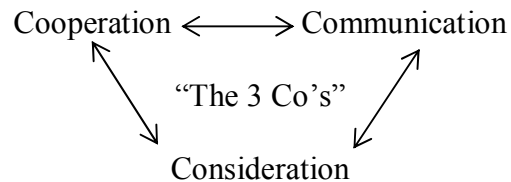


Teaching the 3 “Co’s” in the Engineering Classroom

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Abstract - The cornerstone of business success focuses around three fundamental “Co” words: Consideration; Cooperation; and Communication. Yet with so much emphasis on facts and figures, Technology students have little or no time to learn them. Students are encouraged to become better-rounded by taking several humanities courses, but most technology students view them as a necessary evil to be endured. Through an innovative – and required – Project Management class, students experience more of the “softer side” of engineering business. Role-playing, distance communication tools, and sometimes hard-line discussions are used to teach everything from email etiquette to effective team-building skills. Comments from recent graduates are included to demonstrate the effectiveness of this new approach.

Numbers, equations, graphs, and transformations; our technology students have them mastered. Many students are even becoming better writers, thanks to a renewed focus on writing-intensive courses. But how are they at such soft-side skills as oral communication, negotiation, or team-building? There is a different picture altogether. Yet these are skills cited as some of the most desirable traits in new hires in recent years, and they are certainly attributes that will help students succeed in business as well as in life.



What are the “3 Co’s”? They are Cooperation, Communication, and Consideration, and they are cornerstones of positive interactions between human beings. Cooperation and Communication fall under headings with which we are more familiar: team-building; technical writing; presentation skills. But the foundation of the three, Consideration, is harder to define and monitor. Yet without it, Cooperation and Communication eventually break down in many interactions. Consideration is based upon first awareness of others’ feelings, emotions, and ideas, and then upon an empathetic approach to working with others.

These seem like fundamental concepts that students should gain simply through experience, but this is frequently not the case. Often, new employers comment that students have adequate intellectual development, but lack the emotional maturity to succeed early on in their careers. New graduates, too, comment that their earliest and most challenging moments in the working world come from lack of experience when dealing with “difficult coworkers.” The top technology students graduate as some of the greatest technical problem solvers of their time; what happens, though, when the biggest challenges they face have nothing to do with

technology, but strictly with human emotions and interactions? These same people find their problem-solving skills seriously lacking.

There seem to be three primary reasons why soft-side skills are missing from the students' "bag of tricks": 1) It is difficult to fit them into technical courses; 2) humanities courses generally do not cover the broader spectrum of such skills; and 3) students often do not understand the importance of learning such skills. Technical courses are usually full of all the information necessary to turn out technical experts, and teachers are hard-pressed to cover sufficient technical material in a single semester. Adding personnel skills (which often do not easily integrate with technical material) into an already tight schedule is an enormous challenge. Humanities courses are designed to make our students well-rounded, but most miss the mark when the goal is to teach students about cooperation and consideration. They tend to focus on discipline-intensive material, but not on genuinely recognizing the human emotion behind the words and actions. Finally, most students with strong math and science backgrounds tend to view such "touchy-feely" topics as silly, unnecessary, and "a distraction from things (they) should be learning."

The 3 Co's are brought together in a required Project Management Class being taught in the Electrical Engineering Technology Program at the University of Maine. Students learn basic Project Management skills, from Gantt Charts and Critical Path Diagrams to Earned Value Analysis and the Plan-Monitor-Control cycle. Intermingled with these, though, are such things as effective negotiating, team-building methodologies, personnel feedback and face-to-face peer evaluation. Textbook material and traditional classroom lectures are interspersed with off-beat discussions, role-playing exercises, team-building games, and analysis of human behavior in various situations.

One key element to teaching these concepts is to set the tone early. During one of the first classes, students are told that it is necessary for the professor to leave the room for a few minutes. Participants are instructed, while the teacher is away, to form a circle, introduce themselves, and be prepared for a brief "sing-along, get-to-know-you exercise." Most students pale at the threat of a hand-holding chorus of kumbaya, and many admit to considering the prospect of dropping out of class during this exercise (although none have done so yet). Once over the initial shock, though (and realization that the teacher is not going to make them do it, after all), students take a deep breath and begin to realize that they are in for something different than their normal plug-and-chug formula classes.

Three different formats are used to introduce the soft-side topics: 1) more customary distance communication tools; 2) role-playing games and case studies; and 3) non-conventional discussions and exercises that encourage students to view situations from a unique angle. Even the more fundamental communication tools, however, are taught from a "what-if" standpoint (vs. the simple instructional usage approach). For example, Webex, an online collaborative meeting tool, is utilized by having students log in from a remote access point. Student pairs are each asked to facilitate one mock meeting, during which participants reach a decision on some problem posed. What they do not expect are situations where one attendee gets unruly; someone "walks" out of the meeting; or technology breaks down in the middle of an important presentation. Teaching them to "be prepared, not scared" helps them look ahead to potential crises and devise solutions before the worst happens. Email's effectiveness in interpersonal

communications, along with its shortcomings, is also demonstrated. For example, students are paired for an email exercise, where one student (“the boss”) is told to react to a proposal, via email, in a strictly matter-of-fact tone. The other student (“the worker”) is then told that the person sending the message (the “boss”) is in a highly emotional state, and is sending a rebuttal to the worker’s original proposal. With only email for communication, they are asked to reach a compromise. What ensues is generally a very one-sided discussion where the boss gets very frustrated, and the worker gets very upset. Through mock phone and email conversations, students discover the challenges faced by today’s virtual managers, and how to effectively cope with such obstacles.

Role-playing games and case study discussions are excellent tools for teaching non-traditional topics. Students seem to lose some inhibitions about participating when they get to “play” someone else, and deliberations are generally lively and thought-provoking. Many sites offer role-playing scenarios, from simple getting-to-know-you games to hard-line negotiation exercises, and each plays an important role in teaching consideration of others’ feelings and perspectives. As the book *Getting to Yes*¹ points out, an important aspect of negotiation – and any effective communication, is to truly understand the others’ viewpoints. Role-playing, what-if scenarios, and case studies effectively help students gain that perspective change.

As stated earlier, consideration centers on awareness. Making students aware of others’ feelings and internal motivators helps them become better communicators. But teaching these skills goes beyond simple active listening techniques. In this Project Management class, students are asked to observe human behavior in a variety of situations. From conversations at home, to discussions with faculty mentors, and dialogues with one another, participants are shown how to look beyond the spoken words and find the meaning or intent of the speaker. The first exercise of this sort involves a third party presenting information to the class with a “hidden” undercurrent. Students are then required to determine the real objective of the speaker’s comments. Class participants are asked to approach all communication throughout the semester as if they were to be graded on reiterating the other party’s information; this seems effective in teaching them stronger active listening skills. After completing teamwork activities, participants are asked to provide peer evaluations of each student’s contribution to the assignment. One exercise performed later in the semester, after a considerable discussion of positive constructive feedback, involves students providing face-to-face evaluations (facilitated by the professor) of one another. In this way, participants become more aware of how they are perceived by others, and how to compare this to their observations of themselves. Self-perception (and, eventually, other’s opinions) is raised as students see themselves exhibiting honesty and integrity in a measurable way.

The following quotes from some recent graduates of the University of Maine’s EET 386 demonstrate the relative effectiveness of this Project Management Class:

“I was forced to look at myself and others in a very different way. I still have a lot to learn, but feel that I’m better prepared to handle some of the more challenging aspects of human interactions!”

“I always felt that I had honesty and integrity, but didn’t realize how others perceived me until taking the Project Management Class. My perception was very different than those around me, and I’ve learned to be more conscious of how I speak and work with others.”

“I got a Project Management position directly out of college, and felt adequately prepared to handle both the technological and human challenges I faced. And there have been a lot more human challenges!”

“I feel better prepared than some of my co-workers (who’ve been here for years) to handle difficult situations with others. By truly trying to understand someone else’s reasoning behind an issue, I think I can come to more fair decisions and compromises.”

When all is said and done, can we automatically turn out students that are more thoughtful, considerate, and cooperative in nature? Why not? Perhaps not 100% of them will pick up the true meaning of the lessons learned; there will always be those who are happy (or not) with just a simple grade from another required class. But if even a small percentage can come out more aware of how their behavior influences others, and see the positive effect of being truly considerate, it is well worth the effort.

Resources

1. Webex – www.webex.com – an online meeting, web conferencing, and videoconferencing service (A 14-day limited trial is offered)
2. Harvard Business School Online - www.hbsp.harvard.edu/educators - A great resource for case studies and exercises; often includes teaching notes and further discussion items
3. Negotiator Pro – www.negotiatorpro.com – One of many negotiation and facilitation sites which offer a variety of role-playing scenarios.

Bibliography

1. Fisher, Roger, Patton, Bruce M., and William L. Ury. Getting to Yes: Negotiating Agreement Without Giving In. Boston, MA: Houghton Mifflin, 1992.

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