



Panel 4C: Managing Conflict in Capstone

Facilitator: Bridget Smyser (Northeastern)

Panelists: Nathan Kathir (George Mason), Denny Davis (Washington State, Emeritus), Robert Hart (UT Dallas)

Description: Capstone means teams and teams can mean conflict. The panelists will share their experience in dealing with unproductive conflict and harnessing productive conflict.

Prepared Questions for Panelists:

- Do you explicitly address conflict and conflict resolution skills with your teams? What information do you give them? How is that information delivered?
- What are the most common forms of conflict that you see in your classes? Do you have a standard procedure for addressing conflict?
- How does conflict affect team/individual grades, if at all? Can one student receive a lower grade?
- What is one memorable story of managing conflict from your experience? What did you and/or the students learn from this?

Panelist Introduction

- Nathan M. Kathir
 - Teaching Professor, Dept of Mechanical Engineering, George Mason University since 2019 (5 years).
 - Role: Director of Senior Projects (i.e., capstone program) for the last five years. Manages approximately 20 teams, 80-90 students annually who go through the major engineering design experience. Licensed PE in Colorado and previously worked for Dept. of Defense for over 30 years before joining Mason. Currently a commissioner and member of the executive committee of the Engineering Accreditation Commission of ABET.
- Robert Hart, University of Texas Dallas Design Program
- Denny Davis
 - Emeritus Professor of Engineering Education, Washington State University in Pullman, Washington. I retired in 2012
 - Role: One of 4 to 6 coaches for a high school team of 6 to 12 high school level, home school students. role is teaching the design process, providing engineering conceptual knowledge, facilitating team development, and developing professional skills in team members. I have published several paperback books in support of high school robot design and team development. I have also published paperback books for college-level design teams including Design Thinking.



Capstone Design CONFERENCE 2024

JUNE 3–5, 2024 ► KNOXVILLE, TENNESSEE

Q: Do you explicitly address conflict resolution skills and how?

- Nathan: Originally he didn't think it was needed. After a couple of years, he figured out that managing conflict is his main job. He has them read the book *The five dysfunctions of a Team* ([Patrick Lencioni. The Five Dysfunctions of a Team](#)). He has them do teamwork exercises.
- Robert: Acknowledges it from the beginning. Team function/team health is critical for success. They partner with the Business school to do 2 sessions on teamwork. They do a specific class on conflict resolution with videos, role-playing, and other ways to improve team function. Reaching out to experts is a great way to cover gaps in knowledge. Its important to discuss conflict later in the term so they have some team experiences to work with. Pay faculty a small stipend to teach in another department.
- Keith: About 8 weeks in they do inclusiveness training, revisit team charters, and ask if everyone's voice is being heard, if everyone is comfortable, etc.
- Denny: [Teamwork Minutes Exercises](#). One thing from assessment work was the importance of keeping a professional mindset. Get them engaged in talking about conflicts, how they've handled them, and what works and what doesn't. Give instruction in conflict management as part of the development process. Develop a team identity that includes the project and the team members. Look at core values - build a foundation the team can build on top of. Denny has a bunch of books about team formation at high school and college level (avail. On Amazon)

Q: What are the most common forms of conflict you see in your classes? Standard procedure for addressing this?

- Robert: Unequal teamwork contributions. Some folks want to work on it all day, every day, and some just want to get by.
- Nathan: Team charters for every team. He tells them to go back and read it when there are issues. Think about it like a legal document. You signed it - you agreed to follow it. Lack of communication and lack of trust is another issue. The more they talk to each other the fewer problems they have. Gives the charter 3-4 weeks into the project.
- Regina: We do a team charter, but it seems to be just another assignment to them. No one refers back to it. How can I work it in so they actually use it?
- Keith: Ask them why they aren't doing what they said they would.
- Robert: Don't discount the value of it. It makes the team have an open conversation about values, how they like to communicate, what they want out of the project, etc. It has a lot of value.
- Denny: Also had a charter when he taught capstone. Team goals, a more inclusive team - what are the issues they encounter when they are discussing this? Need to have a context that allows students to work ideas out.

Q: Examples of positive reinforcement?

- Robert: All punitive. Could they, say, give a reward? Have team building activity so members can get to know each other – annotate pictures and name students.
- Denny: Charter is about core values - professionalism, and aspiring to win awards based on professionalism.
- The incentive is “down the road” but drives work quality.
- Audience Member: At ORNL they had a bunch of awards like the Curious George award for curiosity or the Status Quo award for someone who questioned the status quo, etc.



Capstone Design CONFERENCE 2024

JUNE 3–5, 2024 ► KNOXVILLE, TENNESSEE

- Job Juggler Award: “for the person who seems to successfully handle too many things at once - it’s almost suspicious”
- Fire Extinguisher Award: “ for the person who always puts out metaphoric fires.”
- Status Quo Foe Award: “For the person always challenging the status quo to make things better and not accepting the answer, ‘this is just how we have always done it.’”
- They should revisit halfway through the semester to see if it needs to change.
- Nathan: In the showcase at the end of the term they publish a 2-page capstone brochure for each team that they can take to job interviews. Gives them a positive target
- Robert: They have an assignment to go do something fun with the team before they make the team charter so they can get to know each other. It’s required. They have to submit pictures (or it didn’t happen 😊).
- Similar - turn in a picture of the team having a meal together. Teams who do that work better.
- People remembered 4 months later how valuable it was - now it’s a requirement.
- Students develop a team standards agreement. How will they manage the work, the meetings, the documents, etc.

Q: How many folks require a team charter or a project charter?

- Responses from the audience: a large portion of the audience had team charters, some had project charters and some had one document that combined both.

Q: Do you have SOPs for dealing with conflict?

- Denny: My robotics team (homeschooled, familiar with the Bible). First, you go to them and discuss the problem. If they reject the approach, take along a second person who is unbiased and can help make sure people understand. If that doesn’t work, go to the instructor. Parallel to the Biblical method.
- Robert: We have a similar process, but we make sure they understand that they can come right to the instructor if it’s a big issue.
- Nathan: All of my teams are sponsored. There can be conflict between the team and the sponsor. They are not full-time employees of the sponsor - we need to manage expectations. Conflict between the team and their advisor requires the coordinator to talk to both parties.
- Robert: There are always two sides to the story. Need to find out where the truth lies.
- Team killers: The Jerk, The Slacker, The Pessimist. How do we spend time building the team to avoid those folks?

Q: How do you handle grades with team conflict?

- Denny: Conflicts appear in the work products from the individual if they are a slacker – grade would be based on the deliverable plus way the individual interacts with the team via peer assessment.
- Nathan: Can grade based on ABET teamwork criteria. There is also another rubric - the AAC&U VALUE rubric for teamwork. <https://www.aacu.org/initiatives/value-initiative/value-rubrics/value-rubrics-teamwork>
- Robert: Don’t directly penalize - it comes in through peer evaluations. Want students to learn how to manage conflict effectively - try to get to the root cause of the conflict via meeting with students individually to get all sides of the story.
- CDC24 had a “birds-of-a-feather’ - can you fire a student? Syllabus wording: The instructor reserves the right to give different grades to any individual.



Capstone Design CONFERENCE 2024

JUNE 3–5, 2024 ► KNOXVILLE, TENNESSEE

- A lot of conflict due to slackers. Some of the hardest ones have to do with bias. Sexism, ableism, and racism can lead to actual harm.
- Coach can act as a filter for team feedback - see if someone is claiming more credit than they deserve, or doing more work than their teammate is saying they are
- Make sure all team members are involved in the project beyond the administrative role if someone is marginalized and not able to do technical work – need to meet with students as instructors
- Throw in rules for safe spaces earlier in the semester – DEI and other places. Also, there can be problems with cultural issues - such as a woman from a certain country not wanting to argue with a male from the same country. It is good to be aware of those possibilities.
- It can take a lot of time and energy to meet with students – if they have a large class, they need to have faculty/mentors involved.

Q: How do you avoid bias in peer evaluations?

- It is challenging to use peer feedback as a grading tool. Get into the danger zone if one student can score another.
- Robert: Can't take the peer evaluation blind. Need to get the whole story before you have it affect someone else's grade. Last year someone was unfairly penalized - I adjusted the grade upwards.
- Nathan: Having evaluations in the middle and the end gives more points of discussion.
- Denny: You need to have the members of the team value teamwork and have the students buy into it in order to get good peer feedback. A team working together produces better results than a person working alone. Discussion on how to build a pleasant team and what constitutes effective teamwork. What are your fears about teamwork? What actions can you take to improve teamwork? This exercise on a regular basis allows for good peer feedback.
- Nathan: Someone using ChatGPT to take feedback from teammates and write a letter detailing the pros and cons of their performance (removes the idea that they could recognize someone's writing style or try to identify which teammate said which comment)
- Robert: Need to require written comments. Use the EduSource tool which has ways to deal with that. CATME also works

Resources: Tools used for peer feedback: CATME, FeedbackFruits, EduSource (great tool, recommended by Robert at UT Dallas), Google Form with questions to rate themselves, and TeamMates (not used for grading the team members, just as feedback)

Q: How do you motivate students to fill out the peer review?

- We penalize them if they don't do it. If they keep missing it they can fail. If they rate people low, they have to explain.

Q: How do we get them to fill out the feedback form truthfully? What if someone is intimidated?

- Robert: We look for trends in numbers. Flag really high or really low ratings. Spend time in class setting the stage about what is expected.
- Nathan: Even if they are anonymous, you can sometimes figure out who said it. Need to be able to talk about it. If you are working, are you going to let your client suffer because you have a few lazy team members? You have a project and a goal - it's going to hurt you if you don't figure it out.



Capstone Design CONFERENCE 2024

JUNE 3–5, 2024 ► KNOXVILLE, TENNESSEE

- Can't answer with the same value for each team member? She got a lot of pushback. "Everyone on our team is amazing"
- Anything fishy, they have to discuss with faculty. Make it clear - this is for their improvement. They have to be able to clearly explain their assessments.
- Team assessment to find team problems. They use a Google form to rate teammates. Not providing feedback is a result. We asked you to do something, but you didn't do it. That gives a negative impression. Faculty and sponsors both get these evaluations to know who isn't contributing. Can get a lower grade.
- Instruction on how to give constructive feedback. Students don't automatically know how to do this. ChatGPT can take a raw comment and turn it into a personalized letter. ChatGPT anonymizes the feedback and provides feedback letters. Students don't know what good feedback is. A workshop at the beginning of the term is really useful. (Mark Huerta from VT also has some resources on this.)
 - OpenAI-CGPT Prompt: "I am an engineering instructor who teaches a senior-level project engineering class where students work on teams for the semester. You are my assistant, who will help me provide formative feedback to my students. I collect peer comments periodically throughout the semester, and I would like you to summarize the comments into a performance feedback review in a way that is constructive and actionable. The output should be in the form of a letter, including strengths and areas for improvement with bulleted themes/headers with a closing statement at the end. Please avoid using the phrase 'soft skills'. Please also refer to projects as 'your project' or 'the project' rather than 'our project'. Please also include a Rating Summary at the bottom of the letter. Please also exclude anything that is inappropriate for the workplace. [insert X comments here]"
 - Notes: It's important to specify in the prompt your role, and what the format you want it to look like, which will depend on the format you collected the peer feedback comments in. Happy to answer any questions or provide more information on the process specifically - email me! Lisa Schibelius, PhD student at Virginia Tech, lisaschib@vt.edu
- This is interesting. The type of feedback we are giving our students is something different than they have gotten before. We're sometimes giving them crushing feedback on their technical ideas.
- One year in capstone - see the trend that one student in a team of six is not contributing. In teams where there is an even divide - three vs. three. How do you deal with your internal biases and show that you are not favoring students? If peer reviews are all over the place?
- You're seeing cliques.
- Nathan: Assigned teams, three friends want to work together. Can form cliques within the team. He thinks it is better to not assign friends to a team. Put the onus on them - say that they need to work together to learn how to work on a team, otherwise it will affect their grade as a team.
- Real-life experience: A boss will never ask, "Who do you want to work with? What project do you want to work on?" You can choose which company to work for, but not what team members you work with.
- What language do you use to give feedback? They need to know how to do it.
- Students grow in their ability to give feedback - this is a good learning outcome. Some of these folks will move into roles where they have to give performance feedback.
- Bridget: When we assign teams, we will allow students to bid on projects as a team of 4 or 5. This allows students to choose their team - in essence, we let the cliques sink or swim as cliques. We do have to form



Capstone Design CONFERENCE 2024

JUNE 3–5, 2024 ► KNOXVILLE, TENNESSEE

some teams from people who bid as individuals. Some of these teams need more teamwork coaching than others.

- Vito: “Team performance is an engineering problem” – reinforce that teams need to meet to discuss frequently, can find that teams that meet frequently are the best performing teams.
- Robert: We require them to actually talk, in person, rather than texting each other.
- Finding time for multidisciplinary teams to meet can be challenging because their schedules don’t mesh
- Tell them not to plan to work together for 3-4 hours. Frequent short meetings are better.
- Another sort of conflict - a student who has to work. “We can’t meet at time x because I have to work” I know that this is going to be a problem team.
- Nathan: As part of team presentations update to class, they include how many times your team met since the last presentation, how many times you met with your sponsor, and how many times with the advisor if possible.
- Bridget: Some students have to work to put themselves through school. They don’t have the option to not work. Make sure you don’t penalize them for this, and that teammates understand they need to work as a group to schedule meetings so that everyone can attend and this time may change from week to week. [I worked two jobs to put myself through MIT. I kept my group commitments but my schedule was very erratic. Setting a standing meeting at the same time every week didn’t always work. My team was flexible about this (and one of my team members worked at the same job, which helped) but it could have been a problem if I didn’t have an understanding team] – thanks for sharing and including this!

Q: What about athletes?

- Nathan: He tells them to work with their teammates in advance.
- One audience member had rowing team members - they were generally on top of things.
- Robert: These are often the best students in the class.
- Bridget: University rules require us to accommodate athletes. This can be a benefit to letting people choose their own teams. Example: I had a team that came in with four guys all on the Track & Field team. They could continue working together on the bus to meets and such. One downside was that the prototype they designed wouldn’t work well for anyone under 6 feet tall.

Q: Do you see there is more conflict if teams are all high-performing academically, or a mix of high and low GPA students?

- Nathan: Don’t use GPA as a metric – it doesn’t always show which students are the top performers in the teamwork field. Sometimes top students are not the best problem solvers outside of the academic exam environment.
- Some of the ones struggling to get by write really big checks later, because they had to struggle to figure things out.

Q: How do you identify individual contributions?

- Nathan: Part of it is looking at the individual assignments. For each section in group reports - record who wrote it, who reviewed it. Rotate roles. If he doesn’t see their initials, they didn’t work on the project. During the final talk - is it one person on the video, or did they all speak? Or did one person just give the title and then didn’t talk the rest of the time?
- Individual e-portfolios also give an indication of individual performance.



Capstone Design CONFERENCE 2024

JUNE 3–5, 2024 ► KNOXVILLE, TENNESSEE

- Individual sections of reports have to be submitted beforehand. Forces people to get parts done early. Students lose points on their individual parts if they are late.
- Some people (dyslexics, second language) need editing more than they need to do editing. It's hard to get exactly equal work from everyone depending on their individual challenges.
- Nathan: They need to describe their strengths and weaknesses at the beginning of the course. They need to work with the strengths and weaknesses they have.
- Robert: We do individual time tracking of time spent on tasks.
- Software ([Red Mine](#)) that can do trouble tickets, chats, time tracking, etc. to track who did what.
- Some folks use an in-house project management tool.

Summary: Need to keep a close watch on folks to be able to catch things early.