

Student Team Dynamics and Developmental Feedback: A common challenge from a year-long, multi-disciplinary engineering Community of Practice

Jennifer Detlor, Eduardo Arvelo, Arganthaël Berson, Haley Briel, Michael Cheadle, Chris Dakes, Donald L. Gillian-Daniel, Laura Grossenbacher, Erica Hagen, Nathan Jung, Lizeth Ortiz Reyes, Tracy Jane Puccinelli, Amanda Smith, Sinan Tas, Christa Wille

University of Wisconsin–Madison

Context of the Case Clinic Process

Teamwork and communication are essential professional skills for Science, Technology, Engineering, and Mathematics (STEM) disciplines, yet they are often overshadowed by the conventional emphasis on disciplinary knowledge (Holloway & Linvill, 2023). Faculty surveys, alumni, and employer feedback support integrating teamwork and communication more comprehensively into the engineering curriculum. To address these challenges, the College of Engineering at a large, research university created “Engineering4All” (E4All), a Community of Practice (CoP) that supports faculty exploration of pedagogy and content for teaching teamwork, communication, ethics and leadership. The initial E4All cohort of thirty faculty was drawn from introductory, capstone, and engineering communications courses that are critical “touch points” for all engineering undergraduate students. Near the end of the initial year-long engagement, a subset of eight CoP members, a facilitator, a notetaker, and several staff observers convened to conduct a one-hour Case Clinic. Through previous work in the CoP, the group had established trusting relationships, thus allowing us to jump right into the process. Details of the Case Clinic approach (Wenger-Trayner et al. 2023) and lessons learned are presented below.

Fostering positive team dynamics (Coblentz, et al., 2021) emerged as a necessary but difficult goal for many E4All faculty. The Case Clinic started with a faculty member (Lead) posing the following challenge to the group: “How do we foster positive team dynamics in lower-level, large-enrollment courses where students work in groups for short periods of time to do problem solving and other content-related activities? I am finding that students are not well-equipped with the knowledge required to engage in positive team dynamics. Additionally, I am struggling to get students to provide truthful and constructive feedback about one another in their teams. From a curricular perspective, I am wondering how to better equip students to engage in positive team dynamics, especially for future courses where they will work in groups for longer periods of time.”

Developing Understanding

After the challenge was presented, participants were invited to ask clarifying questions about its context and nature. A representative selection of questions and responses is shared below.

A participant began by asking about common team dynamics issues in introductory-level, large-enrollment courses, and about the guidelines provided to students. The Lead shared, “I have seen groups not completing the task at hand, disrespectful communication, and poor allocation of group work between team members. Some instruction is given to students about working in groups and task allocation, such as selecting a leader, assigning tasks to each group member, and suggesting timelines for completion. However, this guidance really only covers the bare minimum—what should students do to successfully submit the task on time?” She explained that students work in multiple groups throughout the semester for problem solving and short projects, and that the groups change frequently. While it would be beneficial for students to revisit group dynamics during each transition, this additional time would come at the expense of content coverage. Another participant asked, “How much time are you willing to invest in providing feedback to students?” The Lead responded that she’s personally willing to dedicate time, but the course is taught by multiple instructors and that willingness may not be the same for others.

Another participant asked about the downstream effects of negative team dynamics and the desired outcome of retooling teamwork practices. The Lead said, “Students are going into upper-level courses with a poor understanding about positive team dynamics. They may develop coping mechanisms or behaviors that are not desirable. A key long-term impact is that students are not prepared to engage effectively in teams in other courses later in the curriculum and in their career.”

Two participants asked similar questions about the course’s feedback mechanisms and whether students could apply the feedback while working in the same group. The Lead shared that while there is currently no formal instructor feedback, students receive peer feedback through group reflections. Since the students switch groups every 2-4 weeks, there are limited opportunities to implement this feedback in the same group. She expressed openness to other ways of providing feedback on team dynamics and emphasized the importance of teaching students to give authentic feedback.

A participant explored this further by asking for examples of biased feedback. “From our [E4AII] CoP, I have been thinking about the conundrum of making feedback part of students’ grades. In doing so, instructors found that students artificially increase scores they give each other. On the other hand, if not included in the students’ grades, the activity does not appear to be taken seriously.” The Lead agreed with the challenge of getting students to be truthful and provide constructive feedback to their peers to improve team dynamics.

Sharing Related Experiences

Following clarifying questions, the facilitator invited participants to share their related experiences. A participant shared a challenge from his introductory-level, large enrollment classes. “I use a flipped-classroom approach. When students come to class they are encouraged to work in teams, but this is not enforced. My class is an ‘extreme’ case of this challenge in that students can form different groups at each meeting. Students form groups naturally, and do not formally provide feedback on team dynamics to one another.” He shared that he rarely hears anything negative, but when he does it is hard to effectively address the issue.

In response, another participant shared an example of small projects completed toward the end of the semester. “Teams do not always finish the task properly because of team dynamics issues. The work is done in a relatively short amount of time, the instructor’s goal is task completion, which they hope happens respectfully... [At the end] we measure how efficient the team is at getting the work done, but we do not evaluate [the group’s] communication.”

This portion ended with a participant talking about the challenges she faces with authentic peer feedback in her course. “In an assessment at the end of class, I find that peer feedback (about one another) is different from what I have heard from the teams. The reality of team dynamics differs from what the students report. This is difficult for me to reconcile, particularly thinking about how to grade fairly.”

Advice from Participants

The facilitator next asked the group to share advice, seeking responses to the prompt: “If I were you, this is what I would do...” Several participants spoke about the benefits of using team contracts. “Ask [the students] to plan for eventualities—like having a specific plan in place in case someone doesn’t show up for class. Having early conversations allows groups to settle into good dynamics... I emphasize that the contract isn’t for me, but for them, and encourage them to clarify my role in any conflict resolution”. Another participant commented that his lab class uses team contracts as a tool for teams to discuss and strengthen their team dynamics. “The contract formalizes what students need to do. When the team becomes dysfunctional, the team can talk with the teaching assistant and review the contract together.”

Aside from team contracts, a participant stated the importance of instructing students on effective feedback, emphasizing that self-awareness is a key part of the feedback process. She recommended asking students to reflect on peer feedback, perhaps using Feedback Fruits, a digital tool that facilitates group feedback and personal reflection on it. Another participant shared similar experiences from his senior design course, where students work on team dynamics throughout the semester. “I want students to go through the process more than once, reflect on what went well, and be able to apply that next time.”

While these suggestions offered valuable insights on the benefits of contracts, group members also identified challenges in applying them to this specific situation. A participant stated, “Team contracts were quite helpful [for my course] because students could reflect on, and act on them. However, I would find it difficult in your situation where teams are changing all the time.” Another participant agreed, mentioning that since students form new groups every day in his class, team contracts would be challenging to implement.

Two participants suggested a template for a team contract that would be easy for students to complete, and a third participant highlighted how a structured contract would both enforce positive team dynamics and serve as a tool to teach students about it. The session wrapped up with a suggestion to iteratively develop the contract, and ways to optimize the process of using it. “The overhead [time] would be higher up front as you figure out their [and] your expectations. Once you have a process figured out, you can build on it and iterate.” He also recommended teaching the TAs about team dynamics so they could lead the activity in subsequent years.

Summary and Next Steps

To wrap up, the facilitator shared that the case clinic was designed to be mutually beneficial, and he hoped that all participants took something away that they could apply to their own classes. Throughout the process, two key ideas emerged for fostering positive group dynamics: (a) student involvement in setting expectations, and (b) iterating on these expectations through self-reflection grounded in peer feedback. In introductory-level, large enrollment courses where students collaborate in short-term group activities, the prevailing suggestion was to implement a structured team contract or activity to assist groups in defining their expectations for working together. The Lead said she plans to implement this in an upcoming course and hopes to have students iterate with built-in opportunities for self-reflection on peer feedback. Participants agreed that it is challenging to solicit authentic peer feedback and stressed the significance of teaching students how to give effective feedback. They concurred that authentic peer feedback remains a challenge worthy of ongoing consideration.

Furthermore, the specific structure of the case clinic enabled all participants to engage fully by asking clarifying questions, sharing relevant experiences, and offering advice on the presented challenge. The Case Clinic structure helped the group to quickly engage in an in-depth discussion of the challenge within the relatively short time frame of one hour. It also allowed for productive sharing among teaching faculty who represented not only introductory, capstone, and engineering communications courses, but also a range of engineering disciplines, including: Mechanical Engineering, Electrical and Computer Engineering, Biomedical Engineering, Industrial and Systems Engineering. Aside from the individual actions each faculty participant will take in their respective classes, the facilitator, note taker, and staff who attended to observe are all poised to convene and facilitate future case clinics with the same structure to address future challenges brought forward by CoP participants.

References

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