Teaching Conflict Management for Teamwork

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This is a Work in Progress paper.

Introduction

Teamwork ability, a highly recognized soft skill in the engineering profession [1-4], is a topic of paramount importance. However, our current engineering curriculum lacks the necessary guidance to help our students develop this critical skill [5-7]. Literature suggests three critical aspects of teamwork – (1) understanding team development stages and managing expectations, (2) communicating effectively within and between team settings, and (3) managing conflicts with professionalism. Recognizing these unmet needs, we have been working on developing workshop-style lecture modules across our engineering curriculum. We have developed lecture modules regarding the first two aspects of teamwork in our sophomore and junior courses over a two-year period [8-9]. This work-in-progress focuses on developing awareness regarding possible reasons for conflicts arising in team settings and their management. We deployed this lecture module in the spring of 2024 for the first time in a senior-level mechanical engineering course.

Undergraduates Improving Teamwork Skills (UNITES)

Our Mechanical Engineering Department (MEEN) at Texas A&M University (TAMU), one of the largest in the United States, typically has 70-80 capstone project teams each year. Capstone faculty frequently are faced with aspects of dysfunctional teams, even after students have been exposed to teamwork since their first-year experience. Teamwork exposes students to different perspectives which fosters creativity and innovation constituting it as a critical skill for success in undergraduate engineering. While technical skills are often the focus of engineering programs, students rarely receive formal guidance on effective teamwork. Without proper training, negative group experiences can challenge their future workforce professional success. Therefore, integrating teamwork training into the engineering curriculum is vital for preparing students for the collaborative nature of their careers and this is our primary motivation.

There is an open question on how and where to fit these teamwork preparations into the curriculum. Developing teamwork skills involves understanding key elements in team dynamics such as, managing roles and expectations, effective communication, and conflict management - shown in Figure 1. Successful teams build trust by clearly defining their purpose, goals, roles, and expectations through core rules, which promotes accountability and alignment. Effective communication is essential for minimizing misunderstandings and ensuring all members are aligned, while conflict management helps teams navigate challenges and restore trust. By mastering these components, students should improve their ability to collaborate, boosting their confidence and success in academic and professional team environments. Motivated by these

teaming challenges, a group of MEEN faculty at TAMU have explored teamwork and developed a model and methodology for effective teamwork skills development called UNITES – UNdergraduates Improving TEamwork Skills (in Figure 1) [8,10]. To fit within the existing curriculum, our goal is to raise awareness among students while giving them a chance to practice and improve their skills in their course projects.

Figure 1. Essential elements of the UNdergraduates Improving TEamwork Skills (UNITES) methodology highlighting the three developed modules [8].

To address our motivation and purpose, during the last four years, we have been developing and refining three lecture modules to train engineering undergraduate students' teamwork skills. This three-lecture-module intervention is progressively introduced at the sophomore, junior and senior years, one module per level in an existing course with a group project. Our approach is structured as a workshop where students receive pre-recorded mini-lectures and spend most of their class time working through activities and discussing. Afterward, students come away with a better understanding of teamwork and a better understanding of themselves and classmates. Each workshop takes one lecture period and can be taught by any instructor with minimal training. The contribution herein has transferable impact across disciplines in the general professional formation of engineers. Modules 1 and 2 have been previously presented [9,11]. This paper will focus on Module 3: Conflict Management.

Conflict Management Workshop

This conflict management workshop is presented to senior students shortly after beginning their multi-week class project. To kickstart student engagement, the workshop begins with a role-playing exercise of four students acting out a scenario in front of the class. Each student is given a one to two paragraph summary of team dynamics from their perspective along with bullet point suggestions to help them act and respond in character. After each "actor" has a chance to study

their role, the scenario begins with the "audience" taking notes from an outside perspective. The scenario is designed to include both *healthy* and *unhealthy* conflicts with one especially stubborn and defensive character. The healthy conflict should be solvable once participants realize that team member expectations were varied, and team communication was inefficient (calling back to previous teaming modules in the sophomore and junior years). The unhealthy conflict may not be solvable. We thought it was important to showcase difficult conflicts to students where "resolution" is not possible and other "management" is necessary. After playing out the scenario, we let audience members discuss their thoughts before allowing the actors to reveal any hidden motivations. This sparks a good discussion among students regarding how they may have responded in this situation. We ask students to keep this scenario and discussion in mind as we proceed with the workshop.

Since this is the third module in a series that students receive over three years, we quickly recap the previous modules (roles & expectations and effective communication) with summary videos. After each video, we engage the students with a quick discussion question where they will reflect on their past experiences.

Next, we discuss the Thomas Kilmann conflict mode instrument (TKI) [12]. Rather than lecturing this material, we state the five approaches to conflict management (avoiding, competing, accommodating, compromising, and collaborating) and anonymously poll students for various scenarios. Given the following (for example): "*One person does not do their work on an important project. A co-worker completes their tasks for them to keep the project on track.*" students are asked to decide which approach best matches this scenario. Poll results are displayed to the entire class, and the instructor can lead a discussion with the students. Instructor prompts can include "Is this avoiding or accommodating?", "When might this be an appropriate or inappropriate reaction to conflict?", "What more, if anything, should be done in this situation?", etc. By presenting the TKI in this way, students remain engaged and an instructor can tailor the discussion to student perceptions/questions.

At this point, we present a five-minute pre-recorded video (to enable broader implementation) covering: the difference between healthy and unhealthy conflicts, potential benefits of healthy conflict, potential sources of unhealthy conflict [13], and the STATE method [14] for communicating in the presence of conflict. After the video, students are asked to reflect on the initial role-playing exercise with this new information. Students should now be able to identify the conflicts as healthy or unhealthy. Additionally, students should better understand the source of the unhealthy conflict and varying perspectives. Students may discuss how the conflict could have been better handled – even if a full resolution was not possible.

Finally, students are given the Dutch test for conflict management [15] to understand their default TKI approach(es). This gives students an introspective look at their behavior as we re-emphasize that their default mode may not always be the best strategy. The more students

understand about themselves and their teammates, the better they can manage group conflict as they pursue a greater goal.

Initial Results

After the module, students are asked to submit an informal reflection by the end of the day. The reflection asks students to list: three things they learned or affirmed, two questions that they still have, and one thing that they plan to do differently going forward.

Tables 1 and 2 summarize the student responses in spring 2024 (41 total students) and fall 2024 (69 total students). Table 1 highlights the key themes that emerged when students were asked to "Identify three (3) things that you learned, found interesting, or confirmed". Table 2 highlights the key themes that emerged when students were asked to "Identify one (1) thing that you plan to do (or do differently) going forward".

Table 1: Instances of self-reported student learning

	Spring 2024	**Fall 2024**
An Understanding of Differences in Individuals and Conflict Management Styles (Including TKI and Dutch Test Results)	30/40 **(75%)**	25/40 **(62.5%)**
The Importance of Communication and/or The State Method	26/40 **(65%)**	20/40 **(50%)**
The Importance of Trust and Respect to Teaming	16/40 **(40%)**	1/40 **(2.5%)**
An Understanding of Healthy and Unhealthy Conflicts	15/40 **(37.5%)**	10/40 **(25%)**

Table 2: Instances of self-reported student commitments

	Spring 2024	**Fall 2024**
Communicate Better	18/38 **(47.4%)**	19/40 **(47.5%)**
Keep an Open Mind and/or Respect Others	15/38 **(39.5%)**	12/40 **(30%)**

Discussion and Conclusions

The results from the first two conflict management workshops are encouraging. Based on the student responses, they are primarily learning about how they may differ from their teammates –

especially with respect to their conflict management styles. It is important to recognize when teammates view and respond to the same situation in different manners. We are also happy to see students reflecting inward. A few students report their default style to be either avoiding or competing and then commit to being either more confident or more open-minded, respectively. Communication was the second most common theme reported by students. Although the previous module focused on effective communication, this module truly highlighted its importance as students witness how poor communication can easily become an unhealthy conflict. Introducing the STATE method here – despite being a general communication method – was an intentional decision to give students a practical technique to employ during conflict.

We expected more students would report learning that there are healthy and unhealthy conflicts but seeing more than 25% of students report this learning is still encouraging. This lesson is especially important for conflict avoiders. Interestingly, the spring cohort had 40% of respondents mention the importance of trust/respect to teamwork whereas the fall cohort had less than 3% report the same. This is likely a result of the differing discussion from semester to semester since the instructor simply provides a framework for student-led discussion and questions. Given the stark difference between the two cohorts, we are exploring the possibility of addressing this aspect more explicitly in future workshops.

Moving forward, we plan to make edits to the role-playing exercise to help students engage more successfully and update the pre-recorded videos to better address common questions submitted by students. All module files are available to other instructors on our website: https://unites.engr.tamu.edu/.

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