Nifty Ideas

and

Surprising **Flops**

Virtual Capstone Design Conference 2020

9 July 2020

Facilitator: Susannah Howe

Nifty/Flopper	Institution	Topic
Bridget Smyser	Northeastern	Virtual Project Presentation Session
Jim Hartman	UNC Charlotte	Use of Adjuncts for Mentoring
John Lens and Dustin Rand	Univ of Vermont	Longer Class Sessions and Dedicated Studio
Jamie Canino	Trine University	The Miniature Radio Flyer Fail
Yen-Lin Han	Seattle University	Students or engineers?
Souheil Zekri	Univ. of Southern FL	Legos and K'nex in Ideation
Gaurav Shekhar	UT Dallas	Importance of documentation
Joshua Gargac	Mount Union Univ.	Motivating Test Design with Lawnmowers
Kris Jaeger-Helton	Northeastern	Protecting People: Proper Protocol or Painful Process?
Stephen Hugo Arce	FAMU/FSU	Student-organized 510(k) Review Panels
Rachael Brown	Seattle University	Virtual Poster Session
Courtney Pfluger	Northeastern	Twitter Poster Session

Virtual Project Presentation Session

All teams

Capstone 1 Summer 2020

General
Abedi Projects
Allshouse Projects
Gouldstone Projects
Hidrovo Projects
Livermore Projects
Minus Projects
Ozdemir Projects
Rouzbeh Projects
Sipahi Projects
Smyser Projects
Taslim Projects
Zheng Projects

Ozdemir Projects

Microsoft Teams allows students to explore the different projects without needing a meeting manager

Bridget Smyser, Northeastern

Use of Adjuncts for Mentoring

Background: Research University, sometimes hard getting Faculty to agree to mentor projects

Capstone 2018: Jim talks to RIT (host) they solved this problem by adding Adjunct Faculty (generally retired Ex- Eng managers)

Academic Year 19-20: Pilot Program - hired 2 part-time Adjuncts

Nifty Idea: Good results!

Flop: Adding Adjunct Faculty is hard. ABET concerns, Bureaucracy, “outsider” concern.

Would like to hear if others have tried this - Results? Is ABET a real concern?

Jim Hartman, UNC Charlotte

Longer Class Sessions and Dedicated Studio

Problem: Team member life/school schedule incompatibility – teams didn't meet enough.

- Less sense of team,
- Individual accountability harder to inspire,
- No easy work-arounds,
- Frustrated students,
- Less productivity,
- Synergy and creativity hampered,
- Fosters last-minute frenzies.

Remedies: Scheduled 6 hours of class time per week (vs. 2.5 hours before) - dedicated design studio space. Replaced lecture-only with lecture/work sessions.

- Better attendance*,
- Team members sit together,
- Longer sessions facilitate design reviews,
- Students spend more time together,
- Students can ask "quick questions" during the class sessions,
- Instructors can "hang out" in the design space outside of class time to be more accessible.

John Lens and Dustin Rand, Univ. of Vermont

The Miniature Radio Flyer Fail

- Make a better Radio Flyer
- About 3 weeks
  - Generate requirements
  - Perform design reviews
  - Build
  - Test
  - Reflect on the process

What was I trying to fix?

1. Students don't "see" the process until the end
2. Students don't understand how long a task takes
3. Address communication issues early

Why Did it Fail?

1. Mistake 1: Groups were not the same so group dynamics of the mini-project had no relationship to their actual groups
2. Real Mistake: Lacked Relevancy

Success from failure

1. Design in Freshman year (See the entire process)
2. Design in Manufacturing Process class (understand how long things take to make)

Jamie Canino, Trine Univ.

Students or Engineers?

Revolutionizing Engineering Department (RED)- Fostering Engineering Identity

Doing school with teachers		Doing **engineering with engineers**	
· Lectures · Students · Syllabus · Learning objectives · Tests · Assessment · Grades · Accreditation · Registration · Professors	· Cover · Due dates · Topics · Homework · Rubrics · Curriculum · Credits · Tuitions · Papers · Classes	· **Meetings** · **Workshops** · **Engineers** · **Project briefs** · **Professional responsibilities** · **Performance evaluations** · **Work teams** · **Supervisors**	· **Schedules** · **Deadlines** · **Debriefings** · **Promotions** · **Credentials** · **Job requirements** · **Resumes** · **Work history** · **Reports** · **Offices**

URMs report that the senior design project provides opportunities to talk with professionals and to be "more on a first-name basis" with faculty.

It could be difficult to get faculty buy-in and to be consistent with the professional language in other "classes".

Yen-Lin Han, Seattle Univ.

Legos and K'nex in Ideation

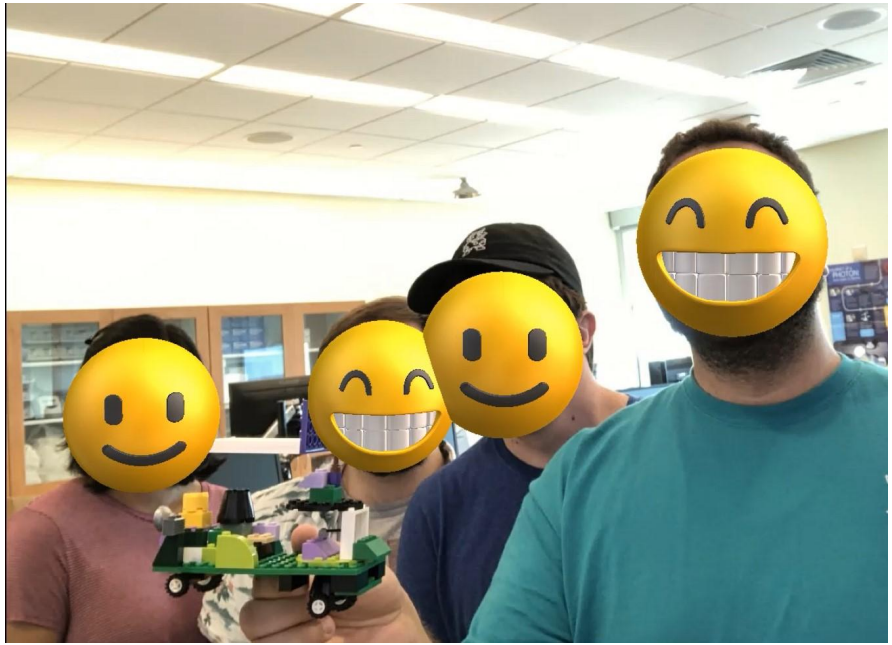
-- Activity happens during the beginning of the ideation phase in the design process

-- Students are given a Lego or K’nex piece to start building an object they have to imagine without talking to each other

-- Each student must add a piece and pass the object to the next student in the group

-- The object is completed when a group decision is made that the object is completed

-- The group then names the object and provides a short description of its utility



The Hoop Rover

Souheil Zekri, Univ. of South Florida

The Importance of Documentation

The “Paper Bridge” - Group Activity

1. Students were asked to use sheets of paper to create a bridge that can stand on its own, you can pass a 1 litre PET water bottle beneath it and this bottle (with water in it) can stand on top of the bridge for 20 seconds
2. Part 1 was to come up with a plan that details the design, the cost and “document” it.
3. Part 2 was to exchange the plan with another team and use it word by word to create the bridge.

Gaurav Shekhar, UT Dallas

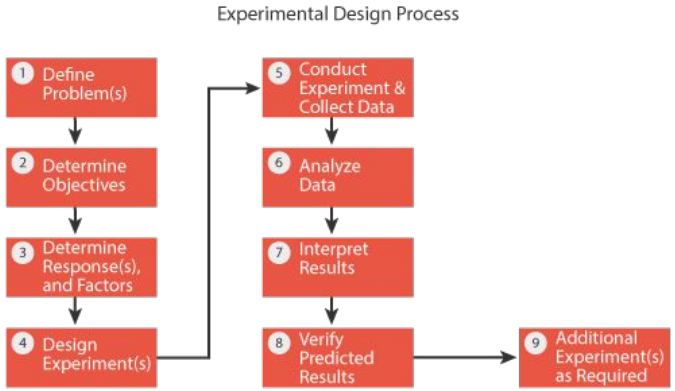
Motivating Test Design with Lawnmowers

Goal: Introduce performance tests for capstone projects in one lecture (1.5 hr)

Part 1: Design Requirements

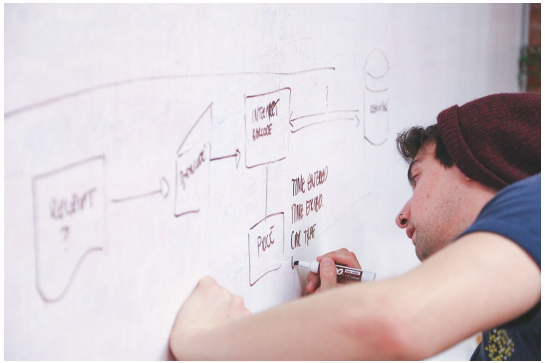
A class, develop design requirements for a new lawnmower

Part 2: Design of Experiments



Teams design an experiment to test one requirement is met.

Part 3: Presentation and Discussion



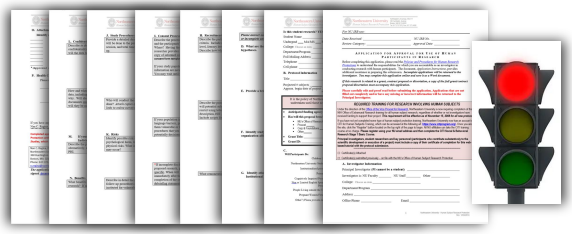
Teams explain their experiments with diagrams.

Joshua Gargac, Mount Union

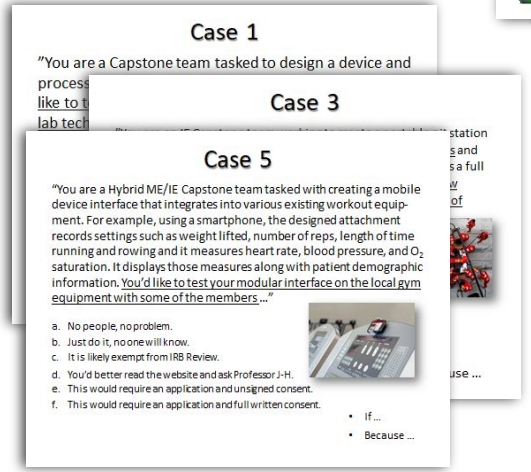
Protecting People: Proper Protocol or Painful Process?

Protecting Human Subjects in Research: This is GOOD.

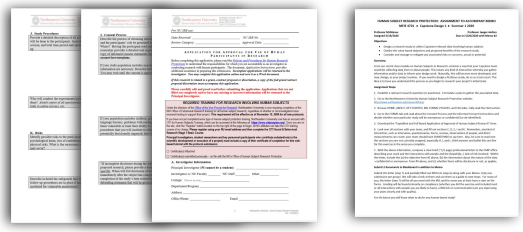
Respect for Persons, Beneficence, Justice



1. The Milgram Study. "Please continue."
2. "Our workers are fearing for their jobs."
3. Nut-shelling device – more specifically, peanut
4. "How does antigravity affect cardiac patients?"
5. "We are creating a user-operated Hoyer lift!"
6. Do patient demographics affect compliance with appointments → Wait time when clinic is attended?
   1. A: Birth year, gender
   2. B: Date of birth, sex, gender, country, postal code, ethnicity, blood type
   3. C: (A or B) *plus* Contact information: Name, Phone, Address, Relationship
   4. D: C *plus* Emergency contact information, family MD, insurance provider data
   5. (C or D) *plus* Allergies, major diagnoses, surgeries, major medical history



STUDENTS Protecting Human Subjects in YOUR Future Testing: This is the IDEA(L)!



Protecting Human Subjects in Research: Avoids the BAD

Kris Jaeger-Helton, Northeastern

Student-organized 510(k) Review Panels

The 510(k) Program: Evaluating Substantial Equivalence in Premarket Notifications [510(k)]

Guidance for Industry and Food and Drug Administration Staff

Motivation: FDA regulations are not exciting for students.

Idea: Have them critique their own work.

Nifty-ness: High engagement, deeper understanding of guidelines than from a ppt lecture, additional constructive criticism on project ideas.

Decision factors:

1. **Is the predicate device legally marketed?**
2. **With the same intended use?**
3. **And same technological characteristics?**
4. **Differences still safe and effective?**
5. **With applicable methods?**
6. **And data demonstrate SE?**

SUCCESS!

Stephen Hugo Arce, FAMU/FSU

Virtual Poster Session

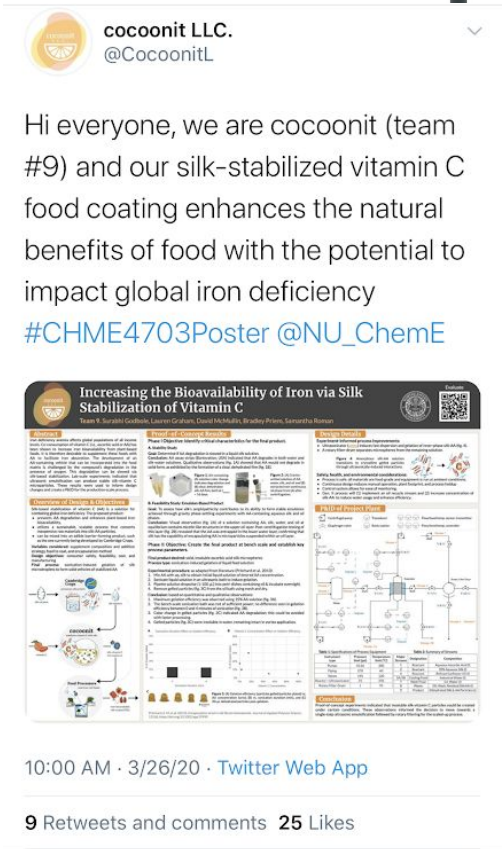
Reality

Virtual Reality

Rachael Brown, Seattle Univ.

Twitter Poster Session

- 23 design teams posters using #CHME4703Poster
- 24-hrs to comment and discuss designs.
- Engaged ChE students, faculty, alumni at NU AND larger scientific and engineering community, notably AIChE and ASEE.
- The event was a success with over 275 tweets, 382 likes, and 81 retweets.



Courtney Pfluger, Northeastern

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