Chassis Plans Leadership in Engineering Scholarship
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Fall, 2016

"I'm not sure why they have an Engineering Department – we end up fixing their mistakes anyway." A common phrase heard around the world from construction workers, welders, fabricators and machinists, amongst other professions, the question begs for an answer that can justify the tens of thousands of dollars students spend each year on pursuing engineering degrees. If engineers cannot be trusted by the workers utilizing their methods, then why do we rely so much on research and development by these same engineers, and why should we allow their products and processes into our lives? In industry, the image of being an engineer has been transformed from hardworking men and women with hands-on experience to nerdy, new grads sitting behind computer screens relying on expensive computer programs to do their dirty work. With such demise in the reputation of engineers, the new question becomes: **how can engineering education be improved to produce the best engineers possible?** *Easy*: by bringing hands-on experience inside and outside the classroom, as well as advocating for improved networking and communication skills.

First and foremost, gaining engineering experience has been the sole responsibility of the student. The College of Engineering pushes students to gain experience by interning in industry. It is the student's responsibility to find an internship, hope he/she is picked for the internship, and pray that this internship fits his/her engineering passion. There are three things wrong with this method: internships are overly competitive and require superb, advanced planning; quality internships at the national level require expensive career fair and conference trips; and finally, with pressure from the university, the student feels obligated to accept any internship position available.

Competition and obligation go hand-in-hand. Students are harshly competing with other students to secure internships. With the workload most students in the College of Engineering endure, there is limited time to seek out internships, which leaves the students begging to be picked regardless if it meets their career goals. For example, typical engineering students take five courses per semester (equivalent to a 40 hour work week with assignments). With a hefty workload, students do not consider seeking out internships until the last minute when most of the interns have already been selected. Now, the student must apply for whatever is left because they feel if they do not complete an internship, chances of a position after graduation are slim. Such circumstances may leave the student feeling unsatisfied with their major or leave them without an internship at all. Finally, the most successful way of securing an internship is by attending career fairs and conferences around the nation. Typical conference costs are $600 per trip (if the university provides some financial assistance). This cost is outrageous for a student to pay in addition to tuition, housing, and living expenses. The *solution*: hands-on experience brought inside the classroom.

As a junior in chemical engineering, I have learned many mathematical calculations. I could tell you how many potato chips are produced annually from the Lay's factory. Amongst conservation laws, cooling laws, pump equations, and heat transfer equipment, one could get lost in all the new theories and processes. A common complaint among engineering students is that while they are equipped with the tools to calculate equipment requirements and other natural mathematical processes, they don't really know what they do. Applying the theories and calculations to function in real life situations may be lost to the inexperienced student. Therefore, let's revert back to elementary school. Let's take the students on field trips to power plants, pump factories, and manufacturing facilities. Let's show the students how a pump works by examining blade angles. Let's show the students the difference between pre-preg, cold working, heat treating, and other material processes. Let's show the students what their calculations actually mean because if they don't know exactly the implications of their actions, then what's the point of hiring them?

Furthermore, a huge impact we can make to improve the quality of our engineers is to teach them effective communication. This is paramount in a multi-discipline work environment. Too many times young engineers rely on the safety of an email instead of picking up the phone to call a colleague. Too many times the words are uttered, "Well, it worked during computer simulation". Too many times the engineers believe they are more knowledgeable than the factory workers. This needs to change. Of course, Communications for Engineers is a required course at some universities, but this course only teaches how to write reports and use spellcheck. Students need a solid foundation of verbal interaction with other disciplines. They need to learn how to explain to the HR and marketing departments, they need to learn how to actively listen to the concerns of the manufacturing floor, and they need to realize that just because someone doesn't have a degree, doesn't mean that they aren't correct. This can be achieved by implementing these skills into the Communications course. The course should teach negotiating and interviewing skills, networking techniques, different methods of communication and explanation, and the importance of the phone call. Ultimately, the course should teach students the power of conversation and how effective communication fixes and avoids mistakes and earns trust and respect among colleagues. Authentic communication and valuing relationships is the bottom line.

Our generation has changed the face of engineering technology but needs solid building blocks and dynamic shifts in relationship building. While we have made impactful innovations, we still have room for innovating ourselves. We need to revert to the models established by hard-working men and women who laid the foundation for our disciplines such as Neil Armstrong, the first man to walk the face of the moon, and Thomas Edison, a man dedicated to improving the lives of his community by filing over 1000 patents in his life time. Although degrees and accolades may be the gateway to a brighter future, without hard work and determination, we will never see the light of our potential. We need to understand the links between knowledge and function, know what it takes to be respected in

industry, and demonstrate how to effectively communicate with our peers. Without these skills we are just nerdy, new grads sitting behind computer screens letting our forefather's hard work and dedication go by the wayside. We *must* change the education of engineering to one of admiration, respect, and trust because we are the future and we are laying the building blocks for the next generation's engineers.