

Scholarship in Engineering Technology: Personal experiences and thoughts

Albert Lozano-Nieto, PhD
The Pennsylvania State University
Commonwealth College
Wilkes-Barre Campus
P.O. Box PSU
Lehman, PA 18627
Phone: (570) 675-9245
FAX: (570): 675-7713
email: AXL17@psu.edu

Abstract

In recent years, Universities have placed a stronger emphasis on research and scholarship as a critical element not only for faculty members to be tenured and promoted but also being used in their performance evaluations. Engineering Technology (ET) faculty members are not an exception. However, ET faculty is a more heterogeneous group than their colleges in Engineering programs, having very diverse experiences and backgrounds. A common factor for all ET departments is the emphasis on undergraduate education and the limited human and infrastructure requirements to conduct the traditionally considered research activities. All this introduces newer elements that need to be considered when defining the activities that can be considered under the umbrella of scholarship in Engineering Technology.

The goal of this paper is not to solve all the problems that exist today in defining and understanding scholarship in our field, but to share the author's experiences in developing his own scholarship activities as an ET faculty member. The author firmly believes that scholarship activities in Engineering Technology will ultimately help to strengthen our own academic identity.

Introduction

Higher Education has changed and will continue changing. Pressures from legislatures, budget cuts and society increasingly scrutinizing their activities have caused University administrators to demand more from their faculty members, most of the times with less resources. Engineering Technology (ET) is not only an exception, but it is one of the areas most strongly affected by these changes. ET faculty members are being subjected to escalating expectations by their

institutions; they not only are required to excel in their teaching, to be current in their professional fields and to serve the profession and the society as it has traditionally been required from them, but they also being now required to actively engage in research and scholarship activities. This is a new requirement for ET faculty, making some of them to feel lost without knowing how to react to these new and increasing demands.

Some engineering technology educators have followed a non-traditional path into academia. While some faculty members hold a doctorate degree, some others hold a Masters degree, as it has traditionally been considered as the terminal degree in the discipline. Even some other faculty members -although their number is declining- only hold a baccalaureate degree. On the other hand, contrary to faculty in other disciplines including engineering, the large majority of ET faculty members have substantial industrial experience outside academia. Given these differences in experience an educational background is not surprising that ET faculty members have a different vision and reaction to these changes in today's academia.

The purpose of this paper is to share some personal experiences, activities and thoughts in what can be considered as research and scholarship. Although it is not the main goal of the paper to discuss the future of Engineering Technology as discipline, the author firmly believes that the whole discipline is at a crossroads where faculty and administrators need to work together trying to find our renewed academic identity.

Talking about Scholarship

Before we can address how scholarship fits in Engineering Technology, we should first address what scholarship is. Broadly defined, scholarship is considered as the building of new knowledge with some boundary conditions: originality and acceptability. The later one brings to the table the concept of quality control that has traditionally achieved in traditional research through peer review. In addition, the building of new knowledge *per se* is not enough; it needs to be disseminated. This dissemination has a double effect: it allows others to duplicate the work and contrast results, but it also serves the more social cause of sharing this knowledge with the academic community and the general public.

Each academic discipline has found its own specific and traditionally accepted ways to disseminate its scholarship; liberal arts have used publication of books, arts use performances and creative accomplishments, sciences and engineering use journals and reports to sponsors and so on. What is then appropriate for Engineering Technology? We cannot establish ourselves as an independent discipline if we don't have our own set of *best practices in dissemination of scholarship* but continue following what our colleagues in other areas, mainly engineering do.

Engineering has used publication in peer reviewed journals and in conference proceedings as the traditional methods to disseminate the scholarship in their discipline. Is Engineering Technology following the steps of Engineering? Should we consider the same dissemination procedures? Or should we consider –and accept- other methods of dissemination? If we are accepting different dissemination methods, will all have the same value? Or will we weight differently? What will

be the criteria that will be used? All these are questions that we need to ask to ourselves before even talking about what constitutes scholarship in Engineering Technology. Engineering Technology faculty should be proactive in leading the way to these efforts before a “definition” of these best practices becomes imposed by their administrators.

Furthermore, defining scholarship and how it is disseminated methods is not enough. Scholarship requires individuals actively engaged in the process of discovery. Therefore, we need to think and agree on what makes an Engineering Technology scholar. We need to understand and agree on the rewards of being a scholar in our discipline as well as the negative consequences for the discipline as a whole of not being involved in scholarship activities. Although some personal rewards or negative consequences are immediate –those regarding to promotion, tenure and professional advancement-, we should rather focus on the longer range vision for our discipline.

Engineering technology and its scholarship

The universe of Scholarship has three traditional forms: *The Scholarship of Teaching and Learning*, *The Scholarship of Research and Discovery* and *The Scholarship of Service and Outreach*. Each academic institution or unit has defined them according to their specific mission and institutional needs. One could consider a fourth scholarship component that is taking a more relevant role: *The Scholarship of Leadership and Citizenship*. However this paper will only address the three first forms of scholarship that are considered in the Boyer report (Boyer, 1990).

What are the functions of scholarship? The Boyer report articulates a new paradigm based on four key functions of scholarship in higher education: *discovery* of knowledge, *integration* of this knowledge, *application* of this knowledge and finally *teaching* this knowledge. Although the exploration of how form and function of scholarship interact is beyond the scope of this paper, one can expect that intersection of form and function will create the institutional framework for understanding and classifying the role of scholarship in a particular institution. At a generic level we need to consider how we can implement each of the three types of scholarship to the specifics of Engineering Technology.

The *Scholarship of Teaching and Learning* can be defined as “the ability to convey subject matter to intended audiences, the ability to demonstrate competency in teaching and capacity for growth and improvement, the ability to maintain academic standards and the ability to train others in research methods and practice to stimulate the interests of those in the field” (Uniscope, Pennsylvania State University, 2000). In Engineering Technology the scholarship of teaching and learning involves educating, guiding, training and instructing others in the fields appropriate for the specific disciplines within our discipline. All these are activities are naturally embraced by faculty members, most of them being extremely innovative and having an extraordinary degree of expertise in helping students to learn. All this creates a high potential to show a very important level of scholarly activity. However as discussed previously, the dissemination of any scholarship activities is the critical part that makes them to become scholarship and receive the attention and merit they deserve.

Engineering Technology has long prided itself for its excellence in teaching. It comes from its long tradition of providing high quality undergraduate education, concern for the student welfare and well being and a vision for their future. Therefore, ET faculty has a natural attraction towards developing activities centered in the scholarship of teaching and learning. We have pioneered the use of computers in the classrooms as a teaching aide, we have been at the front of active and student-centered learning and we have a long history of balancing theoretical concepts with hands-on practical experiences and we have lead most of our engineering colleagues in using innovative approaches in the classrooms. All these issues that focus on pedagogy, methodology and teaching innovation, especially those with a practical emphasis will be very welcome not only by fellow engineering technology colleagues but also by engineering faculty and the academic community in general. The dissemination of laboratory experiences, procedures and even manuals is another are where we can, as an academic community, make a significant contribution to the current body of knowledge. As a discipline, engineering technology has a long standing experience in involving industry in shaping curricular contents via the industrial advisory committees for the majority of our programs. This is an area in which engineering technology faculty can be of assistance to their engineering colleagues as they are faced now with incorporating these industrial advisory boards as part of their new accreditation criteria and we have a long experience in working with industrial members. We can bring our experience in selecting, composing and working with these constituents that are a critical part of the value of an academic program for engineering or engineering technology. Finally, due to the ET commitment to undergraduate education we also have a large body of knowledge and experience in developing student-centered and active learning approaches that would benefit our engineering colleagues. However, it is important to stress once again the importance of dissemination of this knowledge with the academic community as the last step in developing meaningful scholarship. Otherwise, without sharing our experiences, this knowledge will not be useful to the rest of the academic community.

The Scholarship of Research and Discovery can be understood as the “competency to carry out research or creative work of high quality and scholarly significance, recognized reputation in the subject matter, continued professional growth and active contribution to professional societies, and enhancing the quality of life in society” (Uniscope, Pennsylvania State University, 2000). This involves discovery, learning, collecting, or application of theories and facts to a particular subject and the creation of new and original works or application of knowledge. We can think of the scholarship of research and discovery as being the broadest type of scholarship, the most different for each academic discipline, and therefore the one that will allow us to establish our own identity, different other disciplines.

The traditional academic approach in the sciences and engineering has compartmentalized the scholarship of research and discovery in different areas without being interconnected. These areas range from what is known as basic research to expert consultation and expert testimony, including technical assistance and applied research. Traditional engineering programs have considered basic research, specifically publishing in peer reviewed journals and obtaining funding external to their institution, as almost the only type of research scholarship accepted by them as a discipline. It is in this area where we need to define ourselves as a discipline with our own identity on how we approach research and discovery and break with how we have used our differences with Engineering as the way to define ourselves. Different academic missions

between these two programs mean different ways of understanding and implementing scholarship.

Most of the Engineering Technology faculty members are already engaged in one or another form of discovery and research activities. However, what seems to be lacking is once again the dissemination of their scholarship. When considering the traditional methods of dissemination, - peer reviewed journals-, it is clear that the number of journals of quality that are specifically focused on engineering technology issues is extremely limited. Although there is not a specific reason that prevents engineering technology faculty members to publish in traditional engineering or science journals –and may do-, it is also clear that the type of research scholarship that they do does not fit the scope of those journals in most cases.

However, the existence or not existence of suitable journals should not be the force that drives research scholarship in our academic community. Instead, our research and discovery activities should drive the existence of the most adequate dissemination methods, whatever they might be. The peer-review process that is essential to basic research might not be the only adequate process for some of the scholarship activities that we engage in. In each professional discipline it is possible to find professional and trade journals of very high quality that are not peer reviewed. Instead, it is the editor in most cases who decides on the acceptance or rejection of the pieces submitted. This does not mean that these are lesser quality publications but due to the fast pace of industry it is not convenient the long delays associated with peer-reviewed articles. And in many cases, the publishing in these professional and trade journals is extremely difficult, in which only the most competent professionals have their work published.

There are also other venues to disseminate research scholarship that can be appropriate for our discipline. Engineering Technology faculty often engages in consulting or other work with industry, in some cases involving undergraduate students. While in most cases it may not be possible to disseminate the details of the work done due to its proprietary information it may be nevertheless possible to condense or summarize the work that has been performed and share with the academic community and the public at large. Even press releases should be considered as having merit of deserving the credit for research scholarship. Other venues that should be considered by faculty members and especially the administrators of engineering technology programs at the time of defining and setting the parameters of what is acceptable as the scholarship of research and discovery can be the writing of grant proposals, patent applications, projects with consortiums, etc. All these activities are strong representatives of very high quality work.

The *Scholarship of Service and Professional Practice* is maybe the area that shows the greater potential to increase the scholarship of Engineering Technology faculty members. The scholarship of service and professional practice is defined as the “effectiveness of counseling, advising and service to the students; participation in University, college, department and unit affairs; participating in the affairs of the profession and learned societies; and competence in extending and applying specialized knowledge to the University and the public” (Uniscope, Pennsylvania State University, 2000). From the previous definition it is possible to see how these are all areas in which engineering technology faculty members have done extensive work, becoming a natural fit for their scholarship activities.

Although in some cases the boundaries between Service Scholarship and Scholarship of Teaching and Learning and the Scholarship of Research and Discovery are not clearly defined and may overlap, it is necessary to keep in mind that those boundaries are artificial as all the scholarship activities of faculty members follow a continuum. From the point of view of promotion and tenure, the deciding committees have mostly given a very low priority to the service activities. Even new faculty member are strongly encourage to limit the extent of this type of activities. However, by adding the dissemination component, these activities are transformed into scholarship with the added benefit to the faculty members.

A large number of faculty members in Engineering Technology are involved in the accreditation process through their volunteer work in TAC of ABET or similar accreditation agencies. Although the details of the accreditation visits and documentation submitted by the visited institutions is of confidential nature, they nevertheless could be involved in sharing and publishing their personals experiences and observations as members of an evaluation team or to create and develop a set of best practices to be share with their institution and the academic community for example. This is especially important and welcome in the current times as TAC of ABET is changing its accreditation criteria to implement what is known as TC2K. Faculty members from programs that have been successfully accredited through this new criteria will be able to assist programs that will be visited in the near future. Other areas that can benefit from similar approaches could be the mentoring of new faculty members, involvement in the K-12 activities, successful recruiting practices, successful hiring practices, use of the technical skills in the community and any other outreach activity.

Conclusion

The scholarship requirements for Engineering Technology faculty members are here to stay. We can reasonably expect that ET departments will respond to the trends and pressures of their institutions by increasingly demanding their faculty to be scholarly active. Although it is not the goal of this paper to enter in discussions about how appropriate this requirement is for our discipline because we don't have the decision-making power to change them, we can, nevertheless, define the appropriate degree of scholarship that is appropriate for our discipline and help to frame how scholarship fits into the Engineering Technology model. More than this, we should, as an academic discipline, become proactive in defining the types of scholarship that are appropriate for our discipline.

To do this, we should engage all the constituents that make up our discipline in embracing the scholarship activities that have been mentioned earlier especially using a bottom-up approach in which it is the engineering technology faculty members who define what are the best practices and what is appropriate for the discipline. Fellow engineering technology faculty members with whom I have interacted in the past have commonly expressed their dissatisfaction with the ideas of research, scholarship or publishing. Why is such a burden to these excellent faculty members? Why does publishing seem to be such an impossible to achieve milestone? We can find reasons that we would agree on, that have been repeated over and over while bringing scholarship to the

discussion table: “Some faculty members, especially those who do not hold a doctorate have had less exposure to the whole process of publishing; there are very few journals that will accept engineering technology papers; some of the industrial work in engineering technology is proprietary and therefore not suitable to be published; faculty members have too high teaching loads to spend time publishing; faculty members are too busy doing things instead of writing about them”, and many other different reasons, especially “why should I bother publishing?”. Once again, the answer to the main question, why is it so difficult for engineering faculty to buy in the idea of dissemination of their scholarship rests on institutional hands, especially in the hands of administrators. Until the time where there is a good, positive and actually rewarding climate for faculty members to engage in scholarship activities, they will not exist as such. Until the time where scholarship can enhance opportunities for faculty members, aid in their mobility within and between institutions, the concept of scholarship in engineering technology will be just this: a nice concept, but only a concept.

References

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ALBERT LOZANO-NIETO is Associate Professor of Engineering at Penn State, Wilkes-Barre Campus, teaching in the Electrical Engineering Technology program at this location. His research interests are focused on Bioengineering, social implications of technology and developing cooperative learning in Engineering Technology. Albert Lozano is the Past Division Chair for the New Engineering Educators Division of ASEE.
