# Welcome! As you enter the room, please...

1. Plug in your headset (if available).

2. Familiarize yourself with the **top bar** on the screen

3. Make sure your **speakers and mic are enabled** (the icons on the top bar should be **highlighted on green**).

4. Run the **audio setup wizard** (this option is available from the "Meeting" menu on the left right of the screen).

5. Once you have run the wizard, "**raise your hand**" by clicking on the icon available on the top bar. This will indicate hosts you are ready to test your mic.

6. After testing your mic, **mute yourself** by clicking on the mic icon on the top bar (this will help to avoid background noise).
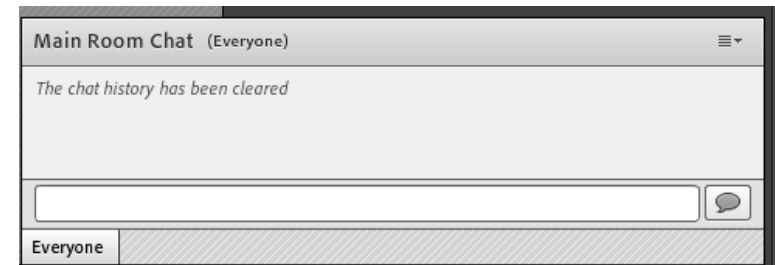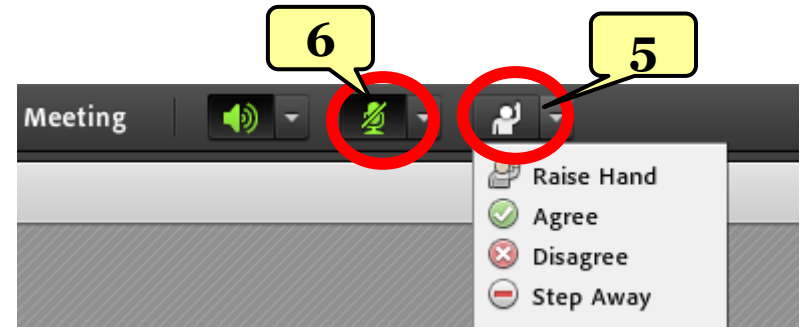
Note: Feel free to use the chat at any

FOEE Virtual Community of Practice (FOEE VCP)
Session 1 – 4/4

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Today's agenda (if all goes well…)

- Welcome, introductions, and navigating the technology ~ 25 min
- Overview of the NSF grant ~10 min
- Overview of FOEE VCP 7 sessions ~10 min
- Discussion of Session 1 ~ 30 min
- Wrap up and plans for Session 2 ~ 10 min

Welcome and introductions

- Please tell us:
  - Your name, institution, department, and
  - One thing you need to share with us to help you be fully present at this meeting?

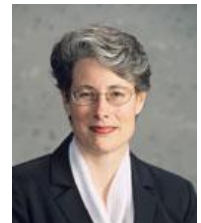**Mary** **Jennifer** **Jill** **Jennifer** **Jeffrey** **Ipsita** **Daniel** **Amy**

Joe **Julie** **Kristine** **Rani** **Sahra** **Stephen** **Victor** **Waleed**

Overview of the VCP project

- Sustainable VCP model that enables engineering faculty to work as a community to
  - Share knowledge
  - Develop strategies for improvement in the classroom and engineering education
  - Identify VCP best practices

Expected Outcomes of the VCP Project

- Knowledgeable, skilled community of leaders
- ~300 engineering faculty that have:
  - Shared practices and gained understanding
  - Implemented and evaluated approaches
  - Continued involvement with their VCP
- VCP knowledge base and best practices

Expected outcomes of the FOEE VCP

- After 7 sessions we hope that you will be able to:
  - Critically discuss the idea of being a change agent in your school
  - Describe key themes and common practices from the literature
  - Frame and create a change practice at your institution

FOEE Sessions Overview

- Session 1 – 4/4   Introduction to the FOEE VCP
- Session 2 – 4/11   The Henderson Model
                              & project assignment
- Session 3 – 4/18   Quadrant 1
- Session 4 – 4/25   Quadrant 2
- Session 5 – 5/2   Quadrant 3
- Session 6 – 5/9   Quadrant 4
- Session 7 – 5/16   Reporting of your projects

Building on the work of others:
Four core change strategies

FIGURE 1

FOUR CATEGORIES OF CHANGE STRATEGIES. (ADAPTED FROM HENDERSON, BEACH, & FINKELSTEIN, 2011)

	Prescribed	Emergent
INDIVIDUALS	I. Disseminating: CURRICULA & PEDAGOGY Goal: Teach individuals about new teaching conceptions and/or practices. 30% of articles	II. Developing: REFLECTIVE TEACHERS Goal: Encourage individuals to develop new teaching conceptions and/or practices. 34% of articles
ENVIRONMENTS AND STRUCTURES	III. Enacting: POLICY Goal: Create environments/structures that require new teaching conceptions and/or practices. 28% of articles	IV. Developing: SHARED VISION Goal: Empower stakeholders to collectively develop new environments/structures that support new teaching conceptions and/or practices. 8% of articles

ASPECT OF SYSTEM TO BE CHANGED

Our Pedagogical Approach

- Framed around Henderson et. al. Model
- The four category change categories
  - C. Henderson, A. Beach, and N. Finkelstein
  - Homepages.wmich.edu/~chenders
    - Publications and Projects
- Journal club enhanced with blogging and breakout discussions
- Project based learning

Session 1: Participant learning objectives

- Review responses from background survey
- Short exercise

What you would like to change?

I am working with six other faculty on creating a new major at my school. It already has support from the Dean, President and Board of Trustees. The major is being supported by KEEN and the intention is to make it modular so that other KEEN schools can adopt as much or as little as they want from what we create. Locally, the goal is to make a tighter tie between the engineering, management and the liberal arts school.

A new addition is being planned for the engineering building. As part of that growth, new classrooms are being designed to allow more interaction among students and the instructional team. I want to help the engineering faculty to prepare for this shift in pedagogy, such as helping faculty "flip" their classrooms.

I would like to see an integrated curriculum that takes advantage of the new approaches to STEM education in K-12; copied and leveraged at the university level (we are unique in that 75%+ of our students study engineering; thus integration is very possible, but not yet discussed).

Implementing new curricula and pedagogy

More project-based and hands-on learning, greater support for educational innovation.

Supporting educational practices

I would like to see it become more personalized.

I am interested in leveraging new instructional technologies to transform the classroom experience away from the traditional lecture and toward a more impactful interactive format.

Improving my work and my classroom

There is increasing appreciation of active learning within the school of engineering. The recently established Engineering Education Research Center (EERC) is catalyzing a change in conventional instructional strategies. I would like to participate in the EERC activities towards imbibing a culture of interactive lectures and active learning.

Changing culture

I would like the discussion and hosted workshops on student learning, pedagogical approach, and assessment to be generated within the department of engineering rather than by an external group, to help establish a culture among the immediate faculty.

There is a very small group of faculty that do engineering education research, and a larger group of faculty that are excellent teachers. I would like a way for both groups to work together to provide information/assistance/advice to faculty interested in improving engineering education. Ideally this endeavor will get faculty trying new things, and help us expand engineering education research at our institution.

Effective Strategies

In my Process Control pillar course (6 credit) I introduced an interactive tutorial session for a third of the lecture (2hrs/ week). The students were required to work on problem sets in class, in small groups. Group discussion was particularly encouraged so they learn from each other and clarify their understanding. It also helped me identify concepts/ topics which the class/ groups are having trouble with.   In general, I have experienced that in class problem solving in groups increases interaction and enhances the learning experience.

Trying out the techniques I find to have potential, and demonstrating their success.

Getting regular feedback from students, sharing ideas with colleagues, and attending the FOEE conference.

I can't say that I have except in single classroom environments.

Within course

Visible support from key administrators, consistency is rewards over a prolonged period, and concrete signals that promotion and tenure depend upon innovation.

Leadership and policy

Getting there, but not enough

The problem is I haven't found what we have done to be very effective. We have had seminars and workshops - but the only people attending were the small group of faculty interested in this sort of thing. While it did help us to network with each other - it did not reach other faculty within the institution.

Developing/Finding the right group

I have found that the various portions of Rogers Diffusion of Innovations to be most helpful. Creating archetypes of the players involved. Assessing the innovation for simplicity, compatibility, relative advantage, trialability and observatiblity. Recognizing that individuals will go through stages of adoption: Awareness, Persuasion, Decision, Implementation and Confirmation. And finally the power of building strategic links to help the innovation move beyond existing silos.

It's important to get key players involved and highlight their successes. Faculty are more apt to think about and enact change if they can see the positive results.

It is helpful to build consensus from the grass-roots level (e.g., by actively engaging as many faculty as possible), as opposed to imposing a change from above.

Potential Obstacles

Convincing colleagues to invest time in changing established courses.

Some faculty seem to be reluctant to adopt new instructional technologies because (1) they don't feel a need to change the practices they are already using, and (2) they perceive that new technologies may "dumb down" the instruction to a lower level.

How to reach out to faculty. We know it is hard to reach out to some - especially those that do not find this to be interesting, easy to try, or worth their time. But there must be some that are not opposed and are willing to listen - we just have to find them and get them excited.

People and perceptions

The primary obstacle was to cover the syllabus and the pace of the lecture. These tutorial sessions were great in clarifying concepts but it did slow down the class. Secondly, the more advanced students were perhaps not benefiting adequately from this structure. We are targeting the average student without benefiting the advanced students.

Time and energy. We're all overloaded with responsibilities, and it's so much easier to just do the same thing you've always done. It will be important to help people identify small steps that can lead to big changes.

Faculty time (or lack there of)

Time and resources

Peers stating they are already overloaded, red tape of how to count credit (intensified in the movement to a performance based budget model), and no apparent reward for the investment of work (also, some folks will simply 'believe' that the same old approach is best....)

There are many young untenured faculty who are being told by older faculty not to join the efforts of the new major. The liberal arts college is suspicious of anything new at the engineering college, because it is perceived as taking resources from them. The process of creating a major takes a long time and could easily lose momentum.

As well as...P&T

The most significant obstacle is the tension between the aspirations of a research university and how it is evaluated, and the educational needs of the students.

Despite obstacles, your motivations...

I have witnessed its efficacy.

I believe that one of the fundamental missions of a university is to be effective in teaching, and that our students depend on us to innovate and do our job as well as possible. An undergraduate education can be a transformative experience for our students, and I believe it is our responsibility to deliver the best possible product to them.

I want students to take more responsibility for their own learning. In doing so, they'll truly be able to be lifelong learners. I am concerned by the number of students who are copying solution manuals (and each other) just to get the homework done. I want to make sure that they learn the material well. I realize that we need to act now to demonstrate the worth of a university education in the face of growing interest in MOOCS and other on-line courses.

I want to see a change in how engineering students move through an undergraduate curriculum. To see design, the liberal arts, entrepreneurship, systems thinking, communication and a host of other topics as threads that run through all courses.

Improving student learning

I believe that the next decade will be an exciting time during which the classroom experience will fundamentally change away from the traditional lecture format. We can continue to debate whether this change is a "good" or "bad" thing, but the reality is that it's going to happen (it's already happening) and I would like to be at the forefront of this change.

I've seen the engineering education communities at places like Purdue, and I want to build a community like that at our institution. I want faculty to feel they have the support they need to improve teaching.

The fiscal realities of higher education, and my personal observations that integrated learning works well for stimulating student engagement (and probably student learning as well...)

It's time for change!

Enhanced teaching and learning experience. More effective use of instruction time.

I'm passionate about how engineering topics are "delivered" to the students.

It's a good thing!

Things you bring...

I have experience doing engineering education research. I've worked on several studies, both long and short term. I've been a resource for my own department on developing research questions and setting up studies. I've also taught capstone design and multidisciplinary freshman design for the past 4 years.

Engineering education research

Co-created the biomedical engineering major at my school. Spent a year at the NSF Epicenter. Chair of the ASEE BED section. Spoken internationally on engineering pedagogy.

In my seven years of teaching experience, I have developed at least five new courses, helped start a new engineering program, and have refined my teaching strategies based on course assessment. I have taken several pedagogical workshop classes, that range from single day to week long courses. I have seven years of industry and clinical experience that helps for some of my course content.

Developing new programs

1. I am currently transforming my undergraduate fluid mechanics class toward following a "flipped" format. But I am concerned about assessing the impact of this change. Are the students really learning better in this environment?   2. I am the undergraduate program director in our department (chemical engineering), and am concerned about managing these kinds of changes more broadly across the curriculum.   3. Our college of engineering has recently announced plans to double enrollment in the next decade. New instructional technologies will need to be part of these plans, particularly in terms of managing larger class sizes more efficiently.

A high visibility position as an endowed chair, experience as a department head and faculty senator on presidential budgeting cmtes, a sincere desire to drive improvement, and a senior administrator who 'gets it'.

People management

Breadth of experience in engineering education, knowledge of computing techniques that could be used to make it more effective.

I teach a course in both on-line and lecture mode. I use Blackboard Collaborate to engage industrial guests in my design class. I am chair of the Engineering Faculty Council, which is wrestling with these issues.

I've organized an interdisciplinary student group that uses their engineering skills to develop low-cost devices to help enable disabled individuals. We partner with nursing homes and specific disabled individuals, seek out funding, and hope to commercialize our projects.   I teach an interdisciplinary honors seminar about fundamental limits on scientific knowledge that covers complex systems, computational complexity, non-computability, relativity, uncertainty and the application of these ideas to scientific determinism.   I teach engineering algorithms in which students implement a series of open-ended and fun projects that let them develop their programming skills while providing platforms for algorithmic experimentation. The class includes traditional lectures and a flipped lab session during which teaching assistants and I provide hands-on instruction.

Pedagogical knowledge

experience - undergraduate instruction in core process control course; graduate instruction in core course - math methods for chemical engineering. Background/ knowledge - Chemical engineering with strength in mathematical methods, systems engineering, bioengineering, systems biology.

Multiple levels of education

Personal aspirations of this VCP

I hope to gain another network of people with the same interests as I have - improving engineering education and research. I also want to learn the skills that will help me to bring people at my own institution together.

Peer support, best practices, and concrete examples of success (to use an examples for action).

Support as I work to enact change. Knowledge/inspiration of what changes could be realized.

My efforts until date have been more isolated. It will be more effective to direct a more structured/ educated effort towards active learning. With this participation I expect to be exposed to advanced instructional practices; gain structured overview of pitfals/ caveats in some of the practices; share ideas/ experiences.

Networking and support

Strategies for change

Learning about how others enact change.

I hope to: learn about educational innovation and connect with innovative educators.

Ideas about how to encourage and propagate changes involving new instructional technologies across our curriculum. What strategies are likely to have the highest probability of faculty buy-in?

(1) How can I make a difference in my department, not just in my classroom?   (2) Learn from experiences and best-practices of others (3) Learn how to continue the conversations generated within VCP to the department/college level.

I want to learn more about the trends in engineering education and how they spread - along the lines of Borrego, Froyd and Hall (2010). I would like to know how others are assessing their innovations (both the learning objections but also how they are diffusing).

Exercise… Who we are…

- Having collectively reviewed the background survey results, please provide two or three adjectives to describe your current thoughts about participating in this FOEE VCP

Session 2 – 4/11

- Determining placement of educational innovations in engineering within the model
- Pre-work
  - Read "Facilitating Change in Undergraduate STEM Education"
    - Posted on the portal
  - Post a blog on the portal by April 9
    - For each quadrant, identify examples of activities or initiatives at your school
    - What does this mean to you?

Blog Updates

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Blog Updates

m.uenking
12:45pm Tue Mar 26

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
#1

jturns@u.washin...
4:56pm Fri Mar 29

Blog Post #1: Instructions

Please post an entry to the blog that contains the following information. Please post this by Tuesday, March 9 (so that Mary and Jennifer can review the postings and strategize for Thursday's session).

1. Think of your own school/department of engineering. For each of the Four-Square Typology of Change Categories, identify examples of activities and/or initiatives that are occurring in your school.

2. Figure out what this means for you. For example, are there quadrants (i.e., particular strategies for encouraging change) at your school that might benefit from more emphasis ("low-emphasis quadrant")? How you might you go about promoting change for this quadrant?

delete   edit   reply

#2

jjessop
2:55pm Yesterday

Question 1

I. Disseminating: Curricula & Pedagogy

Institution 1. Instructional & Classroom Technology Services: workshops/classes to teach faculty how to use new tools http://its.uiowa.edu/services/service-category/instructional-classroom-t... 2. Center for Teaching: workshops/classes to teach faculty new skills http://www.centeach.uiowa.edu/ *College* Engineering Lecture & Something More: workshops, luncheons, and demonstrations about the use of online materials and strategies and innovative teaching methods

II. Developing: Reflective Teachers

Institution Center for Teaching: some of the workshops are run in a "coaching" aspect where faculty focus on a teaching project http://www.centeach.uiowa.edu/

III. Enacting: Policy

Institution TILE classrooms: building classrooms that promote active learning http://tile.uiowa.edu/ *Departmental* Teacher Improvement Activities: this category will be figured into some reward structure (still in works)

IV. Developing: Shared Vision

Recent comments

Question 1 I. Disseminating: Curricula & Pedagogy Institution 1. Instructional & Classroom Technology Services: workshops/classes to teach...
jjessop
2:55pm Yesterday
Blog Updates

Blog Post #1: Instructions Please post an entry to the blog that contains the following information. Please post this by Tuesday, March 9 (so that...
jturns@u.washin...
4:56pm Fri Mar 29
Blog Updates