



Nifty Ideas



and



Surprising Flops



Virtual Capstone Design Conference 2023



14 June 2023

Facilitator: Susannah Howe

Nifty/Flop Agenda

Nifty/Flopper	Institution	Topic
Shraddha Sangelkar, Jay McCormack	Rose-Hulman	Sprint Project Plan
Bryan Lewis	Brigham Young University - Idaho	Task Management and Time Tracking
Blake Johnson	University of Illinois Urbana-Champaign	ME 470, Inc.
Kris Jaeger-Helton	Northeastern	Capstone Awards with Meaning
Susannah Howe	Smith	Alum Voices: Capstone Podcast
Rebecca Laposa, Mahadeo Sukhai	Univ. of Toronto, IDEA-STEM	Inclusive Team Contract

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Sprint Planning v/s Gantt Chart

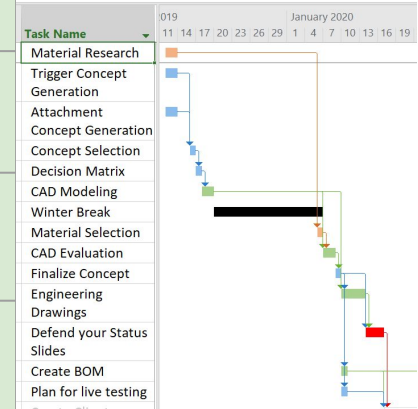
Capstone Design is 3 quarters - 30 weeks
 Teams of ~4 students and ~6 teams per section

Both →

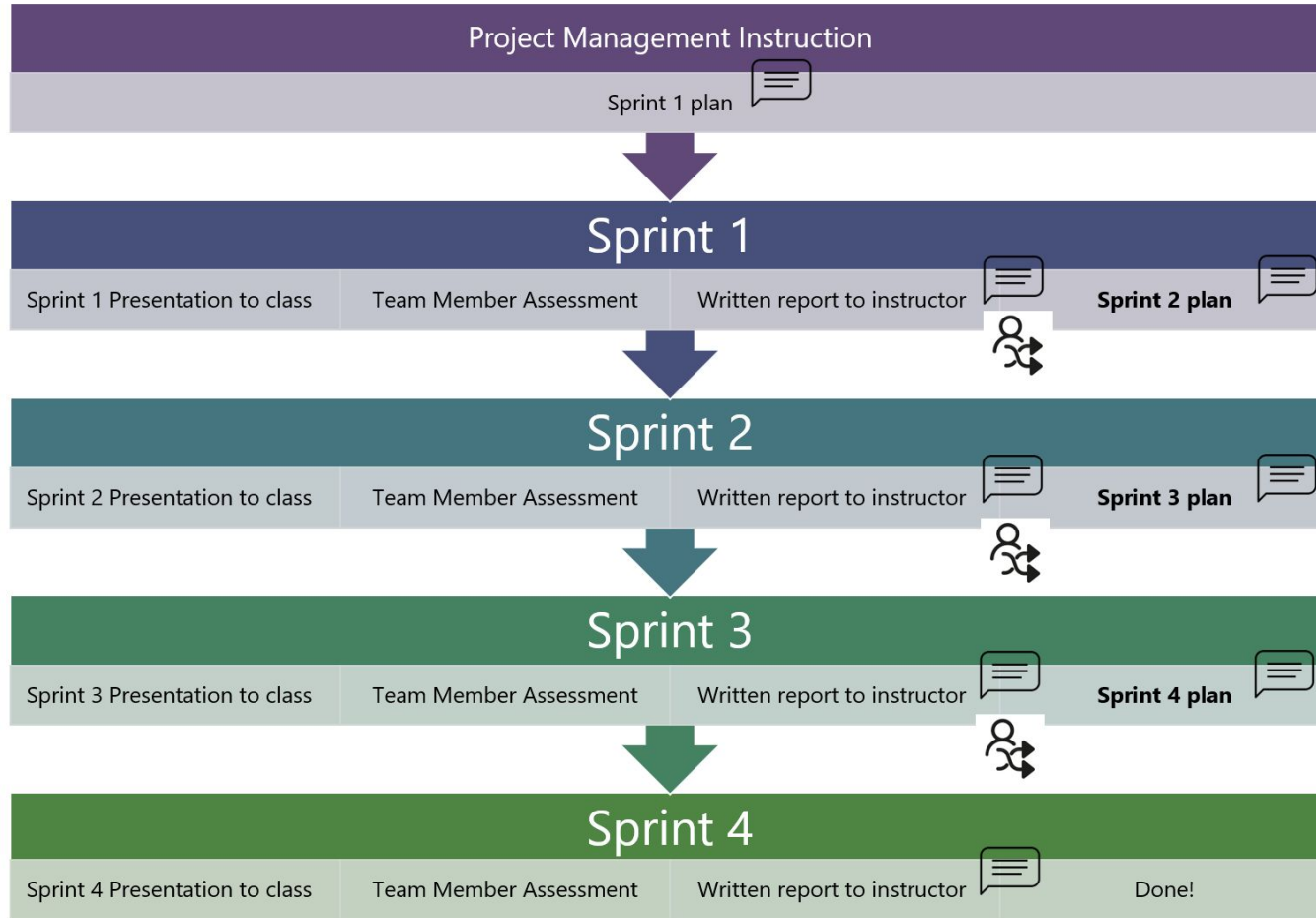
1. define overall goals,
2. define tasks,
3. estimate time,
4. assign individuals



	Sprint Planning	Gantt Chart
Section	Multidisciplinary Capstone	Mechanical Engr. Capstone
Duration	1 quarter (~8 weeks) next quarter - students choose	2 quarters (~18 weeks)
Project Manager	Mandatory Role Rotations	Dedicated project manager
	Define quarter goals <ul style="list-style-type: none"> • Think two weeks in detail • Connect to quarter goals • Formal report every 2 weeks • Perform team assessment 	Plan for the end project goals <ul style="list-style-type: none"> • Work from back • Set intermediate deadlines • More details as we get further • Weekly Informal status update



Gantt Chart Visual



How we implemented Sprint planning?

2 week Sprints

Rotate Roles

Report out

Assess your Team

Next year switching over to Sprint method



Teams who are good →
Perform well either way



Teams that struggle →
may struggle either way



- *Less on their plate at a time*
- *Better ability to pivot*
- *Major deadline every 2 weeks*
- *Teams define the outcomes*
 - *(customized for them)*
- *Instructor controls the frequency*
 - *(streamlined intermediate assessments for you)*

Project Planning
experience is helpful !

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Task Management and Time Tracking



The screenshot displays a Microsoft Teams workspace for a team named 'ME480-S23: Autoliv Airbag ...'. The 'Tasks' tab is selected and highlighted with a green box. The task board is organized into three columns: Week06, Week07, and Week08. Each column shows a list of tasks with completion status and assignees. The 'Tasks by' icon in the left sidebar is also highlighted with a red box.

Week	Task	Status	Assignee
Week06	Use Thomson's high-speed camera	Completed	[Redacted]
Week06	Submit Update 6 to Sponsor	Completed	[Redacted]
Week06	Report 2-Due	Completed	[Redacted]
Week06	Completed by [Redacted]	Completed	[Redacted]
Week07	Brainstorm-containment-box-redesign	Completed	[Redacted]
Week07	Register for R&CW conference	Completed	[Redacted]
Week07	Report 2	Completed	[Redacted]
Week07	Economics-Exam	Completed	[Redacted]
Week07	Ethics-Exam	Completed	[Redacted]
Week07	Completed by [Redacted]	Completed	[Redacted]
Week08	IR camera material research	Due (06/07)	[Redacted]
Week08	Plan demonstration	Due	[Redacted]
Week08	Update BYU CAD model	Due (06/09)	[Redacted]
Week08	Update finance sheet	Due	[Redacted]
Week08	Send weekly update	Due	[Redacted]
Week08	Redesign/fix old Box to continue testing	Due	[Redacted]
Week08	Pick up materials	Due	[Redacted]

The team is given a Microsoft Teams workspace for

- File sharing
- Communication
- Document revision control
- Document simultaneous editing
- **Task management**

Tasks are assigned to individual or multiple students with a specific due date

Students can see tasks in the Team **Tasks tab** or all tasks assigned to them in **Tasks/Planner**

Just [add the Tasks App to your Team](#) to get started

Task Management and Time Tracking



You have late tasks

Microsoft on behalf of your organization <noreply@planner.office365.com>
To: Lewis, Bryan

Friday, May 19, 2023 at 9:00 AM

Hi Bryan. You have a task due.

You have a **late task**

Follow up on content for projects, videos etc..

In the plan **Tasks** linked to **ME & CE Capstone > General**

5/18/2023 **1 day late**

View tasks in **Microsoft To Do** or **Microsoft Planner**

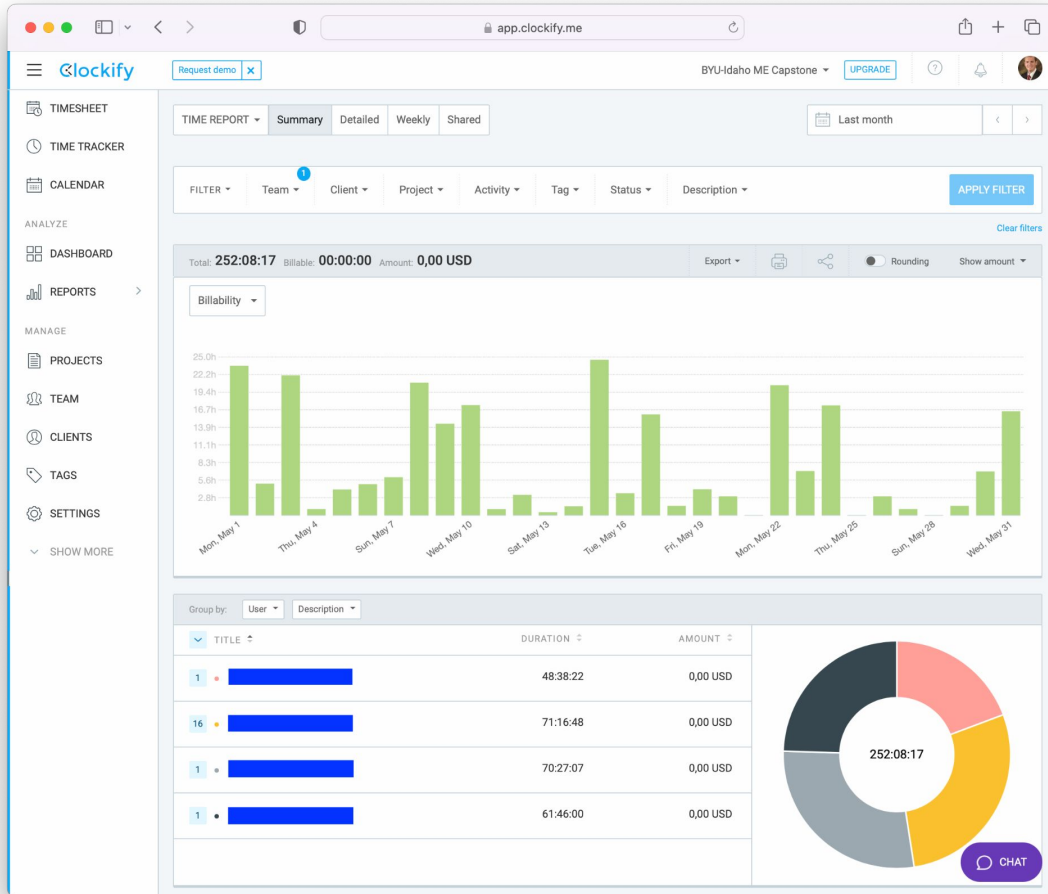
To change your notification settings, go to [Planner for web](#), choose the settings button in the top right, and then select Notifications. [Learn more.](#)

Task Management and Time Tracking



- Clockify is a (free) time tracking app (web browser and mobile app interface)
- Students can be grouped by project team and/or client
- Project **activities** or general work **tags** allow for more detailed measurement of student activities
 - Class assignments
 - Meetings
 - Individual project work
 - FE Exam Prep
- Weekly/Custom Reports available for individuals, teams, projects, activities, and tags.

Bryan Lewis, Brigham Young University-Idaho



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ME 470 at UIUC – Course Description



- Single-semester capstone design course, runs in fall and spring
- 24 projects for ~110 students per semester
- Advanced composition course for Mechanical Engineering and Engineering Mechanics majors
- Major milestones are three reports and presentations, a Trade Show, and a project video. Most projects create a physical prototype.

- 70% of projects industry-sponsored, 30% faculty-sponsored
- Each team (4–5 students) assigned a faculty adviser (FA) and TA
- Each TA advises 8 projects/semester
- Each FA advises 1–2 projects every third semester

- I serve as Course Coordinator, with support from a Projects Coordinator



Classroom-in-the-Round seats up to 180, all within 4 rows of the center podium

Idea: Contextualize ME 470 as a company



**ME
470
INC.**

**Delivering the future
One semester at a time**

Company Mission Statement

ME 470, Inc. is an engineering consultancy firm offering engineering services including mechanical testing, design for manufacturability, and proof-of-concept prototyping. We serve a broad clientele in any industry that requires innovative mechanical solutions. Our student engineers represent the upper crust of new engineering talent. We serve them as well as our clientele through skillful mentoring and professional education services to set new standards for the future of our profession.



Instructor is not the “Professor,” but the “CEO”

The TAs aren’t “TAs,” they are “Project Managers” (PM)

Lectures are not “lectures,” they are “Company Meetings”

Company Meetings are run as “Professional Development Workshops”

Rotating Team Administrator meets weekly with CEO for 5-min update

Teaching emphasis on active accountability and leadership

Weekly performance awards at Company Meetings

Blake Everett Johnson, University of Illinois Urbana-Champaign

Verdict: ME 470, Inc. is a **Nifty Idea**



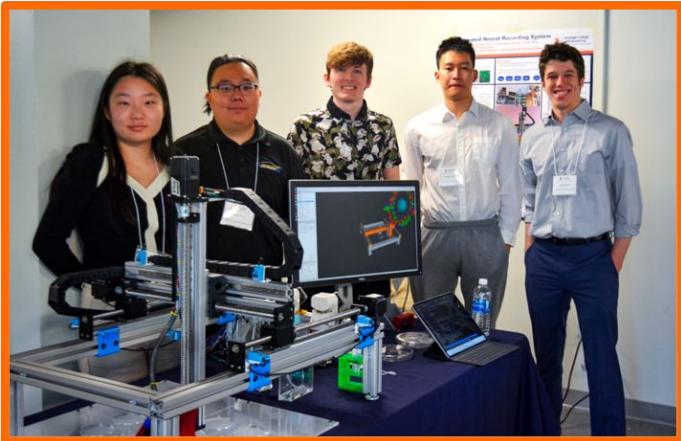
Observations supporting “Nifty Idea”

From Faculty Advisers, who had not advised in three semesters:

- Multiple comments about the students far outperforming what had been done by previous students, even pre-pandemic
- Boisterous enthusiasm after ME 470, Inc. Trade Show

From my personal observation:

- Students learning how to confront under-contributing teammates
- ZERO long-term free loaders



From long-term sponsors:

- “Best student team in a long time.”
- “Keep doing what you are doing, it is really working.”

Observations supporting “Surprising Flop”

Required much time to meet weekly with Team Administrators

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Capstone Awards with Meaning: from Yawn to Yowza

- **Eureka:** Competition!
- **Floppy:** “Best Project” from jurors
- **Nifty Update:** New names, clear criteria, objective rubric!
 - **Most Complete:** Ready to be implemented and/or handed off.
 - **Biggest Impact:** Has potential to have a meaningful effect, not just \$ or ROI
 - Inclusive and versatile: everyone has a chance
 - Reasonably Nifty!



Capstone Awards with Meaning: from Yawn to Yowza

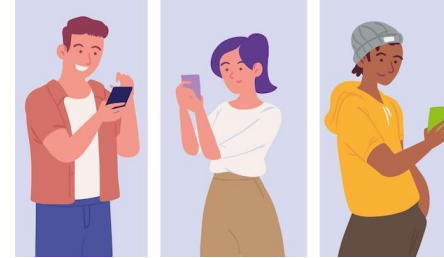
- **Eureka:** Add the Student Choice Awards!

- Support your fellow classmates
- Vote for the team who ...



- **Floppy:** “I vote for ME” or “WE vote for US!”

- 18 teams, 14 self-votes
- 4 ties for 1st



- **Nifty:** Vote for 3 teams and include concrete explanations

- ***Most Dedicated*** and ***Best Pivot***
- Self-votes were allowed; clear winners were honored
- Students wholeheartedly agreed that winning team(s) were deserving
- Add ***Turbo Boost Award*** → Super Nifty!!!



Best Pivot

The team that faced inordinate challenges, obstacles, setbacks, and slowdowns (from present circumstances and/or difficulties throughout capstone) and showed innovation, adaptability, and hard work in overcoming them.



Special Award: Turbo Boost Award

Like many teams, they rose to excellence given the challenging circumstances. This team quietly and steadily pushed through obstacles, questions and at times unavailable resources – also like every team. And then, with a final relentless perseverance, rose even higher.

What sets this team aside is that their project and outcomes don't perfectly fit a singular category, and yet they were consistently near the top of several categories!



Most Dedicated

The team that really put in the work throughout the year/semesters, and showed an exceptional payoff for it.

ACHIEVEMENT IS IMPOSSIBLE WITHOUT DEDICATION.

Best Pivot: Symptom Monitoring

Best Pivot: Some of what you said

"The Symptom Monitoring project had a plethora of hurdles throughout the ENTIRE Capstone. I loved seeing what they were able to accomplish!!"

"... had to learn about healthcare processes and HIPAA laws used in healthcare that limit the ways in which patients and healthcare providers can communicate ... had to do extensive research to be able to design an efficient follow-up process, and had to come up with creative ways to validate process reliability.

"Each of these groups [voted for] faced some challenges. Whether it was advisor, client, project, travel related, etc., these groups really made the best out of less than ideal circumstances. Very proud and want to recognize them!"

"I commend them for bouncing back at the end of the semester and finishing their project!"

Turbo Boost: Some great quotes

"They are also very strong in communicating their technical ideas and pathway during the presentation and in the Q&A session..."

"... biggest strengths was their ability to teach themselves concepts they had never heard before (brain efficiency formula, warehouse layouts, automation in warehouses, etc.)"

"Before presenting a solution, there was a lot of research required on topics that are not "classic" to IE including Brain Simulation and learning a new software - AnyLogic."

"Being able to relate and test these concepts with what they had learned in their undergraduate degree"

Most Dedicated: Some of what you said

"I was really impressed by how many things out of their initial scope each of these groups had to tackle. They were out of the project "comfort zones" and really maximized their project."

"The three [voted for] teams have exceeded the expectations on tackling the problem since capstone 1, they seemed like they could overcome their obstacles pretty quickly thanks to the nature of their projects. And by capstone one their project was pretty much done, which gave it more time to perfect it."

"Appearo: A Blockchain-Based Peer-to-Peer Lending Platform -The team had to learn about blockchain and apply their IE knowledge using this tool."

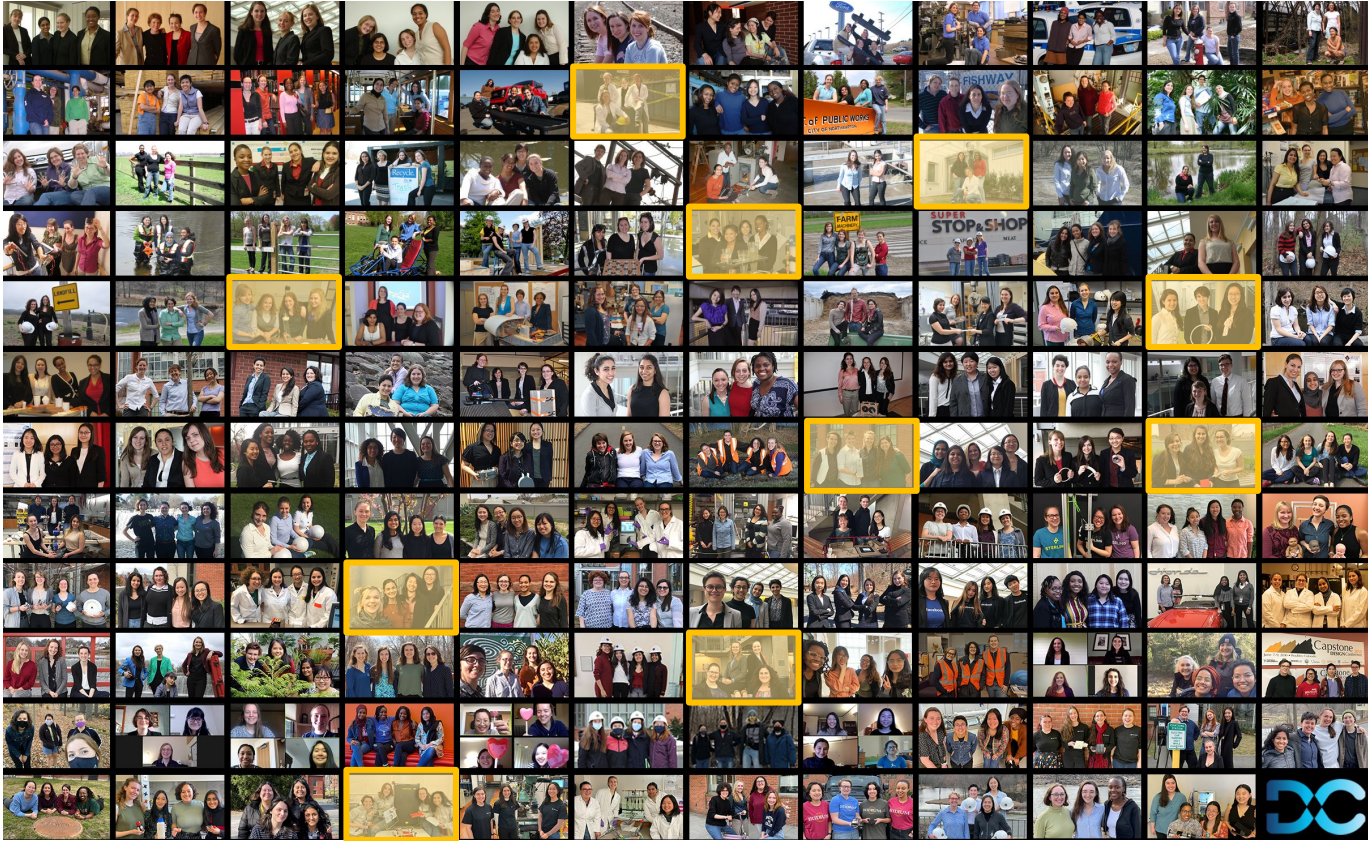
"Was very impressed throughout the process of how professional and fleshed out the idea of Appearo was. [Other] and Appearo to me were the most professional projects and seemed to reflect a large effort behind them."

"Appearo has been this team's existence for the last year."

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Alum Voices: Capstone Podcast



Design Clinic
20th
Anniversary!



Podcast
featuring DC
alum teams

Susannah Howe, Smith College

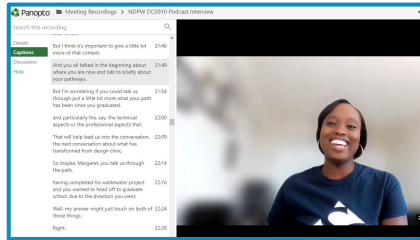
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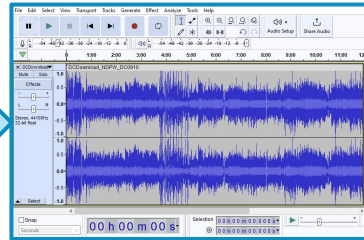
Podcast Topics

- Path since graduating/current work
- Expectations coming into capstone
- Skills transferring from capstone
- Memorable capstone experience
- Role of capstone in undergrad education
- Advice for future capstone students

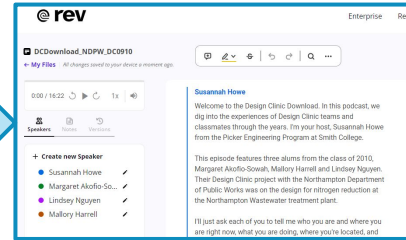
Podcast Interviews on Zoom



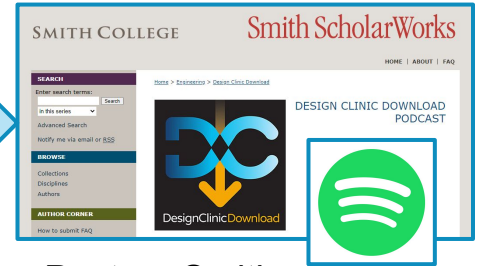
Review Zoom footage, pick content segments



Stitch segments, add musical interludes



Prepare and confirm transcripts



Post on Smith ScholarWorks & Spotify

Susannah Howe, Smith College

Alum Voices: Capstone Podcast



Introducing the DC Podcast

Created in honor of the 20th anniversary of Design Clinic this year, the *Design Clinic Download* podcast features interviews with DC teams and classmates through the years.

 **DesignClinicDownload**

 LISTEN ON SPOTIFY! >

- EP 1 Honda 2019 - 2020**
Elana Helou, Annie Kary, Alina Siminiouk
Design of a long-range heavy payload drone
- EP 2 Schneider Electric 2014 - 2015**
Nicole DeChello, Emily Dixon, Emily Lane, Melinda Pontes
Design of a low-flow measurement device for integration with a vortex flowmeter
- EP 3 Fuss and O'Neill 2005 - 2006**
Sarah Breen, Sara Green, Sarah Mahon, Krysten Oates
Design of a mobile hazardous materials treatment unit
- EP 4 NNE 2017 - 2018**
Leen Ajlouni, Jenny Banh, Catherine Ding
Design of a simulation to analyze and improve a pharmaceutical process
- EP 5 Northampton DPW 2009 - 2010**
Margaret Akofio-Sowah, Mallori Harrell, Lindsey Nguyen
Design for nitrogen reduction at the Northampton Wastewater treatment plant
- EP 6 Medtronic 2015 - 2016**
Marina Biggio, Bethany Claps, Dakota Murray
Design of a Veress needle indicator for minimally invasive surgery
- EP 7 WHOI 2010 - 2011**
Katie Mackenzie, Courtney Murphy, Sarah Pedicini, Sally Stulberg
Design of a sparging chamber subsystem for underwater robot surveying
- EP 8 MITLL 2007 - 2008**
Indira Deonandan, Nora Paul-Schultz, Katie Travis
Design of a low-power, low-cost bioaerosol collector
- EP 9 Dresser-Rand 2012 - 2013**
Zin Min Aye, Phoebe DeGroot, Celeste To
Design of an impeller labyrinth seal for centrifugal compressors
- EP 10 Zipline 2021 - 2022**
Kirsten Appell, Kalyani Weiss, Harriet Wright, Sophie Yates
Design of an anti-icing solution for Zipline's unmanned aircraft

 Listen and download transcripts to all the episodes (past and future) at bit.ly/designclinicdownload

Podcast in assignment:

INDIVIDUAL DELIVERABLE – NETWORKING
NOMINALLY DUE: FRIDAY, 3 MARCH 2023 – UPLOAD TO MOODLE

1. Consider a past experience where you benefitted from someone in your extended network. This could be a professional experience or a personal one, your choice. Discuss the situation and how the connection from your network proved beneficial.
(Length expectation: 1+ paragraphs)
2. In celebration of the 20th anniversary of Design Clinic, Susannah has launched a podcast series called the *Design Clinic Download*. Episodes 1-6 are available on Spotify and also on the [Smith ScholarWorks](https://smithscholarworks.org) site (which also includes transcripts). Select **one** of the six podcast episodes and listen to it (or read the transcript). Discuss something in the episode that struck you and/or that you found relevant for your own life. (Note the name of the alum or team in your response.)
(Length expectation: 1+ paragraphs)
3. Conduct an informational interview with someone of your choice, following the instructions below. [Note: the instructions are set up for you to interview a Smith engineering alum - if you have someone else in mind already, talk to Susannah about your alternate interviewee.]

SmithScholarWorks: bit.ly/designclinicdownload

Spotify: bit.ly/DCDownloadSpotify

Students resonated with specific skills, mindsets, and the ways DC transferred to different pathways after Smith

Susannah Howe, Smith College

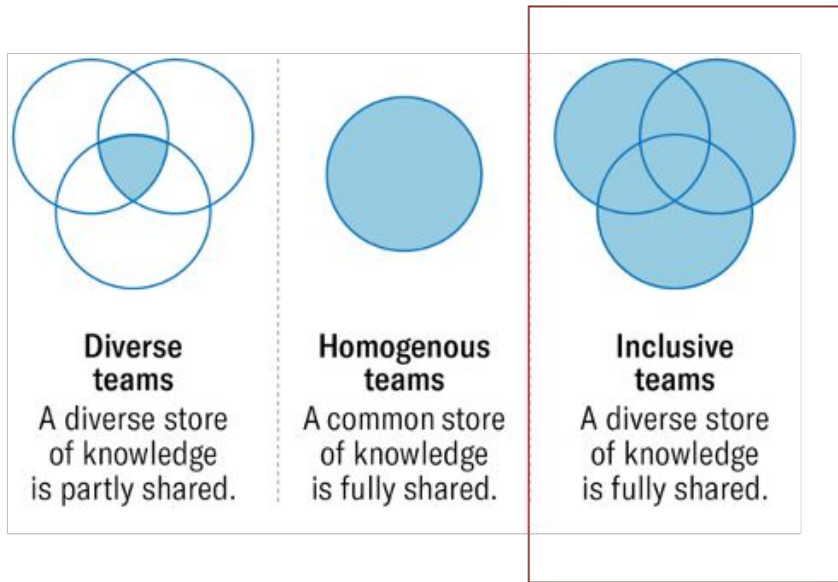
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Inclusive Team Contracts



Inclusive teams leverage diversity



- Inclusive teams:
 - practice specific behaviours
 - avoid specific behaviours
- Inclusive teams workshop:
 - add clarity, precision, and practicality about these behaviours

Watch out for social desirability bias!

Inclusive Team Contract



An Inclusive Team **Does:**



- **Actively listen to team members to understand them**
- **“Yes, and”**
 - A generative environment
- **Recognize an individual’s unique needs and strengths**
 - Amplifying the team’s collective strength
- **Create a safe environment where individuals can genuinely & freely express opinions**
 - Leaving room for reflection and consideration, “How do we feel about X?”
- **Embrace change and conflict**

Inclusive Team Contract



An Inclusive Team **Does Not**

- **Keep people out of the communication loop**
- Shut down conversation
- **Focus only on results/product and ignore process**
- Jump immediately to criticism and the “blame game”
- **Downplay the suggestions or ideas of other people**
- Interrupt team members who are speaking
- **Believe that inclusion is a simple, metricized “tick box” item, only for superficial corporate responsibility**





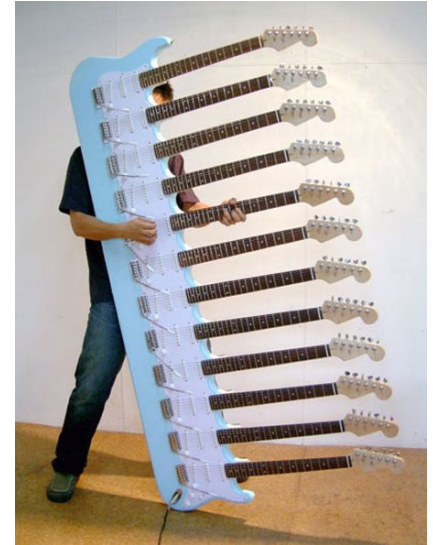
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