

Speculations on the Insights and Perceptions of Professor William E. Warner Regarding the Status of Technology Education and Its Future

James J. Buffer, Jr.

We trained hard, but it seemed every time we were beginning to form up into teams we would be reorganized. I was to learn later in life that we tend to meet any new situation by reorganizing; and what a wonderful method it can be for creating the illusion of progress while producing confusion, inefficiency, and demoralization. (Petronius Arbiter, ca 60 A.D.)

Prologue, Warner the Scholar!

I feel honored to make this presentation on the 75th anniversary of the founding of Epsilon Pi Tau (EPT). My own initiation was conducted in Chicago at Chi Chapter in 1957. There are persons in this room who knew Dr. Warner very well, including my good friend and colleague, Professor Donald G. Lux, who recommended that I give this presentation. Lux was one of Warner's doctoral advisees, a good friend and professional colleague of his at Ohio State, and is an excellent Warner advocate and analyst. Don learned his leadership skills from Warner including delegation, and that is why I am here today. Thank you Don and rest assured that I will do my best to represent Professor Warner with dignity and distinction.

As I pondered how to begin my presentation on this momentous occasion, I reflected on the historical work and scholarly contributions of Professor William E. Warner. Without a doubt, the man was an intellectual genius whose personal and professional energies were devoted to the development and cultivation of industrial arts education.

Warner's Professional Mission

Warner was a tall, distinguished looking man who was always impeccably dressed and whose demeanor attracted the attention and respect of others. I recall an incident at Ohio University when Dr. Warner walked into a meeting during another professor's presentation and the speaker stopped talking. And, all eyes seemed to be on Warner as he strolled quietly down the aisle, and after taking a seat in the front row, instructed the speaker that he could now proceed.

Clearly, Warner was a man who "walked the walk and talked the talk," so to speak. He taught by example as indicated by his involvement of graduate students when undertaking creative and scholarly projects. Many of his master and doctoral students worked collaboratively to create historically monumental documents including "A Curriculum to Reflect Technology," "Plans for the Exemplary 'Laboratories of Industries,'" and "The Three Degrees—Assumptions and Patterns," which were guidelines for the development of baccalaureate, master, and doctoral programs in industrial arts education. Nothing was left to chance with Dr. Warner.

In addition, Warner is acknowledged as *the* person who promoted the creation of the American Industrial Arts Association and Epsilon Pi Tau. Both initiatives were important to elevate the level of professional and scholarly recognition of industrial arts education as a curriculum specialty and to support the professional integrity of industrial arts educators.

To gain such acceptance, he worked diligently negotiating with the leadership of the U.S. Office of Education and the National Education Association, particularly with the president and past presidents of its Art Division. As previously said, nothing was left to chance. He was a master at "networking," and I'll address this process and its political implications as we get into the heart of this presentation.

The EPT Challenge

Jerry Striechler challenged me to "get into Warner's head" and speculate how Warner, who contributed so much to the conceptualization of technology education, would view the profession's recent accomplishments and what the future holds for it. To expand on my analysis, I solicited feedback from two groups: one comprised of associates who worked or studied with Dr. Warner and the second composed of teacher educators or leaders who were aware of Warner's work and have leadership responsibilities in technology education today including

participation in ITEA, EPT, CTTE, AERA, or related organizations.

Respondents were asked to be frank and were assured that no one would be identified to ensure anonymity. My role was to provide a composite analysis and synthesis of their responses. I also reflected at length on my knowledge of Warner and built that into my analysis. As part of this process, I reviewed a historical collection of Dr. Warner's personal correspondence given to me by Mrs. Ellen Warner after her husband's death, watched a video interview of Warner conducted by Dr. David Mohan, and read numerous publications written by or about W. E. Warner including Latimer's doctoral dissertation on Warner completed at North Carolina State University in 1972 under the direction of Delmar Olson, another one of Warner's doctoral advisees.

Questionnaire—Review and Analysis

A formal questionnaire was developed to collect the data and anecdotal information from the two groups identified. Copies were distributed to respondents via mail or e-mail, and upon 100% return, their responses were then compiled to be shared with the profession. Respondents were asked to place themselves in the "mind" of Dr. William E. Warner and critically review each of the statements that relate to the current status and future of technology education. Using a scale of 1 = not satisfactory progress or status, 3 = average progress or status, and 5 = outstanding progress or status, respondents selected the value that best described their perceptions (see Table 1). Respondents could also include a written response to "qualify" or expand on their perceptions, speculating on what Dr. Warner would probably say. And yes, I realized that this task would be quite a challenge because Warner was and remains an enigma today!

Table 1: Results of Questionnaire

GROUP I: PROGRAM STATUS AND VITALITY (2.40 Near Average)	
ITEM 1. Current status of <i>technology education</i> in 2004 based on the number of active <u>programs and student enrollment</u> in:	
a. Middle and secondary schools.	2.35
b. Accredited teacher education programs at the baccalaureate level.	1.69
c. Master's degree programs designed to enhance professional practice and development.	2.69
d. Doctoral programs to ensure and sustain teacher education/leadership pool.	2.50
ITEM 3. Recognition of technology education as a subject area valued as part of general education for all learners.	2.23
ITEM 5. The vitality of technology education as a subject area in K–14 and its mission to enhance the general education goals and objectives for all learners.	2.54
ITEM 10. The status and prominence of international technology education K–12 programs and collegiate programs that focus on technology teacher preparation.	2.80
GROUP II: CURRICULUM AND INSTRUCTION (2.97 Average)	
ITEM 2. Curriculum, terminology, and instructional activities inherent in middle and secondary schools that have evolved from what was known as industrial arts education.	3.15
ITEM 6. Implementation of the ITEA <i>Standards for Technological Literacy</i> in the United States.	3.08
ITEM 7. The extent to which current curricula, instructional programs, and activities are reflective of technology.	2.69
GROUP III: TRANSITIONS TO ENGINEERING TECHNOLOGY (2.87 Average)	
ITEM 8. Appropriateness of instructional practices that link engineering and information technology activities compared to past efforts that focused on problem solving and activity-based learning and skills with tools, materials, and processes.	3.31
ITEM 9. The evolution of collegiate level industrial or engineering technology and human resource development programs and resulting demise of institutions and programs that focus on technology education teacher preparation and teacher education.	2.42

GROUP IV: LEADERSHIP AND DEVELOPMENT (3.41 Average +)	
ITEM 4. Leadership activities that help to improve the status and vitality of technology education across the K–12 curriculum and Higher Education.	3.31
ITEM 11. The mission, goals, and outcomes of professional organizations Warner helped to establish (ITEA & EPT); and their influence on enhancing the status, vitality, and growth of technology education programs (K–12 and Higher Education).	3.50
GROUP V: OTHER OBSERVATIONS	
ITEM 12. Please provide comments regarding other issues, topics, or concerns that you feel Professor Warner would offer on the 75th anniversary of the founding of EPT. For example:	
a. How would Warner, who contributed so much to the conceptualization of technology education, view the profession's accomplishments?	
b. What would Warner have to say about what the future holds for the profession?	
c. How would technology education be different if William E. Warner had not existed?	
d. How would technology education be different if Warner and most of his opponents had worked together to improve the program and its goals?	

Note: Questionnaire used scale of 1 = not satisfactory progress or status, 3 = average progress or status, and 5 = outstanding progress or status.

To help quantify and analyze the results, I combined the 12 statements into five groups. A brief synthesis of the results for each group follows. Those seeking a more comprehensive analysis and discussion of the study along with copies of the instruments may request them by contacting the author at bufferj@vt.edu.

Group I: Program Status and Vitality

The general consensus was that Warner would *not* be pleased with the current status or vitality of technology education programs, primarily because of the dramatic reduction of programs (K–12, teacher preparation, and teacher education) over the past three decades. He might even be “confused” if he made some site visits to various technology education programs across the country. He would see programs that are familiar to him (e.g., hands-on problem solving using a variety of tools, materials, and equipment). But, he would also see many programs made up of nothing but computers and/or a few technical modules and might wonder what was going on.

Furthermore, he would not be pleased to learn that:

1. Many teacher education programs have been replaced with majors in human resource development, training & development, and management or engineering technology.
2. Master degrees are no longer required for licensure or certification and many

practicing teachers are now selecting other specializations for graduate study as security for alternative career placement.

3. The number of doctoral programs in technology education has declined dramatically, and the future professorial pool has dwindled. In 2003 about a dozen doctoral graduates matriculated in technology education, and career opportunities in higher education appear to be minimal.

On the bright side, there are approximately 40 technology education programs nationwide that are accredited through ITEA/CTTE/NCATE guidelines. This is a fairly constant number and, hopefully, in the future this number will increase.

Also, given Warner's involvement in international education, he would be pleased with the international activities of technology educators across the globe as evidenced by collaborative curricular efforts in Japan, the Netherlands, Taiwan, Australia, New Zealand, England, Finland, South Korea, and Hong Kong.

Group II: Curriculum and Instruction

The ITEA standards have clearly influenced the evolution of curriculum, terminology, and instructional activities from industrial arts to technology education. Many states and localities have upgraded their content for these programs

based on the *Standards for Technological Literacy*. Hopefully, the instructional programs will focus on what we do best, namely, “hands on teaching and learning” about how industrial technologies shape our human-made world. And, we need to impress upon our state and national leaders that the study of technology (not narrowly defined as computers) is essential to the health of our nation.

Associates felt that Warner might approve of the “technological problem-solving method” that has been transforming our practice in the past two decades and that he would understand the need to include new technological tools and processes. Tools have changed and are increasingly digital, which appear to be appropriate for a curriculum designed to reflect technology. However, Warner might find this explanation too simplistic. One must also consider the variety of “tools” and processes that humans use to change the form of materials to meet their consumer needs. For example, one cannot troubleshoot and replace a thermostat on a water heater or install a grab bar in a shower solely by studying computer programming.

Warner would not be concerned that the new programs are not consistent with the mission and goals he professed as part of the *Prospectus* and *Curriculum to Reflect Technology*. Rather, he would be more concerned about the assertion that the name *technology education* has little or no identity today. Furthermore, he would say that there is not much uniqueness to the field anymore to a point that almost any teacher could teach technology education without a laboratory.

Group III: Transitions to Engineering Technology

As mentioned earlier, vital signs are bad primarily because we are not producing enough teachers and we are closing too many teacher education programs. Warner would be very disappointed with the almost nationwide abandonment of teacher education in favor of industrial technology, engineering technology, or human resource programs that have been built on an industrial arts platform and that then have allowed the teacher education programs to dwindle and die.

A few respondents expressed positive outcomes coming from formal collaboration with

engineering departments, especially in the delivery of preservice preparation of technology education teachers. And from my perspective, this can become a mutually beneficial outcome for both disciplines, engineering and education alike.

While Warner would embrace some of the new innovations as being important to keep up with our technological and cultural shifts in society, he would also remind us that we ought not leave behind what we have so long known and practiced about activity and activity learning, especially as one begins to link with engineering and information technology. One cannot forget his many pronouncements of teaching the value of “doers versus talkers” and his recommendation that general studies in technology education should continue to focus on our “industrial” heritage within the social-cultural context.

Results of the earlier Gallup poll sponsored by the Standards Project support the “integration” of technology with other subjects in the schools. However, one must be cautious when considering the significance of those results because respondents did *not* know what *technology education* really was. Most thought it had something to do with computer instruction or instructional technology. I am aware that the Standards Project’s leadership staff has taken steps to resolve this issue as part of their recent project updates.

Group IV: Leadership and Development

The creation of EPT and ITEA was clearly a stroke of genius and was due almost solely to the work and commitment of William E. Warner. Clearly, both organizations have done much good for providing professional and scholarly recognition to technology educators and the profession.

National leaders report that EPT and ITEA have remained supportive of each other while each has moved forward with the times. Both have had to deal with globalization for example and have adapted well to this influence. For the most part, respondents felt that EPT and ITEA have stimulated and contributed to major change in our profession over the past few years. A few persons did comment that Warner’s heart and soul were devoted to teacher education, and

questioned EPT's decision to extend its membership and services to nonteaching "industrial technology" fields.

Our profession has created and maintained relationships with accreditation groups such as NCATE, placing our field in the position of having superior accreditation standards along with the other core subjects in our schools. The Standards' initiatives were also a great addition. However, teachers struggle knowing how to make good use of them as far as the curriculum is concerned. ITEA has responded with a written innovative, standards-based technology education curriculum. Through their Bright Ideas and ICON (Innovative Curriculum Online Network) there is a "central source for information dealing with technology and innovation about the human built and innovated world" and it is correlated to the Standards of Technological Literacy. These appear to be excellent curriculum initiatives and their adoption/adaptation by the profession will be indicators of their long-term value in restructuring the technology education curriculum. ITEA is to be congratulated for involving local and state educational agencies, teachers, and supervisors in these developmental efforts.

Warner was an activist and clearly worked in harmony with other educational and political organizations to promote the causes of technology education. As mentioned earlier, he was a master at networking and getting others to support his mission and goals. As such, he would applaud ITEA's demonstrated efforts to collaborate with other professional organizations to promote the study of technology education. However, several associates felt that Warner would have been ambivalent—praising ITEA for its work (e.g., funding successes with NSF and NASA, and consequent standards and curriculum development) but disappointed in its ability to capitalize on these successes in the local and national grassroots political arenas. Warner would probably have liked to see aggressive assistance from ITEA particularly to those local educational agencies and state technology organizations where programs are under siege.

It was also suggested that Warner would most likely have included different representatives as part of his educational and political counsel rather than math, engineering, or sci

ence. Some concerns focused on loyalty and creating political support for the continuation or vitality of technology education in K–12. For example, if a state education department recommends the elimination of technology education programs as it announces the continuation of the delivery of technology education experiences as part of science and social science classes, one must ask if there is reason to believe that NSF would intervene to prevent that from happening. And, would independent technology education programs continue to be offered as part of the common school curriculum?

Group V: Other Observations— Accomplishments & Future Expectations

First, we should feel good about our professional accomplishments and progress over the past century as a new academic subject matter has evolved over the past century with roots emerging from the study of manual training, to manual arts, to industrial arts, and now technology education. Instructional programs seemed to be focused and integral to the teaching of "industrial technological" concepts.

Warner would have been open-minded enough (and somewhat self-congratulatory) to see that much of what has been conceptualized since the publication of *A Curriculum to Reflect Technology* in 1947 has been built on the philosophical principles and foundations described in that document. Some notable examples include the curriculum development efforts at Ohio State University, University of Wisconsin—Stout, and University of Maryland in the 60s and 70s and, to some extent, the work reflected in the ITEA-sponsored *Technology for All Americans* project.

But the profession was not "unified" like math or science; and as a result, there was no single voice or agreement as to what industrial arts education or technology education should have been or was to become. Related to this issue is the fact that as a profession, we have not satisfactorily defined technology education or successfully implemented it as part of the school curriculum, thus causing much confusion and a lack of national support for the field.

As such, the profession must coalesce and strive to focus on a core set of subject titles that can be recognized by the general public such as

what science has done with its subjects: biology, chemistry, physics, and life sciences. Math has been successful in its own way like science.

The other subject areas have 100 years on us. The public probably only knows us as shop or woods, metals, and drafting. Colleagues must come together to accept the challenge and opportunities to engage in curriculum development based on the 2000 content standards, and perhaps in a few years the public will be able to recognize the difference between technology education and the study of computers.

I am certain that Warner would have faith in the collective intelligence of former students and colleagues with whom he enjoyed sharing the podium in providing leadership education for the profession, especially through the two organizations he helped to create; namely, EPT and the ITEA. Particularly, he would encourage greater political intervention by technology educators to ensure the attainment of common goals. This initiative needs to reach the grassroots organizations and political policy decision makers in all states and, perhaps, it would be beneficial if the ITEA leadership spearheaded such efforts. Other professional organizations such as EPT and CTTE and the Association for Career & Technical Education (ACTE) should also be involved in these efforts. Partnerships with science, math, and engineering educators are a reality and, hopefully, this will become a mutually beneficial relationship.

Doctoral leadership programs in technology teacher education are virtually nonexistent today as evidenced by their closure, severe reductions in program and faculty, and/or changed programmatic focus. This includes most of the prominent universities that graduated the majority of doctoral recipients since World War II, including University of Maryland, University of Minnesota, University of Missouri, Texas A&M University, University of Illinois, Virginia Polytechnic and State University, University of Northern Colorado, University of West Virginia, Arizona State University, and Pennsylvania State University. Thus, Warner would strongly advocate the need for revitalization of our university graduate programs to ensure the operation of teacher education programs as well as preparing the future professorate and leadership.

And finally, leadership must be a “shared” responsibility that involves university faculty,

state departments of education, classroom teachers, and supervisors. Professional associations have a responsibility to “serve” the profession and provide support to ensure the delivery and improvement of quality instruction. No one agency, organization, or entity must dominate the process if we are to be successful in managing this professional revitalization of technology education and to ensure quality instructional services to our youth and nation.

Some asked what technology education would be like today without the influence of William E. Warner. From my perspective, technology education might have evolved as a pre-vocational subject (and not necessarily relegated to that of a step-child of trade and vocational education) complete with federal funding and legislative support without Warner. But given Warner’s insights and leadership in creating the AIAA (which later became ITEA) and EPT and an array of curricular-related initiatives, technology education has come into its own. And without a doubt, we would have enjoyed more progress if Warner and his colleagues had worked in harmony to achieve common goals.

In Retrospect

I’m delighted to have been a participant in this dialogue and celebration of the 75th anniversary of the founding of EPT. Warner was a very unique person and it was a bit difficult to get into his head, so to speak. On the plus side, he was very intelligent, professional, an educational visionary, a very successful innovator, and an outstanding leader! He was also thought to be egotistical, self-centered, overly confident, and a “master” at manipulating the power chain to achieve what he thought was important. Nevertheless, he was a “champion” for the evolution and promotion of what we now know as technology education. And as one of his former students suggested, champions are pioneers and often pioneers become popular targets, which he was and clearly his behavior often invited such responses!

One lesson we should learn from studying the professional work of William E. Warner is that the personality and leadership style of those responsible for charting the course of our profession will have a significant impact on the outcomes of any professional initiative they choose to sponsor. As we prepare for creating the technology education program for this new century, let us remind our colleagues of their moral

responsibility to reach out and embrace the general membership to share in the refinement of goals and professional initiatives.

Petronius Arbiter said, "... reorganizing ... could produce confusion, indifference, and demoralization." Clearly, these factors have been apparent, not only in technology education but in numbers of other disciplines. Let's not visit them as negative consequences, but as incentives and motivators to grow and prosper as Warner envisioned the field.

Finally, my expectation is that William E. Warner's final admonition would be a reminder that this has been and continues to be a *wonderful* profession! And, its future is in your hands, so go forth and be the best you can!

Dr. James J. Buffer, Jr. is Horace G. Fralin Professor and Dean Emeritus, College of Education, Virginia Tech; Associate Dean of Research and Professor of Education Emeritus, Ohio State University. He is a member of Alpha Chapter and received his Distinguished Service Citation in 1987.



Ethics for Industrial Technology

Kurt A. Rosentrater and Radha Balamuralikrishna

Abstract

This paper takes aim at one specific, as well as basic, need in teamwork and interdisciplinary projects—ethics and its implications for professional practice. A preliminary study suggests that students majoring in industrial technology degree programs may not have adequate opportunity to formally study and engage in ethical aspects of technology vis-à-vis the practices of the profession. It is reasonable to assume that the ethical dilemmas faced by an industrial technologist would parallel those of engineers and managers. To address this issue, this paper identifies a domain of knowledge that would constitute a necessary background in ethics for industrial technologists, examines various resources for teaching, and makes recommendations from a pedagogical point of view.

Keywords

Curriculum Development, Ethics, Industrial Technology, Professionalism, Societal Obligations

Introduction

The college education of engineers and technologists in the United States in key areas such as construction, manufacturing, communications, and transportation manifests itself in the form of three broad degree programs that can be identified as engineering, engineering technology, and industrial technology. Engineering degree programs have a long history in the U.S., and even though certain misconceptions regarding the profession of the engineer may still exist among the general public, it is fair to state that the profession is relatively well understood among high school students and the public at large.

All fifty states work with the NCEES (National Council of Examiners for Engineers and Surveying) in licensing and maintaining the professional competence of engineers (<http://www.ncees.org>). Engineering technology and industrial technology, however, belong to a newer class of degree programs that have