Quality, Reliability, and Productivity Education: America's Hope for Enhanced Competitive Position

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ABSTRACT: In the aftermath of World War II, Japan was left with little choice but to rebuild from the rubble of a shattered economy. Led by American statistical quality control disciples, Dr. W. Edwards Deming and J. M. Juran, Japan rapidly succeeded in transforming the phrase "made in Japan" from a synonym for junk to a hallmark for quality. Keyed by an emphasis on quality, reliability and productivity Japan has, like the mythical Phoenix, ascended from the ashes. The impact on America has been a significant decline in key world markets. Universities must accept leadership in the competitive challenge facing America.

Erich Bloch, National Science Foundation Director, emphasizes the necessity of infusing quality into academic curriculum in engineering, business administration, management, and in all studies that influence engineering, manufacturing, and management of organizations. Bloch rightly points out in the foreword of a recent book by Gabriel A. Pall (1987) that quality has long been devalued as a subject unworthy of academic attention.

Recent establishment of degree programs in quality and its companion, reliability, at several leading American academic institutions provides ample evidence that quality is making ivory tower in-roads. A relatively complete list of such programs, compiled by R. V. Hogg, President of the American Statistical Association (ASA) and Chairman of ASA's Committee on Quality and Productivity, appears in the Statistics Division Newsletter of the American Society for Quality Control (Hogg, 1987).

Rick L. Edgeman received the Ph.D. degree in statistics and operations research from the University of Wyoming where he received the W. Edwards Deming Excellence Award in Statistics. Currently he is an associate professor of quality science at Colorado State University. He has also held faculty positions at Bradley University, in the Center for Quality Applied Statistics at the Rochester Institute of Technology, and at North Texas State University where was responsible for the development of M.B.A. and Ph.D. programs in Quality and Reliability Management. He was the first fellow of the Caterpillar Tractor Company Research Foundation and serves on the Quality and Productivity Committee of the American and Statistical Association. His publications have appeared in numerous journals including the Reliability Review, Quality Progress, Technology Transfer Advocate, The American Statistician, Mathematics and Computer Education, and the Brazilian Journal of Probability and Statistics.
Central to the establishment of these programs is the desire to assist American commerce and industry in improving its productivity and competitive position. Though simple in principle, the implementation of this desire is nontrivial. Fellers (1987) points to a key stumbling block—the fact that traditional methods of financial reporting force managers to adopt a short-term orientation.

This policy is not generally followed by the Japanese who, in keeping with the philosophy of Dr. Deming (1982), emphasize long-term objectives. One critical difference in the orientations of U.S. and Japanese firms is in the shouldering of responsibility for product/service quality and reliability. In Japan this responsibility is assumed at all levels where quality is affected and, particularly at the top levels of management (O'Connor, 1985). In America this seems to be the burden of the worker. What is needed is a change in philosophy and direction.

**Educational Alternatives and Alternative Education**

Acquisition of knowledge and skill in the allied areas of quality and reliability is available from a variety of sources, both academic and nonacademic, over a broad spectrum of rigor levels and with a variety of emphases. For example the Quality Improvement Company (QPI) of Cupertino, California offers workshops aimed at a. top management, b. middle to upper management, c. people in exempt job classifications, and d. people in nonexempt job classifications. QPI is but one of many such organizations that specialize in such offerings. Confirmation of this statement is found by scanning Quality Progress, published monthly by the American Society for Quality Control.

The Center for Quality and Applied Statistics (CQAS) at the Rochester Institute of Technology, an early leader in the academization of quality, reliability, and productivity, offers M.S. programs that allow students to study one term and acquire industrial experience the next; this cycle can be repeated until the degree is completed. CQAS is also extensively involved in presentation of seminars to industry and will do so either to an audience of professionals from a variety of organizations or in-house, customized to the requirements of a company or division within a company. Continuing Education Units (CEUs) are awarded for completion of CQAS seminars and an individual acquiring CEUs in sufficient number and breadth is awarded a certificate in quality.

In addition to the Rochester Institute of Technology, strong academic