Frequent student presentations in a technology-enhanced classroom (Walker 1330)

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Outline

- Overview of the classroom
- Overview of the course and project
- Bonus: Use of learning assistants
- Insights and lessons learned

Walker 1320/1330: Classrooms designed for active learning

- Seats arranged in pods of 9
  - Tables are minimally moveable

- Instructor station in the center

- Large projectors also available in front/back of classroom

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# Walker 1320/1330: Student pods are technology-enhanced

- Each pod has:
  - Power outlets
  - TV screen
  - HDMI input cables
  - Microphones for class

- Pod TV screens can display:
  - Own pod input via HDMI
  - Spotlight of another pod
  - Instructor display (computer, document camera, etc)

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EMS 180: Materials Selection in Engineering Design

Why are certain materials used for specific engineering applications?

- Upper-division engineering course
- Enrolled 58 students in Fall 2021
  - 41-87 students over last 5 years
- 3 hours lecture
  1 hour discussion section
  - Only one section in Fall 2021
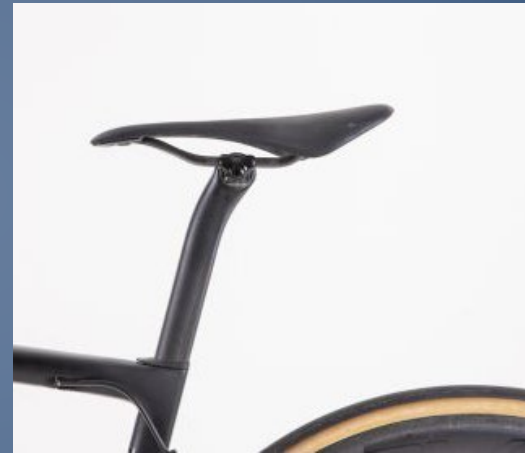
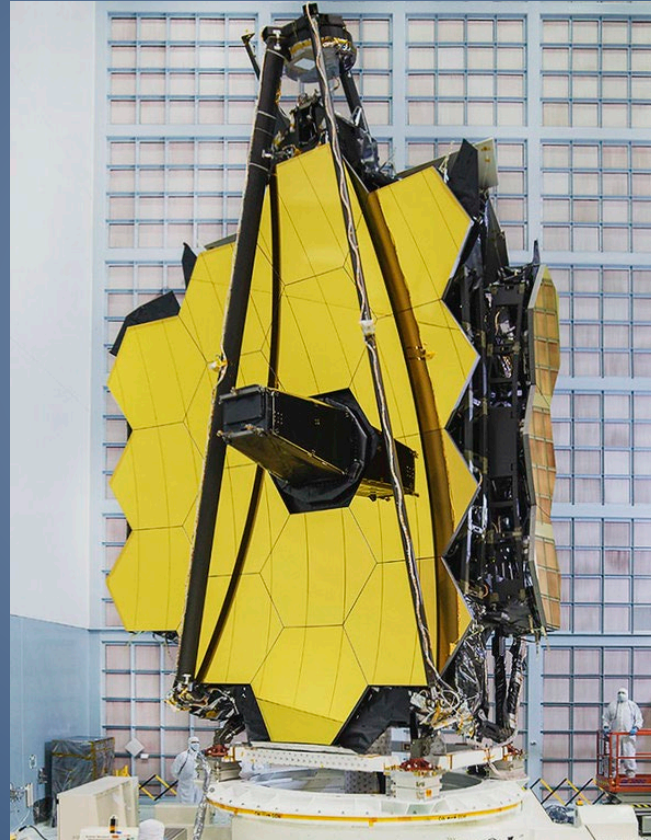Bicycle seat post:
Carbon Fiber Composite

Safety Glasses:
Polycarbonate

Course topics are reinforced through a quarter-long group project

Project Overview

- Groups of 3-4 students
- Select an application
- Address all aspects of course in project
  - Materials selection, manufacturing, etc.
- Findings presented in presentations

Mirrors of the James Webb Space Telescope

- *Requirements:* Lightweight, low thermal expansion (size is stable)
- *Material:* Beryllium coated with gold

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Project presentations provide formative and summative feedback

Graded presentations (Summative)

- Interim Presentation
  - Based on 1st half of course
- Final Presentation
  - Comprehensive, covers entire term
  - Revise analysis from interim presentation (if needed)

Update presentations (Formative)

- Ungraded
- Formative feedback provided by instructor, learning assistants, TA
- Groups critique each other
- Common errors discussed with class

Discussion section used for "update presentations"

Update Presentations

- Each group gives 2 update presentations during quarter
- Assigned topic aligns with expected project progress
- 10 minutes max. per group
  - 3-4 minute presentation
  - Remaining time for audience questions and feedback
- Slides and figures expected

Discussion section timeline

1:10-1:15 PM	Welcome
1:15-1:25 PM (10 minutes)	Update presentations from groups 1-4*
1:25-1:35 PM (10 minutes)	Update presentations from groups 5-8*
1:35-1:45 PM (10 minutes)	Instructor feedback to class (misconceptions and common errors)
1:45-2:00 PM (15 minutes)	Group work while instructional team circulates for questions

* Assuming 16 groups in class

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Bonus: Instruction enhanced by learning assistants (LAs)

- Learning assistants are solicited from previous students
  - Enroll in one-unit EMS 190-series course
- LAs provide formative feedback on presentations
  - Is the analysis correct and easy to follow?
  - Use "engineering judgement" since not an expert in all topics
  - **Do not give graded feedback
- LAs can provide practical tips and suggestions for groups
  - E.g., What literature did they find? Where did they look?

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Lessons Learned: Technology

- *Problem:* Some computers only have USB-C slots
  - *Solution:* Bring extra HDMI-USBC cords
  - *Tip:* Label with your name/e-mail!

- *Problem:* Difficulty setting appropriate screen control (e.g., instructor spotlight to pod-mode)
  - *Solution:* Go into the classroom early to learn how to use technology

Lessons Learned: Classroom management

- *Problem:* Time to rearrange seats
  - *Solution:* Assign seating locations as students enter

- *Problem:* Difficulty hearing presenters
  - *Solution:* Encourage students to cluster close to presenters
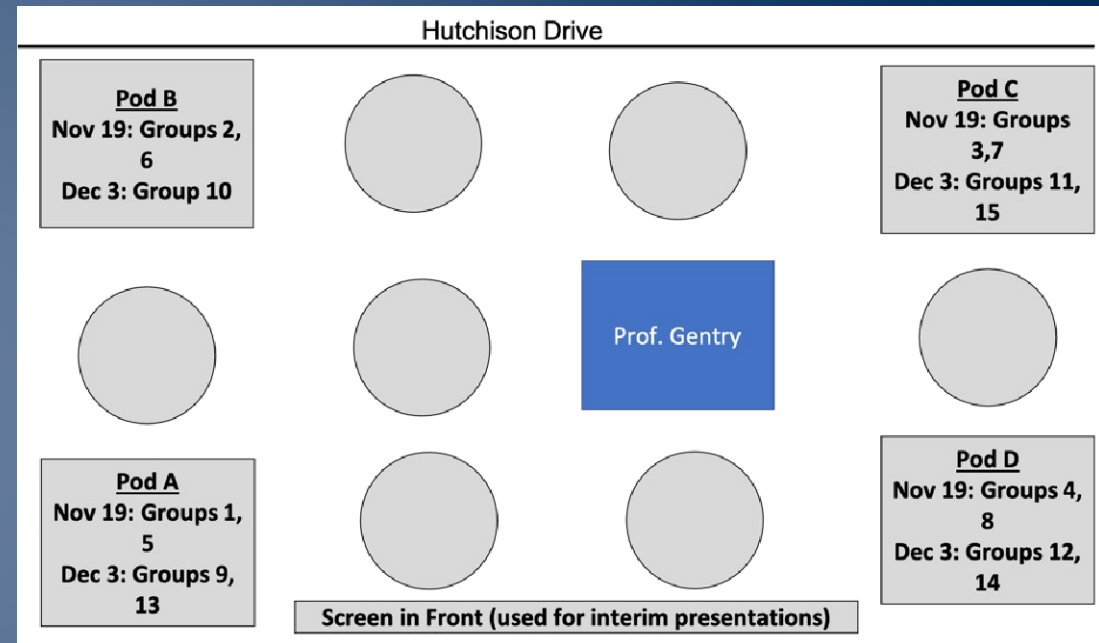
Course instruction was improved by utilizing Walker 1330

- Classroom arrangement allows novel teaching modalities
- Update presentations benefit both students and instructor
  - Students:
    - Gain presentation practice
    - Receive formative feedback from the instructional team
  - Instructional team
    - Simultaneous presentations are time-efficient
    - LAs gain leadership experience
- Method is scalable to classroom size

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