Nifty Ideas and Surprising **Flops**

Capstone Design
CONFERENCE 2026
JUNE 1–3, 2026 ▸ COLLEGE STATION, TX

3 June 2026

Facilitator: Susannah Howe

Nifty/Flop Agenda

John Estell
(Ohio Northern)

Conflict as Content

Lawrence Warren
(UF)
Team Name and Logo Signage

Allison Hutchison
(Cornell)
Sociotechnical Competence

Katy Daniels
(UTK)

GPT4all

Jorge Rodriguez
(UGA)
Torque Meets Rhetoric

Robert Hart
(UT Dallas)
Incorporating Peer Advice

Keith Epstein
(UVM)
Pre/Post Video Thinking/Writing

Nathan Kathir
(George Mason)
Partner Institutions outside the USA

Kris Jaeger-Helton
(Northeastern)
Investment Model for Assessment

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Awards of Innovation

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John K. Estell
(Ohio Northern University)

Conflict as Content:
Peer-Made Training Videos in a Capstone Prep Course

Conflict as Content

Create a conflict resolution training video

- **Assigned conflict type:** Solo Dissenter, Boxing Match, Warring Factions, Blame Game
- **Filmed a 5-to-8-minute training video** contrasting a less effective resolution strategies with a more effective one (Thomas-Kilmann model)
- **Videos screened and peer-evaluated** in the other section of the course.

Conflict as Content

Communication channel chaos

Scheduling difficulties

Not protecting rehearsal time

Off-topic meetings

Arguing over which conflict resolution strategies to use

Couldn't agree on how to act it out

One faction wanted a more theatrical portrayal of conflict

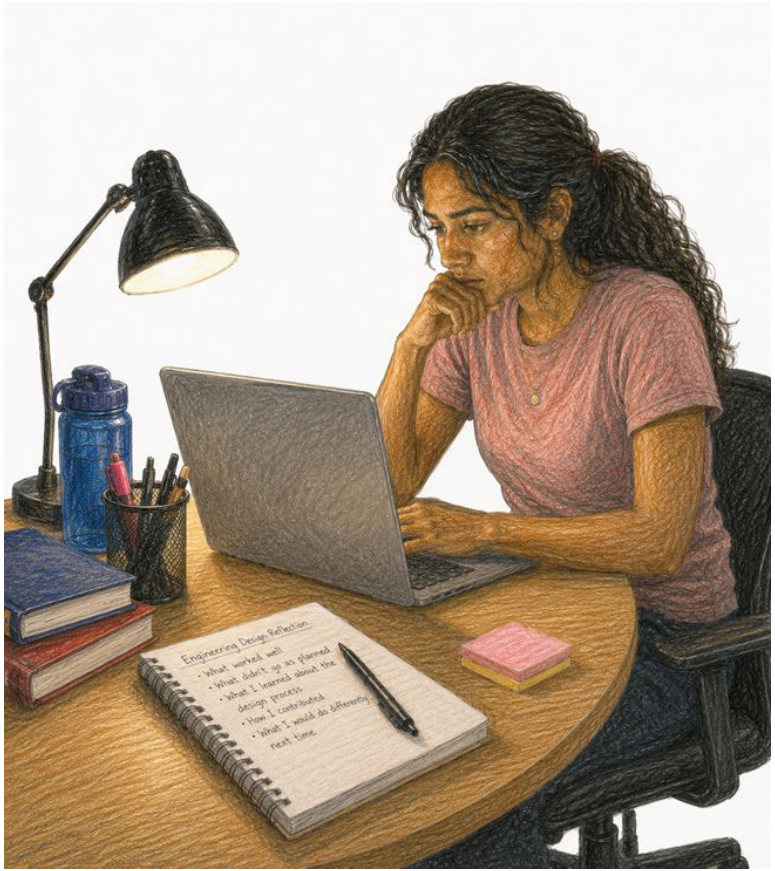
Contacted the instructor about a missing team member

Left out of the final decision – woke up to a short submitted video

John Estell, Ohio Northern

Conflict as Content

- The students who encountered genuine conflict produced the most insightful writing.
- Authentic learning sometimes requires the discomfort of the real thing.
- This assignment delivered it… whether it meant to or not.



John Estell, Ohio Northern

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Lawrence Warren
(University of Florida)

Team Name & Logo Signage

University of Florida

Integrated Product and Process Design (IPPD)

- 31st Year
- Corporate/University sponsorship of all unique projects
- Corporate Liaison and Faculty Coach
- Multi-discipline senior design
- Hardware, software or mixed project
- 4 to 7 students per project
- 24 teams/150 students
- Undergrad and Grad students
- 2 semester commitment

Team Name/Logo Signage

- Teams develop unique team names and logos
- Used on all team presentations, communications

- Printed on double-sided signs, laminated
- Displayed on stands
- Used at all team events throughout the year
  - Showcases
    - Ballrooms
    - Four times a year
  - Classroom
    - Large lecture hall
    - Once a week
    - Three-hour class

Lawrence Warren, UFL

Benefits to Teams and Program

Team

- Identity
- Marketing/Creativity
- Forming their own company
- Esprit de Cours

Program

- Easy team identification
  - Events and Classroom
- Classroom
  - Attendance
  - Class participation
  - Framing questions
  - Recognizing students

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Allison Hutchison
(Cornell University)

Promoting Sociotechnical Competence via Community-Engaged Capstone Projects

Thanks to a community-engaged learning grant, bioengineering students gathered firsthand user insights for their capstone projects.

2024

Grant received; ENGRC curriculum revised

2025

ENGRC course piloted as 3cr instead of 1cr

2026

Students actively on board with engineering service design

We collaboratively created an entire set of course materials on integrating *engineering service design* (ESD) into the capstone design curriculum.

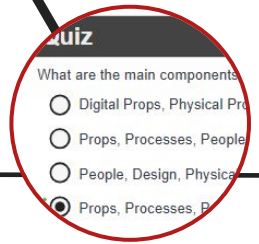
3 professor interviews

12 student interviews

4 site visits

10 conversations w/ farmers

50+ quiz questions



5 interactive videos

Allison Hutchison, Cornell

It's probably safe to say that *some* students have developed a degree of sociotechnical competence, but obstacles still remain.

Questionable project completion

Challenging community engagement

Unknown faculty & future of partnership

Students are starting to "get" ESD

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Katy Daniels

(Univ. of Tennessee-Knoxville)

(More) Sustainably Evaluating Green Design Aspects Using GPT4all

Challenges

- Introducing green design and sustainability concepts late in the design process
- Limited
  - student bandwidth
  - class time (100 minutes)
- Applying a specific GenAI framework
- Avoiding cognitive offloading
- Restricting GenAI prompt to strong references
- Protecting project IP

Shutterstock

Solution: GPT4all–Localized AI

nomic.ai/gpt4all

Your private and local AI chatbot

- Crowdsourced 30% journals, 30% standards, 30% industry reports, 10% general (target: 70 to 100 sources)
- Coached prompt engineering techniques
- Restricted prompts to trusted sources
- Compared multiple open-source AI models (Llama, Orca, DeepSeek, etc.)
- Protected project intellectual property locally

Prompt:
Write a one-page professional memo summarizing a Life Cycle Assessment (LCA) for a senior engineering design project involving the construction of a small-scale hydropower system using a waterfall for renewable energy generation in Tanzania for an agricultural nonprofit organization. The memo should be concise, formal, and written for a non-technical stakeholder audience. Use clear headings and short paragraphs. Include the following sections:

Project Overview – Briefly describe the hydropower system, its purpose, and who it benefits.
Current Sustainability Gaps – Identify where the project is currently lacking in green design or environmental sustainability (materials, transportation, energy use, construction impact, etc.)
Proposed LCA Improvements – Focus on one key phase of the life cycle (such as material sourcing, construction, operation, or end-of-life) and describe specific improvements that will be implemented to increase sustainability.
Expected Outcomes – Explain the environmental, social, and economic benefits expected from these improvements, including reduced carbon footprint, improved resource efficiency, or long-term community impact.

Formatting requirements:
Professional memo tone
Exactly one page
Use bullet points sparingly
Avoid overly technical jargon
Emphasize sustainability, feasibility, and measurable impact where possible

Katy Daniels, UTK

Why it Matters

- Encouraged responsible engineering AI practices:
  - Promoted sustainable collaborative research workflows
  - Strengthened critical thinking and evaluation
  - Protected sensitive capstone project information
- Combined learning about Green Design with learning to use GenAI
- Compared reliability across AI models
- Prepared students for industry expectations
- Avoided overreliance on cloud AI tools

To: Jenga Tanzania Agriculture and Project Stakeholders
From: Maji Cascade Initiative Senior Design Team
Date: February 16, 2026
Subject: Life Cycle Assessment Summary for Waterfall Hydropower Project

Project Overview:
Our senior engineering design project develops a small-scale hydropower system that uses an existing waterfall in rural Tanzania to generate renewable electricity for Jenga Tanzania Agriculture, a nonprofit agricultural organization serving a 50,000-acre farm and nearby villages. The system will divert a portion of river flow through an intake structure, convey water through a penstock to a turbine-generator, and return it to the river downstream, with power transmitted approximately 32 km to connect to the national grid. The electricity will support farm operations such as irrigation, processing, and cold storage while enabling excess power sales to the utility, extending reliable energy access to surrounding communities. Our life cycle assessment (LCA)
examines environmental impacts from construction through operation and end-of-life, focusing on impacts per unit of electricity delivered over the project's expected multi-decade lifetime.

Current Sustainability Gaps:
• High-impact materials: Large volumes of concrete and reinforcing steel are needed for the intake, powerhouse foundations, and support structures, which carry a significant embedded carbon footprint.
• Construction access and transport: Reaching the remote waterfall site requires new or upgraded access routes and repeated trips by heavy equipment, increasing fuel use, air…

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Jorge Rodriguez
(University of Georgia)

Torque Meets Rhetoric: What Happened When We Embedded English Majors in Capstone Teams

The Problem

Engineering Students	• The quality/consistency of public-facing deliverables could be improved • Especially true for the Capstone Report, but also the Research Poster and Elevator Pitch for the Showcase
English Students	• The study of Technical Communications is generally via case study • Industry partners overlook English when seeking out/hiring communications student interns

Engineering + English Partnership

Jorge Rodriguez
Industry Capstone Projects Coordinator

Christine Lasek-White
Department of English Faculty

UNIVERSITY OF GEORGIA

Our Approach

Fall 2025	Workshopped materials with a Technical Communications class	• Four Capstone Groups opted to take part • Groups submitted their reports-in-progress to the Technical Communications students who read and gave feedback on the documents
Spring 2026	Technical Communications Interns embedded in the Engineering Capstone Groups	• Two Capstone Groups opted to take part • Two English students each joined an Engineering Capstone Group as their Technical Communications Intern • The English students proofread deliverables, helped craft the research poster and elevator pitch, and even took part in the Capstone Design Showcase

Engineering + English Partnership

Jorge Rodriguez
Industry Capstone Projects Coordinator

Christine Lasek-White
Department of English Faculty

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COMPUTERIZED SYSTEM OR SOFTWARE DESIGN

AI Maturity Grading for Peanuts

Client: Georgia Peanut Commission
Supervisor: Kevin Wu, M.S. & Christine Lasek-White
Project Team: Tanner Williams, Tyler Williams, Keerthana Ramesh Kumar, Jacob Kilburn

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peanu

MANUFACTURED SYSTEM OR PROCESS DESIGN

Autonomous Vehicle Infrastructure Evaluation Tool

Client: University of Georgia College of Engineering
Supervisor: Wayne Johnson, Ph.D. & Christine Lasek-White
Project Team: Derrick Cannon, Megan Goleniak, Jacob Kuhn, Lucas Landis, Khoa Nguyen

This project aims to design a universal mounting system and integrate cameras and GPS devices to collect data for evaluating how current production autonomous vehicles (AVs) respond to road infrastructure. This alternative data collection method is necessary because AVs operate through black-box systems. The data collected through this project can be used to evaluate the vehicle's display response and performance.

The Outcome

- Both groups with interns were 2026 Capstone Design Showcase winners in their areas
- English students received three upper-division credits and Experiential Learning credit for their work
- They also found the experience incredibly rewarding

Overall, the Professional and Technical Communications internship has been one of my favorite and most valued experiences as an undergraduate at the University of Georgia. As I have reflected in my design notebook, I have developed a deeper understanding of how to apply my English expertise to technical writing to assist other fields of study. I can see major gr
several of my abilities, as well as my confidence to do good work in subjects that I an
to. I felt I contributed meaningfully to the Capstone team, and I hope to contribute in
ways to teams in the future. As I approach graduation next year, I will carry and pull
experience as I apply to technical writing and communication jobs and continue to de
skills in English, editing, and publishing.

UGA Engineering, *Technical Communications Intern* | Athens, GA — January 2026 – Present

- Collaborate with engineering capstone team to develop clear, professional technical documentation for academic and industry stakeholders
- Assist in preparing client-facing materials, including milestone reports and final presentations
- Edit and format project reports, proposals, and presentations to improve clarity, organization, and visual consistency

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Robert Hart
(University of Texas at Dallas)

Learning from Those Who've Been There: Incorporating Peer Advice

Incorporating Peer Advice

UTDesign®

INDIVIDUAL REFLECTION II

Now that your time in Senior Design is nearing completion, it is appropriate to reflect on what you have personally learned during this process. In particular, the focus here is on what you learned beyond just the specialized technical knowledge needed to complete your project. The purpose of this deliverable is to provide you with an opportunity to think critically about how you will use the experience you gained from the process of completing your project to benefit your future projects and your career.

You should strive to provide a response for each question that honestly conveys your personal experience and perspective. Although there is no right or wrong answer to each question, you will be graded on the thoughtfulness and completeness of your responses. Be sure to address all parts of the questions. There is no required length for this assignment and you should write as much as you feel is necessary to express your thoughts.

Requirements

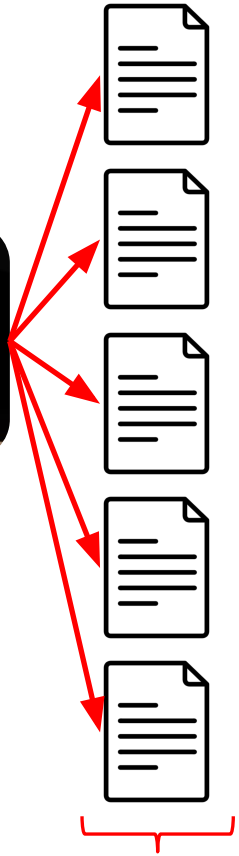
Each individual should prepare and submit their Individual Reflection. The document should contain the following sections in this order:

1. **Cover Page.** All requirements for the cover page should be followed except you should not list the names of your teammates.
2. **Discussion.** Prepare and submit your responses to these questions. List the question first and then your response.
   a. Every project includes some difficulties and challenges. Provide an example of a particular challenge that you or your team faced during your project. Looking back, what could you or your team have done differently during the earlier part of the project that would have minimized or eliminated the issue?
   b. What do you think helped to make your team successful or what do you think kept you from being as successful as you would like to have been?
   c. Suppose that a student taking Senior Design next year asked you for advice on what they should do to have a successful project. Based on your experience in Senior Design, what recommendations would you give him or her? Focus your advice on how to be successful after being placed on a team.

Suppose that a student taking Senior Design next year asked you for advice on what they should do to have a successful project. Based on your experience in Senior Design, what recommendations would you give them? Focus your advice on how to be successful after being placed on a team.

?

Incorporating Peer Advice



5 Sets with 10 pieces of advice each

Team-Based in-Class Activity

UTDesign

Discussion Session Activity
Review of Previous Individual Reflections Advice

As we begin the long project process that will last two semesters, we thought it would be valuable to have you review and reflect on previous engineers' advice that we gather in the final Individual Reflection that is completed at the end of the project.

Below are ten pieces of advice from previous UTDesign engineers. Review them, and choose three that the team feels are the best advice for your team and discuss how you can implement them.

Then complete the section below for those three that your choose and describe how your will implement them on your team. We w
so all team members should be prepar

TEAM #: _____

Complete your responses to three of the pieces of advice here

Advice #: _____

How you will implement this: _____

Advice #: _____

How you will implement this:

1. Read the 10 pieces of advice
2. Discuss as a team and choose 3 that you feel are most relevant to your team and project
3. Determine how you will implement the advice for your project
4. Be prepared to report and discuss

Robert Hart, UT Dallas

Incorporating Peer Advice

Implementation Tips

- Do early in the project
- Post all advice sets afterward

Benefits

- Quick and easy to do as a class activity and ensures that students are reading and reflecting on some of the advice
- Students feel that the activity is relevant because the advice comes from peers who have been where they are
- Students can customize the advice to their particular circumstances
- Increases student awareness of issues they will likely encounter

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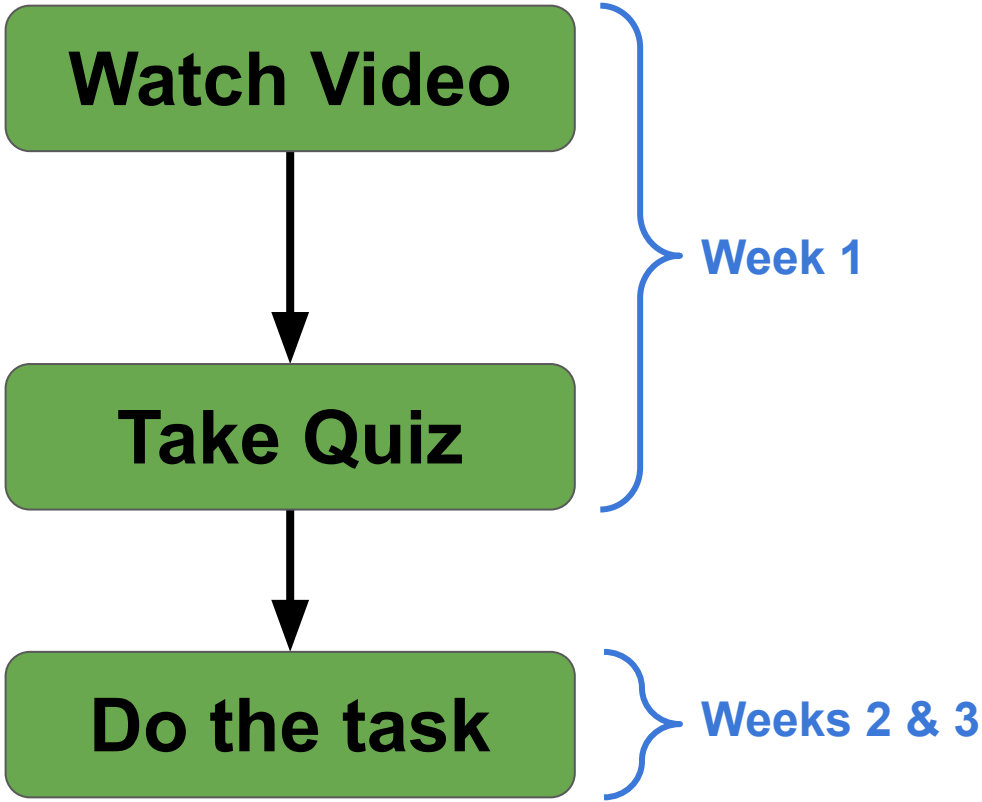
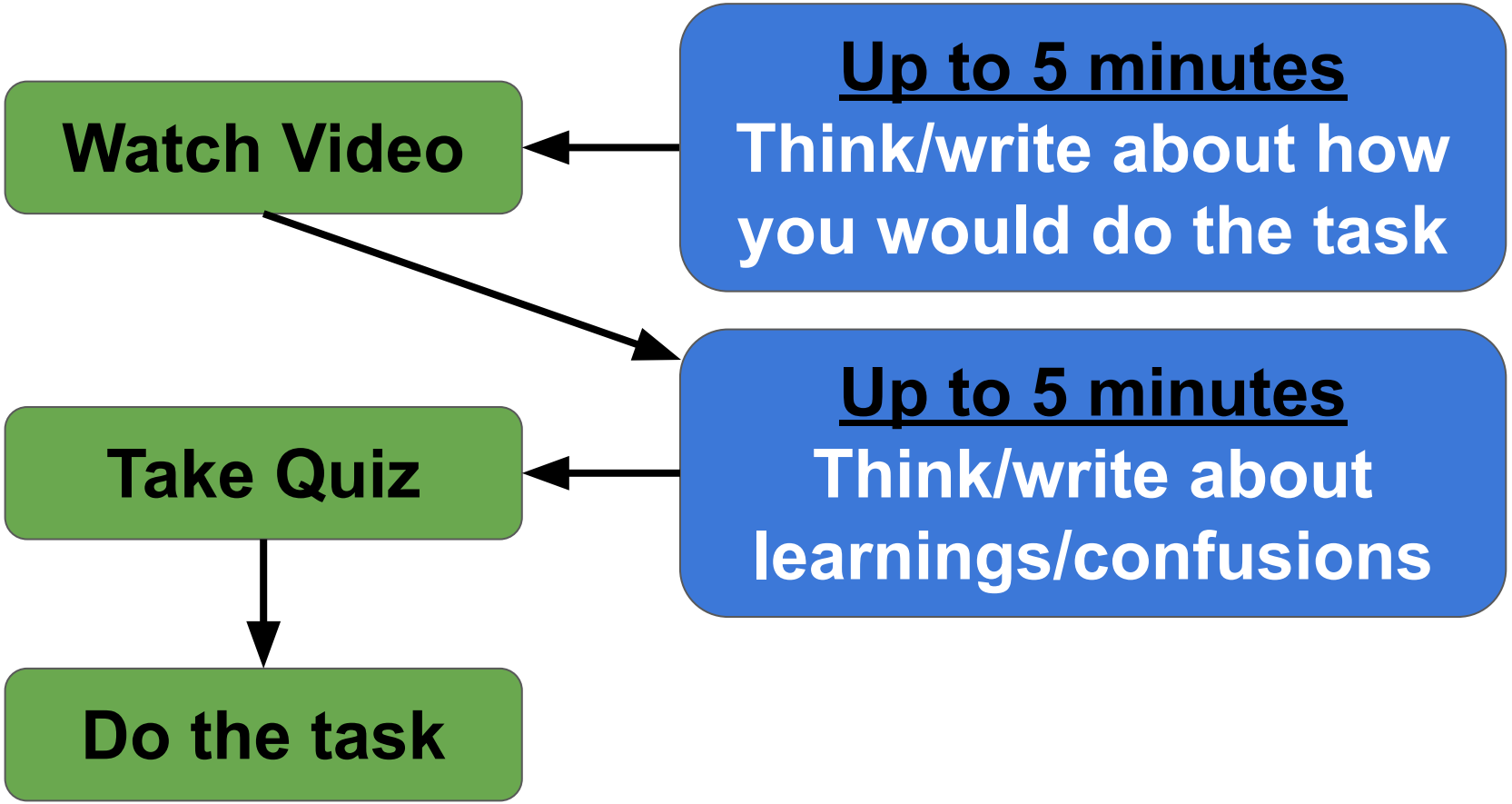
(University of Vermont)

Pre/Post Video Thinking/Writing to Improve Comprehension and Retention

Lack of context limited content retention



Pre/post video thinking helps content stick



Student opinion: positive and varied (n=66 of 96)

	Thinking/Writing Helped	
	Pre-video	Post-video
Agree or Strongly Agree	42%	55%
Neutral	35%	24%
Disagree or Strongly Disagree	15%	15%
Didn't do it	8%	7%

Why did you choose to do or not do the thinking/writings?

- They made me retain more info.
- Free points if we do it. It doesn't take that long so it makes sense to do it.
- Too much time.
- I thought they were required.
- I knew it would help me learn.
- The points on the quiz and the learning benefit.
- Even though I didn't want to, they definitely did help me stay grounded in the information I was learning.

73% think it should continue. Comments about why:

- I like that they're optional and can be beneficial.
- Helpful to learn and think about learning.
- It helps lock in info regarding the lesson.
- Before helps, post does not.
- I don't think the pre is important but the post helps with recalling the information.
- I don't think that these enhanced my learning. Maybe if I had completed them they would have helped.
- Does not really help.
- 5 minute pre/post is too much effort for what it's worth.

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Nathan M. Kathir
(George Mason University)

Capstone Partnering
with Institutions
outside of the U.S.A.

Partnering with Institutions outside the USA

- Why? Why not? Something different in my 6th year; **ASEE June 2025 paper 56104**
- A better way to meet ABET Student Outcomes (SO) **
  - SO2 – an ability to apply engineering design to produce solutions that meet specified needs with **consideration of** public health, safety, and welfare, as well as **global, cultural, social, environmental, and economic** factors."
  - SO3 – ability to communicate effectively with a **range of audiences**
  - SO4 – an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must **consider the impact of** engineering solutions in **global, economic, environmental, and societal contexts**."
- GMU and 5 colleges/universities in India, 6 projects, all MEs; 1 cancelled in Nov.
  - Three students and one advisor for each sub-team.
- [A total of 35 ABET visits as PEV, Team Chair, ExCom (Ed 1); 15 visits were international]

Partnering with Institutions outside the USA

Challenges faced

- Time Zone difference, +9:30 (EDT) or +10:30 (EST)
- Mismatch in academic calendars – off by a few weeks
- Cultural differences; language (sometimes accent)
- Only virtual meetings/collaboration, no in-person meetings
- Network reliability inadequate; Collaboration was challenging in virtual environment
- Student interest lower at our school
- Student Leadership and Motivation, only one of 5; Faculty cooperation, 4 of 5

How I managed

- Took increased personal interest. Additional mentor meetings
- Visited all five colleges in India during our winter break
- Met the faculty advisors and collaborating students in-person
- Revived the “momentum” and interest; productive zoom meetings afterwards

Partnering with Institutions outside the USA

Lessons Learned and Recommendations

- Better planning and setting expectations
  - *A written contract document with clear expectations and start early*
  - *Need buy-in from faculty mentors too, not just administrators*
- Coaching and mentoring with increased frequency
- Motivation: Have recurring, frequent team meetings and sub-teams' meetings
- Monitor progress with increased frequency: team dynamics and time management
- Opportunity for face-to-face interactions, even for a few weeks
- Self-selection of teams versus forced assignment (U.S.)
- Graduates ready for employment with international companies

Quotes by students

- Indian: Provided a great opportunity to apply technical knowledge, collaborate internationally, and improve project management and communication skills
- GMU at the end: Dr. Kathir's vision to open up some of the projects to international connections is a brilliant idea.

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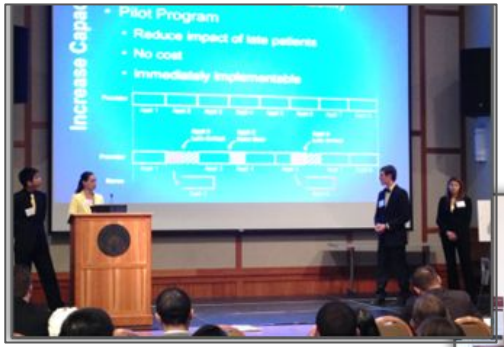
Kris Jaeger-Helton
(Northeastern University)

Capstone Assessment
with a Sound Investment

Background - Assessment: Final Capstone ‘Day’

Pre-COVID Final Capstone Day

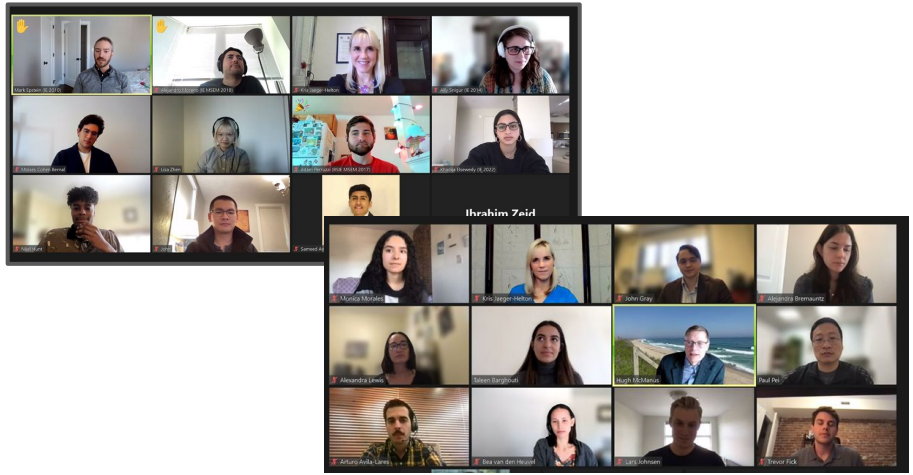
- 14 min pres + 6 min Q&A
- In-person jurors: 4-5/team
- Plus evaluated poster session



- Extensive evaluation: completed in person
- Rubrics involving numbers: time constrained
- Hard to establish enough jurors: 8-10 alumni

During & Post-COVID: Intense Capstone “Event”

- 14 min pres, 6-min demo + 8-10 min Q&A
- Online jurors: 4-5 per presenting team
- Plus 10-min discussion & networking



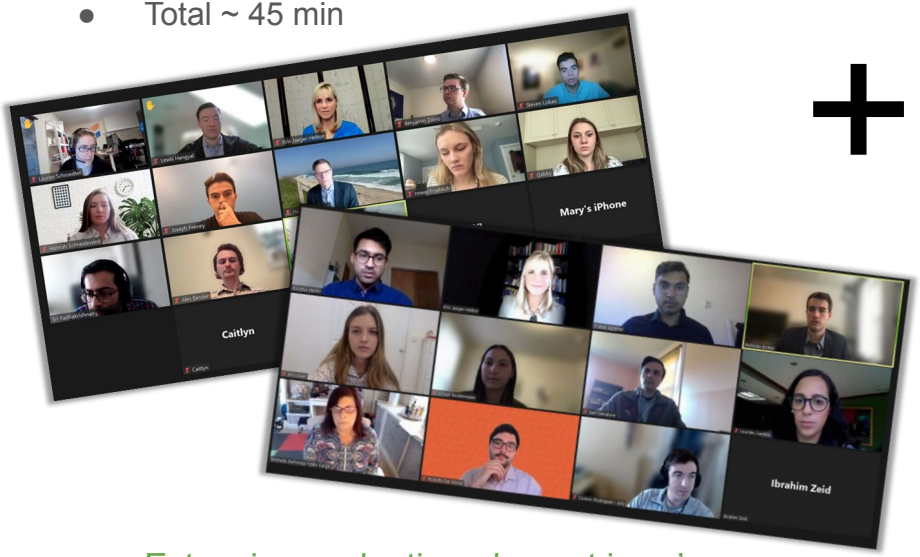
+ Extensive evaluation: done at juror’s pace
+ Rubrics involving numbers: not time limited
+ Engage many alumni: up to 80 alumni jurors
- No poster session - No in-person “finale”

Kris Jaeger-Helton, Northeastern

Recent Assessments: Final Capstone 'Events'

Recently: Intense Capstone "Event"

- 14 min pres, 6-min demo + 8-10 min Q&A
- Online jurors: 4-5 per presenting team
- Plus 10-min discussion & networking
- Total ~ 45 min



+

+ Extensive evaluation: done at juror's pace
+ Rubrics involving numbers: not time limited
+ Engage many alumni: up to 80 alumni jurors

Plus: Capstone Pitches & Posters Day

- 8 min pitch + 8-10 min Q&A
- In-person jurors: 4-5/team
- Plus evaluated poster session

⇒ In-person

+ Less student stress
+ Judges: Instead of Rubric, **Investment sheet**
+ Take notes during pitches & poster sessions
+ "**Invest**" in projects at the end of both sessions

Supplemental Capstone Assessment: A Sound Investment

Investment Directives

- Fictitious $10,000
- Wait to assign % values
- Must invest in at least ½
- Invest ≥ 10% per choice
- All must sum to 100%

Investment Criteria

- Soundness of the work
- Application of knowledge
- Whole team engagement
- Readiness to be delivered
  (Consider nth gen projects)

Judge's Name: _____

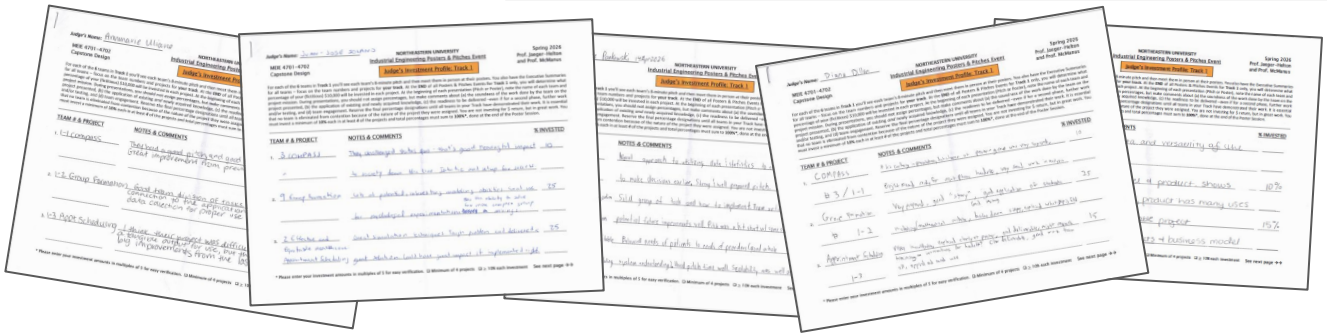
MEIE 4701–4702
Capstone Design

NORTHEASTERN UNIVERSITY
Industrial Engineering Posters & Pitches Event
Judge's Investment Profile: Track 1

Spring 2026
Prof. Jaeger–Helton
and Prof. McManus

For each of the **6** teams in **Track 1** you'll see each team's 8-minute pitch and then meet them in person at their posters. You also have the Executive Summaries for all teams – focus on the team numbers and projects for **your track**. At the **END** of all Posters & Pitches Events for **Track 1** only, you will determine what percentage of your (fictitious) $10,000 will be invested in each project. At the beginning of each presentation (Pitch or Poster), note the name of each team and project mission. During presentations, you should not assign percentages, but make comments about (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, and (d) team engagement. Reserve the final percentage designations until all teams in your Track have demonstrated their work. It is essential that no team is eliminated from contention because of the nature of the project they were assigned. You are not investing for $ return, but in great work. You must invest a minimum of **10%** each in at least ***4*** of the projects and total percentages must sum to **100%***, done at the end of the Poster Session.

TEAM # & PROJECT	NOTES & COMMENTS	% INVESTED
1. _____	_____	_____



Outcomes/Effects

+ Easier to enlist judges
+ More attention to quality
+ More enjoyable for jurors
+ Winners ID'd more efficiently
+ Notes help w/ award speeches

Kris Jaeger-Helton, Northeastern

Nifty/Flop Agenda

John Estell
(Ohio Northern)

Conflict as Content

Lawrence Warren
(UF)
Team Name and Logo Signage

Allison Hutchison
(Cornell)
Sociotechnical Competence

Katy Daniels
(UTK)

GPT4all

Jorge Rodriguez
(UGA)
Torque Meets Rhetoric

Robert Hart
(UT Dallas)
Incorporating Peer Advice

Keith Epstein
(UVM)
Pre/Post Video Thinking/Writing

Nathan Kathir
(George Mason)
Partner Institutions outside the USA

Kris Jaeger-Helton
(Northeastern)
Investment Model for Assessment

Sharon Thorne
(NCSU)
Awards of Innovation

Nifty/Flop Agenda

Sharon Thorne
(North Carolina State University)

Awards of Innovation

Awards of Innovation

Summary: Peer-Created Awards as a Team Design Icebreaker in Senior Design

- Students use the engineering design process to create awards for each other
- Inspired by MakersSpark Workshop through Engineering Unleashed-KEEN

Dr. Sharon Thorne
Department of Materials Science and Engineering
North Carolina State University

Awards of Innovation

- Department awards best report and poster at end of projects
- Students create awards for each other to signify other accomplishments
  - “Peer Design Award” assignment first week of classes
  - Pick their own team of 3-4 students
  - Create name for award (not “most” or “best”)
  - Create design on paper (2-D)
  - Build award (3-D) from low-cost materials
  - Award teams/individuals at end of projects

Awards of Innovation

- Develops teamwork
- Promotes working through a problem (Engineering Design Process)
- Encourages creativity
- Shows empathy –
  - cheer each other on
  - awards for those who may not have been “best” by department
- Students have fun!

“Roller Coaster Award”

“Eye for Beauty”

“Alloy Award”

“Standing on Business”

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Awards of Innovation

Nifty Ideas and Surprising **Flops**

Capstone Design
CONFERENCE 2026
JUNE 1–3, 2026 ▸ COLLEGE STATION, TX

3 June 2026

Facilitator: Susannah Howe