



Helping First-Year Students Transition in the Classroom

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First-year Engineering Program

Engineering Education Innovation Center

A Quick Roadmap for This Morning

- An introduction to the EEIC, First-year engineering, and your first activity
- The “inverted” classroom in the EEIC
- A sample classroom learning activity
- Specific strategies to help students transition
- Questions (and Answers with Discussion)

The Real Stars of the Presentation

Three of our very finest FEH TAs:

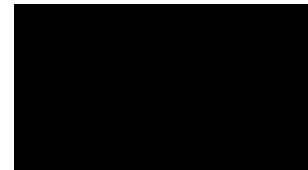
Robby Breetz

Leah Milosh

Ricky Kochert

The Engineering Education Innovation Center

- The purpose of the EEIC is to
 - teach fundamentals of engineering courses required by all engineering programs,
 - teach engineering communication,
 - offer an innovative, multidisciplinary undergraduate capstone experience, and
 - to develop and foster the discipline of engineering education.



Activity Time!

- Get into a group of 3 or 4.
- Get a whiteboard and a marker or two.
- Discuss the following:
- “What are some academic obstacles that can keep first-year students from transitioning to Ohio State?”
- Put 2 or 3 of your group’s favorite answers on the whiteboard.
- Be prepared to share.

Our Solutions



Facilities



Three Big Elements for FEH

- Classrooms that demand interaction
- Teaching Assistants in the classroom all the time
- An inverted classroom approach

Inverted Classroom Structure

Before Class	During Class	After Class
Preparation activity	Short lecture	Finish application assignment(s)
Evaluation	Activities	Prepare for next class
	Application assignment(s)	

Your turn!

- Here's a sample activity that we use in the first few weeks of class with our students.

Engineers and Algorithms

- Generally speaking, engineers solve problems.
- Part of solving a problem is breaking it into pieces and coming up with a plan.
- Algorithms – a “recipe” or step-by-step process

Experiment – Stones In A Bottle

- Problem: Fill a bottle with stones
- Write an algorithm to fill a bottle with stones
- Work in groups
- List assumptions
- Steps in order

Experiment – Stones In A Bottle

- Trade
- Test
- Document

Experiment – Stones In A Bottle

- How did things go?
- Anything left out or overlooked?
 - assumptions
 - steps
 - order

Assumptions – Stones In A Bottle

- Bottle and stones present.
- Enough stones to fill bottle.
- Bottle is empty (or at least not full).
- Some (or all) stones fit through opening.

Algorithm – Stones In A Bottle

1. Set bottle upright near stones.
2. If bottle is closed, open it.
3. If bottle is full, go to #7.
4. Select a stone and try to place it in bottle.
5. If stone is too large, discard stone and go to #3.
6. Place stone in bottle and go to #3
7. Stop.

Journals

By some TA... might have been me

DR. PIE!!

Define the questions

Represent your responses

-

Plan the statistics

Implement an awesome video

Evaluate how you did!



Define the Questions!

- Why did you decide to participate in the Fundamentals of Engineering for Honors Program? How is it going so far?
- How have you matured since the beginning of the school year?
- What other schools (top one or two) did you consider besides Ohio State? What factors contributed to your choice of Ohio State? What was the most important factor in your choosing Ohio State? Who was most influential?

Represent your Responses

(for question 1)

- It would challenge you
- Wanted to graduate with honors
- Wanted to compete against the best, against the best, against the best
- Meet other students in the same classes
- Great reputation
- Robot and Nano program next semester
- Take real-world engineering classes

(Question 1 continued)

- “It’s going pretty well so far”
- Math is quite challenging so far
- Not too hard..... Yet
- Moving at a quick pace
- Like the smaller classes

- I’m bored so far

Question 2

- “I think I have matured in finding out what I need to do to keep up with my classes. At the beginning of the year, I thought i could get away with not doing any book reading for my classes, which started off well but once we hit new material i started falling behind. I now know that the best way to keep up is to read before my class and to review my notes after class. I did better on my second round of midterms, and now it is evident already this semester. I still need to work on my participation in class, trying to answer classes so that I know i am actively learning. I also need to learn how to ask for help better, make use of my TA's and just ask more questions without hesitation.”

(Question 2 continued)

- “I have learned that school is much more than "getting an assignment done" and although you can do that, it's not the best way to go. It is much more beneficial to understand what is going on rather than trying to get by. FEH has changed me in this sense because I constantly see how things are applicable and related to each other. Concepts build upon each other and every application assignment we do are built upon each other.”



....Umm this is awkward

Plan the statistics

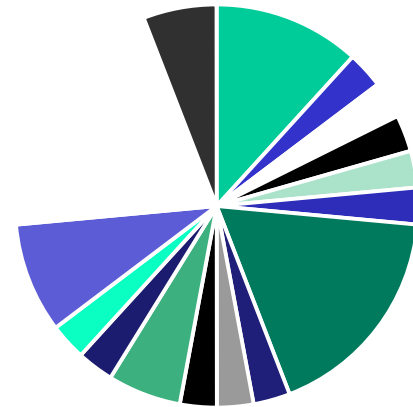
(for Question 3)

Colleges actually attending



■ The Ohio State University

Colleges Considered



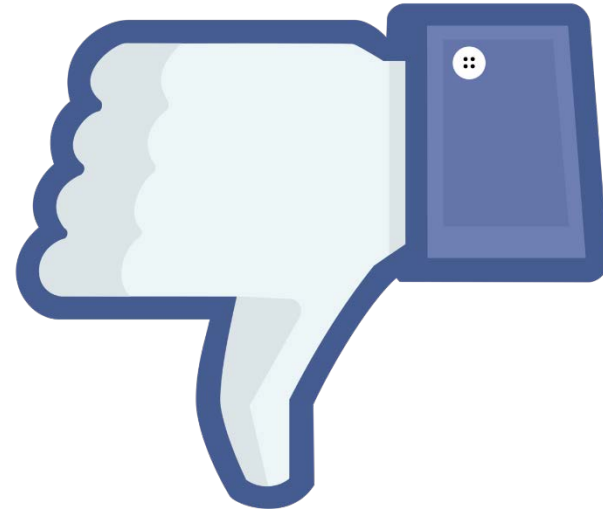
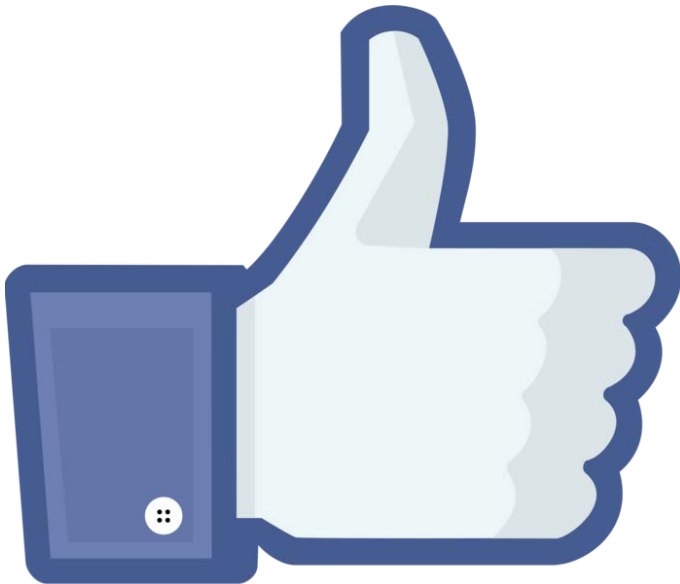
■ Case Western	■ Butler	■ Cincinnati	■ Stanford
■ U of Illinois	■ U of Wisconsin	■ Michigan	■ Bama
■ Pitt	■ OU	■ Clemson	■ Purdue
■ Georgia Tech	■ Northwestern	■ Other	■ Miami

Implement an awesome video

- <http://www.grindtv.com/outdoor/outposts/post/tourist-captures-moment-volcano-erupts-wow/>

Evaluate your results

Verify by a poll of the class:



Formative Assessment

“Helping students learn how to learn from their own mistakes.”

Grade distributions

Exam Corrections

In-class Interactions

Deciding if Engineering is “Their Thing”

- Setting daily work in realistic contexts
- Interactions with the teaching staff
- Weekly hand-on labs (first semester)
- Cornerstone design project

Contact Information

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