Talk Matters:
Investigating the Nature of Non-Content Classroom Language that May Mediate Student Inclusion, Engagement, and Learning

Kimberly D. Tanner, Ph.D.
Professor, Department of Biology
San Francisco State University
Director, SEPAL

Please sit with a person you don’t know! Make a new colleague!
Share with a neighbor...

Introduce yourself...
- Your name
- Something important to know about you as a person and what you value (culture, ethnicity, personal pronouns, family, hobbies, etc.)

...and then share...

Why did you choose to come to this session today?

Person with the longest hair goes first!
SEPAL: The Science Education Partnership and Assessment Laboratory

The Science Education Partnership & Assessment Lab
San Francisco State University

(≈ The Tanner Laboratory)

Funded by National Science Foundation (NSF) GK-12 Award, National Institutes of Health (NIH) Science Education Partnership Award, NSF Transforming Undergraduate Education in STEM (TUES) Award, NSF CAREER Award, and HHMI Undergraduate Science Education Award.

Founded in 2004…

- Programs
- Coursework
- Research
Ideas that Drive SEPAL Research Efforts...

• Twice as many undergraduates leave the sciences as the humanities in the U.S.

• Women and scientists of color continue to be underrepresented in the sciences

• Few scientists have formal training in effective teaching

• **Observation:** Faculty implement similar active learning strategies with highly variable success with students. And they seem to be saying different things...
Engaging Biology Faculty in Explorations of Scientific Teaching...

CCB FEST:
Community College Biology Faculty Enhancement through Scientific Teaching, 2010-present

Engaged ~30% of the CC Biology Faculty in the San Francisco Bay Area, 24 institutions, n~200 faculty

Biology FEST:
Biology Faculty Explorations of Scientific Teaching, 2012-present

Engaged a subset of SFSU Biology Faculty in at least 100 hours of professional development, 1 institution, n~60 faculty
Discovering Classrooms: Observations, Emerging Questions, and Novel Measures

Think of a course you recently taught OR remember from being a student…

*What do you remember yourself OR an instructor SAYING that was NOT content-related?*
Share with a neighbor...

What do you remember yourself OR an instructor SAYING that was NOT content-related?

Person with the shortest hair goes first!
Discovering Classrooms: Observations, Emerging Questions, and Novel Measures

What are instructors saying during class that may influence students’ experiences?

Instructor Talk

Shannon Seidel, PhD
Pacific Lutheran U.

Colin Harrison, PhD
Georgia Tech

Tiffany Nguyen, MS
Foothill College
Why should we study what instructors say during class?

1. **Instructor Immediacy**: Instructor language may impact the social distance between instructors and students, which may impact student learning. Christophel, Comm Ed (1990)

2. **Student Resistance**: There’s evidence that in some situations, students will resist active learning environments.
   Seidel and Tanner, CBE (2013)

3. **Stereotype Threat**: Instructors can say things that cause particular groups of students to underperform.
What is Instructor Talk?

- Said by instructor(s)
- During class time
- Excludes course content (e.g. biology concepts)
- Excludes agenda items (e.g. format of class, date assignments are due, etc.)

Article

Beyond the Biology: A Systematic Investigation of Noncontent Instructor Talk in an Introductory Biology Course

Shannon B. Seidel,* Amanda L. Reggi,* Jeffrey N. Schinske,† Laura W. Burrus,* and Kimberly D. Tanner*
Methods to study *Instructor Talk*

- Accessed a videotape archive of intro bio course
- Co-taught by two instructors
- Instructors had no prior knowledge of study
- Reported little to no student resistance, and high levels of student success and satisfaction
- Included varied active learning strategies and equity and diversity strategies
  - Think-Pair-Share
  - Clickers
  - Group work
  - Minute Papers
  - Jigsaw discussions
  - Cultural relevant case studies
Initial Research Questions

1. To what extent is *Instructor Talk* present in a single biology course?

2. If it is there, what types of *Instructor Talk* could we find?

3. What categories of *Instructor Talk* would be most prevalent?

4. To what extent would we find evidence of *Instructor Talk* in dozens of biology courses?

Over 650 instances of *Instructor Talk* were identified in first course analyzed.
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Emergent Framework for Characterizing Instructor Talk – 5 Categories with 17 Subcategories

<table>
<thead>
<tr>
<th>Category</th>
<th>Subcategory</th>
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</table>
| Explaining Pedagogical Choices | • Supporting Learning Through Teaching Choices  
                               | • Using Student Work to Drive Teaching Choices  
                               | • Connecting Biology to the Real World and Career  
                               | • Discussing How People Learn  
                               | • Fostering Learning for the Long Term |
| Unmasking Science             | • Being Explicit about the Nature of Science  
                               | • Promoting Diversity in Science |
| Sharing Personal Experiences  | • Recounting Personal Information or Anecdotes  
                               | • Relating to Student Experiences |
| Building the Instructor/Student Relationship | • Demonstrating Respect for Students  
                                            | • Revealing Secrets to Success  
                                            | • Boosting Self-Efficacy |
| Establishing Class Culture     | • Pre-framing Classroom Activities  
                               | • Practicing Scientific Habits of Mind  
                               | • Building a Biology Community Among Students  
                               | • Giving Credit to Colleagues  
                               | • Indicating that it’s Ok to be Wrong or Disagree |
Pair Discussion: How would you categorize instances of Instructor Talk?

A. Explaining Pedagogical Choice
B. Unmasking Science
C. Sharing Personal Experience
D. Building the Instructor Student Relationship
E. Establishing Classroom Culture

- Work with a nearby neighbor.
- Take turns reading each quote aloud.
- Discuss which Instructor Talk category the quote might best fit into, & why.
- Prepare to share the letter of the Instructor Talk category which your team thinks best matches each of the quotes.
Pair Discussion: How would you categorize instances of Instructor Talk?

A. Explaining Pedagogical Choice

B. Unmasking Science

C. Sharing Personal Experience

D. Building the Instructor Student Relationship

E. Establishing Classroom Culture

“I don’t have a special email for you guys. You get the same email as my research colleagues and friends get. So anytime you want to email me, you use that.”

“Some of the most important people in this room for you to be successful in [this course] are sitting around you, okay? They’re not up on the stage.”

“I'm going to start this (clicker) up and let you guys weigh in and see where you're at. Based on that, it will tell me where to go.”

“Science is about making predictions. Science is not about memorizing things.”

“That’s where I used to sit. I would sit in the back, and I would never say a word.”
Initial Research Questions

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Pair Discussion: Make a prediction about which category of Instructor Talk will be most prevalent

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Which category will be... most prevalent? least prevalent?
Some of the most important people in this room for you to be successful in [this course] are sitting around you, okay? They’re not up on the stage.

“I don’t have a special email for you guys. You get the same email as my research colleagues and friends get. So anytime you want to email me, you use that.”

“Some of the most important people in this room for you to be successful in [this course] are sitting around you, okay? They’re not up on the stage.”

“So, I'm going to start this up and let you guys weigh in and see where you're at. And based on that it will tell me where to go.”

“Science is about making predictions. Science is not about memorizing things.”

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What proportion of biology instructors (n=63) would evidence use of Instructor Talk?
Instructor Talk was detected in 98% of instructor samples analyzed.

- 63 biology instructors from multiple community colleges and a 4-year university
- Transcribed 15-minute samples from first class session recorded and a second class session mid-semester
~90% of Instructor Talk instances across 63 instructors could be categorized by the original framework

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Emergence of New Form of Instructor Talk – Non-Productive Instructor Talk

~10% instances across 63 faculty cannot be categorized using Instructor Talk framework

“You don't need to sneak in. You're right on time today for a change.”

“And so, when you're plotting something that's 0.5 and you put it here, I don't think you know what the hell you're doing, okay? And so, a lot of people lost points last time because they were plotting things, you know, casually.”

“Some people find that if you haven't had a basic biology class before coming in here, it's a little harder. You've got to learn some of those basic concepts a little faster than other folks.”
## Emergence of Mirror Framework for Non-Productive Instructor Talk

<table>
<thead>
<tr>
<th>Non-Productive Instructor Talk Category</th>
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<tbody>
<tr>
<td>Dismantling the Instructor/Student Relationship</td>
<td>Building the Instructor/Student Relationship</td>
</tr>
<tr>
<td>Disestablishing Class Culture</td>
<td>Establishing Class Culture</td>
</tr>
<tr>
<td>Compromising Pedagogical Choices</td>
<td>Explaining Pedagogical Choices</td>
</tr>
<tr>
<td>Sharing Personal Judgment</td>
<td>Sharing Personal Experiences</td>
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<tr>
<td>Masking Science</td>
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So, what? Hypotheses about what Instructor Talk might predict...

1. Related to Instructor Immediacy?
   - Building the Instructor Student Relationship
   - Sharing Personal Experience

2. Related to Student Resistance?
   - Establishing Class Culture
   - Explaining Pedagogical Choices

3. Related to Stereotype Threat?
   - Building the Instructor Student Relationship
   - Establishing Class Culture
   - Unmasking Science
But what can take away and apply now?

Feature
Approaches to Biology Teaching and Learning

Structure Matters: Twenty-one Teaching Strategies to Promote Student Engagement and Cultivate Classroom Equity
Kimberly D. Tanner

Feature
Approaches to Biology Teaching and Learning

Considering the Role of Affect in Learning: Monitoring Students’ Self-Efficacy, Sense of Belonging, and Science Identity
Gloriana Trujillo and Kimberly D. Tanner

Feature
Approaches to Biology Teaching and Learning

Cultural Competence in the College Biology Classroom
Kimberly Tanner* and Elizabeth Green

Language Matters: Considering Microaggressions in Science
Colin Harrison† and Kimberly D. Tanner‡

†School of Biological Sciences, Georgia Institute of Technology, Atlanta, GA 30332; ‡Department of Biology, San Francisco State University, San Francisco, CA 94132
But what can take away and apply now?

Feature
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Structure Matters: Twenty-one Teaching Strategies to Promote Student Engagement and Equity
Kimberly D. Tanner

• When is the last time most instructors listened to a recording of themselves teaching?
• What non-content things do they say? And why?
• How could we engage instructors in being more purposeful in using Instructor Talk?

Language Matters: Considering Microaggressions in Science
Colin Harrison* and Kimberly D. Tanner†
*School of Biological Sciences, Georgia Institute of Technology, Atlanta, GA 30332; †Department of Biology, San Francisco State University, San Francisco, CA 94132
### Self-Assessing Use of Productive Instructor Talk...

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Discovering Classrooms: Observations, Emerging Questions, and Novel Measures

To what extent are instructors doing anything but lecture?

DART: Decibel Analysis for Research in Teaching

Jeff Schinske, MS
Foothill-De Anza Community Colleges

Shannon Seidel, PhD
Pacific Lutheran U.

Melinda Owens, PhD
San Francisco State U

Mike Wong, PhD
San Francisco State U
But what does classroom sound have to do with inclusivity?!?
Acknowledgements...

CCB FEST and Biology FEST
Instructor Collaborators!


Postdoctoral and Visiting Scholars
Melinda Owens
Gloriana Trujillo
Shannon Seidel
Colin Harrison
Katherine Farrar

Undergraduate Researchers and Annotators!
Susanne Lietz
Shangheng Sit
Zahur-Saleh Subedar
Travis Bejines
Joseph Perez
Amanda Reggi
Katie Lam
Kristin Liang
Alycia Escobedo

Howard Hughes Medical Institute
NSF
Reflection...

On one side of your index card...

– One thing that you learned in this session that will influence your teaching...

On one side of your index card...

– One thing that surprised you during this session...
Thank you for choosing to spend your time with me...

Kimberly D. Tanner, Ph.D.
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The Science Education Partnership & Assessment Lab
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