CDEI 492: Supporting Teams, through a DEI Lens
ASEE 2019
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We are excited to introduce **Tandem** in this session. Since 2011, we have co-taught a first year, team-based, project-based course and evolved a fairly robust system of supporting teams. In early 2018, we proposed to our university's Office of Academic Innovation a teamwork support tool that would integrate and improve upon the system of surveys and online "teamwork lessons" we had been using.

The current version of Tandem is an early iteration of a scaffolded teamwork support system. It contains ideas and work from three faculty sponsors (the two of us plus Dr. Stephanie Sheffield), plus the expertise from our Office of Academic Innovation (behavioral scientists, educational researchers, developers, UI/UX designers, etc.). As part of this process, we have conducted interviews and focus groups with instructors both within and outside of the College of Engineering, focusing both on supporting teams in general and on addressing equity/inclusion issues that arise on diverse teams. We've conducted interviews with students regarding team experiences (in general as well as diversity-related) and regarding their use of this tool specifically. We've done our best to build a robust tool that can support students in teamwork, and we hope to gather feedback from this room of interested/experienced folks to improve it for the future.

Tandem collects (and therefore can tailor feedback based on)
- **Beginning of Term survey**
- **Weekly, quick Team Checks**
- **More significant peer and self assessments**
- **Behavior within the tool**

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A Beginning of Term (BoT) survey about individual characteristics and preferences for work in the class and on a team. Items on the survey are included based on teamwork research (within and outside of Engineering)... For example, we ask about goal orientation, self efficacy with particular course-relevant skills, attitude toward groupwork, comfort speaking up in groups). The survey doesn't need to include most demographic information as we can gather this information from a linkage to the registrar. The BoT survey gives us baseline information we can use to create teams[1] (e.g., optimize shared availability or location; intentionally consider identity characteristics and comfort on a team) as well as to tailor later messaging (e.g., two teams that are struggling with logistics/finding shared meeting times could get different messages if one has multiple non-traditional students and the other has multiple students who indicated low motivation for the class).

Sample logistics questions from BoT survey

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[1] Team creation is manual, for now!

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Weekly, quick Team Checks. Students answer a 5-item sliding scale survey, which provides a quick holistic picture of which teams are struggling and which topics are of most concern across the class. Items are repeated/ predictable, to establish a shared understanding of good teamwork behaviors, and to minimize the burden of completing the checks.

Sample sliding scale questions from weekly team check

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More significant peer and self-assessments. At key points during the semester, students complete assessments of themselves and teammates, choosing from among options as well as writing open-ended feedback regarding what they and others should be proud of and what they and others should work to improve. Questions ask both about contributions in terms of completion of tasks but also about engagement in productive and unproductive teamwork behaviors.

Sample task allocation questions from peer/self assessment

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Reflective questions and behavioral data collected from students' interactions within the tool. Based in experiential learning theory, Tandem's lessons include opportunities for students to respond to open-ended and sliding scale questions about targeted team issues. For example, in a lesson on group communication, teammates are asked about the balance/imbalance of communication. Students on teams with high imbalance are asked about what strategies (from a short reading) they might try to make sure everyone is able to participate and feel heard. Tandem collects the actual textual responses as well as behavioral information (how long did students engage with the lesson? How many words did they write in response? etc.)

Sample reflective prompts from lesson on "Giving and Receiving Feedback"

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Tandem uses that collected information to provide tailored coaching of teams, in these forms
- **A meet-your-team lesson**
- **Lessons on teamwork topics**
- **Team status visualizations**
- **Peer/self-assessment visualizations, with scaffolded reflection**

A meet-your-team lesson. This lesson[2] provides a summary of team characteristics and variability, and encourages students to realize teammates may have different preferences along a number of axes. This lesson leads into a scaffolded, shared "operating agreement" (team contract) in which teams are encouraged to explicitly discuss and determine shared expectations. Last semester, the shared Operating Agreement was made and housed outside of the tool (in Google Docs). It may be implemented in Tandem in Fall 2019.

Teams working on Operating Agreements

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[2] Which will first be implemented in Fall 2019!

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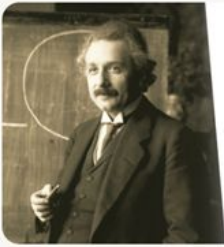www.teamsintandem.com
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Lessons on teamwork topics. With a customizable frequency, students are given short "lessons" on teamwork topics from a bank of such materials. Teams and individuals see specific lessons with specific content based on pre-baked algorithms[3]. For example, a team who reports low scores on the weekly "equal workloads" scale might see a lesson on task allocation on teams. Additionally, the lessons are tailored to individuals, so the task allocation lesson would be further personalized: students who reported low self-efficacy on particular skills relevant to the course but high learning orientation might see encouraging messaging reminding them of course learning goals as well as links to resources; students who reported only performance motivation (grade) would see reminders regarding course grading policies. The lessons have been developed primarily by behavioral scientists at the Office of Academic Innovation.

The basics of imposter syndrome

Imposter syndrome is the feeling that you don't deserve credit for your accomplishments—that you got to where you are by luck, by accident, or by mistake. It's the fear that, any minute, people will realize you're not as talented, smart, or able as once thought, and you'll be exposed as an imposter... despite overwhelming evidence that you're actually talented.

Many people feel this at some point.

Seriously, a lot of people—maybe as many as 70% of people. Even people you look up to feel it; people who you see as smart, talented, poised, and so on. Even they feel like a fraud sometimes.

"The exaggerated esteem in which my lifework is held makes me very ill at ease. I feel compelled to think of myself as an involuntary swindler."

– Albert Einstein

Sample beginning of lesson on imposter syndrome

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[3] Right now. A goal is to use machine learning and A/B testing to better match topics to students.

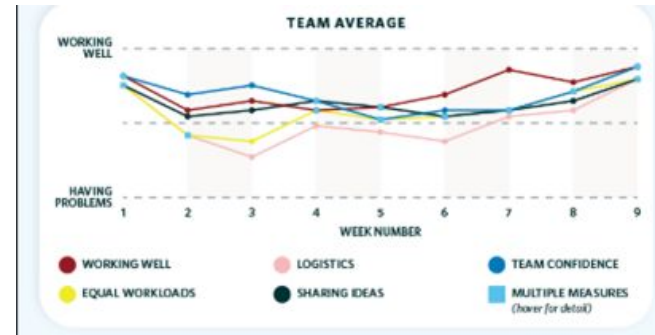**CDEI 492: Supporting Teams, through a DEI Lens**
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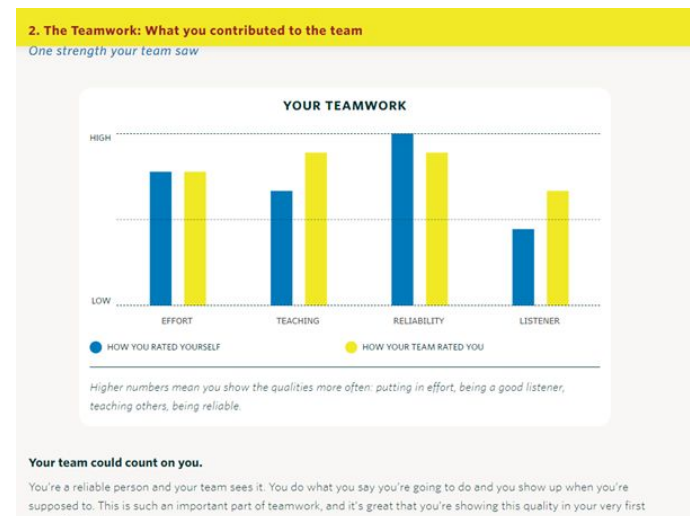www.teamsintandem.com
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Team status visualizations. Students see their own team's status, updated weekly, which enables them to determine areas for improvement as well as general trajectory. Instructors see these visualizations for all teams.

Sample team visualization captures overall trajectory as well as specific areas of weakness.

Peer/self assessment feedback, with scaffolded reflection. Tandem generates reports back to students following peer and self assessment. It identifies areas of relative strength and weakness and highlights those for students. Based in experiential learning theory, it provides prompts to encourage students to abstract from this specific teamwork experience to consider how their own and their teammates' behaviors contributed to the team's level of success.

Sample visual feedback from peer/self assessment

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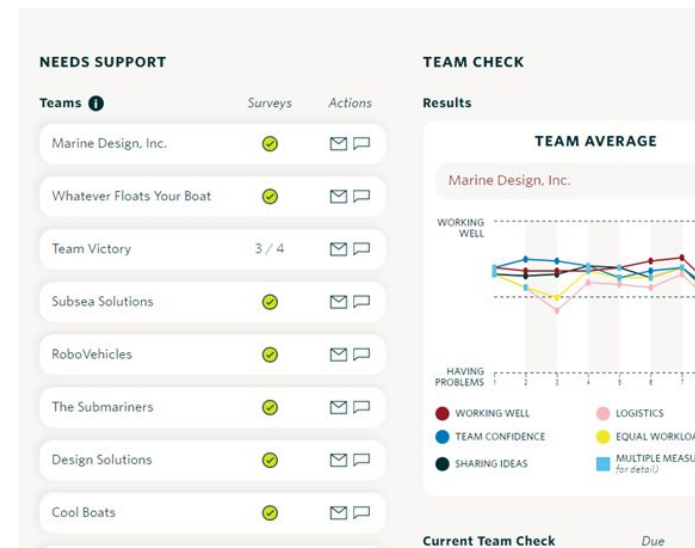ASEE 2019
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Tandem provides faculty digestible information about what is happening on student teams
- **Big-picture landing page**
- **Team-level detail**
- **Individual-level detail**
- **Report-outs at the end (separate file/ second packet)**

See the big picture. From the main landing page, faculty can see general patterns in the class, such as which teams are struggling and whether they are true outliers or just slightly lower than other groups.

Instructor landing page shows teams and individuals, sorted into "needs support" (or not!) categories.

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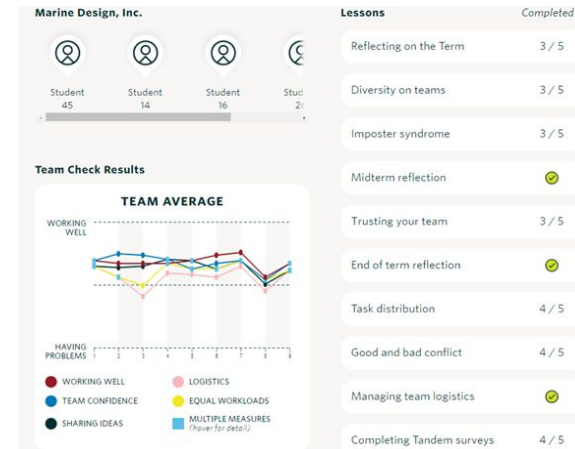ASEE 2019
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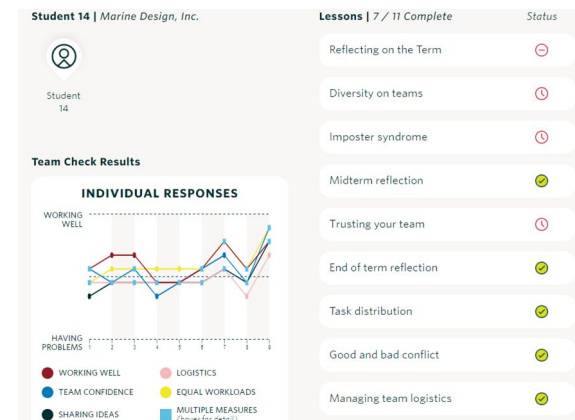www.teamsintandem.com
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Drill down to the team level. Tandem shows instructors how a team has answered weekly team checks, what lessons they have seen and how they have responded, how they each rated each other on peer assessment, etc.

Instructor view, sample team

Drill down to the individual level. Tandem shows instructors how an individual student has answered weekly team checks, what lessons they have seen and (whether) how they have responded, how they have rated themselves, and how others have rated them.

Instructor view, sample individual

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