The History of Engineering Technology
and Engineering Education as It Has Developed in the United States

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Introduction

Covered here are topics of different aspects of the development of the field of engineering technology and engineering education in the United States. Engineering Technology was founded by the “Committee of Twenty One.” The members of this committee took those programs through to the predecessor of what is now ABET accreditation just after WWII. Next the influence of the Grinter Report on engineering technology and the emergence of manufacturing engineering technology as an example will be discussed. A brief historical analysis on whether engineering and engineering technology can exist at the same institution will also be discussed. Next an overview of engineering education in America from its inception to the present will be covered starting with the time period prior to Morrill Act of 1862 and ending with the most recent movements to integrate engineering in K-12. Then engineering, education, and computers, past, present and future will be looked at. Finally the development of the Engineering Technology Listserv over the past twenty years will be covered and how it helped in a unification of the field.

Engineering Technology -- A Discipline or a Stepping Stone: What or Where Now?

Engineering Technology was founded by the “Committee of Twenty One.” They were people of what we now call the “Greatest Generation.” They founded their programs during their “finest hour” and took those programs through to the predecessor of what is now ABET Accreditation just after WWII. Who were they and what was their motivation as they conceived and built their infrastructure, much of that which we enjoy today? And sometimes they had to conceive and build even their own institutions from scratch. They came from all directions simultaneously. And they operated at all levels and within all structures of education as well. What was their vision? What was the glue that held them together? So what was that Committee of Twenty One? What were their constraints? What inspired them to employ so well Shakespeare’s “Sweet uses of adversity” and make Engineering Technology stick to the wall through varying tides and changes in science, engineering, and technology at rates unseen by any generation of educators that came before? Engineering Technology was always there when called upon, and sometimes even when not called upon. And what has Engineering Technology become through all these creative tensions? How truly has Engineering Technology adhered to the visions of its founders? How well has it led? How well has it paved the way? How well is it leading now? These questions are discussed.1
The Influence of the Grinter Report on Engineering Technology and the Emergence of Manufacturing Engineering Technology

Engineers have played an instrumental role in the social, political, and economic development of the United States. As with most professions, engineering has evolved over the years. Engineering has gone from a very rudimentary form of manual arts, to a high level of science and research today. From the beginning, engineering was more of a hands-on, shop-cultured training process learned through various means of gilds, apprenticeships, and simple on-the-job training. Many of the early European immigrants to this country brought these technical skills and organizational talents with them to this new country. After engineering was formally introduced to academia in the early 1800s, a transition started to take place. A subtle shift from the hands-on, shop-cultured engineer, to a more theoretical, school-cultured engineer had begun. This transition happened over many years, but as it evolved an interesting phenomenon took shape. While these new theoretically trained engineers began to graduate and enter the work force, it soon became clear that these new engineers lacked the practical application-based knowledge needed in industry. The hands-on training and background that once allowed these engineers to have a full understanding of how things worked in a manufacturing environment had been lost. The little known “preliminary” Report of the Committee on Evaluation of Engineering Education (otherwise known as the Grinter Report) recognized this apparent void of knowledge. While the final version of said report eliminated what would be considered the engineering technology component of engineering education, it is clear from the preliminary report that the committee saw a need for a more experiential approach to engineering education despite the fact that this ASEE committee ultimately removed the engineering technology component from the Grinter Report. Engineering technology would soon find its place in higher education. However, even as these new engineering technology programs were being developed, it was unclear exactly what “engineering technology” was and what role it would play both in academia, as well as in industry. The purpose here is to trace the origin of engineering technology education in America and describe the events that led up to the introduction of Manufacturing Engineering Technology programs at American universities.²

Goodbye to All That

This author is the only person alive who has taught at both Southern Polytechnic State University (Southern Tech) and Wentworth Institute of Technology. Early on in his career he divided college faculty into two categories: those who taught at the college and those who enjoyed the college. He decided that he was going to be one of those who enjoyed the college. Accordingly (and being a historian by training) he plunged into the life and history of both institutions. L. V. Johnson, H. Russell Beatty, and Ted Kirkpatrick: these were names that became familiar to him. He has been a member of the engineering technology, manufacturing and liberal studies divisions of ASEE since 1985. He is familiar with the pioneering volume, “The Technical Institute” and with “Engineering Technology: An ASEE History.” He has reviewed proposals and articles for national and regional ASEE conferences and for the Journal of Engineering Technology. He is the founding president of the Humanities and Technology Association. Things have not always gone well for engineering technology in recent years. On the national level it is said 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 this is collegiate level education, not just training. This has caused a greater concentration on engineering technology. Some states have made efforts to enhance the community college experience to include offerings in engineering technology. Some private colleges and universities in “moving to the next level” have deemphasized or eliminated their engineering technology programs. (Responding to economic realities?) (Can engineering and engineering technology exist at private universities or is it a case where the lion lies down with the lamb and one day the lamb vanishes?) A brief historical analysis seems to reveal that we may be in a state of confusion. Both enrollments and manpower projections will be looked at here.

Evolution of American Engineering Education

Throughout the history of American engineering education change has been the only constant. The rapid expansion of engineering education started in the land-grant schools established under the provisions of the Morrill Act of 1862. It was then that engineering found a firm place in academia, and a four-year curriculum was adopted as the standard for an engineering degree. However, different forms of formal or informal engineering education did exist prior to the Civil War. Initially, engineering was taught informally as skills handed down from practicing engineers who were mostly European immigrants. Later it was integrated into the curriculum at academies to train engineers to meet the regional economic need. The academies offered a more formal training to high school education. Furthermore; there were several patterns of formal college level engineering courses in the pre-Civil War era. Most historians have ignored different forms of practical engineering courses offered by the antebellum colleges. Here is given an overview of engineering education in America from its inception to the present. Based on the major changes of format and the curriculum content of engineering education, the historical time line can be divided into four major segments. These segments are: 1) the time period prior to Morrill Act of 1862, 2) the post-Civil war and prior to World War II, 3) after World War II and 4) the most recent movements to integrate engineering in K-12.

Using Computer Speech Recognition to Enhance Second Language Learning: A Case Study

In December 1968, Apollo 8 orbited the moon, with less computing power than our $20 calculator. That same month, Douglas Engelbart gave "The Mother of All Demos," showing a computer with a graphical interface controlled by a pointing device. Despite all of these engineering accomplishments, most people thought computers fouled up everything they touched. Now those experimental technologies of 1968 have become part of everyday life, and we also have speech recognition and computer translation. In a case study, using readily available technology, the author spoke his native English and then Chinese. For the spoken English, Mac dictate reliably achieved an accuracy rate greater than 95%. When he spoke Mandarin, a native Chinese speaker was able to translate the words into English nearly perfectly. With the same passage, Mac dictate had an accuracy rate less than 50%. For the future a case study will be looked at that provides some evidence to guide engineering practice. The human translator succeeded because she knew the extent of the speaker’s limited vocabulary. The computer translation failed because it wrongly selected words that the speaker did not even know. This suggests that translation could be improved by adjusting the vocabulary. The end
result would be a computer that understands human speech and performs accurate translations with an interface that is easy to use.\textsuperscript{5}

The Development of the Engineering Technology Listserv over Its First Twenty Years

In 1995 most people did not know what a listserv was. The founder of the engineering technology listserv was at the CIEC that year and as part of his duties as ETD secretary passed around an attendance sheet at the ETD business meeting. Email was just starting to be used in academe then, so he asked everyone to put down their email address. Afterwards he used this list to thank everyone for coming to the meeting. Dave Baker from RIT then used this for a distribution list as did others. When the author arrived at MTSU that summer, the dean of technology at Michigan Tech said he ought to start a listserv, prompting the question, “What is that”?! Michigan Tech was using Majordomo, but the information technology person at MTSU suggested Listproc and thus the engineering technology listserv was born with about sixty members. Engineering Technology (ET) faculty found it useful and so it grew rapidly at about 500 members per year for the first four years. Since it was unmoderated at the time, it plateaued for the next three years due to extraneous messages causing people to get off at the same rate that others got on. Once the list was moderated it again grew at the former rate reaching 3,500 members by 2005. Since the ET faculty field was then about saturated, growth slowed reaching 4,000 members by 2010. Although slow growth continued, due to conversion to the Listserv platform in 2014, membership dipped to a little over 4,000 since Listserv automatically kicks members off if their mailboxes get full. This article will go into more detail on this history and why the listserv has proved a useful tool.\textsuperscript{6}

Bibliography


