

2B Engineers in the Public Eye

Many people in our culture have little or no idea what engineers actually do, probably because (1) they don't personally know an engineer and (2) very few movies and TV programs have featured engineers as prominent characters. (A few exceptions might be: *Apollo 13*, where the NASA engineers talked the astronauts through a recovery and return plan using what was aboard the module; Tony Stark as Iron Man, designer of his own power suit; *Flash of Genius*, movie account of the designer of intermittent windshield wipers; *October Sky*, the life of NASA engineer Homer Hickam; *The Dam Busters*, a WW2 story; and *Mythbusters* from the Discovery Channel.)

Engineers don't get the publicity of doctors and lawyers. In addition, engineers often get a bad rap because of their stereotyped personality:

"When I started college I couldn't even spell 'engineer.' Now I am one."

T-shirt: "English is important, but Engineering is importanter."

Q -What's the world's shortest book (even shorter than the Amish phone directory?)

A -The Engineer's Guide to Fashion.

Q- How can you recognize an extroverted engineer?

A-Extroverted engineers look at *your* shoes instead of their own.

In an animated Dilbert as child sequence his mother takes him to the doctor, worried that he's not like other kids: "Yesterday I left him alone for a minute and he disassembled the TV, a clock and the stereo. He used the components to build a ham radio."

"Oh dear," says the doctor, "I'm afraid he has the knack. It's a rare condition characterized by extreme intuition for all things electrical and mechanical and utter social ineptitude." The mother begins to sob.

"Can he lead a normal life?"

"No...He'll be an engineer." [1]

The stereotypical engineer (think “Dilbert”) works for a large firm, is assigned a cubicle with a small desk and a computer, and crunches numbers or attends boring meetings all day.

Engineers are largely categorized in Myers-Briggs personality profiles as INTJ (introverted rather than Extroverted, Intuitive rather than Sensing, Thinking rather than Feeling, and Judging rather than Perceiving).

On the positive side, engineers are seen as logical, organized, and focused. Moriarty suggests these characteristics:

“Attributes of the engineer: disciplined, dedicated, serious, literal, industrial, rational, persistent, curious, patient, creative, and imaginative” [2]

To be honest, the public stereotype of the engineer might not attract students into the profession. The engineer is portrayed as

- Nerdy in interests
- Lacking social skills
- Highly technical
- Very introverted

As an exercise in combinational logic I’ve often asked my Digital students to design a “nerd detector” using basic logic gates, starting with a list of detectable characteristics. Here’s what they come up with in terms of list:

- Owns three calculators and four computers
- Wears taped-together glasses
- Speaks Klingon
- Does math problems for fun
- Socially adept NOT
- Good hygiene NOT
- Has pocket protector and 50 pens
- Good haircut NOT
- Drives car NOT

- Asks for homework if prof forgets to mention it
- Greets people with “Live long and prosper.”
- Lives in room
- Knows pi to 100 decimals
- Loves Fourier transforms

In other words, resembles an engineering student.

The “engineering mindset” was discussed at the 2016 American Society for Engineering Education conference, in response to an article claiming that engineers are more likely than others to become terrorists since their mindset was

- Structured
- Rigid (inflexible)
- Not people-centered
- Simplistic, and
- Rule-based [3]

(Of forty jihadists who studied abroad, over half, or 27, were engineers.)

Engineering educators did not respond happily to this analysis, pointing out the strengths and independent thought of the engineering personality and the emphasis on social impacts in modern engineering education. In addition, terrorist groups are more likely to recruit engineers to work for them in order to develop secure communication networks and improvised explosives. Terrorists also tend to draw from a certain demographic. (There are very few Baptist or Presbyterian terrorists.)

In 2008 the National Academy of Engineering convened a panel and published a study entitled *Changing the Conversation*. [4] The conclusion was that engineering needed some better P.R. Most young people knew that engineers used science and math (which is hard), but few knew what contributions engineering made to society. Some new tag-lines were suggested, including “Engineering: Turning Ideas into Reality.”

Harris, Rabins, and Pritchard concluded that additional qualities should be emphasized in engineering education, including professional pride, social awareness, environmental awareness,

trustworthiness, and moral courage. [5] Current curricula have, in fact, made an effort to include these.

Making a case for the value and fulfillment of the engineering profession and working to develop well-rounded engineers will continue to be a challenge.

References

1. “Dilbert –the Knack”, from Dilbert animated TV series,
<https://www.youtube.com/watch?v=Dx6HojLBSnw>
2. Moriarty, G., *The Engineering Project*, Penn State University Press, 2008.
3. Berrett, D., “Does Engineering Education Breed Terrorists?” *Chronicle of Higher Education*, March 23, 2016.
<https://www.chronicle.com/article/does-engineering-education-breed-terrorists/>
4. *Changing the Conversation*, National Academy of Engineering, 2008.
5. Harris, C.E., Rabins, M.J., and Pritchard, M.S., *Engineering Ethics: Concepts and Cases*, Cengage, 2009.