What is effective teaching? How do we define it and how do we measure it?

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Abstract: Within higher education, assessing effective teaching is important to ensure that students are receiving a high-quality education that prepares them for their future careers. Additionally, evaluations of effective teaching are an important component in the tenure process for faculty members. In many settings, student evaluations of teaching are the primary measure of teaching effectiveness. However, student evaluations 1) measure perceptions that may or may not align with the effectiveness of the instructor, 2) are often difficult to interpret, and 3) can be influenced by biases. In this interactive session, participants will explore additional measures of effective teaching beyond student evaluations that can provide a more holistic evaluation of teaching.

This session is intended to foster dialogue between faculty members, administrators, faculty developers, and other stakeholders in academia to gain a shared view of effective teaching in higher education and to identify opportunities to measure various aspects of effective teaching. During the session, participants will define effective teaching, examine how their institution currently measures effective teaching, and identify additional opportunities to collect evidence of effective teaching. By the end of this session, participants will synthesize a definition of teaching effectiveness and align measures of effective teaching with that co-created definition.

FOCUS

In this interactive session, participants will explore additional measures of effective teaching beyond student evaluations that can provide a more holistic evaluation of teaching. The focus of this session is on 1) describing effective teaching, 2) identifying new and existing methods of assessing effective teaching, and 3) examining the alignment between views/descriptions of effective teaching and the assessment of effective teaching.

LEARNING OBJECTIVES

By the end of the session, participants will be able to:
- Describe effective teaching
- Identify measures of effective teaching
- Align measure of effective teaching with the components of effective teaching

INSTRUCTIONAL STRATIGIES

This session will utilize several instructional strategies, as described in more detail in the session outline below.
- The learning outcomes and workshop norms will be explicitly stated at the beginning of the session.
- The session will begin by eliciting participants' prior knowledge though a think-pair-share active learning strategy.
- Participants will work in small groups to brainstorm and discuss aspects of effective teaching, assessments of teaching, and the alignment of the two.
- We will use a gallery walk to share ideas between all groups and to help visualize the alignment between aspects of teaching and assessments of teaching.

OUTLINE

Session Duration: The Effective Teaching session (described below) is intended to take 90 minutes. Modifications to adjust for a 60-minute session are underlined in the outline below.

Session Outline:
1. **Introductions (5 min [60 min version]; 10 min [90 min version]):**
    a. **Introductions (5 min):** Facilitator introductions, review learning outcomes and workshop norms
    b. **Introductory Activity (5 min) [90 min version only]:**
        i. Stand by me activity: Facilitator asks participants to think of their answer to a question (e.g., "When I learn something, I prefer to...") and then walk to the area of the room corresponding to that answer (chart paper with answers written on it; e.g., watch a video, read about it, take a class, find an expert to mentor me, learn with friends, study it online). Participants talk briefly with the group at the same paper (introduce themselves, discuss why

they chose that answer, etc.). Multiple questions will be posed in this activity and follow the same format as described above.

2. **Effective Teaching Definition (35 min [60 min version]; 50 min [90 min version]):** The first portion of the session will focus on identifying various aspects of effective teaching.

   a. **Describing effective teaching (20 min):**
      i. *Elicit prior knowledge of effective teaching (15 min):* participants do a Think-Pair-Share around effective teaching.
         1. Participants individually reflect on the following prompt: "What does effective teaching look like? Take 5 minutes to write your initial thoughts to this question. You can include diagrams or pictures." (2 min)
            a. Probing Questions: 1) Consider your own experiences – what marked effective teaching for you? What would you expect to see and/or hear in a classroom where effective teaching is happening? What is the instructor doing? What are students doing?
         2. Participants pair up with someone next to them and share their reflections on effective teaching. (5 min)
         3. Working in small groups (~4 participants per group), participants identify aspects of effective teaching and write one aspect per post-it note. Participants will be encouraged to consider their initial reflections and generate new ideas. (5 min)
         4. Facilitators ask a few groups to share what they discussed in their pairs/groups, including what was surprising and what they had questions about. (3 min)
      ii. *Sharing one definition of effective teaching (5 min):* The definition of effective teaching being developed at Mines will be shared with session participants. This definition consists of four characteristics: 1) supportive of students, 2) focused on learning, 3) intentionally designed, and 4) reflective. This definition will serve as a framework to help workshop participants co-construct a definition of effective teaching.

   b. **Co-constructing a definition of effective teaching (10 min [60 min version]; 15 min [90 min version])**
      i. *Organize aspects of effective teaching (5 min):* Setup: pieces of chart paper will be placed around the room, each with one characteristic of effective teaching as described by Mines at the top. Groups will add their post-it notes to the chart paper if there is alignment between the aspect included on the post-it and the larger characteristic. There will additionally be an extra piece of chart paper hung in the room in case aspects described on the post-its do not align with the four characteristics.
      ii. *Review aspects of effective teaching (5 min [60 min version]; 10 min [90 min version]):*
         1. 90 min version: Participants will walk around the room and review the aspects of effective teaching identified for all four (or more) characteristics. As an entire group, we will discuss each

characteristic and the aspects that align with each characteristic. (10 min)
2. <u>60 min version:</u> Facilitators will summarize the aspects of effective teaching for all four characteristics. (5 min)
   c. **Why is a vision of teaching and learning important? (<u>5 min [60 min version]; 15 min [90 min version]</u>)**
      i. <u>90 min version:</u> Facilitators lead a full group discussion on the reasons why a common vision is important. Discussion questions include: How important is it to have a shared vision across institutions? Should the common vision be content neutral/specific? (15 min)
      ii. <u>60 min version:</u> Facilitators describe reasons why a common vision of effective teaching is important and ask participants if there are additional reasons why a common vision is important (5 min)
3. **Methods of Assessing Effective Teaching (<u>15 min [60 min version]; 20 min [90 min version]</u>):** The second portion of the session will focus on measures of effective teaching and methods to assess effective teaching.
   a. **Overview of common methods of assessing teaching (5 min):** Facilitators will introduce common (and some less common) methods for assessing teaching, such as student evaluations, observations, and portfolios. Participants will be asked if there are additional assessments that are used.
   b. **Alignment activity (<u>10 min [60 min version]; 15 min [90 min version]</u>)**:
      i. Groups will be divided among the 4 characteristic chart papers. Each group considers what measures align with the characteristic described on their chart paper and the individual post-it notes on the chart paper. (5 min)
      ii. Groups report out. Facilitators will provide a brief summary of key takeaways (e.g., importance of alignment). (<u>5 min [60 min version]; 10 min [90 min version]</u>)
4. **Debrief and wrap up (5 min)**
   a. **Debrief and session wrap up (5 min):** Facilitators will summarize the key takeaways from the session.

RMS ASEE TARGET AUDIENCE

This session is intended to foster dialogue between faculty members, graduate students interested in academia, administrators, faculty developers, and other stakeholders in academia to discuss what is meant by effective teaching in higher education and to identify opportunities to measure various aspects of effective teaching. Descriptions and measures of effective teaching impact multiple stakeholders in academia and have implications for tenure. As a result, we aim to bring together multiple stakeholders to begin and continue conversations around effective teaching and how it is measured in higher education institutions.

PRESENTER CREDENTIALS

Amy Hermundstad Nave, Ph.D.
Amy is a faculty developer in the Trefny Center at the Colorado School of Mines. In this role, she helps faculty incorporate research-based practices into their classroom contexts. Originally from Colorado, Amy earned a BS in Mechanical Engineering from Colorado State before going on to earn her Ph.D. in Engineering Education and MEng in Mechanical Engineering from Virginia Tech. Amy's research interests include engineering students' professional development and efforts to support underrepresented students within engineering, primarily using qualitative research methods to investigate a variety of perspectives on these topics. She has also done research on conceptual understanding in engineering courses and studied the variation in cultures between engineering departments and disciplines. In addition, Amy taught first-year engineering courses, worked in an engineering student support center, and worked with graduate students to incorporate contemporary pedagogical practices in a variety of fields.

Sarah Bodbyl Roels, Ph.D.
Sarah is a faculty developer in the Trefny Center at the Colorado School of Mines. Her role includes assisting faculty to achieve classroom and student-centered learning goals. She earned her Ph.D. in Ecology and Evolutionary Biology from the University of Kansas where she studied plant mating system evolution. She has extensive experience managing science communication and education research projects and specializes in facilitating evidence-based training and professional development for K–advanced degree educators.

Sam Spiegel, Ph.D.
Sam leads the Trefny Innovative Instruction Center at the Colorado School of Mines in proactively supporting faculty to advance the quality of students' learning experiences, advance campus discussions on pedagogy and innovative teaching, and advocate for and support faculty in their use of empirically proven innovative teaching approaches.
Prior to joining Mines, Sam served as Chair of the Disciplinary Literacy in Science Team at the Institute for Learning (IFL) and the Associate Director for the Swanson School of Engineering's Engineering Education Research Center at the University of Pittsburgh. He previously served as a science educator at Biological Sciences Curriculum Study (BSCS); as Director of Research & Development for a multimedia development company; and as founding Director of the Center for Integrating Research & Learning (CIRL) at the National High Magnetic Field Laboratory, Florida State University. Under Dr. Spiegel's leadership, CIRL matured into a thriving Center recognized as one of the leading National Science Foundation Laboratories for activities to promote science, mathematics, and technology (STEM) education. While at Florida State University, Dr. Spiegel also directed an award winning teacher enhancement program for middle grades science teachers entitled Science For Early Adolescence Teachers (Science FEAT).

His extensive background in science education includes experiences as both a middle school and high school science teacher, teaching university-level biology and science education courses, working with high-risk youth in alternative education centers, working in science museums, designing and facilitating online courses, multimedia curriculum development, and leading and researching professional learning for educators. The Association for the Education of Teachers of Science (AETS) honored Dr. Spiegel for his efforts in teacher education with the Innovation in

Teaching Science Teachers award (1997). Dr. Spiegel's current efforts focus on educational reform and in the innovation of teaching and learning resources and practices.

REQUIREMENTS

What materials/handouts will you bring?
- We will bring chart paper, post-its, pens, stickers, handouts, and extra paper.

Do participants need to bring anything?
- No

What are your intended (ideal) and max participant counts?
- Intended count: 30
- Max count: 50

REFERENCES

Berk, R. A. (2005). Survey of 12 strategies to measure teaching effectiveness. *International Journal of Teaching and Learning in Higher Education*, *17*(1), 48–62.

Poproski, R., & Greene, R. (2018). Metrics and measures of teaching effectiveness. Retrieved from http://ctl.gatech.edu/sites/default/files/documents/poproski_greene_2018_metrics_and_measures_of_teaching_effectiveness.pdf

Trefny Center (2019). A vision of highly effective teaching at Mines. Retrieved from https://trefnycenter.mines.edu/effective_teaching/