

Future-Proofing America's Engineering Education Programs

By Michael K. Milligan, Ph.D., P.E., Colorado Zeta '83, and Norman L. Fortenberry, Ph.D.

*I*N PLACE of our usual Council's Corner, we are publishing here an article by two of the nation's leading engineering educators.

The alarm bells have sounded: one of the single greatest perceived threats to the future of work lies in automation. According to a report from PricewaterhouseCoopers, 38% of American jobs are at risk of becoming obsolete within the next 15 years.¹ Every industry, from mechanics to medicine, are likely to see some form of their work automated in the future.

And yet, the demand for skilled workers, especially in rapidly-growing engineering and tech fields continues to explode, with some estimates noting that 1 million more STEM graduates will be required by the year 2020.²

Begs the Question

To us, this begs the question: Is higher education filling a serious, but short-term need for skilled talent before certain jobs become obsolete, or are we using the educational experience to future-proof our engineering graduates? At ABET and ASEE, we believe firmly in the latter.

Within the last decade, engineering programs within university and college settings have been racing to keep pace with rapid social and technological change. These programs are implementing proactive and innovative steps to completely redesign curricula to be outcomes-based, informed by real-world business needs and to give students core discipline knowledge while retaining a student's ability to explore individual interests.

Universities that have made such adjustments report direct improvements in their ability to increase general enrollment, improve retention, and develop more thoughtful and prepared graduates.³

Cutting-edge Skills

The constantly-moving target, of course, is how best to ensure that engineering graduates walk out into the world with the cutting-edge skills and technical knowledge required to succeed—and with a set of skills that can change automation from a threat to an enabler of future personal and professional growth.

As individuals, and on behalf of organizations committed to educating this vital next generation of problem solvers, we believe it is how higher education challenges norms, traditions and the status quo of what worked in the past that will define its future. And with the pace of change only increasing, higher education doesn't have any time to waste.



Michael K. Milligan, left, is the executive director and chief executive officer of ABET, the global accreditor of college and university programs in applied science, computing, engineering, and engineering technology. Norman L. Fortenberry is executive director of the American Society for Engineering Education (ASEE), a global society committed to promoting excellence in engineering and engineering technology instruction, research, public service, professional practice, and societal awareness.

Creative Solutions

It's why we're encouraged to see creative solutions like the Grand Challenges Scholars Program,⁴ which is a combined curricular and extracurricular program to impart future engineers with competencies in five areas—research/creative; multidisciplinary; business/entrepreneurship; multicultural; and social consciousness—designed to prepare students to be the generation that solves the grand challenges facing society today.

Recent ASEE research reinforces the urgency, from a true consumer's point of view. Overwhelm-

ingly, students in the multi-year national research study concluded that too many schools were largely paying insufficient attention to an array of knowledge, skills, and abilities needed to produce the desired "T-shaped professional"—one who brings broad knowledge across domains, deep expertise within a single domain, and the ability to collaborate with others in a diverse workforce.

Blur Disciplinary Borders

Indeed, engineering education of today must be far more connected to the world than ever before. Engineering education of today must blur disciplinary borders, be grounded in collaboration, be informed by business, and, at its core, be customizable and flexible to the changing world around us.

As we careen toward this bold new future, where less and less may be in our control, we must be thoughtful about how we will get there from here.

Designing engineering education that can withstand the test of time requires new skills on the part of our students just as much as it requires new skills on the part of educational institutions; it also requires being open to new types of students with different sets of interests. But it is the near-term actions of our educators that will define our nation's ability to thrive.

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1. www.tbp.org/?oped1
 2. www.tbp.org/?oped2
 3. www.tbp.org/?oped3
 4. www.tbp.org/?oped4