Order Matters:
Becoming Metacognitive about Teaching Choices

Kimberly D. Tanner, Ph.D.

Professor, Department of Biology

San Francisco State University

Director, SEPAL

SEPAL

The Science Education
Partnership & Assessment Lab
San Francisco State University

Meet a New Colleague!

Share with a person near you that you do NOT already know…

1. Your name

2. Your institution

3. Something about how you go about planning your class time with students and revising this plan each time you teach…

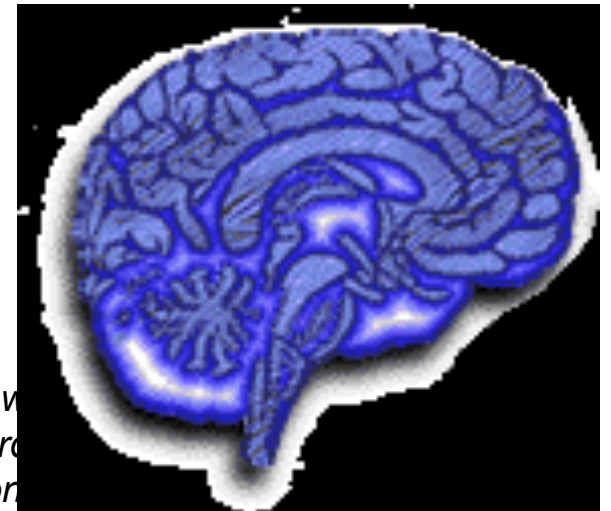# SEPAL: The Science Education Partnership and Assessment Laboratory

SEPAL

The Science Education
Partnership & Assessment Lab
San Francisco State University

(≈ The Tanner Laboratory)

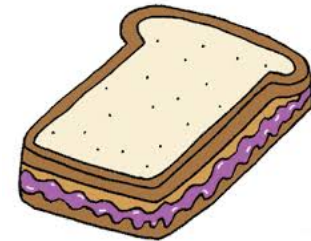Founded in 2004…

- **Programs**
- **Coursework**
- **Research**

Becoming Metacognitive about Teaching

"I have to teach someone to make a peanut butter and jelly sandwich. How am I supposed to do that? What should I start with? How can this be so hard?"

Have you ever thought about teaching someone else how to make a peanut butter and jelly sandwich?

How would you start? What would you do first? Next? After that?

Who was the learner anyway? And had they made a sandwich before? Were they allergic to peanuts? How old were they? Should we let them have a knife?

Should we show them how first? Talk them through it? Let them have a go at it on their own?

Should we first teach them the names of all the tools and things we were going to use? Should we ask them why they needed to learn how to make a peanut butter and jelly sandwich in the first place?

What were the critical issues in teaching someone how to make a peanut butter and jelly sandwich?

Becoming Metacognitive about Teaching

Metacognition: awareness or analysis of one's own learning or thinking processes.
– Merriam-Webster, 2012.

METACOGNITION ALSO INCLUDES SELF-REGULATION – THE ABILITY TO ORCHESTRATE ONE'S LEARNING: TO PLAN, MONITOR SUCCESS, AND CORRECT ERRORS WHEN APPROPRIATE – ALL NECESSARY FOR EFFECTIVE INTENTIONAL LEARNING...METACOGNITION ALSO REFERS TO THE ABILITY TO REFLECT ON ONE'S OWN PERFORMANCE.
– NATIONAL RESEARCH COUNCIL, 2000

Becoming Metacognitive about Teaching – A Framework for Analysis

- Think about a recent class meeting you taught.

- Identify the distinct 'pieces' of this class session. (*eg., gave a quiz, lectured on cell cycle, lectured on mutations, etc.*)

- Record each of these 'pieces' on single index card. You should end up with several index cards that reflect the pieces of your class session…

Becoming Metacognitive about Teaching – A Framework for Analysis

• Share each of the pieces of your class session with a partner.

• Discuss which 'pieces' represent some form of active learning.

One Method for Reflecting on Teaching Choices:
The 5E Learning Cycle Model

Engage

Explore

**E**xplain

Elaborate

Evaluate

Examining Your Most Recent Class Session:
Applying the 5E's

With your partner, give each 'piece' of your respective classroom sessions a designation of one of the E's.

Remember to be a skeptical and critical friend to your partner in helping them assign their E's.

Strategies for Using the 5E Model in Your Teaching

- **Start your class/lesson with something that Engages students and Elicits their prior knowledge.**

- **Allow for Exploration <u>before</u> you Explain or give mini-lectures.**

- **Collect some form of assessment/ Evaluation from your students every class.**
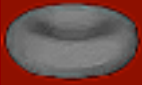
Strategies for Using the 5E Model in Your Teaching

- **Start your class/lesson with something that Engages students and Elicits their prior knowledge.**

  – Questions are your friend! What do you already know about (today's topic)? How is (today's topic) relevant to your everyday life? A challenge statement based on a common misconception about the topic…

  – Demonstrations, personal stories, a current events…

Strategies for Using the 5E Model in Your Teaching

- **Allow for Exploration <u>before</u> you Explain or give mini-lectures.**

    – consider placing mini-lectures in the middle or at the end of a lesson

    – recognize post-activity discussions as a time to explain information, when students are most interested and the information is most relevant

    – be selective in what questions you answer during the exploration phase of a lesson

Strategies for Using the 5E Model in Your Teaching

- **Collect some form of assessment/ Evaluation from your students every class.**

– minute paper or drawing at beginning and/or end of class that pertains to the lesson and aligns with your goals for that lesson

– personal reflection on what they learned (What did you learn today?)

Tweaking Your Most Recent Class Session:
Alignment with the 5E Model

With your partner, go back to your respective class sessions and think about which 'pieces' could be re-ordered to make the class session more aligned with the 5 E Model.

Strategies for Using the 5E Model in Your Teaching

- **Start your class/lesson with something that Engages students and Elicits their prior knowledge.**

- **Allow for Exploration <u>before</u> you Explain or give mini-lectures.**

- **Collect some form of assessment/ Evaluation from your students every class.**
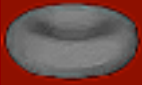
Questions to Promote Instructor Metacognition about Teaching

Table 3. Sample self-questions to promote faculty metacognition about teaching

Activity	Planning	Monitoring	Evaluating
Class session	• What are my goals for this class session? How did I arrive at these goals? • What do I think students already know about this topic? What evidence do I have for my thinking? • How could I make this material personally relevant for my students? Why do I think this? • What mistakes did I make last time I taught this and how can I not repeat these?	• What do I notice about how students are behaving during this class session? Why do I think this is happening? • What language or active-learning strategies am I using that appear to be facilitating learning? impeding learning? • How is the pace of the class going? What could I do right now to improve the class session?	• How do I think today's class session went? Why do I think that? What evidence do I have? • How did the ideas of today's class session relate to previous class sessions? To what extent do I think students saw those connections? • How will what I think about how today's class session went influence my preparations for next time?
Overall course	• Why do I think it's important for students pursuing a variety of careers to learn the ideas in my course? What are my assumptions? • How does success in this course relate to my students' career goals? How might I reveal these connections to them? • What do I want students to be able to do by the end of this course? Still be able to do 5 yr later?	• In what ways am I effectively reaching my goals for students through my teaching? How could I expand on these successful strategies? • In what ways is my approach to teaching in this course not helping students learn? How could I change my teaching strategies to address this? • How is my approach to teaching this course different from last time I taught it? Why?	• What evidence do I have that students in my course learned what I think they learned? • What advice would I give to students next year about how to learn the most in this course? • If I were to teach this course again, how would I change it? Why? What might keep me from making these changes? • How is my thinking about teaching changing?

For Further Reading...

Feature
Approaches to Biology Teaching and Learning

Order Matters: Using the 5E Model to Align Teaching with How People Learn

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Promoting Student Metacognition

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Teaching More by Grading Less (or Differently)

Jeffrey Schinske* and Kimberly Tanner[†]
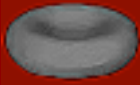
Reflection and Pair Discussion…

On one side of your index card…

– One thing, if anything, that you learned about in this session that will influence your teaching…

On one side of your index card…

– One thing, if anything, that surprised you during this session…

Thank you for choosing to spend your time with me today…

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