Don’t Look at Your Shoes! Getting Engineers and Scientists to Engage with Audiences

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Abstract:

A first-year graduate seminar is used to work with students to alleviate shyness, introversion and speaking anxiety, as well as providing a method for speaking effectiveness incorporating cultural cues when giving technical presentations. The core intent was to get students - particularly those who are not native English speakers - to be comfortable and to improve on monotonous, rote recitation from memorized scripts. The effort has been fortunate to draw on experienced speakers, workshop coordinators, theater and public speaking techniques. While this is a work in progress, ongoing assessment has shown remarkable results in individual student performance and comfort level in public speaking from a student demographic where this is not often the case.

Drawing on diverse materials and exercises for both examples and tutorial help ranging from TED talks to in-class roleplaying, the course progresses from the basics of giving and receiving feedback to overt exercises in analyzing and understanding a seminar audience before a presentation is given. This is done to stress that understanding the audience, ranging from an individual in an elevator pitch to a large lecture hall listening to a formal scientific presentation, is of primary importance to having the audience understand and react favorably to the speaker. The objective is to shift the students’ focus from the instinctive presenter-focus to an audience-focused approach.

Exercises designed to help pronunciation, movement, and interpersonal skills were introduced early in the seminar and helped to build a sense of trust among a diverse group of students who had little interaction prior to the class. From this, feedback begins to emerge allowing students to not only provide constructive reviews to their fellow students, but to capably critique their own presentations. As the course progresses, concepts such as body language and inflection are added to the course as well as a limited incorporation of the role of cultural normative speaking habits and patterns. Modules on data presentation (to avoid endless numbing charts of detailed data that leave audiences stupefied), the skills of storytelling (rather than rote technical presentation), Monroe’s motivated sequence as a method of persuasion to action, and introducing speakers in several diverse settings are included as well.

Finally, handling question and answer sessions involving contentious issues as an “in the moment” exercise help build confidence and presence of mind, as were examples of well-staged corporate product introductions and other large-venue events. At the end of the class, students give a “mini seminar” incorporating the concepts learned in the class with classmates and instructor providing real-time feedback gives the students a chance to integrate the exercises and techniques.
The presentation describes the concepts, building blocks, exercises and timeline necessary to achieve these steps in a limited time frame, how to assess progress, and how to contend with a widely diverse group of students working on very disparate topics of research. The further implication of this effort is that multicultural students may be more effective in an increasingly diverse environment filled with sudden, extemporaneous demands.

General Background:

Engineers and scientists are often perceived and portrayed as being both humorless and uncommunicative. While the former may be ascribed to a tendency to analyze rather than immediately react to the non-sequiturs that humor depends on, the latter may be the result of lack of practice or familiarity with cultural norms. Graduate students, particularly those in the first year, and those from non-English speaking backgrounds are perceived, often incorrectly, as reticent. Additionally, popular culture brands engineering students in general as socially awkward. In this instance, “Don’t stare at your shoes” refers to the tendency of unpracticed and socially introverted speakers to focus on themselves out of fear and nervousness, rather than focusing on the audience that they are presenting to and how best to convey their message most effectively and persuasively.

This may be ascribed to cultural differences. Students from many other countries may view reticence as “proper conduct” in class setting, as a sign of respect for the instructor, or a wish to not interrupt other students’ learning. However, this kind of behavior may serve them poorly in their careers. Using an example taken from medical training, “…failure to establish patient rapport due to poor attitudes or paternalism in a first-year DPR course is predictive of poor performance in the third-year core clerkships.” Though the study shows how corrective measures can be applied. Academic training shows similar patterns, with “shy” or reticent students showing more difficulties in the classroom. While the seminar students are engineers and scientists rather than physicians, similar principles hold true and similar remedies can be adapted and should be applicable.

Course Development Background:

An ongoing seminar series has been explicitly designed to bring students out of their usual surroundings and to give them practical experience with a variety of public presentation tools intended to help them to present more effectively and to move from a subject-centered mode of presentation to audience-aware communication.

The Graduate Seminar is a required part of the University of Illinois at Urbana-Champaign (UIUC) curriculum, but the offerings are quite varied among those instructors within the department, giving the students a wide range of topics. The instructor has extensive background in engineering and industry relations.

Since our department is quite widely constituted, our Process Engineering function overlaps with students in Food Chemistry, Microbiology and even Nutrition giving an interesting and diverse group of students with a wide range of backgrounds ranging from manufacturing engineering to
hospital operations.

Drawing from published experiences in dealing with shy children\textsuperscript{11}, some basic principles were adapted:

- Introduce the concept of being an introvert versus being shy.
- Create an environment that is failure-friendly to encourage experimentation
- Prompt and encourage the students to use the tool sets provided during in-class exercises
- Provide direct examples positive affect through audience understanding and adaptation.
- Expose the students to challenging situations as the class progresses to foster social resiliency

Adapting from this, role-playing, public speaking and interpersonal scenarios and practice with a set of positive, coping behaviors that can be drawn upon in many different types of professional settings (and to do so in an accepting, low-stress environment) has been shown to be effective with shy children and is applied in the seminar. Audience connection is emphasized from the outset, stressing the notion that the student must convince the audience of their position beyond simply presenting data, and that can only be done if the student knows the audience.

A series of stepped class sessions has been created as a series of modules that build upon previous material (Figure 1). Each module covers a set of topics that begin with audience understanding and the idea of very bad presentations. It then progresses to simple physical movement and then to more complex subjects requiring the participants to be aware of their surroundings, be aware of the audience and to use gestures, voice techniques and to expand this awareness and reach outward.

![Figure 1. Progression of Classroom Topics.](image-url)
The subjects of each seminar are broken down into specific sets of skills to be developed and work upward from the background of understanding why students might find themselves reluctant to speak in public. A broad range of materials are brought into the classroom ranging from TED talks illustrating concepts to audio tracks of public speeches including audiographs to emphasize vocal patterns used by famous speakers and product introduction presentations in the electronics industry.

Beginning with simple physical skills such as movement, gestures and space usage, then working on voice skills and data presentations meant to overcome the usual monotonous litany of data, students are prompted to provide a compelling narrative rather than facts, to engage the imagination of a known audience and to move their arguments forward in a persuasive manner.

Further tools are used that show simple means of “telling the story” without compromising the availability of detailed data, but the advantage of having data tables, illustrations, or other granular data at the ready whenever questions arise. This includes a discussion of the universal nature of storytelling and the typical means of engaging an audience whose composition and interests have been assessed as well as the pitfalls of misunderstanding the audience.

Once basic tools for overcoming social reticence and making a persuasive narrative for the research or program being presented, students are given the opportunity to expand outward into unfamiliar situations, including the last-minute introduction of a speaker to a group type ranging from a large professional meeting to a small funding group.

Finally, methods for dealing with confrontational interruptions and questions during presentations are discussed. This requires that the students have been practicing self-awareness techniques throughout the semester in order to deal with disruptive, accusatory or off-topic situations in presentations.

The final exercise in the seminar course requires the student to present a mini-seminar of their own to the class, with the rest of the class as audience and reminding them about (and sometimes demanding of them) technique usage. While this is not time consuming, it does demand that the students draw on past classes and not just fall into old habits.

Methods:

Assessments were carried out throughout the course of the classes, at the end of each class, at the through student self-reflection exercises and end of semester class evaluations and comments. Additionally, the UIUC Instructor and Course Evaluation System (ICES) anonymous reviews and ratings were incorporated. Although these are small samples to date, with much unstandardized feedback, the results are quite encouraging.

Results:

The student-assessment scores via the UIUC ICES system have been overwhelmingly (and unusually) positive, averaging 5.0/5.0 in overall course rating. Additionally, critical comments returned on evaluation forms both within the class and through the ICES system were minimal.
and usually relate to the scheduling late in the day. While this and subsequent comments do not provide a large statistical base, the indications are strong that this was a very positive experience and should be developed\textsuperscript{14}

Overall the students reacted overwhelmingly favorably to the seminar in the near-term and continue to provide positive feedback after the class is over via unofficial contact, or by post-class requests for more information or links/material with which to practice on their own. The most telling of these typically come after the end of the “conference season” (typically summer through early fall, depending on their field): “I tried the things we learned in seminar and it actually worked!” “I felt a lot better about giving my presentation after the practice we did.”

Additionally, it was made evident by both comments in the evaluation and subsequent out of class conversations, that the students who originally considered themselves shy or awkward not only felt better about public speaking but were less stressed, less focused on a rote, memorized presentation and were able to connect better with an assessed audience as the class progressed.

There were some drawbacks and situations that did not work well, however. The effect of habit, and ongoing social/cultural background and research-group norms were apparent. Students have informally reported that changing the usual method of presentation has made both their fellow students and research advisors somewhat uncomfortable even while they felt more capable. To accommodate this, subsequent classes have been advised that some change management may be necessary to get a larger group to adopt the methods, and that it may not be possible as a graduate student to overcome a long-established method in all situations\textsuperscript{15,16}. Additionally, a few students reported that their first public-speaking experience after the class tended back towards habit, with the benefit of their being determined to be more engaged with the audience in future.

Discussion:

Communication by scientists and engineers with both the general public and with specific technical groups can be improved significantly, and the progress of this largely experimental seminar provides a promising series of steps to take to achieve that end. Far from the perceived stereotypes, most barriers to fluid presentations and social interactions seem to be rooted in the cultural requirements, whether from a different nationality, or from students’ introspective nature. These can be accommodated with simple exercises that upset the habitual path of interaction, role-playing exercises, and media presentation in order to give students an additional toolbox to resort to under stressful public interactions.

This is not an attempt to affect an overnight “cure” since there is no pathology to be overcome beyond the influence of habit and culture. A more creative, effective and lasting approach is to accommodate the students’ varied nature and provide them with tools – which they may well regard as theater or as something “outside themselves” – in order to perform effectively. The new approach appeared, within the limits of small class sizes and a limited number of offerings to be well received and effective in overcoming students’ inexperience with audience-centered presentations in subsequent professional situations.

In time, this effort may well provide methods and techniques for a larger group of students to
draw on in order to be effective in their professional pursuits and a better understanding of the interaction of diverse personalities and backgrounds with the demands of public speaking and professional interaction.


4 “Crossing the Distance: Adjustment of Taiwanese Graduate Students in the United States”. Michelle A. Swagler and Michael V. Ellis. Journal of Counseling Psychology. (2003), Vol. 50, No. 4, 420 – 437


7 “Correlates of Deficiencies in a First-Quarter Doctor-Patient Relationship Course Predict Poor Clinical Performance in Medical School.” Murden, Robert A. et al. Academic Medicine V 79 No 10 October Supplement 2004 S46 - S48


13 “Establishing ‘presence’ in the beginning: kâ-pimwêwêhahk.” That Linguist Formerly Known as Mônîyâw blog. moniyawlinguist.wordpress.com. Accessed 1/14/2013. NB: Blog has been made private – contact the author (Morris) for a .pdf copy of the posting if desired.


Ditewig-Morris, K. Business Communication 211; Class Reference Material. Department of Communications, University of Illinois at Urbana-Champaign (2016).