Nifty Ideas

and

Surprising **Flops**

Virtual Capstone Design Conference 2021

9 June 2021

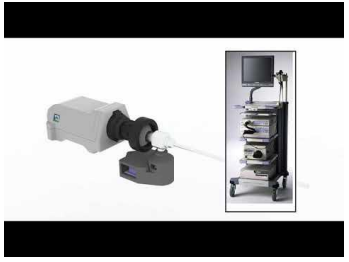
Facilitator: Susannah Howe

Nifty/Flopper	Institution	Topic
Sid Deliwala	UPenn	Micro Design Course Sequences before Senior Year
Robert Hart	UT Dallas	Getting to Know Each Other
Shraddha Sangelkar	Rose-Hulman	Cancelling Kick-Off Project in Hybrid Mode
Edward Latorre	U Florida	MS Teams Course
Beth DeBartolo	RIT	Let's Sort of Do Agile Stuff
Rachana Gupta	NCSU	Good Poster, Bad Poster Workshop
Charles Radovich	USC	Conducting Experiments over Zoom
Kris Jaeger-Helton	Northeastern	Evolution of the Design Review
Jamie Canino	Trine	Action Items after Critical Design
Todd Polk	UT Dallas	Expo Preview
Susannah Howe	Smith	Scavenger Hunt for Reflection and Transfer

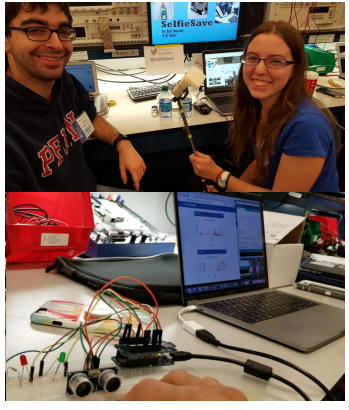
Micro Design Course Sequences before Senior Year

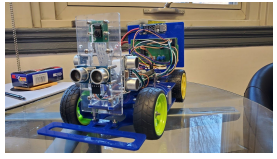
•Average enrollment of 90 students and 20 teams • co-instructor, Jan van der Spiegel • Majors offered:Electrical Engineering, Computer Engineering, Systems Engineering • ”systems” is major that focuses on data science / ML / DL / AI • Capstone Course offers a chance to make teams with students from different majors

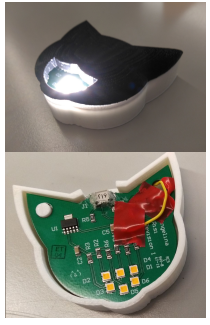
freshmen	sophomore	junior	senior
ESE 111, circuits, arduino, python, IoT	ESE 215, circuits, design of an analog plotter	ESE 350, embed. design, intense final project experience	ESE 421, design of autonomous systems with a final project	ESE 516, DFM IoT Systems
ESE 150, FPGA, networks, dig audio	ESE 319, adv circuits, design a metal detector	ESE 305, data mining and analytics, design of data systems	ESE 505, design of control systems with a final project	ESE 546, Principles of Deep Learning



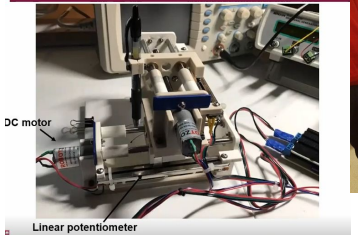
ESE 292, CAD and PCB design.







Analog plotter

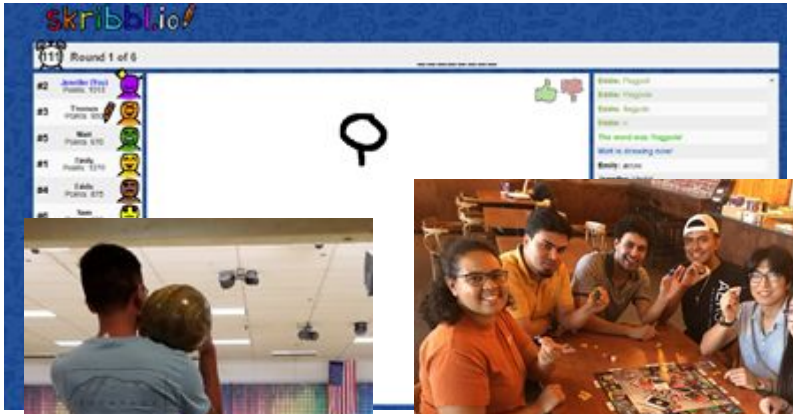


- ❑ Challenges ahead for improving communication and team building skills
- ❑ Can the blended experience improve castone design?
- ❑ It would be great to have 5 person teams in other courses

Penn Engineering Sid Deliwala, UPenn

Getting to Know Each Other

Purpose: Encourage development of strong teams through an early team-building activity



Guidelines

1. Fun activity that involves all team members
2. Must take at least one hour
3. Do before selecting team leader
4. Talking and interaction is a must (e.g., no movies)
5. No project work allowed

Deliverable

A document containing:

- 1-2 paragraph description
- Minimum of 3 pictures showing all team members participating

Other Ideas: Homemade meal, knitting, sporting events, escape room, go-cart racing, Netflix Party app, games, ….

An Early Flop: On-campus scavenger hunt plus a quick hands-on activity done during class time

Robert Hart, UT Dallas

Cancelling Kick-Off Project in Hybrid Mode

What is Kick-off Project?

- At the beginning of ME capstone
- Short 2-week project
- End artifact - a prototype

Cancel? Gain 2 weeks for covid-related delays

Why keep it?

- Recap of the design process
- Keeps over-ambition in check
- Helps with team formation

Why cancel it?

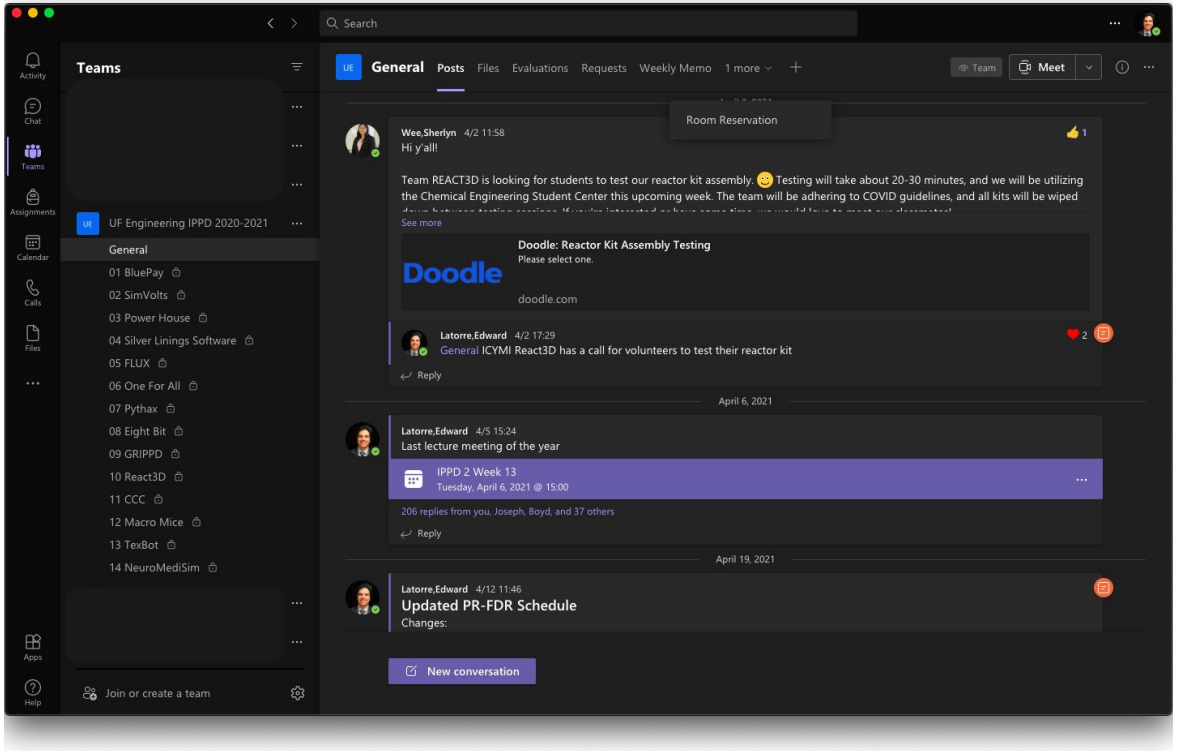
- Eats up time from main project
- Too fast (breadth over depth)
- Students are overwhelmed

How did it go?

- Course evals: Student didn't miss it
- 2 out of 10 teams re-arranged mid year
- Going forward?

Shraddha Sangelkar, Rose-Hulman

MS Teams Course



General ch has

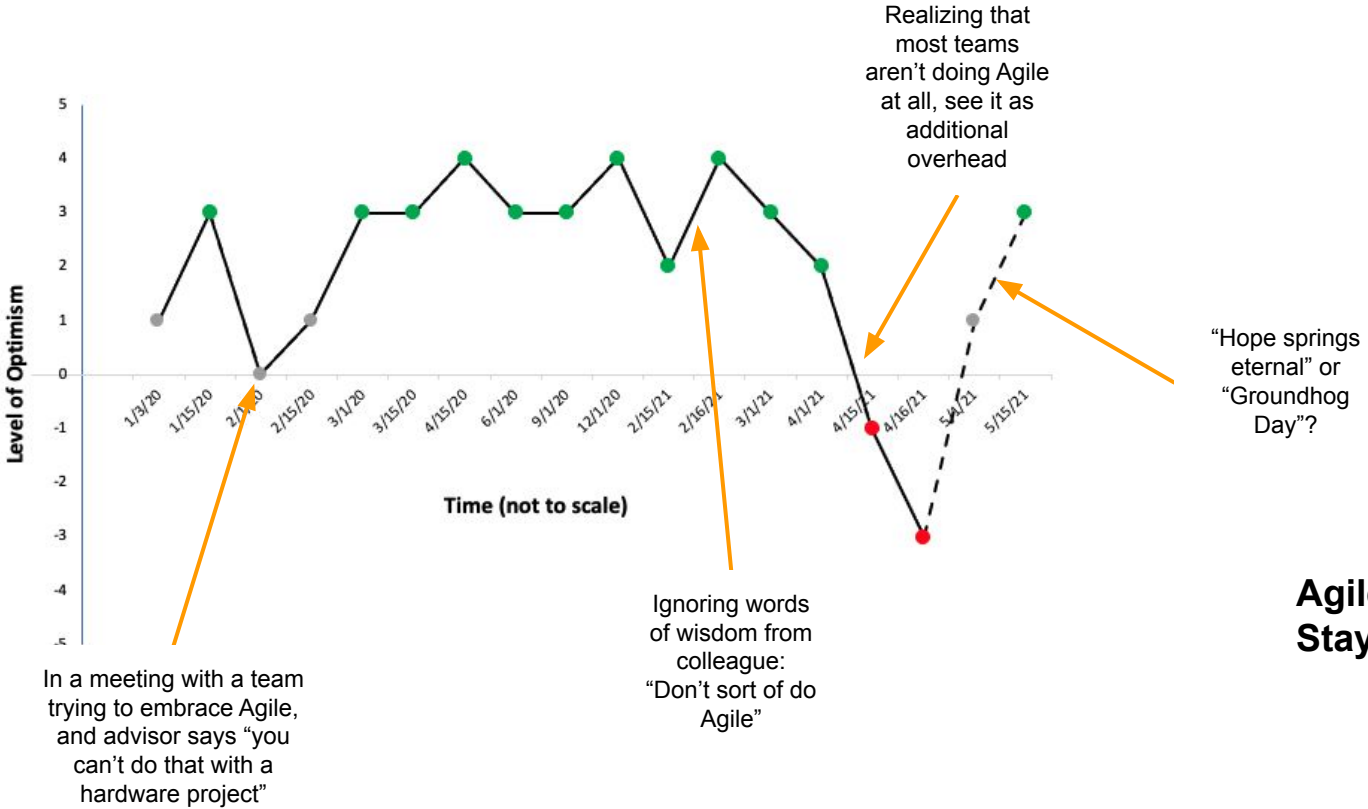
- Apps
- Weekly lectures
- Announcements
- Q&A
- Reactions
- Coaches included

Each team private ch has

- Files & apps
- **Chat & video**

Edward Latorre-Navarro, U Florida

Let's Sort of Do Agile Stuff



Agile pilot: 2021-22
Stay tuned...

Beth DeBartolo, RIT

Good Poster, Bad Poster Workshop

Teach project teams how to design a poster to communicate their project to a broader audience.

Poster template and elements

Show past poster examples

In-class discussion and tips

Feedback for each poster

Not thinking from audience perspective.. Don't understand "why"

In-class Good Poster, Bad Poster workshop (30-45 min)

- Show past posters of all quality and types.
- Let them evaluate each <u>quickly</u> (2- 3 min)
- Provide a simple form to submit ratings
- Share the results
- In-class discussion with tips and guidelines

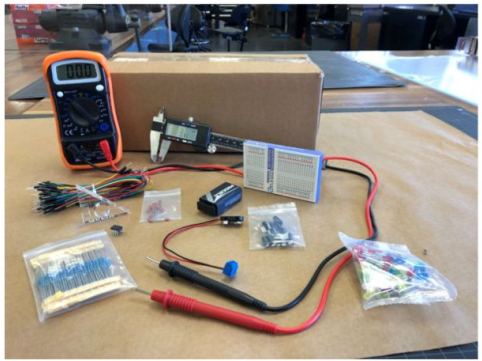
-Evaluation of someone else's poster is easy
-Form helped in making guided observation
-Made quick, good and unique observations
-Formed their own "Don'ts"
-Understood the purpose

Rachana Gupta, NCSU

Conducting Experiments over Zoom

AME 341a Mechoptronics Lab
Online Edition

Hardware Kits mailed to 170 students



- Experimental engineering starter kit
  - Digital Calipers, Handheld DMM, 9V battery “power supply”, breadboard, resistors, capacitors
- Allowed for instruction on
  - Measurement and uncertainty
  - Circuit construction
- Voltage divider experiment at home
- Additional circuits constructed (filters, op-amp) but experiments were conducted using Remote Desktop

https://viterbischool.usc.edu/news/2020/09/biegler-hall-gets-a-makeover/

Remote Desktop connection to on-campus lab stations

- Students connect to lab PCs via AnyDesk (Remote Desktop; **free** version)
  - Have full control of NI VB-8012 (Virtual Bench) hardware
    - Function generator, oscilloscope, DMM, power supply
    - Drive circuits and conduct experiments
  - Circuit construction
    - Students assembled “practice” circuits at home; sent photos for verification
    - On-campus staff assembled the “real” circuits at each on-campus lab station
- Lab started with a group Zoom session
  - Zoom breakout rooms assigned for each lab station for Staff-Student guidance
    - Lab staff could view lab stations in real-time; initiate breakout rooms when needed
    - Some experiments were conducted solo; most paired two students together

Conclusion:
It worked!

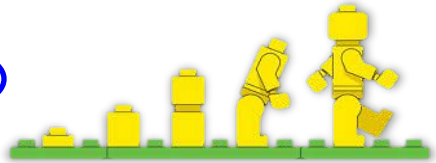
Links
AnyDesk
NI VB-8012
USC Viterbi News

Email
radovich@usc.edu

Charles Radovich, USC

Evolution of the Design Review

What we said ... vs *What they heard*



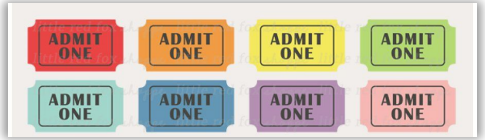
You'll need to present your work to outside experts for their constructive critique (s)...

You'll need to report on all the ways they told you you were doing it wrong.

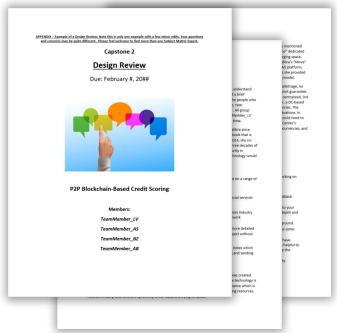
Alright, hang on: The experts will certainly recognize all the things you're doing well...

You can then write up all the compliments they gave you, your team, and your project.

OK, Let's get this right: First, mindfully seek out experts related to (sub)problem(s) …



Next, develop a PLAN for a balanced Design Review …



Finally, reflect on how it went, and what you learned.

Kris Jaeger-Helton, Northeastern

Action Items after Critical Design

Goal: Maintain motivation while addressing issues found during a review

Action Item #	Priority	Description	Date Closed
1		What is your predicted trim and elevator angles for mission 1?	
2		Will the wheels contact the shell of the car? Provide a CAD image.	
3		PVC is probably the wrong choice for that pipe, explore alternatives	

Determine together

- Improve their grade as items are closed
  - Up to 1 point out of 5
  - More points for closing sooner

Impacts

- Maintains motivation (Students actually like it!)
- Design issues get resolved quickly and systematically
- Reduces student stress during the critical design review

Jamie Canino, Trine

Expo Preview

Problem: Teams say they never get a chance to see the other team's projects

Solution: Give them a chance to visit each other!

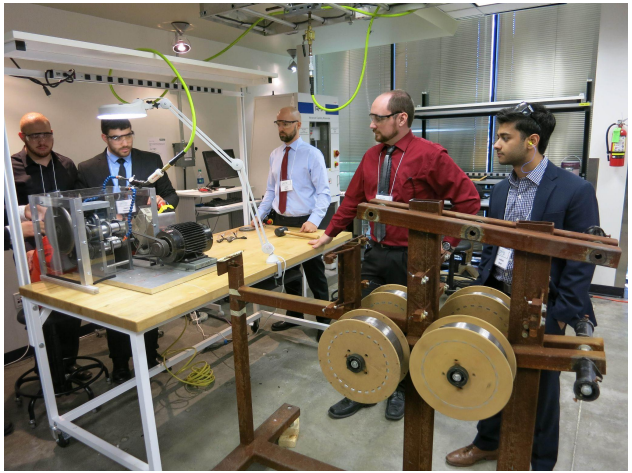
OK, but when and how?

When:

- Our Expo is an afternoon event
- In the morning, for two hours, the teams have a chance to visit each other

How:

- Each team splits in half
- One half visits other teams
- Other half stays to greet other teams and **practice their Expo pitch**
- Switch halves after an hour



Todd Polk, UT Dallas

Scavenger Hunt for Reflection and Transfer

Goals: wrap up capstone course by looking back and forward, encourage teamwork and class fun

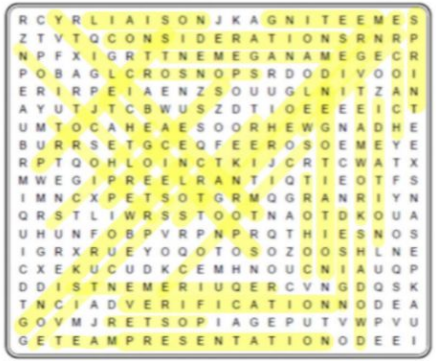
Design Clinic Cup

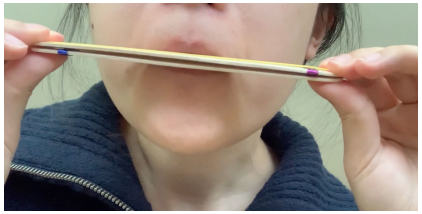
Activities:

- Relate to specific projects/teams
- Connect with overall class
- Include silly and serious
- Award points based on difficulty
- Plan more items than time allows

Logistics:

- Teams document on slide deck
- Instructors score in real-time
- Bonus points awarded at end
- Winning team announced





"To passively engage in your project is to fail before even starting"

I'll be honest, I first was afraid
With Covid, my plans were delayed
But DC was the best
Compared to the rest
Because of the friends that I made

Susannah Howe, Smith College

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