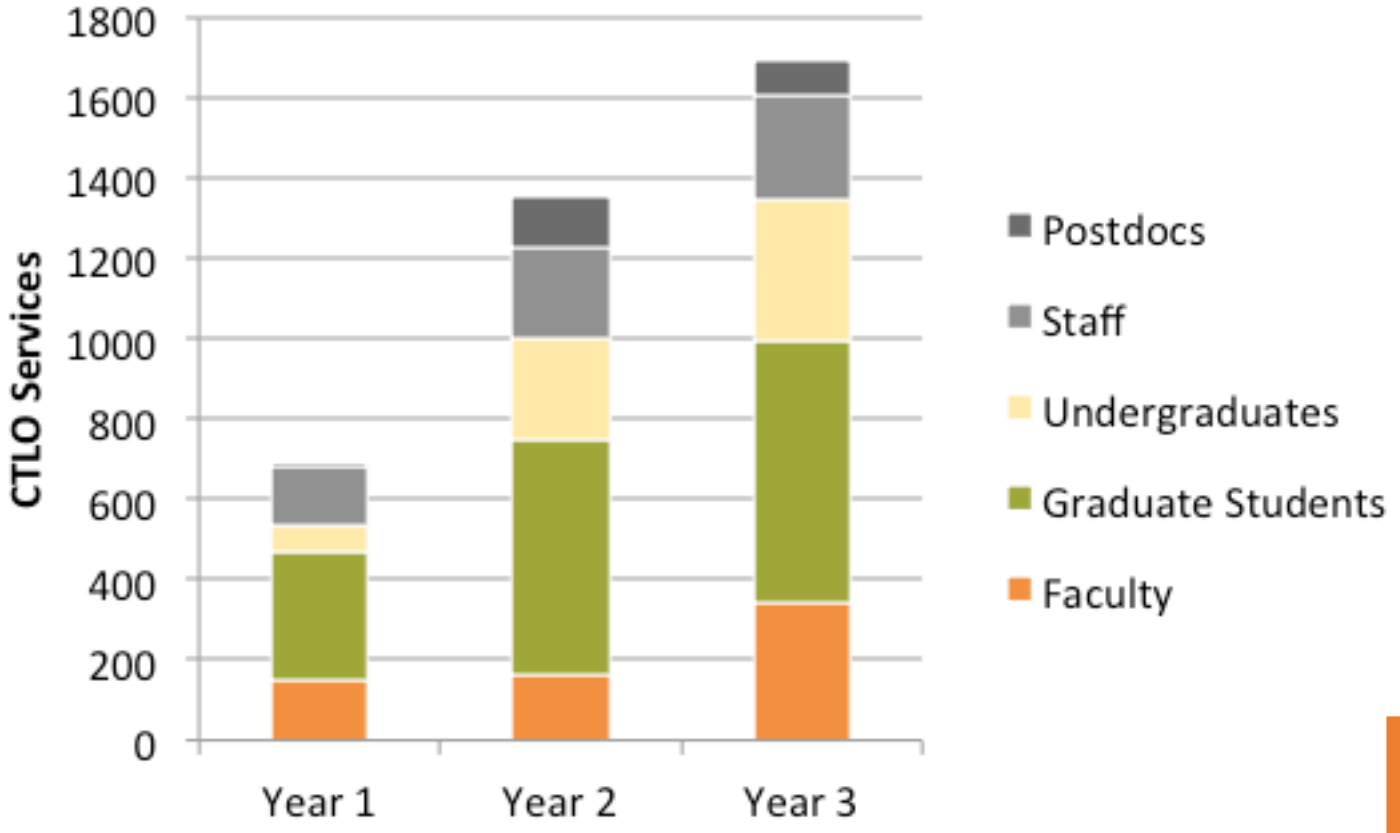
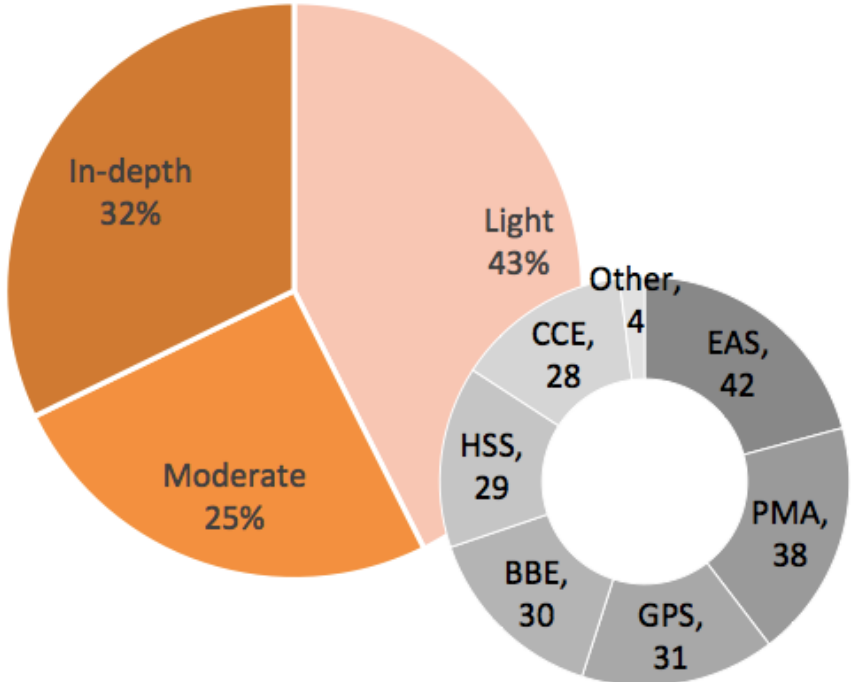


202 out of ~300 faculty



Participation by Faculty Rank	% of CTLO Participants	% of All Faculty
Professor	62%	72%
Asst. + Assoc. Prof.[6]	24%	15%
Non-tenure track	14%	13%

First Three Years of Operation

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Inaugural Caltech Team Impact Award, Spring 2016

"In the short amount of time that Caltech has had a Center for Teaching, Learning, and Outreach, the CTLO has had a tremendous positive impact on the educational quality at Caltech."

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Going forward:

1. How… are you thinking—from what disciplinarily perspective(s)?

2. What… is the subtext of your population's questions and comments?

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Creative Approaches and Nudges for Educational Development

Thank you!

Cassandra Volpe Horii
cvh@caltech.edu

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