

# **IMPROVING LISTENING, TEAMWORK, AND LEADERSHIP SKILLS THROUGH INNOVATIVE CIVIL ENGINEERING CLASSROOM EXPERIENCES**

**Colonel Robert L. Green, PE  
Virginia Military Institute**

## Introduction

Engineering students spend many hours in traditional lectures and laboratories. They spend many more hours solving traditional homework problems. All of which is very necessary to ensure that these students understand certain fundamental principles and to demonstrate that they can think!

The purpose of this paper is to share several classroom experiences for senior level engineering studies that address the "soft skills" of listening, teamwork and leadership.

## Listening Skills

Most engineers have some form of engineering management responsibility. Published lists of skills important for the technical manager always include "communication" and all good definitions of communication include "listening." Listening is also one of the key characteristics of effective leaders. Bennett (1996) states that "Like most skills, good listening can be studied and learned. Americans tend to speak at about 150 words per minute; we are capable of listening to about 1000 words per minute. Is that 85% idle time spent in reviewing and assimilating what has been said, developing an argumentative rebuttal or brilliant reply, or thinking about an unrelated topic?"

It is also very important for engineering students to appreciate the impact of vocal expression and volume, posture, eye contact, and gestures on becoming a good listener.

The use of a role play exercise in the classroom can be an effective method for engineering students to study and learn to become effective listeners. The role play exercise can compliment classroom lectures by intentionally providing important factors such as urgency, anxiety, vagueness, inconsistencies in information, and a speaker's mannerism. These factors can help prepare engineering students to meet the challenge of learning to become good listeners.

The major activities in a suggested process for such a classroom role play include the following:

1. The instructor identifies an ongoing project and provides the students with a brief written description of the project.
2. The students then review the construction documents (plans and specifications) and the contractor's critical path (CPM) schedule for the project.
3. The students' visit to the site would ideally occur when construction has progressed to the point to reveal the magnitude and complexities of the project.
4. During the visit the students should meet with the contractor's project manager. It is important that the project manager discusses his project budget and explains his firm's project team, especially his "boss" and their relationship.
5. The students will prepare written reports on their site visit. If these reports are satisfactory to the instructor they would be discussed in class with the students taking appropriate notes on the comments made during this discussion.
6. The activities to this point in the process have "set the table" for the classroom role play between the project manager (a student) and his boss (the instructor). The script for the role play should be realistic and be fun! The students observe the role play and take notes. The project manager receives verbal instructions from his boss in the simulated rapid pace of a civil/construction engineering firm. The project manager (students) prepares an effective project planning memorandum for his boss to use in an important upcoming project meeting.
7. The students prepare their project planning memorandum and if these are satisfactory to the instructor they are discussed in class. The students can add their class discussion notes to finalize their memorandum before filing in their course workbook.
8. The students enter this listening skills role play with much of the project background information obtained first hand (reviewing actual project plans, visiting the construction site, and talking with the project manager).
9. The two role players, especially the boss (instructor) can ensure that vocal expression, posture, and gestures are also a part of what the students hear and see.

To summarize, this listening skills role play allows the instructor to interact with his students in a somewhat non-traditional manner that enhances and compliments the student-instructor relationship. Using an ongoing project provides a "case study" that can include an actual site visit and a conversation with a "real" project manager! Students should not only benefit by having improved their listening skills but also by developing confidence in their abilities when confronted with a similar circumstance in their future engineering careers.

### Team Marketing Proposals

Knowledge of specific business areas such as marketing and finance is important as young

engineering graduate's transition to engineering managers. A classroom experience that involves the use of actual marketing proposals submitted by civil/construction engineering firms as a part of a competitive selection process for a project can provide an opportunity for students to learn and to apply marketing principles. If properly developed this exercise will also benefit the engineering students in the following areas:

1. Students learn teamwork by working together in a small group to prepare their student "firm" presentation.
2. Students learn to use usual aids, especially computer generated slides, as an integral part of their presentations.
3. Students learn to make an oral presentation that combines an engineering approach to a project/problem with a marketing strategy to be competitively selected for that project.
4. Students learn to critique their team's performance as they evaluate and compare the presentations of the other student "firms" competing for the project.
5. Students learn the relationship between market niches, competitor firms, and clients/customers through their study of the client's "request for proposals" (RFP), the qualifications and experience of the civil/construction engineering firms competing for the project, and the client's evaluation criteria for selecting firms.

Watching the engineering students take on the roles of real firm principals, project managers, and senior engineers is truly rewarding. Seeing the students develop their presentation strategies to build on the real firm's strengths and then prepare their presentations to take advantage of their own personal strengths is equally rewarding.

The following is a "checklist" for instructors to help them prepare for this engineering classroom exercise:

- Contact a private or governmental entity that has recently issued an RFP and has received several proposals. Obtain a copy of the RFP and each of the civil/construction engineering firm written proposals received.
- Contact each firm and obtain permission to use their proposals and ask for their support/cooperation.
- Divide the engineering students into small teams, one team for each proposal. These teams become the student "firms." Give each team the RFP and their real "firms" written proposal.
- Give each student "firm" the assignment to prepare and present an oral presentation of

specified duration. Students should be encouraged to use computer-generated visual aids and handouts.

- ❑ Prepare/obtain evaluation forms for the students to use in evaluating and ranking their competitor student "firms" marketing presentations. Students should ask questions during the presentations to simulate an actual firm-client selection committee interaction.
- ❑ Student teams should be encouraged to contact their real "firm" counterpart via web page, e-mail, and phone/fax, to aid in their presentation preparation.
- ❑ Provide ample time for follow-up discussions and constructive peer critique of this exercise.

### Leadership Development

Young engineering graduates can find themselves in leadership roles very early in their careers. They may be project team leaders, quality improvement process team leaders, or officers in the Armed Forces. It is also very likely that, as they progress in their careers, they will need to be good leaders since "40% of industrial executives and 34% of all top corporate managers in the United States have engineering backgrounds" (Bennett 1996).

There are many excellent reference books on leadership and Kouzes and Posner's "The Leadership Challenge" is an especially effective one. Engineering students can benefit significantly from many of the leadership development exercises suggested by Kouzes and Posner. Engineering instructors should consider the following exercises to help their students develop and improve their leadership skills:

1. Students write and discuss a "personal best" case from their own leadership experiences. The "personal best" is a time when the student believes they performed at their peak as a leader. Many exemplary leaders have benefited by learning lessons about their own strengths, weaknesses, assumptions, strategies, and tactics (Kouzes and Posner, 1995).
2. Students read a biography or autobiography of a leader whom they admire and prepare a written report and an oral presentation. The reports/presentations must emphasize and focus on demonstrated leadership qualities and skills. Biographies are a rich source of information on the great leaders of the past and a good way to gain access to the wealth of knowledge others have about leaders. A goal of this exercise would be for students to make a practice of reading and studying biographies of leaders (Kouzes and Posner, 1995).
3. Today's engineering graduates will have twelve or more jobs and at least five careers over their lifetime. The key to success for these graduates, and especially for the leaders among them, is "lifelong learning." Leaders see all experiences as learning experiences and they also know that ultimately, leadership development is self-development. Students should prepare and discuss personal leadership development plans (Kouzes and Posner, 1995). The engineering student's instructor can also relate this exercise to continuing professional development/competency for professional engineers.

4. Students can also develop a simple cause and effect diagram to help illustrate how these leadership exercises, "causes," result in the desired "effect," the students improved leadership skills.

### Summary

Engineering and construction professionals agree that good listening, teamwork, and leadership skills are very important. These same professionals also feel that their academic years provided them with few opportunities to improve those skills. The most competent and successful engineering and construction professionals recognized the importance of these skills early in their careers and worked hard to acquire and develop them.

The three classroom experiences described in this paper involve engineering project planning, engineering services proposal presentations, and continuing professional engineering development/competency. The students participating in these classroom experiences will be given a head start in their appreciation, understanding, and application of these important skills.

Innovation can be defined as "change in the way of doing things." The three classroom experiences described may or may not meet this definition. However, if an instructor of engineering students has been motivated to change the way they have been conducting their courses and these changes make them more effective in the classroom then we will have been successful.

### Bibliography

Bennett, F. Lawrence, 1996. *The Management of Engineering*. New York, NY: John Wiley & Sons, Inc.  
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### BOB GREEN

Bob Green is the Fred C. Culpepper '40 Adjunct Professor of Civil and Environmental Engineering at the Virginia Military Institute in Lexington, Virginia. Bob teaches Civil Engineering Design and Civil Engineering Professional Practice courses to senior students. He is a registered professional engineer in Virginia with over twenty years experience as a professional engineer in private practice. He received a B. S. degree in Civil Engineering from VMI and a Masters Degree in Civil Engineering from the University of Virginia.