Public Speaking, Leadership, and Engineering

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Abstract - When considering the skills of an engineer, one might say that he/she must have sharp technical skills – be good in math and science. Others might say that an engineer should be able to problem solve effectively. While both of these views are correct, they are also, as of more recently, incomplete. With the changing of modern business practices, employers are saying that their engineers must also be – now more than ever – confident public speakers and leaders. The widespread change in employers’ views resonated deeply into the engineering education community, even shaping the criteria for ABET accreditation. Following these changes, engineering universities have experimented with developing the public speaking and leadership skills of their students in a variety of ways – some successful, while others not as fruitful. Although well-intentioned, many of these experiments get implemented without a thorough evaluation on their helpfulness to students. Until the approaches of these skills are formally assessed, universities will not fully understand the consequences of their curriculum.

This student poster presentation will present the results of a study on the impact of proving public speaking opportunities in the engineering curriculum. The presentation will summarize the roadblocks to improving student skills and possible solutions to these roadblocks.

Key Words – public speaking, communication skills, leadership, teamwork, engineering education.

There is a Need

Current ABET accreditation requirements emphasize the importance of “soft” skills in planning and achieving excellence in engineering education. Criterion 3 under Program Outcomes states: “Engineering programs must demonstrate that their students attain (g) an ability to communicate effectively”[11].

What engineers need to experience and know, in addition to “hard” knowledge, is “process-oriented skills and awareness-oriented skills” [1]. Process-oriented skills include “communication, teamwork, and the ability to recognize and resolve ethical dilemmas” [1]. These skills are powerful when combined with awareness skills involving “understanding the impact of global and social factors, knowledge of contemporary issues, and the ability to do lifelong learning” [1]. But what are the most effective ways of incorporating process and awareness-oriented practices into engineering curricula already crowded with necessary science, math, and disciplinary courses? How can engineering schools, which must ensure that their students graduate with sound hard skills, also ensure they are graduating engineers who have encountered and practiced communication, teamwork, and the ability to recognize and resolve ethical dilemmas; who are cognizant of the potentially enormous social impact of engineering; and who have skills which facilitate lifelong learning in these very areas?
Schools of engineering are parts of larger educational institutions, and, as such, have the opportunity and obligation to make the best use of the resources a whole university has to offer. Here at the University of Pittsburgh, the Swanson School of Engineering faculty and administration have worked in tandem with librarians and with faculty from the English Department’s Composition Program to develop tools and projects to increase students’ engagement with the “soft skills” of communication and aware, responsible professionalism. The Swanson School of Engineering has made curricular moves that require students to see the importance of research and writing in learning about engineering and the importance of communication to engineering excellence even beyond the college years.

However, successful engineers must also rely on strong communication skills in nearly every aspect of their work [2, 3]. Currently, engineering curricula prepare students for the job market’s technical writing demands, but do they equip students with the necessary public speaking or leadership skills?

**What the Industry Expects**

From an employer’s point of view, public speaking and leadership skills are non-negotiable. According the NACE’s Job Outlook 2010, communication skills rank at the top of employers’ lists in skills they seek in potential employees [4]. From this same survey, the ability to work in teams (leadership) also ranks as third most important [3]. According to the Occupational Outlook Handbook, employers seek “engineers and scientists who possess administrative and communication skills in addition to technical knowledge in their specialty. The reason industry puts such a large demand on these skills is because engineers must effectively lead groups and coordinate projects” [3].

**The Need for More Guidance**

In a recent survey, over 60% of entry-level engineer employers deemed communication skills as “needing increased emphasis” in engineering education. Moreover, 2 of the top 10 required skills ranked as important to engineering practice related to making oral presentations. Despite the importance of these skills, not all universities require public speaking instruction for students [5].

Universities provide writing and communication skills through the general education elective requirements. However, with the variety of course offerings a student can select courses which may require writing assignments but avoid any public speaking. Thus, the humanities and social science electives may not provide the background required by industry.

The engineering curriculum tries to address this communication need by having lab report and project report requirements but again most of these fall short in proving public speaking. The senior design courses require an oral presentation by every student, but these courses typically come in the last semester and thus, do not provide the required practice and repetitive exposure that is need to become effective at public speaking.
Students and Anxiety

Poor presentational skills can compromise a student’s credibility and image in their field [5]. In one study, an engineering professor and his TAs observed students with no formal public speaking training. They identified students’ common habits while speaking in public, which are listed below:

1. High levels of anxiety,
2. Gaps in organizational focus,
3. Poor delivery skills,
4. Awkward presentation format,
5. Poorly prepared visuals, and
6. Unprofessional dress.

The author also noted that habits will only persist until they are formally addressed in an environment conducive to learning speaking.

What students’ need is the same formal education in public speaking as they do in any science field. In the sciences we begin with the basics in an introductory course, and then the concepts are improved with follow up experiences in the second and third year, until the student demonstrates his/her proficiency in the senior design course.

Pitt’s Actions and Classes

At the University of Pittsburgh, engineering students have the option to take one of two public speaking classes:

(1) Public Speaking (COMMRC 0520) and
(2) Communication Skills for Engineers (ENGR 1010)

Although these classes address these skills, they only reach out to a few. For example, “Communication Skills for Engineers” only one section is offered in the Spring term, seating 50 students at a time. Fifty students may seem like a lot, but there are roughly 2,000 undergraduate engineering students at the University of Pittsburgh main campus alone [6]. As long as these public speaking classes are limited and optional, the majority of engineering students will lack formal presentation and public speaking training.

In addition, ABET accreditation requires communication skills to be developed in engineering classes, normally taking the form of group presentations and team-based assignments. Although these efforts are giving students practice, they lack:

(1) Personal feedback to know where to improve their skills,
(2) Consistent and long-term practice to build confidence [2].

To address these issues the Freshman Program at the university has added a writing and communication component into the first two Introduction to Engineering courses. In the fall all
students must take ENGR0011, the first semester Problem Solving course, and ENGR0081 the first semester seminar course. ENGR0011 has an extensive writing component that involves a semester long project that produces 4 written projects and a presentation at the end of the semester. The presentation component is integrated into the Peer Mentor component of ENGR0081. Thus, this presentation fulfills the first step or introductory exposure of public speaking for every student. By having the student presentation in the small mentor section, less than 15 students, the student’s first public speaking experience takes place in a very friendly and informal setting. This addresses the anxiety issue stated above. In addition, by having four independent writing assignments throughout the semester, that each produce a milestone, we are also addressing item 2 above, by providing the organizational focus needed by novice public speakers. The mentors also meet with each student one-on-one and review the presentation before and after the first presentation, to provide feedback prior to the formal presentation. This allows us to address format, visual aids, and delivery skills, with each student.

During the second semester Problem solving course, ENGR0012, continues the development of the student communication skills. During this class each student presents a formal technical paper in a professional conference setting. As during the first semester, the project is broken down into five milestones to assist the students in the development of the format and structure. Once again the students meet each week with their peer mentors to discuss their paper process. In addition, we add evaluation by outside practicing engineers. Since the papers are going to be presented at the freshman conference, which involves some 130 papers, the conference must be divided into 30 concurrent sessions. Each session is assigned an practicing engineer to act as the session chair. These session chairs meet with the students at least twice during the preparation process to assist the students with their written paper and oral presentation. By adding the professional engineers into the process we are able to address issues on profession dress and proper presentation formats.

**Thinking Outside the Classroom**

The introduction to public speaking in the freshman year is a great start, but without additional follow-up courses, many of the skills learned in the freshman year will be lost by the time the student gets to the senior design course. Because of the lack of classes offered, we must look to other alternative opportunities for public speaking and leadership.

The University of Pittsburgh identified several ways to promote students public speaking and leadership through:

1. Better publicizing the Pitt Emerging Leaders Program to Engineering students;
2. Better publicizing the Pitt Freshman Engineering Leadership Team (FELT)
3. Encourage students to become involved with the freshman conference
4. Requiring Engineering students to take at least one Public Speaking class;
5. Giving more thorough evaluations of in-class presentations;
6. Holding in-class debates to help students think on their feet;
7. Establishing a Toastmasters club for Engineering students;
8. Implementing a workshop on Public Speaking [2, 5].
The Pitt Emerging Leaders Program
As quoted from the program, “The Emerging Leaders Program has been designed to complement your classroom and student life experiences by focusing on the behaviors that strengthen your personal effectiveness and leadership development. The Emerging Leaders Program is apart of the Cross Culture and Leadership Development office's initiative to create thoughtful, Impactful global leaders” [7].

This program offers a unique a personal leadership development program for all undergraduate students at Pitt. Participants are introduced to the fundamentals of leadership, including self-knowledge, valuing others, personal accountability, integrity, and change [7]. This program provides learners with opportunities to:

- Explore and assess your leadership skills and style
- Practice and experiment with new leadership behavior
- Receive feedback on your style and behavior
- Plan for your on-going leadership development [7]

By better publicizing or even requiring this program, more engineering students could benefit from this more formalized leadership program.

Freshman Engineering Leadership Team (FELT)
The Freshman Engineering Leadership Team are student leaders in the School of Engineering who help ease the transition of freshmen from high school to college [8]. Overall, the team is comprised of student Ambassadors and student Peer Advisors. The FELT Ambassadors help acquaint prospective students with Pitt’s Swanson School of Engineering by giving campus tours and by assisting with various recruitment and admissions programs. The FELT Peer Advisors assist current freshmen with registration, are available for consultation daily, and offer a variety of ongoing workshops that help students master time management, study skills, and test preparation strategies. These students also manage the ENGR0081 small seminar sections during the fall and assist the freshman students with their first semester presentation. The combination of these positions gives the FELT students the ability to speak in front of varying groups and lead their freshman or tour groups.

Freshman Conference
As noted above each freshman must present a paper during the second semester at the freshman conference. Over the past ten years, a variety of administrative procedures have been used to supervise the conference and improve the environment for the freshman. Five years ago it was decided to add Co-chairs to each of the conference sessions. The Co-chairs were under graduate students that participated in the conference during their freshman year. The Co-Chairs permitted us to meet with the students every week instead of only twice during the semester. The addition of the Co-Chairs has greatly improved the quality of the freshman presentations. However, the Co-chairs now also give the upper class engineering students the opportunity to also increase their group leadership and public speaking skills. This has resulted in a win-win situation that allows the Swanson School of Engineering the ability to work in an academic classroom setting.
with the present freshman and to work outside the classroom with the upper class engineering students.

**Required Public Speaking Courses**
As mentioned earlier, there are communication courses offered, but many times not required. A simple departmental requirement would drive students to more formally practice their speaking skills. However, this also put a burden on the humanities department to offer more sections of the course. Thus, this may be a good solution, but not one that can be controlled by the school of engineering.

**Better In-Class Evaluations**
Most of the classes that require in-class presentations do not give complete evaluations on students’ public speaking skills. By providing students with a written evaluation on their presentation skills – eye contact, vocal variety, body language, etc – students will know where they can focus their attention when presenting. An evaluation of the presentations, as simple as listing students’ strengths, places to improve, and comments on their style will go a long way to improving the students ability. The main problem with this solution is it requires that the person doing the evaluation has the necessary skills and time to provide meaningful feedback. In the typical engineering lab setting many of the TAs are ESL students. Since English is their secondary language they may not feel comfortable providing feedback.

**In-Class Debates**
A simple way to integrate these skills into an engineering course would be to require a student debate or in-class discussion. Before exams or after a major paper, students could report their findings and defend their results in an in-class debate. This would give students the opportunity to think on their feet and practice their “real”-world engineering impromptu speaking skills.

**Toastmasters International**
To personally address these issues the author became active in Toastmasters International. The basic Toastmasters International program is summarized in Table 1.

The value of being involved in this organization provided training that was impossible to get from the limited course offerings at the university. Thus, as a structured and potentially long-term solution, we propose establishing a Pitt Engineering Toastmasters club that could provide an opportunity to help engineering students develop these skills.

Beyond academia, more than 850 companies have started corporate Toastmasters clubs for their employees. Of these companies, many of them are engineering firms, including Dow Chemicals, ExxonMobil, Emerson Process Management, and Zachary Engineering Corporation [9]. In the spirit of developing public speaking and leadership skills, a Toastmasters-related club or event has the consistent and proper potential to prepare engineering students.
Table 1 What is Toastmasters International [9]

<table>
<thead>
<tr>
<th>Toastmasters International (TI) is the world’s leading non-profit educational organization that helps its members to develop their communication and leader-ship skills in a positive, supportive environment.</th>
</tr>
</thead>
</table>

**Background:**
Founded in the basement of a YMCA in Santa Ana, California, Ralph C. Smedley held the first meeting of what would eventually become Toastmasters International in 1924. Today, TI is headquartered in Rancho Santa Margarita, California, and serves more than 250,000 members in more than 12,500 clubs in 106 countries.

**Members Have the Opportunity to:**
- Learn and practice techniques of effective public speaking.
- Prepare and deliver formal speeches on subjects of their own choosing.
- Give impromptu talks on assigned topics.
- Gain speaking experience that relates to specific career needs.
- Sharpen their listening/evaluation skills.
- Learn proper parliamentary procedure.
- Preside as a meeting chairman.
- Gain valuable leadership management experience
- Gain personal confidence that will help when speaking to one person or one thousand.
- Enter Toastmasters International’s Annual Speech Contest, “The World Championship of Public Speaking.”

Workshop on Public Speaking
Lake Superior State College held a 90-minute workshop that benefitted its students. Although not equivalent to a class or Toastmasters club, such a workshop could give students a clear direction to giving presentations and leading teams. Thus, it is also proposed that a student organization such as the Engineering Student Organization could take the lead on organizing student workshops throughout the year. At the present the Civil Engineering ASCE chapter holds review sessions for the FIE exam, so a similar format could also be used to promote public speaking.

A Survey of the University of Pittsburgh Chemical Engineering Senior Students

To better understand the contributing factors that improve a student’s public speaking skills, a survey was given to a class of 47 undergraduate chemical engineering seniors. The survey asked students to rate their public speaking abilities at various points throughout their college years: before freshman year, after freshman year, and during senior year (now). Coursework and extracurricular activities were also explicitly asked to understand their effects on students over time. A sample survey can be found in Appendix I.

It should be noted that these chemical engineering students average two to three class presentations per semester after the freshman year. One presentation is required for the chemical engineering laboratory practicum to discuss the results of their lab. Typically, these chemical engineering students also had a design project as an end-of-term assignment, requiring some form of in-class presentation. Depending on the semester and other classes, students may have had to make another presentation.
Results of the Survey

Table 2 summarizes the general responses of the personal rating of the 47 undergraduate chemical engineering seniors experiences on a scale from 1 (poor skills) to 10 (proficient skills). Figure 1 presents the same data in a graphical format. Figure 1 does show a general upward trend to the mean as time progresses. That is, there is an improvement after the freshman year and there is an improvement between the freshman and senior year.

Before the freshman year, 17 students mentioned that either a class or activity in high school helped them to feel comfortable with public speaking. The majority of these students credited high school activities such as student government or leadership roles in student groups. This was contrasted with 12 who explicitly noted that they were “nervous” about public speaking prior to college. In general terms, about one third of the students entered with a calm feeling about public speaking, about one third were very nervous and about one third were neutral.

After the freshman year, 14 students explicitly noted that the ENGR0012 professional conference helped them feel relatively more comfortable with public speaking. The majority of these 14 students were in the nervous or neutral category. In addition, seven students explicitly wrote that they did not feel much of an improvement after the freshman year. All seven were in the neutral area at the start of the freshman year.

Table 2: Analysis of Students Rating of Themselves During Undergraduate Years

<table>
<thead>
<tr>
<th></th>
<th>Before Freshman Year</th>
<th>After Freshman Year</th>
<th>During Senior Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>5.36</td>
<td>5.96</td>
<td>7.77</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>1.88</td>
<td>1.79</td>
<td>1.29</td>
</tr>
<tr>
<td>Range</td>
<td>2 - 10</td>
<td>2 - 10</td>
<td>4 - 10</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number on Survey</th>
<th>Spread of Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rating of 1 (Poor Skills)</td>
<td>0</td>
</tr>
<tr>
<td>Rating of 2</td>
<td>1</td>
</tr>
<tr>
<td>Rating of 3</td>
<td>7</td>
</tr>
<tr>
<td>Rating of 4</td>
<td>11</td>
</tr>
<tr>
<td>Rating of 5</td>
<td>7</td>
</tr>
<tr>
<td>Rating of 6</td>
<td>7</td>
</tr>
<tr>
<td>Rating of 7</td>
<td>7</td>
</tr>
<tr>
<td>Rating of 8</td>
<td>5</td>
</tr>
<tr>
<td>Rating of 9</td>
<td>1</td>
</tr>
<tr>
<td>Rating of 10 (Proficient)</td>
<td>1</td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
<td>47</td>
</tr>
</tbody>
</table>
When you analyze the data past the freshman year, of the 47 students, 19 explicitly noted that they felt more comfortable with public speaking because they had multiple opportunities to practice. Many noted that their activities and work-related experiences also contributed to their current public speaking skills. Based on the numerical rating of the surveys, Table 3 summarizes the differences between each time period: before the freshman year to after the freshman year, after the freshman year to the senior year, and before the freshman year to the senior year.

Table 3: Analysis of Student Rating of Themselves Between Undergraduate Years

<table>
<thead>
<tr>
<th>Difference/Timeframe</th>
<th>Before Freshman Year to After Freshman Year</th>
<th>After Freshman Year to Senior Year (Present)</th>
<th>Before Freshman Year to Senior Year (Present)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased by 1</td>
<td>21</td>
<td>17</td>
<td>10</td>
</tr>
<tr>
<td>Increased by 2</td>
<td>4</td>
<td>16</td>
<td>12</td>
</tr>
<tr>
<td>Increased by 3</td>
<td>0</td>
<td>5</td>
<td>11</td>
</tr>
<tr>
<td>Increased by 4+</td>
<td>0</td>
<td>5</td>
<td>11</td>
</tr>
<tr>
<td>Decreased by 1,2 or 3</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>No change (= 0)</td>
<td>21</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
<td><strong>47</strong></td>
<td><strong>47</strong></td>
<td><strong>47</strong></td>
</tr>
</tbody>
</table>

Table 3 shows that over half of the students (25 of 47) felt that something in the freshman curriculum helped them feel more comfortable about public speaking. The gains they expressed were on a low scale, but they still felt that by their own internal comfort level that they did improve. This low gain can be seen in the modest change in the average score after the freshman year in Table 2. After freshman year, 43 of the 47 felt that they improved their public speaking.
Overall, 44 of the 47 felt that they improved their public speaking skills over their undergraduate years.

To gain a better insight as to how students improved their public speaking skills, students were asked specifically about the effect coursework and activities had on them. Table 4 depicts the responses to those factors. To account for other contributing factors, students were asked to fill in other factors that impacted them. Table 5 lists those factors.

**Table 4: The Impact Coursework and Activities had on Students Throughout College**

<table>
<thead>
<tr>
<th>Response \ Contributing Factor</th>
<th>Coursework</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Students it Helped</td>
<td>39</td>
<td>23</td>
</tr>
<tr>
<td>Number of Students it Did Not Help</td>
<td>8</td>
<td>24</td>
</tr>
</tbody>
</table>

In the Coursework area, 36 of the 39 students noted that coursework helped because it allowed them opportunity to practice. Those who felt that coursework did not help mentioned that not enough feedback was given or presentations were not required in the classes he/she had taken. From student activities, it was also noted that 15 of the 23 felt that being a club officer/leader improved their speaking abilities.

**Table 5: Additional Contributing Factors to Student’s Public Speaking Skills**

<table>
<thead>
<tr>
<th>Contributing Factors</th>
<th>Number of Times Mentioned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Involved with the Co-op program</td>
<td>7</td>
</tr>
<tr>
<td>Work related or Internship activities</td>
<td>8</td>
</tr>
<tr>
<td>Involvement in undergraduate Research</td>
<td>4</td>
</tr>
<tr>
<td>Class (electives/speech classes)</td>
<td>7</td>
</tr>
<tr>
<td>Fraternity/Sorority Involvement</td>
<td>4</td>
</tr>
<tr>
<td>Interviews &amp; Job Hunting</td>
<td>2</td>
</tr>
<tr>
<td>Providing Tutoring</td>
<td>1</td>
</tr>
<tr>
<td>Involvement in Sports</td>
<td>1</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
</tr>
</tbody>
</table>

Through this survey, it was found that internships, co-ops and elective/speech classes all greatly contribute to improving a student’s public speaking ability.

**Discussion and Analysis of Survey**

As this survey shows, there are many factors that contribute to an engineer’s public speaking skills. In Table 2, a general trend of improvement can be seen, with the averages increasing from a rating of 5.36 to 5.69 to 7.77 in senior year. Overall, students tend to feel that they have improved their public speaking skills over time, though they do not all start at the same point.

In looking more deeply between years, the large majority of students improved over time. In looking in the effect of freshman year, many students either felt that they improved (25 of the 47) or that their public speaking skills did not improve (22 of the 47). Of the 22 student who felt that
the freshman curriculum did not improve their skills, 11 students rated themselves with a 6 or better during freshman year. This would suggest that those student who already felt comfortable with public speaking prior to college did not gain much improvement after freshman year. Thus, the freshman year benefited most of the students who did not initially feel comfortable with public speaking.

After freshman year, 43 of the 47 students felt they improved their public speaking skills with time. Similarly, 44 of the 47 students felt that they improved their public speaking skills from before freshman year to their present senior year. A great factor in improving public speaking skills is the compounding effect of practice. With approximately six semesters of classes after the freshman year, these seniors gave 12 or more presentations in class, and many of them got involved in extracurricular activities. As noted, 19 explicitly noted that they feel more comfortable with public speaking because they had multiple opportunities practice. Although several students wrote that not enough feedback was given, students still felt more comfortable giving presentations with practice.

In understanding where students practiced, many felt that both their coursework and their activities helped, as can be seen in Table 4. With 39 of the 47 students saying that their coursework helped, 36 of them attributed it to the fact that their classes required some form of presentation and that gave them the practice to improve. Presentations in coursework is important because students are required to at least try practicing their skills. Required presentations reach out to even those students not involved in many or any activities. Extracurricular activities are more voluntary in nature, and this may have been why 23 of the 47 students benefited from them. Of the 15 students who said that being a club officer/leader improved their public speaking skills, nine of them improved their public speaking skills by a rating of 3 or 4 from before freshman year to senior year. These nine students were among the 22 who improved from by a rating of 3 or more from before freshman year to senior year. This number suggests that those who take on an officer/leader position benefit greatly in terms of their public speaking abilities.

In Table 5, students also described other modes through which they improved their public speaking skills. It was found that co-ops, internships, and research projects were crucial in shaping students’ skills. These circumstances are similar to coursework in that students were required to at least try presenting in front of an audience to communicate project results. Speech classes were also a benefit to four students by giving them a specific strategy on how to speak in public, in addition to giving the practice.

Summary

Students are influenced by a variety of factors during their undergraduate years. One of the most important factors mentioned was practice. With time and required practice from coursework and activities, many students showed a gradual increase in confidence with public speaking. Students who took on an officer/leader position in their activities were found to have greatly improved their public speaking skills with 9 of 15 improving by a rating of 3 or 4 from before freshman year to senior year. Other important factors that contributed to a student’s public speaking skills include: co-op, internships, research, and speech classes.
The survey only shows the results for one department in engineering. Each department has different public speaking requirements throughout the program. Some departments have the same basic requirements as the Chemical Engineering department but others may have much less. However, the survey does show that by offering students more public speaking and leadership opportunities, a larger percentage of the engineering student population could improve their “soft skills.”

The point that must be emphasized is that these are student self assessment reports of their public speaking skills not the assessment of their skills by trained professionals. As noted by Bureau of Labor Statistics [3] the view of employers is more training is still required. Thus, it also appears that many students are still over rating their own skills.

As a possible curricular alternative or addition, departments could provide students with a list of outside activities that could help them improve their public speaking skills. In addition, the school could help create an active Toastmasters club to provide the long term public speaking opportunity for a large number of students. Although Toastmasters is a reliable option, there are several more decentralized alternatives that can be implemented to help students. These include:

1. Better publicizing the Pitt Emerging Leaders Program to Engineering students;
2. Requiring Engineering students to take at least one Public Speaking class;
3. Increase the number of upper class students into the Freshman Conference;
4. Giving more thorough evaluations of in-class presentations;
5. Holding in-class debates to help students think on their feet;
6. Implementing a workshop on Public Speaking [2, 5].

Finally more research in this area is needed. The authors plan on continuing this study to measure the impact in all the different departments and to try and determine what additional training would be most effective.

References

Appendix I

NAME: ______________________
MAJOR: _____________________
YEAR IN COLLEGE: __________

Student Survey

Please answer the following questions about your personal experiences:

On a scale of 1 – 10, where 1 is poor and 10 is proficient,

What were your public speaking skills when you entered college?

1 2 3 4 5 6 7 8 9 10

Please describe:

What were your public speaking skills after you completed the freshman year:

1 2 3 4 5 6 7 8 9 10

Please describe:

What are your public speaking skills now:

1 2 3 4 5 6 7 8 9 10

Please describe:

Did your coursework help you improve your skills. If so, how?

Did your involvement with student activities help you improve your skills? If so, how?

Were there any other factors that helped develop your public speaking skills in college?

Do you have any personal stories that you would like to share that impacted your skills?