

By Andy Reese

CROSS THE GENERATION GAP

Challenged to integrate and engage with Millennials, engineering organizations are finding new ways to bridge generational divides

More than 30 years ago, when Carl Selinger was a junior engineer at the beginning of his 31-year career at The Port Authority of New York and New Jersey, he accompanied a delegation of transportation officials from Southeast Asia to dinner. Unsure of how to behave during the meal, he asked his senior colleague who was managing the delegation what he should do. “He told me, ‘Watch them, and do what they do.’ And it worked!” says Selinger.

Selinger, the author of best-selling book *Stuff You Don't Learn in Engineering School* (Wiley-IEEE Press, 2004), harkens back to those early days of his career as he reflects on how today’s engineering leaders need to think about engaging with the Millennial-generation professionals increasingly filling the ranks of their organizations. “It goes back to the individual and helping that person develop soft skills—or what someone who reviewed my book called ‘life skills.’”



▲ Author Carl Selinger

Photo Credit: John Livsey

BIG GENERATION, BIG CHALLENGES FOR ENGINEERING

Millennials—those born roughly between 1980 and 1995—now constitute the largest generational



cohort in the workforce, surpassing Baby Boomers and Gen Xers, according to the Pew Research Center. With an average of 10,000 Baby Boomers currently turning 65

every day, Millennials will account for greater than 50 percent of the workforce by 2020, Pew notes.

Those numbers add up to significant challenges and competitive risks for engineering organizations. Consider: Between the Baby Boomers and Millennials, the smaller Generation X graduated fewer engineers than their parents’ cohort. As a result, organizations that struggled to hire

Gen X engineers—and that therefore continue to rely on greying Boomers—must now ensure that they are attracting Millennials onto their teams or risk a serious shortage of qualified



engineers, as well as a catastrophic brain drain as the Baby Boomers retire out of the workforce.

Demographic trends, however, present a further challenge for engineering leaders: Millennials are more numerous than Gen Xers, but as a group, they are not producing any higher percentage of STEM (Science, Technology, Engineering, Math) graduates than their generational predecessors, according to government data. A recent report from ABET, the group that accredits college and university engineering programs, points to a shortage of about 1 million STEM graduates over the next decade.

These trends put a premium on an engineering organization's ability not only to recruit fresh talent, but also on its ability to integrate Millennials—often labeled as “entitled”—into existing engineering teams, hierarchies and processes. In addition, engineering leaders must ensure they are keeping these young recruits—perceived as

“job-hoppers”—engaged so they don't leave the organization after only a few years. Let's start by looking at these two challenges.

INTEGRATION & ENGAGEMENT

Raise the issue of Millennials with a senior engineering leader, and inevitably the term “entitled” comes up. That's perhaps not surprising, as today's senior engineers naturally view Millennials through the lens of their own experience, says Dr. Ryan Boettger, associate professor of technical communication at the University of North Texas.

“When Baby Boomers were coming into the workforce, they were told not to expect anything until they reached age 40 in terms of promotion or advancement. You kept your head down and you stuck with the

company,” says Boettger, who also is editor for the *IEEE PCS Professional Engineering Communication Series* published by Wiley. “Millennials have different expectations: They want to be seen as being on the same level as their more senior colleagues—not necessarily from a pay perspective, but from a value perspective.”

These inter-generational differences set up a potential conflict between, on the one hand, Baby Boomers and Gen Xers, who might feel that Millennials should naturally follow the same path they did—“grinding it out” for years before earning recognition—and Millennials, who might be more inclined to simply go elsewhere in search of an environment that provides more rapid—if not instantaneous—gratification.

Whether Millennials actually are any more inclined to “job hop” than prior generations is the subject of debate among social scientists. A recent Pew Research article by Richard Fry, for example, suggests, “Among the college-educated, Millennials have longer track records with their employers than

Generation X workers did in 2000 when they were the same age as today's Millennials.”

Nevertheless, the perception persists that Millennials are less loyal to a given employer than past cohorts. Fred Filler, a product manager in the Engineering & Product

Design Business at IHS Markit, points out that Millennials are often viewed as not being as “performance-driven” as prior generations. “They are seen as more ‘experience-driven.’ They might migrate frequently between jobs, not because they feel like they're stuck in



▲ Dr. Ryan Boettger,
University of North Texas

a nowhere job or they're looking to get more money or a better title. They simply have a 'carpe diem' attitude," says Filler.

APPRENTICESHIP APPROACH

In response, Boettger sees some organizations adopting a mentorship-type model as a tool for intergenerational integration and engagement—not a formal, one-on-one mentor model, but a more organic, team-based model that would be very common in a project-based setting at an engineering firm. Different team members, across different generations, come together around a common goal, but work on their own set of defined tasks that, in the case of Millennials, makes them feel like they're a valued contributor to the success of the overall project.

"It becomes like an apprenticeship model," says Boettger. "It's the perfect work environment for Millennials because it's spontaneous and it's continually evolving. That gives Millennials something they need, which is going to help with their retention, but it also gives them the structure that they require."

In addition, this project-based approach provides Millennials with exposure to other generations and opportunities for learning at the same time—the opportunity to "do what they do," as Selinger says, the chance to assimilate both technical knowledge and soft skills from their more senior colleagues.

Boettger also suggests engineering firms think about ways to throw their young engineers out of their comfort zone. For example, have them go on a site visit to a different firm, and then have them write a site report. Send them to a conference where they can sit and listen to experts, and then have them write a trip report.

"It's not all about accommodating

Millennials," Boettger says. "It's also about giving them the skill sets they need to be productive, including the ability to convey complex data and information in a way that is understandable to their target audience."

Filler says that encouraging cross-generational interaction and communication in these ways ultimately provides opportunities for both senior engineers and the organization as a whole to benefit from the fresh perspectives that Millennials bring to the table. "Engineering leaders should recognize that—unlike generations before them—Millennials aren't as tied to the status quo and may be more adept at thinking about perennial problems in nontraditional ways and creating innovative solutions," says Filler.

**"DIGITAL NATIVES,"
DIGITAL DANGERS**

Regarding the contrasting attitudes of Baby Boomers and Millennials on the use and usefulness of technology, Selinger describes a conversation with a senior engineering leader that he mentors. She was resisting using Twitter as a communication tool to coordinate among a group of younger engineers that she was leading on a business trip, Selinger relates. "I told her, 'Twitter is free. If they want to communicate that way, get a Twitter account and see how it works.' When she got back, I asked her how it went, and she said it was fine."

Millennials are, indeed, the generation that grew up alongside the internet and at the epicenter of the explosion in mobile computing and communications. Where Baby Boomers typed memos, and Gen Xers sent emails, Millennials favor text

messages and tweets, if not simply an emoticon, to express their point. At the same time, Millennials' early exposure to technology has created expectations that these "digital natives" would automatically know how to process and analyze data. "That's a fallacy because basic human cognition doesn't change," says Boettger. "Just because you're surrounded and consumed by



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information doesn't mean that you know how to use it."

Filler says that, in a sense, the instantaneous nature of the internet—"Just Google it!"—has created two potential issues for engineering organizations. First, the expectation that we can have the answer to any question at our fingertips with a few keystrokes. And second, the expectation that we can find the best answer at the top of our search results list, regardless of the source of the information.

On the first issue, Filler says, "Millennials are not necessarily going to sit down with an engineering book and read it cover to cover. They're going to read enough to get an answer or solve a problem, and then come back to it when they need to." It's not only a function of the technology

they've been exposed to, Filler adds. It's also a function of how they are learning in college. "With a lot of the texts going electronic, professors can be much more prescriptive about reading specific sections in specific chapters."

The second issue, of perhaps greater concern to engineering organizations, is the degree to which Millennials accept information at face value. "Millennials do consume a lot more information, but they're not necessarily as cautious in terms of vetting that information," Boettger says. "For an engineer, in particular, that becomes an issue because there is a lot of information out there that is not necessarily accurate and correct."

It's not that Millennials don't have critical thinking skills, Boettger is quick to add. "The problem is that the technology has become so intuitive, information just gets spit out at you. In some ways, the sophistication of the technology has taken the guesswork out of the information, and people will just accept the information uncritically."

Jill Hawthorne, associate director for international business development at the publisher Wiley, warns of the dangers of "satisficing" when Millennials are searching for information. "The immediacy of online communication and gaming tends to make Millennials impatient, even by their own reckoning," Hawthorne writes on the Wiley Exchanges blog. "High technical engagement can be accompanied by a willingness to accept 'good enough' information drawn from a limited range of sources. 'Satisficing' denotes the tendency to feel satisfied with their research when a sufficient answer is reached, eschewing an exhaustive search of all sources."

CROSS THE DIGITAL DIVIDE

Engineering organizations have begun to put in place solutions that meet Millennials' need to engage with

technology on the job in the same way they incorporate smartphones, tablets and apps into their personal lives. In addition to finding ways to incorporate tools like Twitter, as Selinger described, technologies that enable instantaneous collaboration, like video conferencing or instant messaging chat groups, play to Millennials' strength—the ability to come together to resolve a problem quickly, and then disperse.

Fred Filler, with IHS Markit, also points to a new generation of engineering intelligence solutions that bring together technical reference such as standards, handbooks and manuals, journal articles, and other authoritative content from vetted sources—all wrapped in a Millennial-friendly interface. A simplified interface masks powerful content analytics and semantic search technology that work behind the scenes to deliver the best answer to a query at the top of the search results list. For Millennials unaccustomed to looking past the first or second page of search results, this kind of solution ensures that they get the information they need quickly—before they're inclined to "satisfice."

This same kind of solution can be extended to encompass structured

and unstructured corporate data, too, according to Filler. This ensures that engineers truly have a single source to go to for all their internal and external technical content. It also promotes the reuse of institutional knowledge embedded in the disparate enterprise systems that engineering organizations have already put in place—so all the tribal know-how of the Baby Boomers continues to drive value into the future.

BUILD THE BRIDGE

For his part, Selinger takes the long view of the engineering profession's intergenerational challenges. Over his 31-year professional career at the Port Authority, as well as the three decades he spent teaching at Cooper Union, SUNY Maritime and other institutions, he says he has seen senior engineers long struggle with managing and communicating effectively with younger engineers entering the corporate world. "Engineering management,' in my opinion, is an oxymoron, because we're typically not trained as managers—we're just good engineers," he says.

Moreover, Selinger adds that generational change is just one of many issues that engineering leaders have to consider as they think about

how to keep their teams operating efficiently, collaborating and engaged. Issues related to gender, age, and diversity, for example—let alone technological advances—continue to impact how engineering is done today versus decades past. "Sometimes you just want to go back to your cubicle and design the bridge," he says in conclusion. "It can be very difficult to deal with all these issues—but you have to deal with them to get the job done." 



A SIMPLIFIED INTERFACE MASKS POWERFUL CONTENT ANALYTICS AND SEMANTIC SEARCH TECHNOLOGY THAT WORK BEHIND THE SCENES TO DELIVER THE BEST ANSWER TO A QUERY AT THE TOP OF THE SEARCH RESULTS LIST.