

# Preparing Future Engineering Faculty:

## Initial Outcomes of an Innovative Teaching Portfolio Program

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# Presentation Outline

1. Engineering Teaching Portfolio Program (ETPP) Description
2. ETPP Design Principles
3. Qualitative Research
4. Case Studies (2)
5. Preliminary Results

# Engineering Teaching Portfolio Program

Participants agreed to:

- Meet weekly for 8 weeks
- Receive & provide peer feedback
- Practice active & collaborative learning
- Provide researchers with feedback



# ETPP Product

## Teaching Portfolio Draft

- Teaching philosophy statement
- Diversity statement
- 2-3 annotated artifacts

### Philosophy

As an educator and a scholar, I am committed to inclusive teaching and research and I firmly believe that we have a responsibility to be representative, both topically and personally, of the society in which we live. As academics we influence how others perceive our disciplines—through decisions about course content and selection of research topics. The exclusion of particular subjects, whether conscious or unconscious, sends a strong message about who and what we think are important. These decisions determine who sees the discipline as interesting and relevant and who feels welcomed to the discipline. To ensure that all potential scholars successfully negotiate the educational system and become professionals requires that we also consider whom and how we encourage and mentor newcomers.

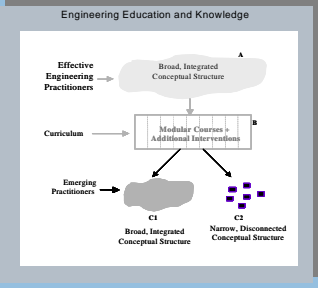
**Curriculum Transformation**  
I have already begun the process of transforming my courses to make them more inclusive. I want students to feel equally valued and work to create a learning environment that is respectful and comfortable for all by treating all my students as individuals. I ask students to share with me information on their background, preferred learning style, course expectations, and content knowledge. I also use a variety of teaching techniques, learning activities, and evaluative methods to ensure that one kind of student is not privileged over others. One area I am exploring is how to involve students in my courses in the diversity critique and to place that discussion in the context of disciplinary ethics.

**Public Outreach**  
I carry this inclusive philosophy into my public outreach work making school presentations and serving as a role model and mentor scientist. I work with educators to ensure that my material is relevant for the audience and linked to specific learning outcomes. I make a particular effort to interact with groups that are typically not encouraged to pursue degrees or currently underrepresented in the academic community. I was drawn to the Rural Girls in Science Program because it brought me into contact with girls who rarely encounter strong female role models and are seldom encouraged to become scientists.

**Institutional Change**  
I am working with my departmental and institutional colleagues to create more inclusive courses and to establish a committee on diversity issues at a wider university level. I am also working with my colleagues to share best practices by graduate students and to establish a committee on issues and make suggestions for leadership is unaware of whether

### Exercise

Current engineering educational practices modularize knowledge through distinct courses. Both research and practice show, however, that expert engineers hold a broad and deep integrated conceptual structure of their discipline.



**The Engineering Professional Portfolio:** A collection of artifacts, artifact annotations, and overarching statements that a student uses to communicate an understanding of engineering and preparedness to perform engineering work.

**Example Portfolios:** These examples suggest the varied nature of the artifacts, annotations, and overarching statements that may be included in the Engineering Professional Portfolio. Additionally, the examples illustrate two of the technologies that can be used to support portfolio development.

**Portfolio construction as a promising intervention:** According to the theory proposed by Bransford et al. (*How People Learn*, 2000), effective learning environments are those that are concurrently learner-centered, knowledge-centered, assessment-centered, community-centered, and context-centered. Portfolio construction can easily fulfill these goals:

- **Supports the development of a professional identity:** The portfolio provides a space for students to reflect on their experiences and to articulate their values and beliefs as a professional engineer.
- **Encourages the development of a learning community:** The portfolio provides a space for students to share their experiences and to learn from each other.
- **Provides a space for reflection and self-assessment:** The portfolio provides a space for students to reflect on their learning and to assess their progress.
- **Provides a space for showcasing learning:** The portfolio provides a space for students to showcase their learning and to demonstrate their skills and knowledge.
- **Provides a space for showcasing professional development:** The portfolio provides a space for students to showcase their professional development and to demonstrate their readiness for the workforce.

## ETPP Motivation

1. National need to improve engineering student learning
2. Improving engineering teaching is one strategy to improve learning
3. Engineering faculty and grads receive relatively little preparation to teach
4. Engineering grads are interested in learning more about teaching

# ETPP Design Principles

- Customized for Engineers
- Peer-Focused
- Diversity



# ETPP Qualitative Research

- Field Notes
- Post-program Group Interview
- Individual Interviews
- Questionnaire



# Participant Case Studies



For each we will discuss:

- Individual characteristics, background & teaching experience
- Key aspects of their process
- Self-identified significant impacts



## Preliminary Results

- Most participants completed their portfolios
- Participants perspectives about teaching changed
- Participants developed a network of peers interested in teaching
- Participants with little teaching experience successfully participated

## Participant Feedback Themes

Most Challenging:

- Teaching or diversity philosophy

Most helpful:

- Peer-review process & structure

Other Impacts:

- ETPP structure borrowed/transferred
- Search committee feedback, "strongest application packet ever seen"

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ETPP [http://www.engr.washington.edu/caee/sot\\_etpp.html](http://www.engr.washington.edu/caee/sot_etpp.html)  
CAEE <http://www.engr.washington.edu/caee/>

# ETPP Design Principles

## Customized for Engineers

- product oriented
- material format language, & examples

## Peer-Focused

- rotating leadership
- peer-review
- sustainable

## Diversity

- participants
- diversity statements

