

Panel 3 Nifty Ideas and Surprising Flops

Facilitator: Susannah Howe (Smith College)

Sidekick: Bridget Smyser (Northeastern University)

Nifty-Floppers:

- 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: From Yawn to Yowza
- Susannah Howe (Smith) - Alum Voices: Capstone Podcast
- Rebecca Laposa (Univ. of Toronto) and Mahadeo Sikhai (IDEA-STEM) - Inclusive Team Contract

Description: A series of brief presentations of good (and bad) ideas that instructors have tried

Notes: [skip to nifty flop discussion](#)

Pre-session discussion of sponsor fees/IP

Q: For all those charging the fee... does sponsor retain 100% IP as a result of any work done?

- Brenden Smerbeck (CPE, URI): 100%, yes
- UTK: yes
- Northeastern: Outside company - they own IP. Internal project - students own IP

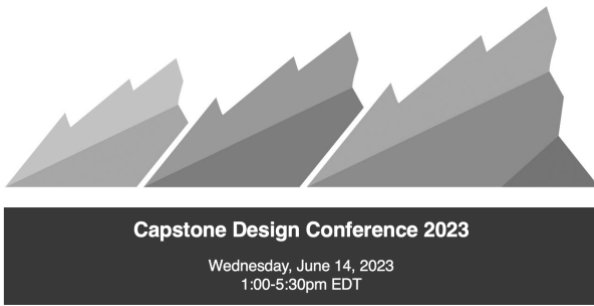
Q: how much does their personal contribution of time/labor/materials/etc. count toward that?

- Rungun Nathan (Penn State Berks): We try to tell them that they are contributing to the next generation of engineers and their potential employees
- Rungun Nathan (Penn State Berks): We do not have students working at the facility - that becomes a bigger issue with "Risk Management" for the two parties (industry and university) involved - which can become a nightmare
- Dee Kivett (Clemson): As the sponsor, I had to invest my time, my resources, my liability having students working in my facility, and it was going to be very expensive for me to take them in and ultimately their work may or may not be useful.



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Shraddha Sangelkar & Jay Goldberg - Sprint Project Plan

General Comments:

- Brenden Smerbeck (CPE, URI): Taiga (taiga.io) as another option for agile project management. Free and open sourced, sprint/kanban options. File uploads, wiki creation, fully customizable, hooks for other services. Very helpful
- Hrushu Godbole (RIT) Great, thanks! I am new to capstone design context. In my previous project - I was exploring dynamic learning cycles. When the uncertainty is high (early on) it is good to have shorter sprints. While later on when the uncertainty is low, you can go towards longer sprints.
 - Jay McCormack: Uncertainty awareness is great. Additionally, students early in a project can be discouraged by project management because so much of the work is nebulous. Shorter sprints can help. I think focusing on the tracking and reflection portion of project management is more important early in the project, then they can transition into planning as they understand more about the project.

Q: Is the sprint approach (as used in the course) representative of what is done in a company using the sprint approach?

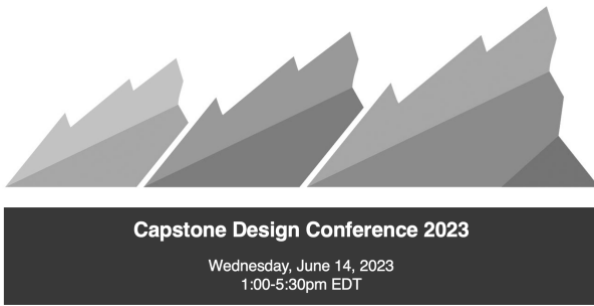
- Jay McCormack: Yes.

Q: How do you hold students accountable to mandatory role rotations?

- Shraddha: It is a required part of the class. Students did not challenge it. And the Project manager submits a sprint plan and completes a sprint presentation so we would know if they were not following the prescribed role rotation. In the following quarter however, they can choose the details of project management as well as a project manager(s) and we do not micromanage that part.

Q: Are there particular project types/attributes that you find 'sprint planning' better suited than Gantt chart (and vice versa)?

- Jay McCormack: That's a good question. I think the concept of short chunks of work and reflecting on the results is pretty universal. Students of course push back that their project is different, but I don't buy that.
- Sarah Bloomer (Olin College): It depends on how the work can be broken down into work items - can work be completed in 2 weeks (you should be able to break just about



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anything down into 2-4 weeks sprints) but perhaps there're bigger chunks...yes, like Jay said.

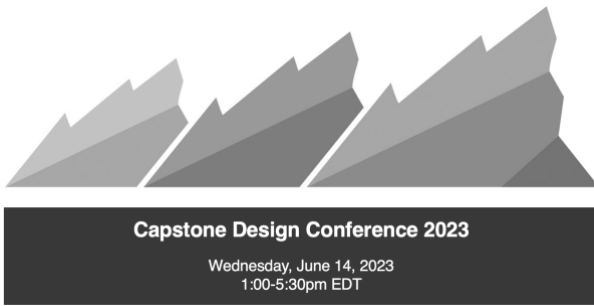
- Jay McCormack: I've had students tell me that they'd like to do a one week sprint versus two because they lack discipline :) <<wow, that's remarkably honest!

Q: How do you manage the reporting out to the class each week? We have ~ 20 teams in the class, which makes that kind of hard for students to pay attention to.

- Jay McCormack: I think having a small group listen in on the report outs makes sense. Keeping student involvement under an hour makes sense. It shows that you value their project time so they do as well. Building a community around a handful of projects is helpful for cross-pollinating ideas and student accountability, but I would avoid having students listening in to multiple hours of report outs.
- Matt Bietz (UCI): In our Informatics/Software Engineering Capstone, we use sprint method tied in to a larger Agile methodology that includes Agile "rituals" (sprint planning meetings, daily stand-ups, sprint retrospectives), use of user stories to represent requirements, Kanban planning (using Trello), effort estimation, and task prioritization.
- Bob Buckner (Tennessee Knoxville): Really like the idea of rotating the PM role so every student has the opportunity to learn the competencies. We're considering the same for product manager/owner and technical lead roles.
- Shraddha Sangelkar: That is the main aspect of the sprint implementation that I liked.
 - Jay McCormack: I think that part came from Renee Rogge (of Rose-Hulman).
- Jay McCormack: I like to give a grade in terms of Red, Yellow, Green every sprint. I used to hang them on the wall so that everyone could see them. Visual management! I'll write them feedback and use it as a prompt for meeting. I'd prefer to minimize show and tell in meetings. This fills in for that. Then when we meet we can focus on process, planning, troubleshooting, etc.

Q: Are there particular project types/attributes that you find 'sprint planning' better suited than Gantt chart (and vice versa)?

- Jay McCormack: I appreciate their self-awareness.



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Bryan Lewis - Task Management (Microsoft Teams - Task App) and Time Tracking (Clockify)

General Comments:

- Sarah Bloomer (Olin College): This is similar to Trello or Notion, but it's in Teams. We looked at it and thought it was too simplistic. Cool to see you using it, Bryan.
- Bryan Lewis: I agree that it is very basic. But you can use it in a more sophisticated way if you want to.

Q: How are the reported times confirmed / verified for accuracy? And can teammates see one another's responses? That might help keep them honest about time reporting.

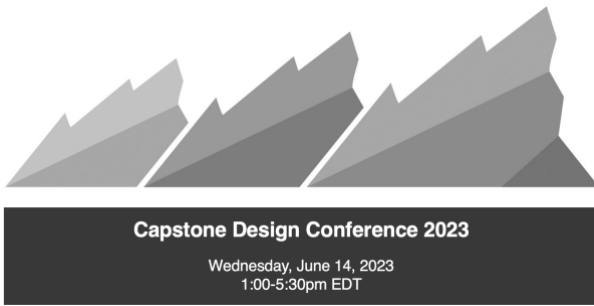
- Bryan Lewis: The times are not verified formally, but I can check them against the amount of time we spend in class or other known events. And the team members can all see each other's responses, so there is a lot of transparency.

Q: Did you get any feedback on whether the time tracking categories made sense? Did students want more/fewer/different categories?

- Bryan Lewis: I have not asked yet. This is my first semester using the tool. I will have questions about it for the students in the end-of-semester evaluation. You are welcome to contact me for more information in late July.

Q: How many hours are students required to spend on their capstone course weekly?

- Bryan Lewis: 10 hr/week is the expectation. Usually a little less at the beginning and much more at the end.
- Todd Polk (UTDallas): Ours is also 10 hrs/week, and 15/week in the summer which is a shorter semester
- Brenden Smerbeck (CPE, URI): We require 15 hr/week; with 5 hours being accomplished during required course time
- Jay McCormack (Rose-Hulman): 12 hours per week
- Sarah Bloomer (Olin): we do 12 hours per week
- Keith Stanfill (UTK): I suggest 10-15 hours per week; in practice, this is rarely achieved. Time tracking is suggested so they can learn to calibrate their estimates on task



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completion; however, unless I require them to report their weekly hours, few have the discipline to do this on their own

Q: Does anyone record time-spent on "individual work" vs. "collaborative work with at least one other team-member"

- Bryan Lewis: Everyone is responsible for recording their own time. With the categories (work tags) I have now, they would record if they are in a meeting, but any collaborative work outside of class/meeting times would just be recorded as "Project Work"

Q: How do you use the information? Grading? As a prompt to talk to the students?

- Bryan Lewis: When I meet with the team every few weeks, we go over everyone's timesheet and discuss how things are going.
- Mark Anderson (RPI): seems like it might lead to debates if the # hours relates to max possible grade

Q: How many teams can you handle in the free version?

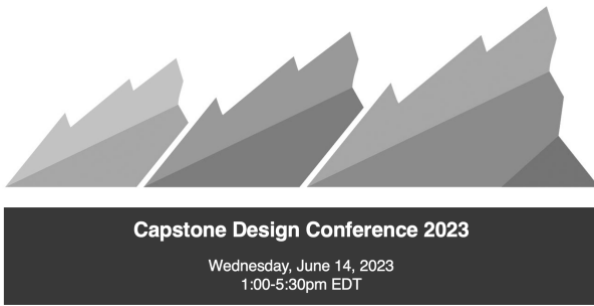
- Bryan Lewis: I have 5 teams right now. I have not seen a limit with my free account. I work with another group on campus who has used it with many more groups each semester.

Q: Can that account for differences in ability and efficiency in completing certain tasks?

- Bryan Lewis: It is just a grade cutoff. So they can put in 200 hr and that does not give them an A. Their grade will be determined by the peer feedback and what they actually do. The hours are just used as a grade cape.
- Jay McCormack (Rose-Hulman): I think one thing to keep in mind is that the number of credit hours in the course already implies a certain amount of effort from the students. This just makes that explicit and hopefully students gain some self-awareness about how long things actually take.

Q: Do your students check their emails?

- [Humor response] This is the \$64,000 question!
- Bryan Lewis: I have a conversation with all the students at the beginning of the semester that Capstone is a professional experience where they simulate the environment of working in a company. I specifically tell them they are expected in the workforce to read and respond to all emails promptly. Does it work???



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Blake Johnson - ME 470, Inc.

General Comments:

- Daniel Augur (University of Denver): We do the same thing at DU - the students are now associates of the “company”.
- Bill Endres (Michigan Tech): ME470 - How I have framed my program since I took over in 2009. Works well in many ways. Nice job! Thanks for sharing.

Q: Often students take Capstone without completing core coursework. How do you handle this?

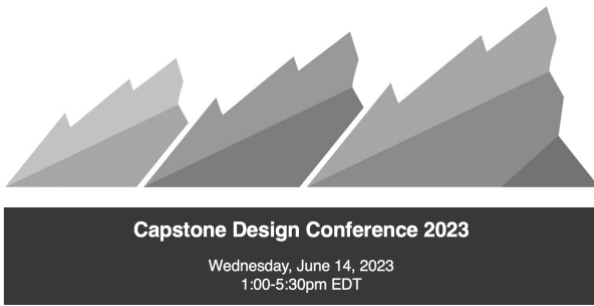
- Blake Johnson: This problem is resolved mostly via our project selection process. Our students review all of the project descriptions prior to the start of the semester. They then rank *at least* ten of the projects with a nonzero weight factor 1–5 such that their ranks sum to 30. Students are never assigned to a project that they do not rank, which allows them to opt out of projects for which they have insufficient knowledge. The projects that are most affected are those that require knowledge of controls or heat transfer, as those courses seem to be the ones that students most often delay to the end of their education.

Q: What are the team roles in this structure?

- Blake Johnson: We do not assign roles to the students, instead allowing them to self-organize. The Team Administrator role rotates through all team members over the course of the semester. The primary role of the Team Admin is to assemble materials for weekly update meetings, and to meet with the CEO for a weekly update. The CEO comes to that meeting with some prior information about the performance of the team, so the CEO may use those meetings to press the Team Admin about issues on their team, and to coach them about how to address interpersonal problems among teammates. I think that this may be the single greatest strength of this new approach to teaching the course.

Q: Why does the ME470, Inc. increase student performance?

- Blake Johnson: The added emphasis on maintaining active accountability among students seems to me to be the most effective aspect of the course. I think that the direct role that the CEO takes to coach Team Admins about confronting teammates is the single most transformative part of this new format.



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Kris Jaeger-Helton - Capstone Awards with Meaning

General Comments:

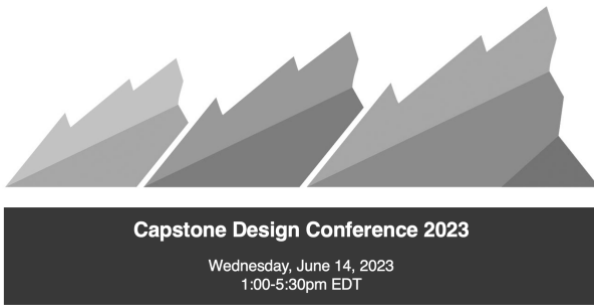
- Dustin Rand (UVM): I do a "Student Choice" award after our Design Night event after the course is basically done. It is a big hit. We hand out certificates and I have seen the awards on their resume. We also have two Instructor-given awards for "Innovative" and "Production Ready".
- Jay McCormack (Rose-Hulman): I really like the most complete!
- David Schmidt (U of Minnesota): Thanks Kris, I was thinking about adding the 'best project' award. I can take that off my todo list maybe the student choice award is on my list now

Q: How often do teams see the work of other teams in your course?

- Kris Jaeger-Helton: We require peer feedback for presentations at the end of Capstone 1 and during Capstone 2. Groups are assigned other groups to provide feedback for, to make sure everyone gets feedback. Closer to the end of Capstone 2 we have a 'show off' day where the teams view each other's posters and projects in an informal setting (i.e., the capstone lab). Half of the teams 'present' in the morning and half in the afternoon so everyone has a chance to see everyone else's work. Additionally, on the ME side of things, the students are all working in the same large studio for the most part, and they get to see each other fairly often.

Q: We've struggled with finding ways to give impact awards that focus on what the students did rather than what their project sponsors did. For example, our students don't necessarily get their first choice project, but some are "build something useful for this business" while others are "help cure cancer" kinds of projects. Giving an impact award seems to be rewarding the sponsor's choice rather than the students' work. **Do you have any advice about how to ensure the judging focuses on the students rather than the sponsor's choices?** (Matt Bietz - UC Irvine)

- Kris Jaeger-Helton: For both the Judges' and Student Choice Awards, we outline the most representative criteria possible. We try not to eliminate any project in the description. In terms of 'impact', If students have been able to demonstrate the value beyond themselves and focus beyond the single result and can convey that, then they



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are considered eligible! Some of the guidance for the judges includes considering “(a) *the soundness of the work done by the team on the project presented, (b) the application of existing and newly acquired knowledge, (c) the readiness to be delivered –even if for a second phase, further work and/or testing*”. Another key piece of direction we give the judges is: “*It is essential that no team is eliminated from contention because of the nature of the project they were assigned.*” We have had great outcomes with this.

Q: Do you publish these awards?

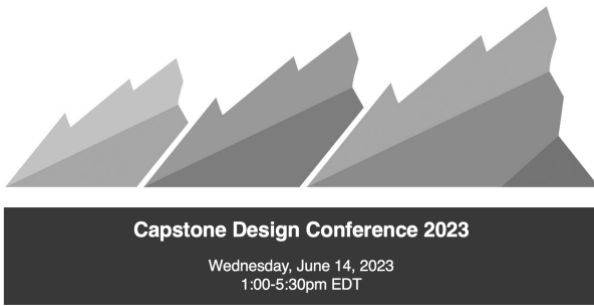
- Kris Jaeger-Helton: We have conducted our own scheduled reveal/announcement session and we have forwarded to our departmental news. We could even do more beyond that, but with so many departments, programs, tracks and differing program criteria, the awards have less context outside the original domain. Now that we are back in person after COVID, these are announced -with the descriptors- at the Capstone celebration luncheon. Seeing the looks on team members' faces when they learn that they have been recognized is priceless.

Q: Is there money with these awards?

- Kris Jaeger-Helton: There have been Benefactor funds donated for the Student Choice Awards and Departmental funds have been available for Track (Judges') Awards. We do not promote any of the monetary prizes at the outset. Budgeting and fund allocation happens later. We do tell the students how they can characterize the awards when they include them on their resumes.

Q: Are these awards only once a year?

- Bridget Smyser (Northeastern): These are at the end of each sequence - at the end of each Capstone 2.



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Susannah Howe - Alum Voices: Capstone Podcast

Q: Where can I find the Design Clinic Download podcast episodes?

- [Smith ScholarWorks](#) (includes audio and transcripts)
- [Spotify](#) (just audio)

Q: Did any of your alumna further develop or commercialize the results of their projects after graduation?

- Susannah Howe: No - all of the projects were externally sponsored by industry/government, and almost none of the alums worked with those sponsors after graduation. Some continued to work in related industries, but not on the same project.

Q: How long did this take? (review footage, stitch segments, transcripts, etc...)

- Susannah Howe: About 5-10 hours per episode. It got faster as I got into the process. Possible ways to streamline it in the future would be to have a shorter Zoom interview and/or do less editing (keep much of the recording exactly as is)

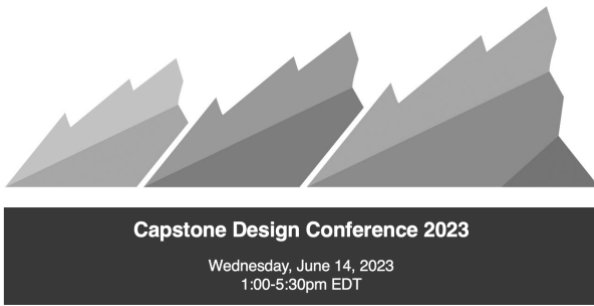
Q: Did you contact sponsors regarding not infringing NDAs?

- Susannah Howe: I didn't because the alums didn't share any more about their (past) capstone projects than they had done in the final presentations (and often less detail than that). I did ask the alums for permission to record the Zoom interview for the purposes of recording a podcast, and I sent the draft podcast recording to them before making it public.

Rebecca Laposa and Mahadeo Sukhai - Inclusive Team Contract

Q: When in the semester time frame did this happen and how did you support them after it happened?

- Rebecca Laposa: This workshop was 8 weeks in and made a big difference. Had to write a 1 page reflection afterwards.



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Q: Those are some really thoughtful insights from your students! Did you address unconscious bias?

- Mahadeo Sukhai: Not explicitly. Needed some dialogue and questions from the instructor

Q: Why wait 8 weeks for the workshop? Would it be helpful to hold this workshop at the start of the project?

- Mahadeo Sukhai: Needed some practical before theoretical

Q: How long is the workshop/coaching? Would you be able to do a workshop for capstone instructors -coaching them to coach?

- Rebecca Laposa: I recommend reaching out to Dr. Mahadeo Sukhai at <https://idea-stem.ca/> and reading "Creating a Culture of Accessibility in the Sciences" ([Amazon link to Dr. Sukhai's book](#))

Q: Did you discuss strategies for calling out/correcting bad behavior, or helping students speak up for themselves and others? Any favorite strategies?

- Rebecca/Mahadeo: Yes, this was a very practical aspect of teamwork/leadership training done earlier in the course (AID method, Action, Impact, Desired Behaviour see <https://ilead.engineering.utoronto.ca/>). Students wrote in their reflections that describing the Impact of the behaviour was the most helpful part to keep feedback conversations focused, effective and helpful