Capstone Design
CONFERENCE 2022

JUNE 6–8, 2022 ▸ DALLAS, TEXAS

Panel Report-Out

Key Takeaways

Session 1

Monday 10:30am-noon

Capstone Design
CONFERENCE 2022

JUNE 6–8, 2022 ▸ DALLAS, TEXAS

Panel 1A Finding and maintaining remote client partnerships

- Find partners: Capstone Conference, Alumni, networking with local engineers & philanthropic organizations (NGO)--be open to new opportunities
- Advantages:
  - Students learn empathy and how to design for those from outside their own lived experiences
  - Develop cultural competencies--learn to deal with “island time” or “India time”
- Capital Factory: source for projects, advisors & seed money https://www.capitalfactory.com
- Time zones are challenging
- Students and clients are now comfortable with livestream video calls

Panel 1B: Written/Oral Communication in Capstone Design

- Writing assignments should be *functional*
- Concepts can be taught by Capstone faculty, Tech Writing experts, or some combination.
- Need to move away from super long reports with a high ‘whack factor’ to streamlined reports that align with industry.
- Templates + feedback + rubric = clear expectations
- Giving students examples helps a lot
- Design communication like you design a project

Panel 1C: Capstone 101

- Good projects found from alumni, former clients, industry contacts
- Assessment at many points during process
  - Individual vs. Team achievement and contributions
  - Client satisfaction
  - Design process & communications
- Model what you want them to learn
- Need some ambiguity for things to be ‘real world’
- Unequal contributions dealt with mix of team and individual assessments; CATME also good for this
- All teams need advisors - usually faculty, can be clients, PhD students
- Expectations setting is key!

Session 2

Monday 2:30-4:00pm

Panel 2A: Managing Conflict

- Frame the concept up front - conflict is inevitable, not always negative
- Avoiding conflict can stop the design process
- Going to a professor can be intimidating - especially if there is conflict
- Need to build trust with the instructor and within the team
- Need to work with students who see feedback as an attack.
- Active Bystander Training can be highly useful
- Space where mental health comes into play. “I didn’t want to have an excuse”. “It’s not an excuse, it’s a reason”
- Instructors need to be engaged with the difficult conversations around conflict.

Panel 2B - 101 Ways to Structure a Capstone Design Course

- Flipped class approaches to cover topics, class time for open discussions and designed work
- Project bidding by students can be by preference, by skills, or some combo
- Contact hours with faculty and/or student working hours good to track and enforce
- Over half the audience charges sponsors for projects - amount varies
- Some instructors specifically teach about IP, some have guest speakers from legal/technology transfer, some don’t specifically discuss
- Increasing coordination between first year cornerstone courses and senior capstone courses

Panel 2C - After Capstone What Happens to Projects After the Course is Over?

Options for transferring prototype:

- Industry sponsor
- Faculty sponsor
- Client with disability (unique liability issues)
- Used for scrap parts

Options for project

- Prototype shelved/stored for future team (legacy project)
- Students continue development - potential commercialization

Various resources available to support continued development

Panel 2D - ABET and Assessment

- “ABET is like floating down a river as a leaf waiting for someone to fish you out”
- Gathering information, writing the self study report, and getting faculty buy in are all challenges
- Assessing individual achievement can be done with peer review, individual meetings or assessments, small individual presentations
- Assess each SO 1-7 in at least two courses, not just capstone
- Use Senior exit surveys, Advisory Board review AND regular data to demonstrate Continuous Improvement
- Interdisciplinary programs might need to consider multiple sets of outcomes

Session 3

Tuesday 2:00-3:30pm

Capstone Design
CONFERENCE 2022

JUNE 6–8, 2022 ▸ DALLAS, TEXAS

Panel 3A: Intro to Capstone Design Research

- Where to start?
  - Observe what's happening
  - Read what's already out there
  - Find mentors
  - Start small
- Ask yourself: who needs to learn from this and why?
- Learn what you need to know about working with people/IRB
- Collaborate with other instructors/universities
- Shift from engineering mindset (quantitative) to education mindset (quantitative and qualitative)
- Lots of funding sources and publishing venues available - see the session notes!

Panel 3B Industry-informed Capstone

- Students need to develop their own ethical standards; data says they rate themselves highly, but they consistently test lower
- Pick up the phone and call the non-responsive client or supplier
- Email etiquette is lacking
  - Always respond to a superior's email
  - Proper addressing--not "Hey"
  - Bottom Line Up Front (BLUF)
- Meeting process immature
  - Agenda distributed ahead of meeting
  - Notetaker assigned and action items captured
  - Distribute minutes within 24 hours
- Leverage industrial advisory boards for course content validation and new content suggestions
- Design Expo judges selected from prospective sponsors
- Feedback sessions at end of year with clients (Zoom or F2F) to share pros & cons, plans

Panel 3C: Establishing A Safety Culture in Capstone

- Start building as early as possible - freshman year is ideal
- Your university EHS department should be on speed dial for
  - Policies (college, local, state, etc.)
  - Checklists for various experimental activities
  - Advice on best practices
- Training on machine tools and other equipment needs to be assessed and controlled.
- Need to balance fear and overconfidence to hit somewhere in the middle
- Resources from industry can help
- CSHEMA (Campus Safety, Health, and Environmental Management Association) is a great source for info as well

Panel 3D: Student Mental Health

We shouldn't be changing standards when dealing with the struggling students - they don't want it either. The rubric won't change, but you can support them differently.

Student Perspective: *When we are struggling make it as easy a click of a button. Going to the office or writing an email is too much work.*

Recommendation of Clinical psychologist: ***put on your own O2 mask first****, take care of yourselves*

shame (I am something bad) vs guilt (I've done something poorly); growth vs fixed mindsets.

tough love?, if the delta between expectation and actual student grows overtime then it is not going well- they need to seek help.

Research by Allison Woodbroks of Harvard Business School - shows that maybe actually increasing anxiety/energy to get hyped up before a presentation can be helpful

Session 4

Wednesday 9:00-10:30am

Capstone Design
CONFERENCE 2022

JUNE 6–8, 2022 ▸ DALLAS, TEXAS

Panel 4A: Project Management and Individual Accountability

- “Capstone ruined my life. Capstone is the best thing I’ve been through” ← from the same student!
- Not many students have PM experience - needs to be taught
- People have had mixed results with assigning/rotating team roles
- Tend to let students choose the PM software that works for them
- Discuss “What did you say you wanted to do, and what did you do?” without grade penalty to promote learning
- Create strong relationships with team leads so they’ll come to you with problems
- Faculty advisors key in tracking individual contributions

Panel 4C: Community Engagement and Service

- Finding projects?
  - Use your own contacts, or the students', or the university's
  - COVID caused community needs to pop up
  - ASEE and other professional organizations can help
- Projects are either paid for by university/unfunded, or on a sliding scale
- Community can be local, national, or international
- Mixture of short-term and long term projects - rather situational
- Students need coaching on how to interact with non-engineering clients, children, people with disabilities, etc.
- Safety may be a concern in some areas
- Useful book: Connecting Civil Engagement and Social Innovation

Panel 4D A Cornucopia of Capstone Course Challenges

- IP: Patentability and who gets named as an inventor
- Assistive technology design: need to include a liability waiver prior to transferring prototype to end user
- How to ask for references and FERPA considerations for referees
- Use of internal design reviews to keep teams on track
- Learning task time estimation is a vital skill
- Use of weekly timesheets and end-of-term performance reviews to tease out individual contributions and influence on team dynamics

Session 5

Wednesday 10:45am-12:15pm

Capstone Design
CONFERENCE 2022

JUNE 6–8, 2022 ▸ DALLAS, TEXAS

Panel 5A: Nifty Ideas and Surprising Flops

Capstone Design CONFERENCE 2022
JUNE 6–8, 2022 ▸ DALLAS, TEXAS

Nifty/Flopper	Institution	Topic
Alexis Gillmore	UT Knoxville	Senior Design Showcase Simulator
Kris Jaeger-Helton	Northeastern	Shark Tank, Move Over: Pitches and Posters Day
Nathan Kathir	GMU	Periodic Activity Reports
Samuel Malachowsky	RIT	Increasing Visibility of Coach Tasks for Accountability
Jim Hartman	UNCC	Use of Part-time Mentors from Industry
Allyson Gibson	BYU	All Female Capstone Team
Keith Stanfill	UT Knoxville	For Sale. Green Screen. Never Used.

Nifty/Flops Slide Deck (PDF document)