

Supplemental Material

CBE—Life Sciences Education

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Appendix 1

STAR Questionnaire

STAR design feedback

1. How did you hear about STAR?
 - a. E-mail announcement
 - b. Department head
 - c. Colleague
 - d. Brochure at meeting
2. What role did the stipend covering travel, lodging, and per diem play in your participation in STAR?
 - a. It was not important
 - b. I could not have attended without it
 - c. Not applicable
3. What role did the stipend covering travel, lodging, and per diem play in winning support of your administration for your participation in STAR?
 - a. It was not important
 - b. I could not have attended without it
 - c. Not applicable
4. In your view, what is the best way to advertise professional development opportunities such as STAR?
 - a. E-mail announcement
 - b. Brochures at meetings
 - c. Direct mail to faculty
 - d. Contact department heads who then disseminate the information
5. How valuable was it to you (Responses: Not valuable; Moderately valuable; Very valuable; N/A)
 - a. To have colleagues who went through the same experience?
 - b. To interact with colleagues in your institution in order to implement STAR methods/changes to your teaching?
 - c. To interact with STAR alumni from other institutions in order to implement STAR methods/changes to your teaching?
6. STAR participants came from a cross-section of educational institutions, from community colleges and two-year institutions to research-intensive universities. Did this mix of faculty hinder or enhance the overall dynamics/effectiveness of the mini-institute?
 - a. Hindered greatly
 - b. Hindered
 - c. No effect
 - d. Enhanced
 - e. Enhanced greatly
7. Briefly describe your interaction with STAR colleagues:
8. My participation in the STAR mini-institute was worthwhile to me.

- a. Strongly disagree
- b. Disagree
- c. Neutral
- d. Agree
- e. Strongly agree

Participant demographics

1. What percentage of your academic appointment is dedicated to teaching?
 - a. 25%
 - b. 50%
 - c. 75%
 - d. 100%
2. On average in a two-semester academic year, how many courses do you teach?
3. What level are these courses?
 - a. 100/1000 level
 - b. 200/2000 level
 - c. 300/3000 level
 - d. 400/4000 level
 - e. Graduate level
4. What is the approximate number of students that you teach each academic year?

Participant or student gains

1. Rate the impact of STAR (Responses: Very negative; Negative; Neutral; Positive; Very positive)
 - a. On your teaching.
 - b. On student engagement and learning.
2. What was the attitude of your administration (Responses: Very negative; Negative; Neutral; Positive; Very positive):
 - a. To your participation in STAR?
 - b. To your implementing what you learned in STAR?
3. Please rate your gains in teaching skills after STAR (responses: No gain; Small gain; Moderate gain; Large gain; Very large gain):
 - a. Scientific teaching
 - b. Active learning
 - c. Assessment
 - d. Developing learning goals
 - e. Diversity
4. Please rate your agreement with the following statements pertaining to your use of scientific teaching (Responses: Strongly disagree; Disagree; Neutral; Agree; Strongly agree)
 - a. I think that this type of teaching improves student learning.
 - b. I think that this type of teaching engages students in the class more.
 - c. Students are completing outside learning assignments more frequently.
 - d. I see students becoming more responsible for their own learning.
 - e. I have seen my students develop more of a student learning community.
 - f. I observe students interacting more outside of class than before.
 - g. As a result of scientific teaching, fewer students are dropping the class.
 - h. Students are more motivated.
 - i. More students are passing my class now.

- j. Overall student performance has increased as compared to when I did not use scientific teaching methods.
- k. Student attendance has increased.
- l. Students develop a deeper understanding of concepts.
- m. Students use critical thinking/problem solving more.

Implementation of Scientific Teaching techniques

1. Did you implement part or the entire teachable unit your group developed during STAR?
 - a. Yes
 - b. No
2. Did you implement part or all of a teachable unit prepared by any other groups at STAR?
 - a. Yes
 - b. No
3. Which active learning approaches and assessment techniques have you implemented and approximately how often do you use them? Please respond to all that apply. (Responses: Once a semester; Once a month; Once a week; More than once a week)
 - a. Communicate course goals and objectives to students
 - b. Student group discussions
 - c. Cooperative learning
 - d. Problem-based learning
 - e. Case studies
 - f. Homework assignments
 - g. Think/pair/share
 - h. Scoring rubrics
 - i. Concept maps
 - j. Minute papers
 - k. In-class questions (clickers)
 - l. Muddiest point papers
4. Which forms of student feedback have you implemented and approximately how often do you use them? Please respond to all that apply. (Responses: Once a semester; Once a month; Once a week; More than once a week)
 - a. Formal student evaluations from department/college
 - b. Instructor-designed evaluations
 - c. Individual student feedback by e-mail
 - d. Individual student feedback by casual conversations
 - e. Feedback from class representative
5. Thinking back to the end of STAR, you developed an action plan for the upcoming semester. To what extent did you successfully follow this plan?
 - a. I did not follow it at all
 - b. I followed it somewhat
 - c. I followed the majority of it
 - d. I followed it completely

Table 1 Supplement. Example schedule for the Scientific Teaching, Assessment, and Resources (STAR) mini-institute. Overview of activities in which mini-institute participants engage during the three-day program.

	Monday	Tuesday	Wednesday	Thursday
8:00		Registration & Coffee	Coffee	Coffee
8:30 - 9:30		Topic Scientific Teaching	Topic Assessment	Group Work Time Developing teachable unit
9:30 – 10:00		Break	Break	Teachable Unit Presentations
10:00 – 11:00		Topic Active Learning	Topic Syllabus, Teaching Plans & Portfolios	
11:00 – 12:00		Topic Goals and Teachable Unit Discussion	Documenting Teaching Performance	
12:00 – 1:00		Lunch	Keynote	
1:00 – 4:30	Facilitator Training	Group Work Time Developing teachable unit	Group Work Time Developing teachable unit	Lunch & Wrap up
4:30			Wrap up	Topic Diversity

Table 2 Supplement. Scientific teaching sessions presented at STAR along with learning goals for each session and example activities.

Topic	Goal	Example Activity
Introduction	Participants learn about literature documenting reasons for students leaving STEM disciplines; discuss the need to improve undergraduate science education	Participants answer science education opinion poll
Active Learning	Participants appreciate that active learning models the scientific method; understand the constructivist learning model; practice active learning techniques	Participants engage in various active learning demonstrations then reflect on how these activities compare with traditional lectures
Teachable Unit Development	Participants learn about the elements of a teachable unit and the goals for group work each day	Participants engage in group discussion of strategies to incorporate diversity, active learning and assessment into teachable units
Assessment	Participants learn that regular classroom assessment can drive student learning and provide feedback to instructors and students	Participants engage in case study illustrating misalignment of teaching and assessment; participants engage in various classroom assessment techniques
Syllabus and Teaching Plans	Participants learn to construct a syllabus that communicates learning outcomes, active learning, assessment, and how these align	Participants engage in a Think-Pair-Share activity where they develop learning goals then evaluate those goals based on Bloom's taxonomy
Evaluation of Teaching	Participants learn about methods used to document teaching effectiveness	Participants engage in a group discussion of the essential information needed for an effective teaching portfolio
Diversity	Participants become aware of the different learning/teaching cultures in two-year and four-year institutions; participants become aware of different learning styles	Participants take the VARK Learning Style Inventory to determine their learning styles; discuss best practices for reaching students with various learning styles
Group Work and Presentations	Create a teachable unit using scientific teaching concepts	Participants work in groups to develop and present a teachable unit