Capstone Design CONFERENCE 2026
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Panel 3A: Ask Me Anything

Facilitator: Robert Hart (UT Dallas)

Panelists: Susannah Howe (Smith), Todd Polk (UT Dallas), Keith Stanfill (UTK)

Description: A team of ‘old hands’ will be here to answer whatever questions you can come up with. Team problems? Can’t come up with projects? Not sure where to start? Ask them anything!

Notes:

Question: At a small private undergraduate-only institution where all tenure-track faculty supervise capstone projects and there is no year-long capstone course, how can programs ensure consistent advising and expectations across multiple faculty advisors?

Keith Stanfill:

- Hold regular meetings (e.g., biweekly) with capstone advisors/mentors to discuss project progress and share challenges.
- Use student evaluations of advisors/coaches to identify advising issues and gather feedback on mentor availability and effectiveness.

Susannah Howe:

- Use design review cross-participation, where advisors sit in on other teams’ design reviews to increase visibility across projects and learn how other advisors are guiding teams.
- Implement cross-evaluation or cross-grading, where faculty review or grade reports from teams they do not directly advise.
- For large scale programs where there are many people involved, cross-communication and cross-calibration are important

Todd Polk:

- Use weekly or regular mentor–team meetings so mentors can review team deliverables before submission and help keep teams on track. Mentors also conduct practice runs for major presentations.
- Collect student feedback on mentors (e.g., midterm and end-of-semester evaluations) and compile the results to identify issues in advising and engagement.
- Implement scheduled but optional mentor coordination sessions, such as monthly virtual meetings that bring together mentors from different backgrounds (e.g., industry professionals and senior engineers).
- Mentors are paid to evaluate teams, but the instructor is responsible for grading the student work.

Question: How do institutions manage capstone projects that span spring–fall cycles with a summer break in between, especially when students or industry partners are not focused on academic timelines? Specifically, what strategies help maintain project continuity during the summer and reduce the “restarting” effort at the beginning of the fall semester?

Keith Stanfill:

- One approach is to avoid a summer break entirely, running capstone courses in a continuous sequence (e.g., summer–fall) so projects do not pause.
- For programs that do have a break, teams are required to complete an immediate project plan review in the first week back, typically presented in front of a panel of faculty, to quickly restart progress.

Susannah Howe:

- Introduce a small-credit (e.g., 1 credit) pass/fail course during the break period to maintain continuity in capstone work.

Question: How can instructors help capstone teams recognize and address gender bias?

Susannah Howe:

- Implement rotating team roles (e.g., by month or quarter) so that responsibilities such as note-taking, documentation, and hands-on tasks are regularly switched among all team members.

Keith Stanfill:

- Have multiple people doing the same tasks.

Todd Polk:

- Try to balance team composition during formation, avoiding highly unbalanced gender ratios (e.g., not creating 5:1 teams when possible) to reduce the risk of one student being isolated or dominated.
- Assign rotating meeting leadership roles, where each team member leads weekly mentor meetings on a rotation schedule so responsibility is shared equally.
- Allow teams to adjust leadership mid-project based on workload or seasonal availability, with roles sometimes split across semesters.
- When bias or imbalance occurs, faculty may hold individual one-on-one meetings with affected students to understand the situation and provide strategies for increasing involvement in technical work.

Audience:

- For team deliverables, students are required to rotate responsibilities weekly for meeting minutes and major submissions.
- For reports and other large deliverables, each student must clearly document their individual contributions, including which sections (or subsections) they worked on.

Question: How can instructors effectively manage and evaluate student use of AI in capstone reports and deliverables?

Keith Stanfill:

- Provide formal training on AI use (e.g., workshops in the second semester) to teach students how to use AI effectively for research, prompt design, and generating useful briefing documents.
- Set clear rules that only enterprise-approved AI tools can be used to protect intellectual property and avoid exposing sensitive project data to public models.
- Require students to explicitly disclose and document how AI was used in their reports

Todd Polk:

- For projects involving external customers under NDA, students are generally prohibited from using public AI tools because project information cannot be exposed to external systems.

Susannah Howe:

- In some NDA-protected projects, students themselves may resist using AI due to concerns about academic integrity or confidentiality.
- Students may use AI for low-risk tasks such as grammar correction and formatting support, rather than generating core technical content.

Question: From a faculty perspective, what is the core purpose of capstone projects beyond being a degree requirement, specifically, what educational value, skills, and outcomes are capstone experiences intended to achieve for students, especially in the context of industry-relevant or real-world projects?

Keith Stanfill:

- Capstone projects serve as a vehicle for students to complete their transition from school to professional practice.
- They are designed to instill professional behaviors, including attention to detail, use of structured design processes, client interaction, problem-solving, and communication skills.
- The open-ended nature of capstone projects helps students develop the ability to work on real-world, ill-defined problems that cannot be fully replicated in traditional lecture-based courses with exams and homework.

Susannah Howe:

- Capstone is viewed as an “outro course” that complements the intro class and helps students transition to what comes after graduation.
- It prepares students for their next steps after college, whether entering industry or pursuing graduate school.
- The capstone project serves as the primary vehicle for this experience, ideally providing a longer, more sustained project experience rather than a short end-of-course assignment.

Todd Polk:

- The stated goal of the capstone program is to prepare students to function as industry-ready engineers, not just as students completing coursework.
- From day one, students are positioned as engineers working in a consulting-style environment, serving real clients on project teams over two semesters.

The panelists and audience then discussed different perspectives between industry and academia on capstone projects. Some industry partners view capstones primarily as a way to meet and recruit students, with limited emphasis on project outputs, while faculty recognize a tension between maintaining high, industry-relevant expectations and the practical constraints of project scope, duration, and student readiness. Although students

can sometimes deliver meaningful value depending on the company and project, faculty emphasize that the primary goal is not producing high-impact deliverables for industry, but ensuring students learn and develop professionally through authentic experience. Ultimately, capstone courses are framed as educational experiences focused on “engineering talent” rather than “engineering products,” where the main value lies in student learning and development rather than project outcomes.

Question: What are best practices for grading diverse capstone projects in a way that is consistent and fair across teams?

Keith Stanfill:

- Using very granular grading schemes with many components.
- A key strategy is to incorporate multiple perspectives on student performance rather than relying on a single evaluator.
- Valuable inputs can come from clients, faculty coaches, and mentors involved in supervising projects.

Susannah Howe:

- The grading approach has focused on three main components: process, communication, and outcome.
- The process includes ongoing engagement such as meetings, design reviews, and student intentionality throughout the project.
- Communication is assessed through standard deliverables like reports and presentations using established rubrics.
- Outcome is more subjective and includes sponsor/client feedback, though this varies depending on sponsor involvement and level of detail provided.
- There is acknowledgment that grading inherently includes subjectivity, especially for outcomes, and that consistency improves by incorporating multiple perspectives and calibration with colleagues.
- Students receive a lot of feedback throughout the project, so final grades are not a surprise.
- Rather than using letter grades during the semester, evaluation is often based on a “meets expectations” scale, similar to industry performance feedback (e.g., meets expectations / needs improvement / not acceptable).

Todd Polk:

- Students are given clear expectations and guidance on how to move from “meets expectations” to higher performance levels.
- The rubric structure is described as “generically specific”: it uses consistent categories while allowing flexibility in how those categories apply across different types of projects.
- The rubric helps ensure grading consistency across instructors.

Question: Do we grade students as a group or individually?

Answers: Students receive a team grade with an individual adjustment component that allows the instructor to increase or decrease a student’s grade based on their level of contribution to the group (e.g. 60% team grade and 40% individual grade).

Question: How are capstone programs administratively supported? Specifically, what staffing structures are used, and where is this support located (department level, college level, or university level), across different institutions?

Todd Polk:

- Dedicated administrative and technical staff support operations such as purchasing, budgeting, and managing facilities (e.g., shop managers and machine shop personnel).

Susannah Howe:

- Various offices on campus

Keith Stanfill:

- A part-time administrator may support capstone coordination and operations.
- Additional infrastructure support can include a makerspace with a lab manager and student workers, though these resources typically serve the entire college rather than only capstone.
- Administrative coordination is distributed, with some staff focused on college-wide event support and others assisting through departmental volunteers.

Question: How do programs handle grading rubrics in multidisciplinary capstone courses where projects vary widely (e.g., software vs. hardware), and not all rubric criteria apply equally?

Todd Polk:

- Rubrics are fully published and shared with students in advance.
- The same rubric is used for all multidisciplinary teams, regardless of whether the project is software, mechanical, electrical, etc.
- Core grading focuses on universal expectations, such as design description, documentation quality, and justification of design decisions.

Susannah Howe:

- In a general engineering program with multidisciplinary projects, having broad, flexible guidelines is seen as a feature rather than a limitation.
- This approach helps students understand that design manifests differently across disciplines and project types.
- Students are responsible for identifying which rubric components are relevant to their specific project and adapting their deliverables accordingly.
- This process is supported through regular (e.g., weekly) communication with students during project development and deliverables.
- Faculty advisors may play a key role as intermediaries, helping students interpret guidelines and apply them appropriately to their project context.

Keith Stanfill:

- Emphasizing high-level systems engineering concepts helps create a common foundation across different types of projects.
- For major deliverables (e.g., design reports), instructors provide guided support on structuring content, including helping teams refine overly large or irrelevant sections (such as excessive tables of contents).
- Students are encouraged to consult both faculty advisors and industry clients to determine what content is most relevant for their specific project.

Question: Where does the funding come from to support capstone program staff and resources?

Keith Stanfill:

- Tuition funds primarily support the overall capstone program structure.
- Materials and supplies are funded through project contributions raised from sponsors/clients.
- Some support staff time (e.g., undergraduate assistants, lab managers) is funded through sponsored research budgets, where portions of their time are allocated to specific projects.
- Fabrication and outsourcing costs are paid from individual project funds, often included in sponsor contributions.
- The makerspace is supported through donor funding, helping ensure that material costs are not a barrier for student learning and access to equipment.

Todd Polk:

- Staff funding is split between the Dean's office support and project-generated fees brought in through capstone projects.
- Each team has a defined project budget.
- If teams exceed their budget, they may negotiate with their client/sponsor to request additional funding.

Question: What practices are used to improve the quality of the actual project outputs, given that students are capable but may lack industry experience?

Susannah Howe:

- Many iterative cycles and multiple revisions rather than a single final submission.
- The final report is built progressively from earlier written deliverables developed throughout the semester, which are continuously refined and compiled.

Todd Polk:

- Quality is maintained through structured faculty checkpoints and team mentors, including a required full design review before progressing past the first semester and a re-check after winter break.
- A series of scheduled status reviews and prototype milestones (including an ~8-week checkpoint and a working prototype ~4 weeks later) ensure steady progress and accountability.

Question: How do capstone programs decide what to change or improve across semesters and academic years?

Susannah Howe:

- Course changes are guided by an annual faculty course assessment report.
- The report documents what was done during the year and includes recommendations for future improvements.
- Writing this reflection immediately at the end of the academic year (e.g., in May) helps capture ideas before they are forgotten.
- These written records are then revisited in the following academic cycle (e.g., in August) to implement changes.

Todd Polk:

- All proposed changes are recorded in a running document, where updates are tracked.

- This creates a long-term record of continuous improvement, accumulated over 10+ years of course iterations. As a result, the capstone course evolves significantly over time, meaning the version taught today is substantially different from what was taught 5–10 years ago due to ongoing refinements and enhancements.

Keith Stanfill:

- Semesterly course management surveys are used to evaluate the course, along with ongoing discussions with faculty advisors and collect industry feedback to identify issues and needed changes.
- Improvements are tracked and implemented using a living task system (e.g., Microsoft Planner).

Question: How is industry or client feedback collected in capstone projects? Specifically, is feedback gathered via ongoing communication with industry sponsors?

Susannah Howe:

- Industry/client feedback is collected throughout the project lifecycle.
- The instructor also monitors sponsor relationships and intervenes when needed, especially with new sponsors (including attending meetings if projects start to go off track).

Todd Polk:

- Continuous engagement is maintained through multiple touchpoints across the project lifecycle, including a client orientation at the start, periodic reminder emails before major milestones, and encouragement for early issue reporting (“don’t wait until the end to let us know”).

Keith Stanfill:

- Client interaction is maintained through weekly team–client meetings, supported by a recurring quad chart update, with faculty (and sometimes clients) copied for visibility.
- The instructor monitors communication asynchronously, occasionally engaging directly in email threads to ask questions or clarify progress, which can also help surface or correct discrepancies in reported status.
- Additional structured feedback occurs during formal design reviews at the end of first semester

Question: How do capstone programs manage and organize different types of systems and information used in academia and industry?

Susannah Howe:

- Use a traditional method where teams submit hard copies of deliverables for record keeping.
- In addition to paper submissions, students also submit a digital copy (CD/DVD) containing all project files.

Todd Polk:

- The program uses a university cloud storage system.
- Each team is assigned a dedicated folder where all project materials are uploaded, including reports, code, data, documentation, and a README file.
- At the end of the project, the complete project archive is finalized and shared with the client via a time-limited link, with the option to regenerate access if needed later.

Keith Stanfill:

- Project evaluation and grading are managed through Canvas.
- Each team is also given a Microsoft Teams site, which serves as the central workspace and contains a final documents folder with all deliverables.
- At the end of the project, sponsors are asked whether they want project materials, which are then shared through a secure file transfer system with a time-limited link.

Question: If designing a capstone program from scratch, how should priorities be set to determine what to implement first in order to build an effective and functional program?

Todd Polk:

- Attend capstone-focused conferences like this to seek advice and learn from others.
- Do not build a capstone program entirely from scratch. Leverage existing materials and best practices from experienced faculty and institutions.

Keith Stanfill:

- Benchmark with other capstone programs.
- Spend time with industry advisory boards and understanding the skills and experiences employers value most.
- Gather alumni feedback to identify gaps between their academic preparation and what they need in industry or graduate school.

Susannah Howe:

- Visit or benchmark against peer institutions.
- Collect information and examples from established capstone programs.
- Be willing to continuously refine the program rather than expecting to get everything right the first time.

Question: How much formal lecturing is typically included for capstone class? What topics are usually covered in lectures?

Susannah Howe:

- The “lecture” component is highly interactive rather than traditional lecturing, covering topics include presentations, report writing, communication skills, negotiation, networking, intellectual property, tech transfer, sustainability, engineering ethics, life cycle analysis, quality management and engineering economics.
- The course also includes alumni talks and career-focused sessions, giving students exposure to life after graduation and different career paths.
- Content is flexible and responsive to student input, asking students what they want to learn and then incorporating those topics into the course.

Keith Stanfill:

- During the pandemic, a large portion of the course content was recorded as short instructional videos.
- The class has now become fully flipped, where students are expected to watch content before class and use class time for applied, scaffolded activities tied directly to their projects.
- In-class time is used for hands-on implementation, immediate feedback, and practice activities such as presentations and stand-ups.

- Before major presentations, teams present preliminary design reports and receive feedback from classmates, coaches, and instructors, which is highly valuable.
- The course includes multiple MVP checkpoints in both fall and spring.
- Class time is also used for structured evaluations, including qualification review board meetings where students present to both business and technical panels.

Todd Polk:

- Pretty much everything is prerecorded videos that students watch ahead of time, followed by quizzes to ensure preparation before coming to class.
- When students come to class, it is treated as “training” rather than lecture time. In-class training activities emphasize brainstorming and communication.
- Teach mainly professional skills such as the engineering design process, project management, and teamwork development, helping teams build cohesion early in the semester.
- In the second semester, there are fewer formal meetings and more execution-focused work (build and test), with instructors mainly providing periodic check-ins and oversight.

Question: What strategies are used in capstone programs to motivate students to go above and beyond baseline expectations and deliver higher-quality work?

Todd Polk:

- Treat all teams the same, but when a team or individual is behind, instructors step in with direct coaching conversations to understand what’s going on and help them get back on track.
- When needed, granulate down to the individual level, especially when peer evaluations show a student is not contributing at the same level as the rest of the team.
- Students are still held accountable for their team expectations, but instructors account for legitimate external circumstances when they exist.

Susannah Howe:

- Build connections across all directions—between instructor and students, students within their teams, students and their sponsor, and instructor and sponsors—so that everyone is connected in the process.
- Even if the project is not students’ “dream project,” they develop a sense of responsibility and accountability to the people they are working with, which motivates them to put in the extra effort.
- The instructor should also put in effort to match student effort, showing students that engagement and commitment go both ways.

Keith Stanfill:

- Team conflicts are common, particularly in multidisciplinary settings where students may undervalue other majors, leading to tension and lack of respect between disciplines.
- The instructor’s role is to be intentional but not always the central mediator, sometimes connecting students with the right resources so they can resolve issues directly with each other.
- Empathy is a key part of managing these situations.