

## **Communication and the Engineering Profession: A Field Study**

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Scholars and industry leaders alike are touting the growing importance of communication skills in the engineering profession. However, engineering has traditionally been recognized as a safer haven for those who prefer to rely on technical, rather than people, skills to succeed. Do practicing engineers see their role becoming more communication-focused? Do all engineers share similar perceptions? Do engineers feel they are competent to take on these new demands? This investigation sought answers to these questions by examining the careers and perceptions of approximately 200 graduates from the University of Kentucky College of Engineering.

The present study has attempted to extend our understanding of how engineers perceive the role of communication in their chosen career paths by: 1.) identifying specific communication skills that engineers perceive as important, 2.) examining engineers' perceptions of self-competence at performing the same communication activities, and 3.) identifying critical gaps in communication competence that could have significant impact on engineers' career progression.

After identifying importance and self-competence perceptions, it was important to understand how communication apprehension (CA) might affect these perceptions. Research has shown that the effectiveness of communication skills training, either in engineering programs or in the workplace, may depend on individuals' level of communication apprehension. This study also explored how CA is related to job satisfaction and satisfaction with career progression.

### Engineers' Perceptions of Important Communication Skills

Of the 16 communication skills rated by engineers for their importance, the top 50% in descending order were relationship building, listening, motivating, giving feedback, negotiating, small group leadership, persuading, and routine information exchange. It should be noted that the averages for all 16 skill areas surpassed the midpoint so it would be difficult to classify any as unimportant. These results are not surprising since those skills rated as most important represent some of the most common forms of communicative interaction in any organization regardless of position, organization type, or organization level.

In contrast, some of the communication skills rated as least important can be considered more "special-purpose" skills and may not be used as much on a day-to-day basis by the sample as a whole. These included public speaking, soliciting feedback, conflict resolution, interviewing, instructing, and giving orders.

### Engineers' Perceptions of Communication Self-Competence

Fewer studies have asked engineers to rate their competence at performing a listing of specific communication activities. This sample rated their competence at relationship building the highest followed by routine information exchange, small group participation, listening, and instructing. Of even greater importance, engineers rated public speaking as the activity in which they were least competent followed by interviewing, conflict resolution, motivating, giving orders, and soliciting feedback.

### Identifying Critical Communication Skills Gaps

By identifying communication activities of greatest perceived importance and combining that information with perceptions of the lowest communication self-competencies, we can discover critical communication skill deficiencies that can be overcome through targeted education and training efforts. In this study, areas with the largest discrepancy between importance and self-competence scores were public speaking, motivating, negotiating, listening, conflict resolution, and giving feedback.

### Communication Apprehension Prevalence in Engineering

Although it was predicted that engineers would be more apprehensive about communicating than the general population as a whole, results of this study indicate that some engineers are quite communicative, even more so than the norm.

Although there has been some evidence that levels of CA may be lower for more tenured technical professionals, this study found that engineers who graduated 25 years ago or more had CA norms higher than the general population while younger engineers, those graduating since 1991, had CA scores lower than population norms (although neither group statistically differed from general population averages). One explanation may be that newer engineers have been given more access to (and are now required to participate in) communication skills training in college. Because of this training, they may be more likely to accept the increasing role of communication in their profession.

The CA-score breakdown for engineering specialization produced interesting results. Civil engineers, as a group, were the most apprehensive about communicating of all six engineering specializations. In contrast, mechanical engineers were significantly less apprehensive than general population norms.

Consistent with findings of earlier research, CA scores were highest for those who held positions in lower levels of the organization and in positions that paid less money. The study also found that engineers' ratings of their own extent of communication training shared a strong relationship with their levels of communication apprehension. Those who believed their training was extremely limited were significantly higher in CA than population norms. Likewise, those who rated their communication training as good enjoyed much lower CA scores than the general population.

### Communication Apprehension's Affect on Communication Importance Perceptions

This study also explored how communication apprehension might affect one's perceptions about the importance of communication to their chosen career path. Some studies have found that individuals who suffer from high CA are more likely to rate the importance of communication lower as a means of rationalizing their avoidance of communication. For practicing UK engineers, this study partially replicated those findings. After controlling for the effects of engineering specialization, communication training, position level, scope of supervision, organization size, and salary, CA was found to be negatively associated with 7 of the 16 communication skill areas under examination. In other words, the higher the CA score, the lower importance rating for advising, instructing, small group leadership, giving feedback, soliciting feedback, public speaking, and listening.

### Communication Apprehension's Affect on Perceptions of Communication Self-Competence

Individuals with high CA definitely rated their own self-competence at performing specific communication skills lower than others. Relationships with only two of the 16 communication skill areas (giving orders and relationship building) did not reach statistical significance.

### Communication Apprehension's Affect on the Relationship Between Importance and Self-Competence Perceptions

Whether communication apprehension actually affects the relationship between importance and self-competence perceptions remains uncertain but quite possible. When scatterplots of high CA's importance/self-competence rating means were compared to scatterplots of low CA's importance/self-competence rating means, there were obvious and substantial differences observed. Overall, it was easy to detect a shift upward in communication activities toward higher self-competence values for low-CA engineers. The opposite effect was quite evident when analyzing the graphical display of high-CA engineers.

Correlation tests between level of CA and each communication skill area's discrepancy score (perceived importance minus perceived self-competence) produced 16 positive relationships of which 10 were statistically significant. However, another type of correlation difference test produced no statistically significant differences. The sample size for that test may have been too small.

### Communication Apprehension and Job/Career Satisfaction

Because CA has been consistently shown to affect individuals' tenure within organizations, it would seem logical to assume CA may also have some affect on job

satisfaction. Several scholars have studied this but most have produced limited support. It appears CA may be associated with some aspects of job satisfaction such as satisfaction with supervisor but any link to overall job satisfaction remains unclear. This study examined CA and overall job satisfaction for engineers and again found no statistically significant relationship.

Interestingly, an exploratory study between CA and a much broader satisfaction measure, satisfaction with career progression, did produce a highly significant negative relationship. In other words, the higher the CA score, the lower the satisfaction level with career progression and visa versa.

### Conclusion

Changes in the engineering profession have prompted industry leaders and educators alike to reassess the preparedness of new graduates entering these evolving roles. There is overwhelming evidence that proficiency in communication behaviors can make any engineer more versatile and thus more competitive in today's job market.

This study has identified communication skills that are perceived as important by practicing engineers and has compared those perceptions with judgments of self-competence in order to explore critical gaps that can be narrowed or eliminated through education and training. Among the many variables that can affect these perceptions, communication apprehension has been shown to play some role in perceptions of communication importance but play even a stronger role in perceptions of self-competence.

There is however, cause for optimism. Newer engineering graduates from the University of Kentucky College of Engineering appear to suffer less from communication apprehension than more tenured alumni in spite of some studies that would predict results to the contrary. With more of a communication focus within the College of Engineering and university-wide communication coursework requirements, it appears progress is being made to educate engineers about evolving communication requirements within the profession while helping them manage apprehension and become stronger communicators.

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