

- Collecting data (sampling surveys, design of experiments)
- Quality culture (philosophies of Deming, Juran, etc.)
- Use of quality teams and minute papers for course improvement
- Seven basic tools (including control charts, capability indices and understanding of common and special causes)
- Scientific method (plan-do-check-act)
- Importance of understanding variation and prediction
- More graphical skills
- Communication and people skills
- Working on project from beginning to end
- Case studies of important problems
- Time series (in particular, exponential weighted moving averages)
- Computers and appropriate software
- Basic multivariate analysis
- Messy and large data sets
- Ridge regression, Taguchi methods, response surfaces, nonlinear regression
- Simulation, bootstrapping and so on.
- Cluster analysis, classification.

I believe that this list includes most of the topics Banks wants to teach, at least in a superficial way. As different from Banks, however, I would teach some TQM because I believe that it is important for our students to have some understanding of these principles and the gurus involved in the quality movement. That is, I would like to think that our students would have heard of Deming, Juran, a fishbone, a Pareto chart and benchmarking when they go to industry. Just like they may not be an expert in bootstrapping, they would at least be exposed to some of this terminology associated with TQM.

Banks and I do not differ too much in our views. For example, I also note the consulting activity advocated by Boen and Zahn and their stress on good oral and written communication skills. I think that our problem is introducing this in our programs. In the fall semester, 1993–1994, under a “topics” course number, I plan to give one semester of such a sequence as a trial. I hope that all new applied masters students as well as those interested in our Quality Management programs, will take the course. Not every faculty member, however, agrees with me, and I might be disappointed in the enrollment. I will have more facts in January of 1994 and maybe even by that time have enough students interested in a second semester of such a course, given by a more qualified instructor than Hogg. At least I am following Bob Galvin’s advice of “Damn it, do it.”

#### *Personal Quality Improvement*

After studying all of the ideas from TQM, I am convinced that the only way to improve quality in manufacturing, health and education is to begin with the individuals who are involved. As I left Bob Galvin’s office, he reminded me that quality is very personal. People can establish visions, aims and missions for themselves. They can immediately start collecting personal data and discover what “defects” regularly impede them from moving toward their vision. They can then work continually to reduce these personal defects. Once everyone in an organization feels this way, the infrastructure to achieve everything a committed CEO wants has been established.

Even at 68, I am trying to improve every day. So while my trip to organizations practicing continuous process improvement is finished, my own quality journey is far from over.

## Comment

Vijayan N. Nair and Daryl Pregibon

Our views and experiences are quite different from those portrayed in David Banks’ article. We are much

more optimistic about the future of industrial statistics. A broad view of industrial statistics includes applications in science and technology that includes manufacturing, software production, business and marketing and service industries. All these areas share a common need for information, the raw materials of which are data. From the perspective that statistics is the science that transforms data into information, we

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