Redefining the Engineer

Ability, Textiles, and Engineering at Home

Author: Toni Saylor
BS Mechanical Engineering ‘17
Olin College of Engineering
1000 Olin Way
Needham, MA 02492
Toni.Saylor@students.olin.edu

Research Project Advisers: Sara Hendren and Caitrin Lynch
Olin College of Engineering
Sara.Hendren@olin.edu, Caitrin.Lynch@olin.edu

Introduction

An engineer is defined as "a person who has scientific training and who designs and builds complicated products, machines, systems, or structures.[1]" This paper will explore a new definition of engineer—engineer as anthropologist and critical thinker.

Background

As a Clare Boothe Luce scholar I worked on three projects. For Sara Hendren I researched alternatives to traditional medical treatments of disabilities. For Caitrin Lynch I did field work in a local, family-owned textile factory. As a joint project with both professors, I participated in the planning and prototyping stage of http://engineeringathome.org/

Engineers as Anthropologists

In my research for Sara, I primarily focused on comparing two innovative interventions for Deafness: cochlear implants and Deaf Space at Gallaudet University.

The cochlear implant is an impressive technology that stimulates the cochlea electrically to restore most hearing to Deaf individuals. Given that hundreds of thousands of people around the world use cochlear implants, it is shocking to most laymen to discover that in the Deaf community the implantation of cochlear implants is a controversial and often rejected practice. To many in the Deaf community, becoming a hearing person is not a goal or desire. In fact, many Deaf individuals believe they are not disabled or hearing-impaired.[2] They identify with a different definition of disability—the incompatibility of the built environment with their bodies.

Deaf Space is a different type of intervention for Deafness. Rather than change the Deaf individual to fit the surrounding environment, the Deaf Space principles of architecture lay down guidelines for designing an environment that fits the Deaf.[3] Learning Residence Hall 6 at Gallaudet University, an American Deaf university, is the best example of Deaf Space architecture to date. The building features open sightlines for easy ASL communication, wider hallways and stairwells so students can walk and sign simultaneously, as well as other innovations to fit the principles.[4]

Cochlear implants are certainly a feat of science and engineering to be admired, but there needs to be a greater attempt on the part of engineers to understand their user group, and to consider adapting the environment to the individual, and not the individual to the environment.

Technicians as Engineers

Initially our fieldwork at the factory took the form of working 6:30-3:00 shifts, bouncing around from job to job in an effort to meet everyone and write down everything. After several weeks of that my research partner, Mary Martin (also a CBL scholar), and I had noted potential, small projects around the factory. We used a user-oriented design approach to narrow down to a particular machine that needed fixing. The machine had the most potential to damage fabric in its use, and because of efforts to avoid damage, was the slowest part of the process.

After choosing a project, we began working with Bernie, a machine technician and jack-of-all-trades at the factory. As we cut and bent metal, wired up electronic readouts, and installed magnetic pickups, we realized just how much we, sophomore and junior engineering students, did not know about engineering that Bernie did. Bernie had never completed high school, but he knew how to machine better than us, how to design parts better than us, and even how to do math better than us.

In the original definition of engineering, Bernie does not fit. He does not have formal scientific training, but he does everything else an engineer supposedly does—namely design and build machines.

Engineers as Critical Thinkers

As part of my research for *Engineering at Home*, I spent a number of hours with Cindy. Cindy, a Wellesley retiree, lost both legs below the knee and some amounts of all of her fingers following complications of a heart attack. Although she had all of the feats of engineering available to her—including the much-touted myoelectric hand with fourteen grip patterns—Cindy has developed her own arsenal of unlikely solutions. By the time her myoelectric hand had arrived for her use, Cindy had already adapted to her environment—and adapted her environment to her.

Using incredibly low-cost solutions, Cindy made possible what her OTs and prosthetists could not. She attached zip-ties to zippers and handles to make them movable by her. She attached off-brand Command hooks to the tops of jars so she could spin the lid. She realized she could use tweezers and a pill organizer to access her large collection of earrings.

As Cindy's high-tech "Darth Vader" hand (her words) sat in her closet, she used her own arsenal of smaller solutions to make her life livable every day. Do we consider Cindy an engineer? She may not be designing machines, and she may not have scientific training, but she did a better job designing solutions for herself than trained engineers did for her. This is not to say the high-tech hand has no place—it certainly works for many. But it is an example of really cool engineering faltering in practice. The majority of people who need a prosthetic cannot afford the high-tech hand, and even if they can it takes months to arrive.

Conclusion

As engineers, we have to do both. We have to create the technologically advanced myoelectric hand and the cochlear implants. But we also have to begin to ask questions about where those products are going, who can afford them, who wants them at all. The definition of engineer needs to begin to encompass the acts of individuals doing engineering in little or big ways—technicians or suburban retirees. This is not to undervalue the engineering degree. Instead it is to slowly push the envelope of what it means to be an engineer, until engineers are filling the current gap between the engineering product and the user's use, until engineers are acting as anthropologists and critical thinkers as well as trained scientists.

References

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