for academic statisticians to collaborate with those in industry to write case studies. Case studies are needed to show the rewards of resolving the often challenging practical issues required to apply statistical quality improvement methods.

TEXTBOOK REVIEWS

I have taught several courses using editions of Montgomery's (1991) textbook and one course using Ryan's (1989) textbook. Montgomery's book was preferred because Ryan provides insufficient background on some important topics, referring the reader too often to out-side sources. Montgomery (1991) also provides better exercises. The material on control charting in Montgomery's book could benefit, however, from some updating. For example, the simple CUSUM chart design method of Johnson (1961) could be replaced by a much more accurate method using the results of Siegmund (1985, p. 27).

Montgomery (1991) covers acceptance sampling in detail, but it is unlikely that one would want to emphasize this area in an introductory course. Vardeman (1986) gives a thorough discussion of the role of acceptance sampling in modern industrial practice.

Comment

C. F. J. Wu

In this paper, the author gives a biased view of industrial statistics. It is a hodgepodge of book reviews, comments on research and Japanese quality practice and an attack on academic statistics. It attempts to do too much and does it poorly. Some of his opinions are not based on thoughtful research. They are incorrect, misleading or superficial and can have a damaging effect. It sends conflicting and confusing messages. I do not recommend this paper for serious readers in industrial statistics. For the unfortunate few who will read this paper, I would like to provide the following comments.

DOES STATISTICS PLAY A SMALL ROLE IN PRODUCT QUALITY?

His opinion appears to be based on the writings of some Japanese economic historians. There is ample evidence to the contrary by many eminent Japanese quality experts such as the late K. Ishikawa. Widespread use of basic statistical tools (which is made possible within the TQM framework) and statistical thinking (which the author chooses to ignore) are some of the key factors in Japan's quality success. The Japanese contributions are not limited to simple tools. Some of the advanced quality methods/tools were developed

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and successfully applied in Japan; these include robust parameter design and quality function deployment. A comparison between JUSE and ASQC provides additional support to my point; JUSE sponsors many statistics-related activities such as short courses and study groups on emerging methodologies. By comparison the statistical level of ASQC-sponsored activities has remained low for a long time. Many eminent applied statisticians in Japan have been and are active in JUSE. The same cannot be said about ASQC.

COMMENTS ON THE SEVEN TOOLS

Obviously the seven tools are very simple but the author fails to understand or appreciate the Japanese contributions. How and why did JUSE choose and package these seven tools from among a large number of candidates? As great practitioners, the Japanese (in this case, JUSE appointed a special committee to take charge) studied how various tools were used in practice and after several years of study, chose these seven to be widely promoted. It is the process of selection rather than the final product that explains their success.

COMMENTS ON "CONVENTIONAL" TOPICS IN INDUSTRIAL STATISTICS

This is the worst part of the paper. The word "conventional" is misleading. Many of the novel ideas in experimental design including robust parameter design are not conventional. Regarding experimental design, he says that it is "hard to see profoundly new ideas on the horizon." The most notable counterexample to this claim is Taguchi's contributions to robust parameter

design. The notion of variation reduction as the main objective of experimentation and the issues of planning and modeling strategies for achieving this objective have raised many novel and fundamental questions not considered in the literature. For readings on parameter design, I recommend the excellent panel discussion in *Technometrics* edited by Nair (1992) instead of the author's subsection 3.3, which misses this important reference. There are also important advances made in "traditional" design. Let me mention a few examples here. Use of the minimum aberration criterion for factor assignment in factorial design poses a very difficult and still unsolved problem in coding theory (see Chen and Wu, 1991). Construction of supersaturated designs poses another combinatorial challenge (see Lin, 1993; Wu, 1993) and can benefit from work on search designs due to Srivastava (1975). Design and analysis of computer experiments present new challenges not encountered in physical experiments. Before making such a statement the author should have thoroughly researched a basis for it!

An unforgivable mistake he makes is in judging the recent advances in experimental design based on a book edited by S. Ghosh. The author should know well that most original ideas appear in refereed journals (like *Technometrics*). I suggest that the author read the last seven years of *Technometrics* before making such a grandoise statement. If referring to these "conventional" topics, the author says "[they] are either intellectually stale, or quickly becoming so." It is amusing to hear this from someone who is apparently unfamiliar with the recent advances in experimental design.

The author lists four "new" topics which in his opinion "would provide enormous profit potential to industry." These new tools are interesting and may have the potential to be used by research statisticians in industry. However, it is premature to make such a statement. Can he point to many (or even a few) case studies to support his speculation? By comparison

"conventional" tools such as experimental design and statistical process control have already helped industry reap enormous benefits. Partial least squares is being used by some researchers in the chemical industry but widespread use of them is still far off. High-dimensional response surface analysis and spherical regression are still in their infancy in industry.

A DISTORTED VIEW OF ACADEMIC STATISTICS AND STATISTICIANS

Let me choose to refute only the more blatant statements made by the author. At the end of Section 2 he says, "chucking money at university statisticians is a laudable charity, but may be a breach of fiducial responsibility. . . ." In Section 6 he says, "To academics the economic progress of an industry . . . is a distant consideration, except . . . rationalizing a proposal for funding." This cynical view is ill-founded. In fact academic statisticians (unlike our colleagues in computer science) have not received much funding from industry. Those who are good or lucky enough to initially get funded have to work extremely hard to continue the funding. I invite the author to supply evidence to support his claims. Another incorrect statement at the end of the paper is that "It is probably past time for university researchers to drop stale pseudo-applied activities (such as control charts and oddly balanced designs)." Both are real applied activities and are not stale.

Let me conclude my discussion on a more positive note. I do share the author's concerns with the overemphasis on theory in academic training and the tendency of some professors to place weaker students in industry (or government). Again one cannot be too pessimistic. There are schools which show intellectual respect for work in industrial statistics and I like to think that Carnegie Mellon is one of them.

Comment

H. P. Wynn

The divisions which Professor Banks highlights between his three groups of statisticians pale into insig-

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nificance compared to the other divisions which hold back the use of statistics and related methods in industry. The most serious of these also haunts the hallways of academia. This is the professional division between engineering as a discipline and statistics. The strength of the separation is not uniform. For example, electrical engineering has led the way in areas such as automatic