Goodbye to All That: the Future of Engineering Technology

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“This kind of education is so good that we can’t even mess it up.”  
Professor Bob Hays, Southern Tech

“No ideas but in things.”  
William Carlos Williams

Abstract

Things have not always gone well for engineering technology in recent years. On the national level one hears that 65% of the future jobs will require post secondary school education. The “soft skills” of writing, oral communications, teamwork, presentation skills and analysis of human factors will loom as ever more important. In other words, collegiate level education, not just training.

This would seem to cause a great concentration on engineering technology. Some states have made efforts to enhance the community college experience to include offerings in engineering technology. Some private colleges, tuition driven, and desiring to “move to the next level” have deemphasized or eliminated their engineering technology programs. An interesting and problematic future may lie ahead.

Needs

One of the areas that engineering technology clearly impacts is manufacturing, particularly what is called the “new’ manufacturing. Eric Ailworth, writing in the Boston Globe (January 25, 2014) notes that Massachusetts manufacturers frequently complain that they cannot find enough skilled workers. (One report describes the shortfall as being as high as 10,000 workers.) Michael Goodman, a professor at the University of Massachusetts Dartmouth provides an interesting perspective. Goodman argues that rather than a shortfall there is a disconnect between companies and the state’s workforce.

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development system. Manufacturing in Massachusetts is not what it was. There were 480,000 manufacturing jobs in Massachusetts in 1990 and there are some 250,000 today.\(^1\) On the bright side, of the 1350 firms that he surveyed 6 of 10 reported that they wanted to hire people within the next two years, but 1 in 3 reported a hard time in finding people. Goodman notes that 69\% of the companies had never contacted a community college and 76\% had never reached out to a four-year university. The shortfall may be higher yet with the impending retirement of as many as 100,000 Baby Boomers. This situation has precipitated a grant of $1.2 million to the Lawrence area with the cooperation of Northern Essex Community College and a similar grant of $1 million for new manufacturing lab equipment to Quinsigamond Community College in Worcester. The Massachusetts Manufacturing Extension Cooperative, a group of small and medium size manufacturing companies, reported that 90\% of their membership expressed a willingness to train new employees but 79\% also reported a lack of resources to do so.\(^1\) Robert Reich, former Secretary of Labor under President Clinton, writing in PARADE magazine (September 1, 2013) has observed that what we need are manufacturing engineers, process specialists and skilled technicians to facilitate the new high-tech manufacturing. He advocates a “plus One” system utilizing the senior year of high school and one year of post secondary education as the means of meeting our manpower needs. Reich also notes that such a system might decrease the high school dropout rate by...
offering a career path for those not aiming for four-year colleges. However, a sobering note was sounded by Linda Noonan, Executive of the Massachusetts Alliance for Education (Boston Globe, Feb. 15, 2014) who remarked that 40% of the students entering Massachusetts’s public colleges and universities needed remediation and many would never reach their degree goals. To all of this one must simply ask whither engineering technology? The good news for people like me who have spent their professional lives teaching the humanities and social sciences in the technical environment is that the “soft skills”: communicating both orally and in writing, the people skills to run meetings and work in teams, judgement/decision making, and knowledge of the world around us: these skills after the core issue of technical competency will determine how people are hired and how they advance.

But the case does not rest only with the problem of ET meeting the national and regional needs in manufacturing. There have been some jolts.

Jolts

In Georgia, Southern Polytechnic State University, fondly known to all as Southern Tech and founded at the behest of the Georgia Business and Industry Association and currently enrolling some 6000 students, is being combined with the 21,000-student Kennesaw State University to form one university under the Kennesaw State name. Wentworth Institute
of Technology after the mechanical engineering technology program met 150% of its enrollment projection cancelled that program and channeled most of the students into a BS in mechanical engineering. With the ongoing controversy in civil engineering that only those with a BS in civil engineering be allowed to sit for the PE exam, the civil engineering technology program was also cancelled and the students funneled into the BS in civil engineering. One might also note that of the top 50 schools in the conferring of Bachelor’s degrees in engineering technology only 8 are private institutions. This brings up an interesting question, namely are private, tuition driven institutions “moving to the next level” eliminating engineering technology in favor of engineering? How many examples can we find (Rochester Institute of Technology?) where, in a private school the existence of engineering and engineering technology does not mean the elimination of engineering technology? The lion shall indeed lie down with the lamb (engineering technology) but the lamb gets very nervous and one day when you walk by the enclosure you notice that the lamb has gone away! Engineering technology seems to have a secure place at state institutions often with a freestanding college of technology. This may make moot Steve Cheshier’s famous 1985 article (A Modest Proposal…..”) that engineering technologists are applied engineers, at least at private institutions if the demographics and the income stream point to an emphasis on engineering. The issue is the economic survival of programs not just professional registration.

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Wentworth and Others

The issue is clearly not that engineering technology, particularly associate degree programs cannot provide the type of education that is needed. Larry Carr, former Dean of Wentworth’s College of Professional and Continuing Studies alluding to the now famous Georgetown University manpower study, noted that 65% of jobs in the next twenty years will require some sort of post secondary training or education.4 And what does the Georgetown Center’s report actually say? The Center is the source for Dean Carr’s figure of 65% and the reports point out that there are now at least five ways in the area of career and technical education that can transport students into the American middle class. These paths include: employer based training, industry-based certificates, apprenticeships, subject matter certificates and associate degrees.6 The Center declares that there will be 29 million jobs paying at least $35,000 that will not require a bachelor’s degree. 50% of these new jobs will confer middle class income status almost immediately. 11 million jobs will pay around $45,000 or more and 4 million new jobs will pay $75,000 or more.3 On my local front I can report that Wentworth’s new Manufacturing Center with its computer controlled milling machines and lathes, solid model makers and 3D solid-state printers is filled to bursting. Classes could run 24 hours a day. Scheduling mechanical students and students from industrial design and other

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majors into the facility is a huge problem. For approximately the past three years
Wentworth’s College of Professional and Continuing Studies has partnered with the
Electrician’s Union, the Carpenter’s Union and the Sheet Metal Worker’s Union.
The idea is to give a package of technical credit by way of experience and then to fill in
the general education courses and remaining technical courses so that an associate’s
degree can be earned. A portion of these students usually go on to bachelor degree
programs. Attending a reception for the first cohort of associate’s degree recipients from
the Carpenter’s Union some of the senior union officials welled up at the sight of the
students and their families. After long years they had found a college willing to partner
with them. “It makes a huge difference in these people’s lives.” they observed. I
interjected, “It always does and it always will. That’s what Wentworth does.”

At Wentworth there is now much emphasis on EPIC Learning (Externally Collaborative,
Project-based, Interdisciplinary Curricula for Learning.) Which is not to say that such an
interest in innovation cannot be found in an engineering technology environment. One
needs only look at similar work and aims at the Purdue University Polytechnic Institute,
which is in the College of Technology on the Lafayette campus.
Various states are trying to meet the looming workforce needs and these efforts are
intimately involved with engineering technology. In Ohio one finds Sinclair Community
College in Dayton. The total college enrollment is around 25,000 with engineering

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technology programs at the associate level in electrical, mechanical, manufacturing, civil and construction engineering technologies along with a wide variety of other career-related associate degree and certificate programs. Upstate in Toledo one finds Owens Technical College with an enrollment of 40,000 students making it one of the largest community colleges in the East. Again there is a wide variety of associate level engineering technology programs.

To the south, the state of Georgia is conducting an interesting experiment. In addition to the thirty plus units of the State University System there is now a Technical College System of Georgia. There are twenty-five technical colleges distributed throughout the state. Georgia reinvigorated its vocational school system making many capable of offering the associate’s degree. In addition to main campus sites there are satellite campuses and online programs. The old Cobb County Vocational School has become Chattahoochee Technical College with a main campus in Marietta, Georgia and eight satellite campuses in Fulton, Cherokee and Fulton counties. At the other end of the state Wiregrass Georgia Technical College has a main campus in Valdosta and two satellite sites. In Georgia, within easy driving distance from anywhere in the state, there are multiple technical colleges that are conveniently located.

The Future

What then lies before us? The need for engineering technology programs has
perhaps never been greater. There may be a gap between the public and private institutions. Private schools may be pressured by costs and demographics. Will engineering technology programs remain one of the best ways for people to make a difference in their lives, the lives of their families and the economic growth of the country? Technology programs require the resources of labs and equipment and that does not mean all "virtual" labs or simulations. “Hands on “ education is still needed. At what level and by whom will future manpower needs be met?

Bibliography


Biography

Amos St. Germain has taught for some 29 years in the Department of Humanities and Social Sciences at Wentworth Institute of Technology. Before that he taught for 12 years at Southern Technical Institute. He is the only person alive who has taught at both of these engineering technology pioneering institutions. He spent 16 years in administration at Wentworth. He has been a member of the Engineering Technology, Manufacturing and Liberal Studies Divisions of ASEE since 1985.