From the Editor

Building upon Our Melting Pot
of Technological Diversity: A Lesson from Butte

I grew up in Montana and became very interested in the history of the city of Butte after working there as an engineering aide at an electrical power company while I was going to college. At one time, Butte was considered to be the mining capitol of the world and is still referred to as "The Richest Hill on Earth." Once word got out about the abundance of resources in the area in the late 1800s, immigrants came in droves to find a new beginning and a better life there. Initially, the Irish, Italians, and the "Cousin Jacks" from Cornwall, England settled in the area, followed by people representing nearly every nation in the world. Butte was considered by some to be one of the most culturally diverse cities in America in those early years.

As was true in virtually every older city, the new settlers carved out areas of the town so that others of their same nationality and language would settle there with them. There was deep distrust across ethnic sectors. Even though some nationalities shared a common religion, the churches to which they belonged were marked out ethnically. For example, there were Irish Roman Catholic churches and there were Italian Roman Catholic churches. Mines were divided by ethnic boundaries as well: the Never Sweat mine, for example, was the exclusive domain of the Irish for several decades.

Such situations continue today, over a century later, as immigrants settle in America, seeking out the larger cities for their greater potential for employment. Schools struggle to figure how to deal with students for whom English is a second language – if they can speak English at all. The same distrust and misunderstandings that existed in Butte in the 1800s still occur today as new ingredients are added to the melting pot of America.

It occurred to me that there are some parallels in the foregoing to technology education. A number of different, diverse "communities" have existed within the field over the years and many continue in various degrees today. There are some in our profession who still believe that teaching the use of tools is most important while others believe that conceptual knowledge should be the goal. Some believe in vocational education purposes while others are adamant about general education. Some value engineering design while others value aesthetic design; still others do not value design at all. Some have embraced our Standards while others have rejected them. Among those who

embrace the Standards are those who do not accept biotechnology, medicine, and agriculture; a subgroup has even rejected all of the Standards by virtue of their disdain for the inclusion of these three areas. Some embrace distance education while others feel it is eroding the quality of our profession. Some feel that "board and t-square" drawing should continue to be taught while others feel that only computer-based visual expression should be included. Some are passionate about emphasizing engineering concepts, even suggesting we rename our profession as engineering education, while others are diametrically opposed to engineering.

There are a variety of sub-communities within virtually all subject areas in the schools. In agriculture education there are those who still believe in the value of agricultural mechanics and welding as the focus while others believe that the emphasis should be agricultural sciences and biotechnology. Right now in mathematics there are some who are promoting the elimination of the teaching of fractions while others are in disbelief that this notion would even be suggested. Social science educators range from one extreme to the other regarding the need to teach historical facts. Perhaps, though, nothing compares to issues regarding evolution, creationism, and intelligent design in the science community. In addition, the science community also has to reconcile the differences that occur from the fact that there are three different sources of curricular standards: the American Association for the Advancement of Science (AAAS), the National Research Council's National Committee on Science Education Standards and Assessment (NCSESA), and the National Science Teachers Association (NSTA). Within the triangle of these standards is the issue of eliminating the "layer cake approach" of separate courses in earth science, biological science, and physical science and, instead, including all three areas in all the courses the students take.

Divergent points of view and philosophies are healthy for any profession and are often the seeds from which positive change grows. As I reflect on this over the past forty years, it does seem that we have had a lot of seeds planted, perhaps more than any other subject in education. Some sprouted up and looked sturdy and healthy at first, but later withered and died when they were no longer nurtured. Others came up as weeds. Some, however, took deep roots and became the foundation of what was to come.

In addition to all the proposals for change that have been put before the profession, in recent years there have been many "immigrants" into the profession. They differ significantly from those who started a career as a technology teacher fresh out of college at the age of twenty or so. Among them are those who were prepared as teachers in the field, but decided to pursue a career outside of teaching for a while and are now entering teaching for the first time. A lot has changed since these folks graduated. There are those who are career switchers, obtaining licensure as a technology teacher with a degree in another field, after spending time in business, industry, or the military. There are those who are licensed to teach in other fields and decided to switch to technology education, either due to personal interest or by necessity.

Increasingly, those with degrees in engineering are entering the profession. Adding to the complexity is the variability in the programs in which these teachers were prepared and *when* they were prepared. Some come from programs that have a vocational orientation and a concomitant emphasis on technical skill. Some come from programs that are based on the Standards while others come from programs that closely resemble the industrial arts programs of the 1960s. Some learn the technical content through courses that serve prospective teachers, along with those bound for careers in industry. For some, all of the professors in their major have degrees in technology education while for others this is the exception. For some, their hands-on lab experience was working with tools and materials to solve technological problems, while for others their problem-solving tool was principally a computer. Yet others have had virtually no technological problem solving experience at all. For some, the majority of their course work was delivered virtually over the Internet, and nearly every recent graduate has completed at least one course online. Some have a significant number of courses in mathematics and science while others have a minimal exposure to these subjects. Likewise, some embrace mathematics and science while others hold these two disciplines in contempt because of negative experiences. Arguably, we have the most diverse array of teachers in the schools. Arguably, as well, we have had more initiatives for significant change in our curricula and methods over the past several decades than any other teaching area.

The proposals for change in our profession over the years have not simply been a reordering or recombination of subjects, or simple tweaks in how we approach laboratory instruction. Rather, they are major changes that have required a complete overhaul of the value system of our profession and the individual members within it. Moreover, this overturn in values has not been expected just once, but several times. Though this treatise reflects what has happened in the US, I am confident that our international colleagues have comparable stories to tell.

Though the Standards are logical, needed, and rational, they do not necessarily address the problem with changing the core values of the teachers to whom they are directed. People do not generally behave in a way that is inconsistent with personal values and let us not kid ourselves – our teachers are the bottom line in our efforts to change.

The challenge to bring a consistent set of values to the diverse members of our profession is indeed formidable, yet essential, if we are to realize our ideals and provide a viable, enriching, defensible, and reasonably consistent experience to the students we serve. Values are based on beliefs and beliefs are tied to emotions. Emotions are the windows to our inner-selves, yet they can be our most irrational attribute. Rampant, uncontrolled emotions can lead to poor decision making. The history of the world is filled with the frightening results of emotions that have gone out of control.

Indeed, the diversity of our profession is comparable to the many cultures in the early mining city of Butte, Montana, with all the emotional underpinnings

that accompany them. Mining in Butte is almost gone and it is now the largest environmental disaster Superfund site in the US. Despite the challenges Butte faced, they pulled together and I do not know of a city that has a higher spirit of community. Today, the Irish in Butte enjoy eating a Cornish pastie just as much as Cousin Jacks enjoy corned beef and cabbage. What's more, they can enjoy the food and each others' company while sitting at the same table. They did not get there, though, by putting fences around their ethnic neighborhoods nor did they get there by "picking up their toys and going elsewhere." They communicated and built trust, and they grew to respect and appreciate their divergent values, building their community upon them. They were able to meld their personal values together with the values of the community as a whole. They faced the challenges together and met them – together.

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