Total Quality Management: Empirical, Conceptual, and Practical Issues

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In recent years, total quality management (TQM) has become something of a social movement in the United States. This commentary returns to the writings of the movement's founders—W. Edwards Deming, Joseph Juran, and Kaoru Ishikawa—to assess the coherence, distinctiveness, and likely perseverance of this provocative management philosophy. We identify a number of gaps in what is known about TQM processes and outcomes and explore the congruence between TQM practices and behavioral science knowledge about motivation, learning, and change in social systems. The commentary concludes with a prognosis about the future of TQM—including some speculations about what will be needed if TQM is to take root and prosper in the years to come.

It has now been a decade since the core ideas of total quality management (TQM) set forth by W. Edwards Deming, Joseph Juran, and Kaoru Ishikawa gained significant acceptance in the U.S. management community. In that decade, TQM has become something of a social movement. It has spread from its industrial origins to health care organizations, public bureaucracies, nonprofit organizations, and educational institutions. It has become increasingly prominent in the popular press, in the portfolios of trainers and consultants, and, more recently, in the scholarly literature.[1] Institutions specifically chartered to promote TQM have been established, and a discernible TQM ideology has developed and diffused throughout the managerial community. And, in its maturity, TQM has become controversial—something whose worth and impact people argue about.

Some writers have asserted that TQM provides a historically unique approach to improving organizational effectiveness, one that has a solid conceptual foundation and, at the same time, offers a strategy for improving performance that takes account of how people and organizations actually operate (Wruck and Jensen, 1994). A more skeptical view is that TQM is but one in a long line of programs—in the tradition of T-groups, job enrichment, management by objectives, and a host of others—that have burst upon the managerial scene rich with promise, only to give way in a few years to yet another new management fashion.

In this commentary, we provide a conceptual analysis of TQM that places these competing claims in perspective. We ask whether there really is such a thing as TQM or whether it has become mainly a banner under which a potpourri of essentially unrelated organizational changes are undertaken. We document how TQM activities and outcomes have been measured and evaluated by researchers and note some significant gaps in what has been learned. We explore the uneasy relation between behavioral processes that are central to TQM practice and mainline organizational scholarship about those same processes. And we conclude with an overall assessment of the current state of TQM theory and practice, including some speculations about what may be required if this potentially powerful approach is to take root and prosper in the years to come.

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We do not provide here a comprehensive review of the large and rapidly growing literature on TQM. For a sampling, see Jablonski (1992), Krishnan et al., (1993), Sashkin and Kiser (1993), and the July 1994 special issue of the *Academy of Management Review* (vol. 19, no. 3) on "total quality."

IS THERE SUCH A THING AS TQM?

As is inevitable for any idea that enjoys wide popularity in managerial and scholarly circles, total quality management has come to mean different things to different people. There is now such a diversity of things done under the name "total quality" that it has become unclear whether TQM still has an identifiable conceptual core, if it ever did. We begin with a close examination of what the movement's founders had to say about what TQM was supposed to be, and then we assess how TQM as currently practiced stacks up against the founders' values and prescriptions.

Virtually everything that has been written about TQM explicitly draws on the works of W. Edwards Deming, Joseph Juran, and Kaoru Ishikawa, the primary authorities of the TQM movement (for a review, see Crosby, 1989). Rather than providing here a precis of their writings, we draw on them to determine whether there exists among them (1) a coherent philosophical position that specifies the core values to be sought in TQM programs and (2) a distinctive set of interventions (structures, systems, and/or work practices) that are intended specifically to promote those values.

TQM Philosophy

Deming, Ishikawa, and Juran share the view that an organization's primary purpose is to stay in business, so that it can promote the stability of the community, generate products and services that are useful to customers, and provide a setting for the satisfaction and growth of organization members (Juran, 1969: 1–5); Ishikawa, 1985: 1; Deming, 1986: preface). The focus is on the preservation and health of the organization, but there also are explicitly stated values about the organization's context (the community and customers) and about the well-being of individual organization members: As Ishikawa (1985: 27) said, "An organization whose members are not happy and cannot be happy does not deserve to exist." The TQM strategy for achieving its normative outcomes is rooted in four interlocked assumptions—about quality, people, organizations, and the role of senior management.

Assumptions. The first assumption is about quality, which is assumed to be less costly to an organization than is poor workmanship. A fundamental premise of TQM is that the costs of poor quality (such as inspection, rework, lost customers, and so on) are far greater than the costs of developing processes that produce high-quality products and services. Although the organizational purposes espoused by the TQM authorities do not explicitly address traditional economic and accounting criteria of organizational effectiveness, their view is that organizations that produce quality goods will eventually do better even on traditional measures such as profitability than will organizations that attempt to keep costs low by compromising quality (Juran, 1974: 5.1–5.15; Ishikawa, 1985: 104–105; Deming, 1986: 11–12). The strong version of this assumption, implicit in Juran and Ishikawa but explicit and prominent in Deming's writing, is that producing quality products and services is not merely less costly but, in fact, is absolutely essential to long-term organizational survival (Deming, 1993: xi–xii).

The second assumption is about people. Employees naturally care about the quality of work they do and will take initiatives to improve it—so long as they are provided with the tools and training that are needed for quality improvement, and management pays attention to their ideas. As stated by Juran (1974: 4.54), "The human being exhibits an instinctive drive for precision, beauty and perfection. When unrestrained by economics, this drive has created the art treasures of the ages." Deming and Ishikawa add that an organization must remove all organizational systems that create fear—such as punishment for poor performance, appraisal systems that involve the comparative evaluation of employees, and merit pay (Ishikawa, 1985: 26; Deming, 1986: 101–109).

The third assumption is that organizations are systems of highly interdependent parts, and the central problems they face invariably cross traditional functional lines. To produce high-quality products efficiently, for example, product designers must address manufacturing challenges and trade-offs as part of the design process. Deming and Juran are insistent that cross-functional problems must be addressed collectively by representatives of all relevant functions (Juran, 1969: 80–85; Deming, 1993: 50–93). Ishikawa, by contrast, is much less system-oriented: He states that cross-functional teams should not set overall directions; rather, each line division should set its own goals using local objective-setting procedures (Ishikawa, 1985: 116–117).

The final assumption concerns senior management. Quality is viewed as ultimately and inescapably the responsibility of top management. Because senior managers create the organizational systems that determine how products and services are designed and produced, the quality-improvement process must begin with management's own commitment to total quality. Employees' work effectiveness is viewed as a direct function of the quality of the systems that managers create (Juran, 1974: 21.1–21.4; Ishikawa, 1985: 122–128; Deming, 1986: 248–249).

Change principles. TQM authorities specify four principles that should guide any organizational interventions intended to improve quality. The first is to focus on work processes. The quality of products and services depends most of all on the processes by which they are designed and produced. It is not sufficient to provide clear direction about hoped-for outcomes; in addition, management must train and coach employees to assess, analyze, and improve work processes (Juran, 1974: 2.11–2.17; Ishikawa, 1985: 60; Deming, 1986: 52).

The second principle is analysis of variability. Uncontrolled variance in processes or outcomes is the primary cause of quality problems and must be analyzed and controlled by those who perform an organization's front-line work. Only when the root causes of variability have been identified are employees in a position to take appropriate steps to improve work processes. According to Deming (1986: 20), "The central problem of management . . . is to understand better the meaning of variation, and to extract the information

contained in variation" (see also Juran, 1974: 2.10–2.17; Ishikawa, 1985: chap. 12).

The third principle is management by fact. TQM calls for the use of systematically collected data at every point in a problem-solving cycle—from determining high-priority problems, through analyzing their causes, to selecting and testing solutions (Juran, 1974: 22.1–28.1; Ishikawa, 1985: 104–105; Deming, 1986: chap. 8). Although Deming, Ishikawa, and Juran differ in their preferred analytical tools, each bases his quality-improvement program on collecting data, using statistics, and testing solutions by experiment.

The fourth principle is learning and continuous improvement. The long-term health of an enterprise depends on treating quality improvement as a never-ending quest. Opportunities to develop better methods for carrying out work always exist, and a commitment to continuous improvement ensures that people will never stop learning about the work they do (Juran, 1969: 2–3; Ishikawa, 1985: 55–56; Deming, 1986: 49–52).

TQM Interventions

Despite some differences in emphasis, the three TQM authorities have a common philosophical orientation and share a set of core values about people, organizations, and change processes. They prescribe five interventions to realize those values.

Explicit identification and measurement of customer requirements. To achieve quality, it is essential to know what customers want and to provide products or services that meet their requirements (Ishikawa, 1985: 43). It is necessary, therefore, for organization members to assess directly customer requirements such as durability, reliability, and speed of service (Juran, 1974: 2.2; Deming, 1986: 177–182). Some customers are external to the organization, others are internal, as when the output of some organization members is passed on to others. TQM defines the next process down the line as the "customer" for each process Within the organization, then, the assessment of customer requirements serves as a tool to foster cross-functional cooperation (Ishikawa, 1985: 107–108).

With data about customer requirements in hand, quality improvement can focus specifically on those aspects of work processes that are most consequential for customer satisfaction. Even so, high quality is not assured. Some organizations actively manipulate customer preferences (for example, through advertising) to bring them into line with what the organization already is able to provide. And customers may define their own requirements in terms of existing products and services that may be low in quality (Hayes and Abernathy, 1980). Deming (1993: 7–9) suggests that this may be especially characteristic of customers in the United States, because they have grown accustomed to poor-quality products and services; U.S. organizations that rely too heavily on what customers say they want risk setting quality standards far below what employees actually are capable of achieving.

Creation of supplier partnerships. TQM authorities suggest that organizations should choose vendors on the basis of quality, rather than solely on price. Moreover, they recommend that organizations work directly with raw material suppliers to ensure that their materials are of the highest quality possible (Juran, 1974: 10.1–10.35; Ishikawa, 1985, chap. 9; Deming, 1986: 31–43).

Use of cross-functional teams to identify and solve quality problems. Although cross-functional teams can be used in multiple ways in TQM programs, their main purpose is to identify and analyze the "vital few" problems of the organization (Ishikawa, 1985: 113–119; Deming, 1993: 85–89). Juran (1969) refers to such teams as the "steering arm" of a quality effort. Other teams, also cross-functional, are created to diagnose the causes of problems that have been identified by the steering arm and to develop and test possible solutions to them. Diagnostic teams can be either temporary task forces or continuing organizational entities. In both cases, department heads are included as team members to ensure that stakeholder departments will cooperate when the time comes to implement the team's recommendations. Juran, far more than Deming, advocates the use of quality-improvement teams within functions. But the team composition principle is the same: Choose people who can provide access to the data necessary for testing potential solutions and who are critical to implementing the solutions developed (Juran, 1969: 78–89).

Use of scientific methods to monitor performance and to identify points of high leverage for performance improvement. The three TQM authorities are of one voice in advocating the use of statistical tools to monitor and analyze work processes (Juran, 1974: chaps. 22–27; Ishikawa, 1985: 109–120; Deming, 1986: chaps. 8–9). A wide variety of statistical tools are available to identify the points of highest leverage for quality improvement, to evaluate alternative solutions to identified problems, and to document the results of process changes. Many of the tools involve applications of probability theory to generate findings that then can be summarized pictorially. Literally dozens of "quality tools" have been described in the literature (for a review, see Sashkin and Kiser, 1993). Three of the most commonly used tools are control charts, Pareto analysis, and cost-of-quality analysis.

A *control chart* provides a pictorial representation of the outputs of an ongoing process. Control charts are used to monitor the performance of a process and to determine whether that process is "in control"—whether the variance produced by the process is random or attributable to specific causes. It is assumed that all processes produce variance, but a stable process fluctuates randomly. Therefore, data from a stable process will tend to fall within predictable bounds. Scrutiny of a control chart allows the user to (1) determine whether a given process is in need of improvement, (2) identify points outside the control range so that the causes of uncontrolled variance can be sought, and (3) reassess the process after experimental attempts to improve it are completed (Deming, 1986: 323–346).

Pareto analysis is used to identify the major factors that contribute to a problem and to distinguish the "vital few" from the "trivial many" causes. Pareto charts are used when each separate contributor to a problem can be quantified. For example, a group attempting to identify the vital few causes of high inventory costs would list each inventory item in order of total dollar value of materials kept in stock. Those materials that turn out to be major contributors to inventory costs are then addressed first (Juran, 1969: 43–54).

Cost-of-quality analysis is used to highlight the cost savings that can be achieved by doing the work right the first time. The analysis involves quantifying all costs associated with maintaining acceptable quality levels, such as the costs of preventing errors, and then comparing these with the costs incurred by failures to achieve acceptable quality, such as the cost of rework. Cost-of-quality analysis thus helps to identify those opportunities for improvement that offer the largest cost savings (Juran, 1974: chap. 5; Ishikawa, 1985: 54–55).

Use of process-management heuristics to enhance team effectiveness. The TQM authorities suggest several techniques to help quality teams use their collective knowledge effectively in identifying and analyzing opportunities to improve quality. Three of the most commonly used devices are flowcharts, brainstorming, and cause-and-effect diagrams.

A *flowchart* is a pictorial representation of the steps in a work process. Flowcharts, which use standardized symbols to represent types of activities in a process, help members identify activities that are repetitive, that add no value, or that excessively delay completion of the work (Deming, 1993: 58–61).

Brainstorming is used by groups to generate lists of ideas about matters such as the potential causes of a problem, possible solutions, and issues likely to be encountered in implementing those solutions. Its purpose is to tap the creativity of group members by explicitly ruling out the evaluation of member contributions to the list and actively encouraging building on others' ideas. Brainstorming often is followed by the Nominal Group Technique or multivoting to reduce and prioritize the list that has been generated (Ishikawa, 1985: 64–65).

A *cause-and-effect diagram* or "fishbone" was developed by Ishikawa to graphically represent the relationship between a problem and its potential causes. Fishbone diagrams can help a group examine thoroughly all possible causes of a quality problem and discern the relationships among them. Group members place the problem at the right-hand side of the page (the head of the fish). The "bones" of the fish are lines on which members list the potential causes by category; the generic categories are causes related to people, tools, materials, and methods. Members then collect data to assess the potency of each of these potential causes (Ishikawa, 1985: 63–65).

According to the founders of TQM, the five interventions summarized above define the core of total quality management. Knowledge of customer requirements provides a test for considering and evaluating process changes. Supplier partnerships ensure that materials entering the organization are of acceptable quality. Cross-functional teams bring the full spectrum of relevant information and expertise to bear on decisions about systemwide problems. Scientific methods and statistical analyses provide teams with trustworthy data to use in their decision making. And process management heuristics can improve the quality of the decision-making process itself.

TQM in Practice

To assess how TQM actually is practiced in U.S. work organizations, we address two questions. First, in what ways are contemporary implementations of TQM consistent with the founders' tenets? Second, in what ways do current practices differ from their prescriptions, and do those differences enrich the core ideas of quality management or diverge from them?[2]

Continuities. Organizations that implement TQM are consistent with the founders' ideas in developing means for assessing their customers' preferences, altering relationships with suppliers, using teams (both cross-functional and within-function) to solve problems, investing in training in problem-solving tools and, to a lesser degree, teaching statistical analysis to front-line employees. The top-down implementation strategy used in U.S. organizations is congruent with the founders' assumption that quality is ultimately a management responsibility and that attempts to improve quality must begin at the top. The five TQM practices described below, presented in order of their prevalence, are generally consistent with the ideas and techniques originally articulated by Deming, Ishikawa, and Juran.

A recent survey reports that the single most commonly used TQM technique is formation of short-term problem-solving teams with the overall objective of simplifying and streamlining work practices (Conference Board, 1991). Nearly all manufacturing firms using TQM use such teams, and 90 percent of service firms do so. Problem-solving teams work on a wide variety of tasks, ranging from cross-functional involvement in product design to solving within-unit workflow problems.

The second most commonly used practice is training. Organizations that implement TQM invest heavily in formal training for a large proportion of their employees. According to the Conference Board (1991), 92 percent of manufacturing companies and 75 percent of service companies implementing TQM use some form of training as part of their change effort. Typically, nearly all senior and middle managers are trained in quality practices, with a median of 16 hours of training. About 80 percent of first-line supervisors and 50 percent of nonmanagement employees receive a median of eight hours of training. Olian and Rynes (1991) found the most common training content to be, in order of frequency, interpersonal skills, quality-improvement

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For findings from surveys of U.S. organizations about their TQM practices, see Conference Board (1991), Delta Consulting Group (1993), KPMG Peat Marwick (1991), and Lawler, Mohrman, and Ledford (1992). Neither these surveys nor this commentary address differences between TQM practices in the U.S. and other countries.

processes and problem-solving, team leading and building, running meetings, statistical analysis, supplier qualification training, and benchmarking.

The third practice is top-down implementation. In keeping with the TQM authorities' view that quality is ultimately the responsibility of top management, most TQM programs begin with the training of top managers in the quality philosophy, followed by the articulation of an organization-wide quality vision and communication of that vision throughout the organization (Conference Board, 1991: 18). Both education about TQM and implementation of TQM practices typically take place in cascading fashion, with each layer carrying the message to the next lower level of the organization.

The fourth practice is developing relationships with suppliers. At least 50 percent of TQM organizations collaborate with their suppliers in some way to increase the quality of component parts (Lawler, Mohrman, and Ledford, 1992), often by sending "quality action teams" to consult with their major suppliers. The objective is to help suppliers use TQM to analyze and improve their *own* work processes (Sashkin and Kiser, 1993).

The fifth practice is obtaining data about customers. Although systematic data are not available on the proportion of TQM organizations that directly assess customer preferences and customer satisfaction, nearly all case studies of TQM companies include descriptions of the means such organizations use to obtain customer data. Commonly used devices for obtaining these data include toll-free complaint lines, marketing research firms, and customer focus groups (Olian and Rynes, 1991).

Enrichments. Two additional interventions—competitive benchmarking and employee involvement—have become strongly associated with TQM in the United States. Although not explicitly advocated by the TQM founders, these activities are generally consistent with their ideas. Benchmarking involves gathering information about "best practices" from other organizations. Thus, a company that wishes to improve its customer service might observe service practices in firms renowned for their service quality, regardless of their industry. The prevalence of benchmarking in contemporary TQM programs appears to derive primarily from its inclusion as a Baldridge Quality Award criterion (Malcolm Baldridge National Quality Award Consortium, 1990).

Benchmarking serves multiple functions consistent with TQM philosophy: (1) determining what customers can expect to get from the competition, as part of assessing customer requirements, (2) learning alternative work processes, and (3) in some cases, guiding the establishment of quality-improvement goals. The ambitious quality goals of many TQM programs, such as zero "defections," cutting defects by 90 percent in two years, or reducing cycle time by 50 percent may be more likely to be accepted by organization members once competitive benchmarking demonstrates that other organizations achieve them (Olian and Rynes, 1991). Just because a new idea has been

discovered, however, does not mean it will be used. Ulrich, Von Glinow, and Jick (1993) noted that organizations that rely heavily on external benchmarking to identify superior work processes tend to have the most difficulty getting those processes adopted internally.

TQM organizations in the U.S. invariably introduce mechanisms for employee involvement in quality that extend beyond those that are integral to the TQM program itself (Lawler, 1994). According to the Conference Board (1991), 65 percent of TQM organizations create employee suggestion systems, and 70 percent have quality meetings between managers and employees and/or focus groups to solicit ideas about quality. The widespread use of "quality days" and other celebrations of quality-related events and achievements further reinforce the aspiration, in many organizations, to involve every member in quality-improvement processes. Such celebrations, moreover, are consistent with Deming's view that social approval and public recognition are important sources of human motivation (Deming, 1986: 85). Finally, some TQM organizations create self-managing teams to perform the regular work of the enterprise, thereby further expanding the involvement of organization members. KPMG Peat Marwick (1991) found that 15 percent of the TQM organizations studied used such teams, and among organizations with more than five years of TQM experience, almost 50 percent did so.

Divergences. Some aspects of contemporary TQM practice dilute or redirect the core ideas of the movement's founders. Noteworthy are the attenuated role of scientific methods in TQM programs and an increasing reliance on performance measurement and performance-contingent rewards to motivate and control employees.

The use of scientific methods is among the most distinctive features of TQM. In contemporary practice, however, there is much greater emphasis on group-process techniques and interpersonal skills than on scientific methods. Nor is there evidence that organization members actually use even those statistics they have been taught. In many organizations, the emphasis on statistics and experimentation is stripped away very early in the process of implementing TQM, leaving only the rhetoric of "management by fact" (Zbaracki, 1994).

A large majority of organizations using TQM modify their performance measurement and reward systems so that achievement of specific quality goals can be assessed and rewarded, even though Deming (1993) explicitly argues that such practices are counterproductive. According to the 1991 Conference Board survey, 85 percent of TQM organizations have developed programs to reward individuals and teams for quality achievements. In addition, 75 percent tie performance appraisals to quality, although principally for managers (only 46 percent of front-line employees are assessed on their use of quality tools). Such practices may derive from Juran's eclectic philosophy for managing individual performance. Unlike Deming and Ishikawa, Juran subscribes to no particular motivation theory. Rather, he calls for the use of a range of motivational techniques, from job

enrichment to quality audits: "All available tools must be used, each directed at the specific problem it is able to solve. None are panaceas" (Juran, 1969: 18–19).

The longer an organization has been involved with TQM, the greater its reliance on incentives to motivate work toward quality improvement goals. The 1991 KPMG Peat Marwick survey found that 60 percent of organizations with five or more years of TQM experience explicitly rewarded the achievement of quality goals. The survey also showed, however, that organizations with greater experience with TQM tended to place greater emphasis on group, departmental, or organization-wide, rather than individual rewards. This is consistent with the TQM authorities' emphasis on teamwork and between-unit interdependence and with their view that it is the system, not individual efforts, that ultimately determines quality. Such rewards, however, almost always are linked to quantitative performance measures, which Deming believed to be "limiting" (Deming, 1993: 47).

Conclusion

We have approached the question, "Is there such a thing as TQM?" in the same way that we would approach analysis of any construct: by assembling data relevant to its convergent and discriminant validity. Convergent validity, as adapted from Campbell and Fiske (1959) for present purposes, reflects the degree to which the versions of TQM promulgated by its founders and observed in organizational practice share a common set of assumptions and prescriptions. Discriminant validity refers to the degree to which TQM philosophy and practice can be reliably distinguished from other strategies for organizational improvement, such as participative management, management by objectives, and so on. Only if TQM passes these two validity tests does it make sense to dig more deeply into the conceptual, empirical, and practical issues that can inform its overall assessment.[3]

Convergent validity. We conclude that TQM passes the convergent validity test. As we have seen, there is substantial agreement among the movement's founders about the key assumptions and practices of total quality management. Moreover, contemporary TQM practice is generally consistent with the founders' ideas. The record is not perfect, however. Some of the sharpest and most distinctive ideas of the TQM founders have been sanded down a bit over the last decade. And there is, these days, greater adherence to TQM philosophy at the espoused than at the operational level, as seen, for example, by the diminished role of scientific methods and statistical tools in many TQM programs. Still, we find that there is impressive convergence—across theorists, across practitioners, and across time—of the basic ideas of total quality management.

Discriminant validity. In assessing the distinctiveness of TQM, we consider three comparison groups: programs that are subsumed by a full-fledged TQM program, those that are clearly different from TQM, and those that are, like TQM, broad and multifaceted organizational improvement programs. As articulated by its founders, TQM clearly

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This is a characteristically psychological approach, which is consistent with our own backgrounds. For an excellent analysis from the perspective of economics, see Wruck and Jensen (1994); for one from the perspective of sociology, see Zbaracki (1994); and for one from the perspective of management theory, see Anderson, Rungtusanatham, and Schroeder (1994).

subsumes a number of smaller and more focused initiatives, such as quality circles, cross-functional project teams, and zero-defects programs. It also is distinct from interventions such as job enrichment, performance-contingent rewards, and goal setting, some of which are explicitly disavowed by one or more of the three TQM founders—for example, the emphasis of some job-design models on employee autonomy about methods, pay-for-performance programs that tie financial rewards to bottom-line outcomes, and goal-setting programs that specify explicit performance objectives within a department or function. We will have more to say about these discrepancies later; for now, we simply note that TQM is clearly different, both conceptually and operationally, from at least this sample of other change programs.

Finally, TQM as described by its founders is readily distinguishable from other broad, multifaceted initiatives, such as participative management and quality of worklife programs. As a concept, participative management would itself fail the convergent and discriminant validity tests. So many different interventions are mounted under this label that they appear to have only the most general kind of management philosophy in common. Moreover, participative management has no generally accepted set of "must do" management practices; the way participation is implemented in one organization often bears little resemblance to its use in another. Participative management, then, is the same kind of thing as TQM but is not as clean or distinctive conceptually.

The quality of worklife (QWL) movement, which peaked in prominence in the U.S. in the early 1980s, has many similarities to TQM (Lawler, 1986: 119–143). Both initiatives are rooted in identifiable philosophical positions and both have associated with them a specific set of interventions. The values of the QWL movement center on fostering labor-management cooperation to improve simultaneously productivity and the quality of employees' worklives. Key organizational devices in QWL include labor-management committees, surveys of employee satisfaction, and so on. QWL, like TQM, is a broad and multifaceted change effort that also passes the convergent validity test. But it clearly differs from TQM both in philosophy and in practice.

Our conclusion is that TQM does pass the discriminant validity test with reference to the writings of the TQM founders. But it is close to failing that test when one focuses on contemporary organizational practice. Many devices that are specifically eschewed by the founders are now commonly implemented in the name of TQM. And many practitioners now talk about "involvement" and "empowerment" as if they were synonymous with TQM and implement various employee involvement or empowerment interventions as part of a TQM package (Lawler, Mohrman, and Ledford, 1992). Thus, one can in 1995 still point with some confidence to the constellation of ideas and interventions that form the core of TQM, and one can, with less confidence, show how that constellation differs from others. At least for now, there is indeed a "there" there for TQM.

MEASURING AND ASSESSING TQM ACTIVITIES AND OUTCOMES

A full-fledged evaluation of a TQM program would include three distinct types of assessment. First is empirical demonstration that TQM has, in fact, been implemented, to confirm that it is TQM that is being assessed rather than, for example, some subset of the integrated TQM package, some related intervention, or some wholly different program that has been carried out using TQM rhetoric.

Second is determination of whether TQM alters how people work together to meet customer requirements. This analysis assesses *process criteria* of effectiveness—the degree to which the improvements in organizational functioning that are expected actually are observed. Finally comes assessment of *outcome criteria*—the degree to which improvements in bottom-line organizational effectiveness are found. It is important to examine both process and outcome criteria because, as scholars who study decision making know all too well, a capricious environment sometimes can intervene between process and outcome in a way that turns behaviors that could not have been better into results that could hardly have been worse. As will be seen, empirical evaluation of TQM programs presents a significant challenge to researchers because what must be done to accomplish the three different assessments involves very different methods and analytic strategies.

Is It Really TQM?

To address substantive questions about the effects of TQM on organizations and their members, one must first establish that TQM actually has been installed. This is the organizational change equivalent of conducting a manipulation check in the research laboratory to ensure that the experimental intervention actually was implemented as intended. To accomplish this task in research on TQM, one would collect behavioral data to document that the five core features of TQM are in place. Specifically, (1) Are organization members assessing customer requirements and measuring performance against those requirements continuously? (2) Are suppliers chosen on the basis of quality, rather than solely on the basis of cost, and are organization members working with suppliers to improve suppliers' quality practices? (3) Are members operating interdependently, as teams, across traditional organizational functions, rather than independently or in ways that maintain functional separateness? (4) Are members using statistics and scientific reasoning to formulate and test hypotheses about work processes and strategies for performance improvement? and (5) Are members using process-management heuristics to enhance team problem solving and decision making? Research on TQM rarely addresses these questions, except for studies that focus on Baldridge Award-winning companies. Because application for that award involves careful inspection of actual quality practices, it is safe to assume that award winners actually have implemented the full TQM package (see Malcolm Baldridge National Quality Award Consortium, 1990).

More common is research that involves no attempt at all to assess the degree to which TQM has been implemented: Of 99 papers about the effects of TQM published in academic and practitioner journals between 1989 and 1993, only 4 percent assessed the degree to which TQM interventions actually were in place. And even when "manipulation checks" were performed, they often involved inferences based on qualitative accounts of the evolution of a TQM program rather than on direct measurements of behavior (e.g., Fisher, 1992). Existing research findings about the effects of TQM on organizational performance, therefore, may be about programs that—although perhaps well-tailored to a given organization's needs—are not full-fledged implementations of TQM.[4]

What Are Its Effects on Work Processes?

The second challenge in research on TQM is to specify and collect data about those processes that would be expected to result from TQM and that should, all else being equal, contribute to organizational effectiveness. Considering group and organizational performance generally, without specific reference to TQM, Hackman (1987) has suggested three process criteria of unit effectiveness: (1) the level of *task-oriented effort* exhibited by unit members, (2) the amount of *knowledge and skill* members apply to their work, and (3) the appropriateness of the *task performance strategies* members use in carrying out the work. To the extent that a work unit has a high standing on these process criteria, the likelihood increases that its final product, service, or decision also will turn out well. To the extent that members exhibit insufficient effort, bring insufficient talent to bear on the work, or use task-inappropriate performance strategies, overall unit effectiveness is likely to suffer. Although these three process criteria are quite general and have been neither explicated nor endorsed by TQM scholars or practitioners, they might nonetheless be useful in assessing the impact of TQM interventions on work processes. We consider below the ways that a quality team's standing on each of the three criteria might be enhanced by TQM interventions.

Effort. Quality teams have challenging and significant work—specifically, collaborating to generate continuous improvement in meeting explicitly stated customer requirements—which motivation theory suggests should enhance collective effort. Moreover, use of the process-management techniques that are integral to TQM programs should decrease the degree to which effort is wasted through coordination losses and misdirection.

Knowledge and skill. TQM quality teams are composed of members from different functions, ensuring that there is more talent available for work on the collective task than would be the case for individuals operating on their own or in homogeneous teams whose members come exclusively from a single function or unit. Moreover, the use of statistical analyses and data-representation techniques should lessen the degree to which teams make decisions based on misapprehensions about the state of the work system. Finally, use of group process-management

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This problem is not unique to TQM. Frank and Hackman (1975) empirically documented the same difficulty in evaluations of the impact of job-enrichment programs.

heuristics should enhance members' learning from one another, thereby increasing the total pool of talent available for the work. They also should decrease the likelihood that existing talent will be wasted, for example, by overlooking or inappropriately weighting the contributions of members who have special talent or insight.

Performance strategy. Task-performing teams sometimes head off in the wrong direction or go about their work in inefficient or inappropriate ways, merely because members are not entirely clear about what they are supposed to do or whom they are supposed to satisfy. Under TQM, these risks are minimized: Customers are specifically identified and their requirements are clearly explicated. Customer requirements provide an available and appropriate test for team members to use in inventing and choosing among alternative ways of proceeding with their work. Moreover, changes in those requirements can provide a clear signal that it is time to abandon or revise existing performance routines. The use of the process-management and problem-solving heuristics that are integral to the TQM package should increase the chances that members' deliberations about such matters will generate ways of working together that are especially well-aligned with what customers want.

It appears, then, that these three process criteria—effort expended, knowledge and skill applied, and task-performance strategies used—may be of use in assessing the impact of TQM on how, and how well, organization members work together. If TQM is working as intended, organizational units should exhibit a high standing on all three of them.

Process criteria have the important advantage of being more accessible to reliable measurement than are outcome criteria. Moreover, assessing the process criteria allows researchers to check empirically the validity of TQM predictions about unit processes, for example, that TQM techniques help people work together more efficiently and productively. Yet process criteria—whether the three that we have mentioned or others—are almost never addressed in TQM research. Less than 15 percent of the studies of TQM programs that we examined document actual behavioral changes that occur after TQM has been adopted. And those that do address work behaviors rely on anecdotal descriptions of particular quality teams and their problem-solving processes. This oversight in TQM research has left a significant gap in knowledge about both the effects of TQM interventions and the means by which those effects are generated.

What Outcomes Are Obtained?

It is tempting to go for broke in research on the impact of interventions such as TQM, testing directly the relationship between the entire intervention package and global organizational outcomes. The logic is straightforward: Since TQM is supposed to enhance organizational effectiveness, then it should be a simple matter to determine whether organizations that use it improve on generally accepted performance measures. In fact, it is maddeningly difficult to do such research well, for several reasons.

First, there are serious measurement problems associated with even standard indices of firm performance such as market share, profitability, or stock price (Brief, 1984; Pennings, 1984; Kaplan and Norton, 1992); these problems are compounded for public and nonprofit organizations (Hage, 1984). One strategy for circumventing this difficulty is to obtain productivity measures at the individual or unit level and then to aggregate them across units. Such measures generally have psychometric problems of their own, however, and the link between individual and organizational productivity is far from straightforward (Goodman, Lerch, and Mukhopadhyay, 1994).

Second, as mentioned earlier, exogenous disturbances can significantly obscure the link between work processes and organizational outcomes. And even when a relationship does exist between intervention-induced process improvements and organizational outcomes, it may be so weak relative to other influences that it can be nearly impossible to confirm statistically unless one has a very large sample of organizations, which is unlikely in intervention research. Wruck and Jensen's (1994) study of the effects of TQM at Sterling Chemical provides a good case in point: Despite a TQM program that by all accounts was highly successful, measures of firm performance still exhibited a monotonic decline because of industry and market factors.

Third, temporal issues can obscure intervention-outcome relationships (Whetton and Cameron, 1994). There often is a discrepancy between short-term and long-term organizational results, and it is by no means straightforward to decide how long after an intervention one should wait before analyzing outcome measures. The longer one waits, the more opportunity TQM has to realize its effects on organization-wide results, but the more those results are open to confounding by other factors. Even longitudinal research that documents changes in outcome measures over time is of limited use in disentangling the effects of a focused intervention from those of other endogenous and exogenous changes.

Taken together, these three difficulties can make it nearly impossible to detect statistically the direct effects of TQM on global measures of organizational outcomes. As serious as these problems are, they are compounded by another, namely, the process by which attributions are made about the *reasons* for any observed performance changes. Every researcher knows that one cannot simply make an intervention, observe subsequent outcomes, and then conclude that any changes in the outcome measures were caused by the intervention. Many reports about TQM effects, however, do precisely that: TQM is implemented, unit productivity or organizational profitability improves, and it is concluded that TQM caused the improvement (e.g., Littman, 1991; Gilbert, 1992; Raffio, 1992). In fact, the observed gain could have been the result of other events that coincided temporally with the intervention, or by the phenomenon, sometimes referred to as the Hawthorne effect, of people working harder when they are being studied. But there is an even more prosaic explanation for

performance improvements that are observed after introducing an organizational intervention such as TQM.

In a work unit that has been operating in business-as-usual mode for some time, inefficiencies and redundancies are likely to have gradually made that unit far less tight, lean, and efficient than it could be. Managers may select that unit as the target of an organizational change program—perhaps a quality intervention, perhaps something else. As managers and change agents begin to plan for implementation, they scrutinize the staffing, workflow, and internal organization of the unit in great detail, the first close look the unit has received in a long time. Any accumulated inefficiencies are likely to be noticed and, coincident with the intervention, corrected. If productivity improvements subsequently occur, it may seem obvious to those responsible for the change program that the favorable outcomes stemmed directly from the intervention. Although that may be true, the improvements may have resulted solely from the fat-trimming that accompanied, but was not integral to the intervention. Without appropriate control units and data on work processes as well as outcomes, there is no way to choose between the two explanations.

The research literature on TQM effects includes few studies whose designs permit definitive statements to be made about causes and effects. More than 80 percent of the published assessments of TQM describe what happened when the program was installed in one particular organization. The outcomes most frequently reported are (1) improvements in error rates, for example, "more accurate invoices" (Teresko, 1991), (2) decreased time needed to complete a process, for example, "assembly-line time decreased by 67 days" (McDonnell, 1992), and (3) dollar savings from process efficiencies, for example, "reduced laboratory turnaround time resulting in a $10,000 savings" (Koska, 1990). Such findings are consistent with the aims of TQM interventions, but the absence of appropriate research designs makes it impossible to attribute them directly to TQM.

Straightforward evaluation research that attempts to assess the effects of TQM on global measures of organizational effectiveness is fraught with both methodological difficulties and interpretative dangers. Although well-instrumented quasi-experimental studies can help with the design and measurement problems inherent in this type of research, not all of the problems can be solved. Still, the question that outcome-focused evaluation research studies seek to answer cannot be finessed: It *is* important to know whether TQM generates real organizational improvements. One way to gain purchase on this question is to return to the writings of the primary TQM authorities to extract their assertions about what is sought and expected from TQM programs and use those assertions as the primary criteria for assessing TQM outcomes. Deming, Ishikawa, and Juran are clear about what they expect TQM to achieve: (1) better performance in meeting customer requirements, (2) improved organizational performance capability, and (3) greater knowledge and work satisfaction on the part of organization members. Because these three outcomes are

less vulnerable to the measurement and interpretive problems that plague global indices of firm-wide economic performance, they offer attractive options for research on TQM outcomes.

If TQM programs do increase the degree to which customer requirements are met and, in the process, improve the performance capability of the organization and the well-being of individual members, then global and economic measures of organizational effectiveness surely should improve over the long term as well. This prediction is stated explicitly by the TQM theorists whose work we have been reviewing, and it strikes us as entirely reasonable. Yet, for all the reasons discussed above, it may also be a prediction that can never be definitively confirmed in empirical research.

Conclusion

Research on the effects of TQM has focused largely on global outcomes. The results have been strongly positive, but they are almost all based on case reports. In part, this problem exists because TQM has captured more attention from practitioners than from researchers: Many assessments of TQM are descriptions written by a member of the focal organization. But if knowledge of the effects of TQM on organizational effectiveness is to cumulate, researchers must focus less on evaluation studies of the 30-percent-gain-in-productivity variety and more on research that includes both explicit manipulation checks and measurements of process criteria.

TQM practitioners are expected to focus their attention on work processes rather than on outcome measures and to use scientific methods to improve those processes continuously. These prescriptions rarely are applied to the study of TQM itself. It is ironic that the designs and methodologies used in research on TQM fall far short of the standards of research design, measurement, and analysis that would be required of organization members studying their own work processes under TQM.

BEHAVIORAL PROCESSES UNDER TQM

To accomplish its purposes, TQM must alter how people actually behave at work. As suggested in the previous section, people should be working harder (i.e., with more effort), smarter (i.e., with greater knowledge and skill), and more responsively (i.e., with task performance strategies better attuned to customer requirements) under TQM than otherwise would be the case. Three behavioral processes are key to achieving these aspirations: motivation, learning, and change.

Motivation

Deming and Ishikawa identify three different sources of human motivation at work. First is intrinsic motivation, the "joy of climbing a mountain just because it is there" (Ishikawa, 1985: 27) and, more generally, growing, learning, and developing one's self (Deming, 1986: 72–86). Second is task motivation, the good feeling that comes from accomplishing things and seeing them actually work (Ishikawa, 1985: 28; Deming, 1986: 72). Third is social

motivation, the energy that comes from cooperating with others on a shared task and the incentive provided by recognition from others (Ishikawa, 1985: 28; Deming, 1986: 107).

How congruent are TQM interventions with its founders' propositions about motivation? In general, the fit is good. TQM provides people with opportunities to learn and to develop themselves through joint problem-solving efforts. Meeting clear and often challenging customer requirements and working to improve work processes continuously provide task challenges that should both test and stretch members' skills. And the insistent emphasis on teamwork and cross-functional relationships provides many opportunities for social interaction and social reinforcement. The fit between TQM practices and other motivational theories prominent in the organizational literature, however, is uneasy. Among the evidence we reviewed for the discriminant validity of TQM was the fact that TQM explicitly eschews a number of popular motivational devices, including work redesign (e.g., job enrichment), goal setting (e.g., management by objectives), and performance-contingent rewards (e.g., pay for performance). Although each of these interventions has been shown, in some circumstances, to enhance organization members' work motivation (Locke et al., 1980), all of them are in some significant way inconsistent with TQM theory and practice.

Work redesign. Work-redesign theory specifies that motivation is strengthened when the work itself is meaningful, when performers have considerable autonomy in determining the means by which it is accomplished, and when they receive regular, trustworthy knowledge about work outcomes (Hackman and Oldham, 1976). The first and third of these design specifications—meaningful work and knowledge of results—should be routinely present in TQM organizations. The tasks of meeting customer requirements and continuously improving processes are meaningful, and the emphasis on analyzing data about performance processes ensures that performers will be almost continuously aware of how they are doing.

The problem comes with the second design specification, autonomy about work methods. Under TQM, much energy is spent identifying the "best" work practices, those that bring work processes under the greatest possible control. Cross-functional teams undertake research projects to develop or identify such practices, managers do benchmarking visits to other organizations to learn about alternative ways of performing the work, and front-line employees are themselves expected to search continuously for improved and simplified work practices (Juran, 1969: 9–45); Ishikawa, 1985: 55–56; Deming, 1986: 49–52).

Once such practices are identified and documented, they are diffused throughout the organization and standardized, with the result that work-unit members may wind up with very little discretion about how they perform their tasks. The potential for overspecification of work procedures is so great that one is reminded of industrial engineering during the heyday of scientific management, when it was the job of

process designers to identify the "one best way" to perform the work and the job of front-line producers to do the work precisely that way. The motivational costs of this approach are well documented (O'Toole, 1977; Hackman and Oldham, 1980).

Under TQM, standardized procedures are more likely to come from peers working on cross-functional quality teams than from industrial engineers. But it is not the source of the procedures that matters, nor is it the philosophy that lies behind their development and diffusion. What matters is the design of the work itself. TQM, along with other currently popular reengineering initiatives, runs a risk of spawning a new version of old-time scientific management, complete with the human and organizational dysfunctions that prompted the job-enrichment corrective over two decades ago (Pallas and Neumann, 1993; Anderson, Rungtusanatharn, and Schroeder, 1994; Spencer, 1994).

Some commentators dispute this view. Adler (1993), for example, interpreted findings from the NUMMI plant of General Motors-Toyota as showing that the motivational dysfunctions of standardized, routine, and repetitive tasks can be mitigated when workers are treated fairly and respectfully, provided with proper tools and training, and share in decision making about performance policies and standards. And Klein (1991, 1994) described how the loss of employee autonomy that accompanies standardization and process controls can be compensated for, to some extent, by greater collective autonomy about how tasks are designed in the first place

The problem is that only a subset of the members of TQM organizations (often a small subset) have the opportunity to participate in the cross-functional quality teams that redesign tasks and develop improved work methods. Such teams typically do have ample autonomy in their work, sometimes even including the authority to implement the solutions they develop. Moreover, case reports document the energy, enthusiasm, and commitment exhibited by members of these teams. There remains, however, a pervasive and worrisome discrepancy between the motivationally engaging work of special TQM teams and the standardized work practices of those who perform the routine productive work of the organization.

Goal setting. Goal-setting theory predicts that motivation is greatest when performers focus their attention on achieving clear, specific, and challenging goals (Locke and Latham, 1990). Although research evidence generally supports these predictions, TQM authorities are ambivalent about both the appropriateness and the efficacy of setting specific goals in TQM programs. Deming is opposed: "The only number that is permissible for a manager to dangle in front of his people is a plain statement of fact with respect to survival. . . [such as] 'Unless our sales improve 10 per cent next year, we shall be out of business' " (Deming, 1986: 76). Explicit goals, he says, narrow performers' vision and implicitly invite them to slack off once a goal is achieved. Ishikawa, by contrast, views challenging goals as appropriate so long as they are about solving particular problems and are

established in such a way as to allow cooperation among functions (Ishikawa, 1985: 60–61).

It is not surprising that there is disagreement among the TQM authorities about goal setting, because the nature of the work done by quality teams raises some complex issues about how goals and objectives are properly framed. Under TQM, the analysis of work processes focuses attention on deviant cases, the ones indicating that a work process is, to some extent, out of control. This emphasis on failures rather than successes also is evident in the language of TQM: One talks about the 1 percent of the cases for which existing processes did not work rather than the 99 percent of the cases for which they did (Ishikawa, 1985: 61–62; Juran, 1988: 130–132). Moreover, TQM methods help team members identify that subset of the 1 percent that represents the most pernicious or frequent problems so that they can be taken care of first, before moving on to the next most consequential problems. Both the work and the talk are more about problems than about successes.

Some commentators, such as Wruck and Jensen (1994: 271–272), have found value in this problem-focused approach. They noted that both managers and front-line employees exhibit a remarkable tendency to ignore or dismiss problems and mistakes, which usually results in a gradual erosion of organizational performance. Because TQM insistently focuses attention on the things that must be fixed, it can partially reverse the natural human tendency to turn away from signs of trouble. But we also know that lofty and challenging goals can engender levels of work motivation that rarely are observed when people are occupied mainly with things that are not going right (Conger and Kanungo, 1988; Locke and Latham, 1990). How might these two positions be reconciled? Clearly, there is a balance to be achieved between looking at the dark and the bright sides of work processes. We need to know considerably more than we do at present about how that balance can best be managed in the context of TQM philosophy and practice.

Pay for performance. There is abundant research evidence about both the motivational benefits and the risks of basing compensation and other extrinsic rewards on measured performance. In contrast to their ambivalent views about the value of goal setting, TQM authorities are clear and decisive about basing pay on performance: Do not do it. The arguments they marshall to support their position are, in general, the same ones that have been well documented in the organizational and economic research literatures. One, organizations do get what they pay for, but sometimes they get only that (Kerr, 1975). Two, specific outcomes that are rewarded can become so salient that performers risk losing sight of the larger picture, for example, whom the organization exists to serve or what principles are supposed to guide provision of that service. Three, performance-contingent extrinsic rewards can undermine performers' intrinsic motivation (Deci, 1971). Four, reward systems that place people in competition for rewards that are distributed from a fixed pool not only divert performers' attention from customers' needs but also undermine relationships among

members and make it difficult for them to work together on the collective tasks that are the organization's real work. Five, rewards necessarily are based on some measure, but few measures approximate the full dimensionality of the contributions that really are needed from organization members (Ishikawa, 1985: 25–28; Deming, 1986: 102).

Many TQM organizations avoid all of these problems in a single stroke. They avoid performance-contingent extrinsic rewards entirely and rely on intrinsic motivation. This solution, however, has significant opportunity costs. The best motivational state of affairs is obtained when an organization does not rely exclusively on either intrinsic or extrinsic rewards but, instead, structures the work in a way that fosters intrinsic motivation (for example, by providing challenge, autonomy, and direct feedback from customers) and then supports that positive motivation with performance-contingent extrinsic rewards. As recent findings of Amabile (1993) show, the supposed trade-off between intrinsic and extrinsic motivation is neither as straightforward nor as general as sometimes has been claimed. It is, in fact, possible to structure work and reward systems to promote both types of motivation simultaneously (Wageman, 1995). In TQM organizations, however, it is much easier to accomplish that for managerial staff, who have considerable autonomy, than for rank-and-file employees who, in their regular work, have little (Waldman, 1994).

TQM authorities acknowledge that social reinforcement, which is extrinsic, can enhance the motivation of organization members, and they do suggest that organization-wide gain-sharing or profit-sharing programs can appropriately be used to recognize and reward collective excellence (Juran, 1974: 18.19; Ishikawa, 1985: 26–27). If this can be done at the organizational level, then there would seem to be no conceptual reason to conclude that it could not also be done at the group level. A system in which rewards were contingent on gains in performance (such as bringing work processes increasingly under control), for example, would seem to fit rather nicely with the TQM philosophy of continuous improvement. The no-extrinsic-rewards principle, then, may be more an ideological stance of the TQM authorities than the result of reasoned conceptual judgment. Clearly, further thought and research is warranted on how, in TQM programs, one can capture simultaneously the benefits of both intrinsic and extrinsic rewards.

The motivational basis of TQM practices is generally sound. It is true that a number of positive sources of motivation are overlooked or forgone and that, by diffusing standardized "best practices" throughout the organization, members' regular work may be less well designed motivationally than it could be. Still, organizations that follow TQM practices should not fall victim to the known dysfunctions of poorly conceived or poorly implemented motivational programs. An interesting possibility is to find ways that TQM organizations can do a better job of having their motivational cake and eating it too—that is, of retaining the considerable motivational benefits that are built into orthodox TQM while also harvesting the motivational gains that can derive from

well-designed work, from specific, challenging performance objectives, and from the use of extrinsic rewards to recognize and reinforce extraordinary accomplishment.

Learning

TQM is pro-learning, with a vengeance. The movement's founders note, correctly, that people inherently want to learn and develop. They also point out that this inclination is fragile, that it can be undermined by social systems that create fear and defensiveness. And even though the inclination to learn is built in, people also require tools and coaching if they are to express that inclination in their work behavior.

TQM practices create good learning environments both by minimizing fear in the organizational culture and by providing members with a rich and diverse set of learning tools. Moreover, TQM exposes workers to data about their work processes more or less continuously and encourages them to use scientific methods to analyze and improve those processes. Finally, members of TQM organizations are asked to reexamine their work processes repeatedly, and do so with no holds barred: "Ask not just why we do it that way and can we do it better, but also ask why we do that at *all*" (Juran, 1969: 118). In Argyris and Schon's (1978) terms, people in TQM organizations are expected to do double-loop as well as single-loop learning.

There are two quite different varieties of human learning. One variety, that on which TQM philosophy is based, is the wired-in human inclination to grow and develop in competence. This inclination is well known to anyone who has observed the joy experienced by very young children as they learn to pull themselves to a standing position in their cribs, take their first unsupported steps, or use language to express their wishes and feelings. The other variety is the robust but often-overlooked capacity of human organisms to adapt to the many problems that life inevitably brings. The human organism is capable of learning to make do even under conditions of profound disappointment and adversity, such as losing a spouse, a limb, or a means of livelihood.

These two opposing inclinations—to stretch and grow, and to adapt and make do—are present in all of us. Schools and work organizations are among the most important settings in which these opposing varieties of learning are engaged and played out. Experiences in these organizations have large and enduring effects on one's personality, intellectual style, and orientation toward future learning (Kohn and Schooler, 1978; Schooler, 1984). Sometimes the result is a life of continuous and ever-escalating growth and learning; other times it is a life characterized mainly by adaptation and acceptance of one's lot.

An excessive emphasis on either type of learning can be dysfunctional. Too strong an orientation toward adaptation can result in what commonly has been found in survey studies of job satisfaction at highly controlling organizations. People report on the surveys that they are satisfied, but closer analysis reveals that such "satisfaction" mainly expresses their acceptance of a life bereft of opportunities

for career and personal growth. Growth-oriented learning has atrophied for such people, and their organizations are obtaining but a small portion of what they actually have to offer. Too strong an orientation toward personal growth and development also is sometimes observed in work organizations, especially those that are driven by humanistic, democratic, or spiritual ideologies. Members of such organizations may be encouraged to pursue their personal aspirations to such an extent that the capability of the organization to mount efficient collective action is compromised, eventually threatening its very survival.

How well do TQM organizations succeed in providing a balance between these two varieties of learning—at promoting continuous personal learning, but of a type and in a way that also generates efficient and effective collective performance? To address this question, we examine TQM learning processes in three arenas: (1) learning from one another in cross-functional quality and problem-solving teams, (2) learning about ways to improve work processes and performance, and (3) learning about what the collectivity *should* be doing—the double-loop learning espoused by Argyris and Schon (1978).

Learning from one another. The cross-functional quality teams that are among the hallmarks of TQM organizations stack the cards in favor of learning by the simple fact that they *are* cross-functional; individual members are exposed to more, and more diverse, points of view than would be the case if they worked mostly by themselves or in within-function units. Moreover, the group-process heuristics that teams are taught increase the chances that this built-in talent will be used well. Members are likely to learn, for example, how to solicit the contributions of quiet or recalcitrant members and how to weight the contributions of members in accord with their actual knowledge and expertise rather than on the basis of task-irrelevant factors such as demographic attributes or interpersonal style. Moreover, the group-process techniques teams use increase the chances that, over time, members will actively teach and learn from one another, thereby increasing the total pool of knowledge and skill available for the team's work. In all, TQM receives excellent marks for the ways and the extent to which it fosters interpersonal learning.

Learning about work processes. TQM strategies for learning about work processes rely heavily on numerical data (which are to be viewed as friendly even when they point to disconcerting trends), analyzed and interpreted using scientific and statistical tools (which are viewed as providing protection against human distortions and biases). There is reason for concern about both the sufficiency of the tools and the readiness of the people who use them to accept what the data show. Even in the institution of science, where scientific norms and tools are far more robust than the learning devices used in work organizations, scientists sometimes exhibit behaviors that are oriented more toward succeeding than toward learning. Data sometimes are collected in ways that virtually ensure that the scientist's hypothesis will be supported. Scientists sometimes continue to advocate favored theories despite the ready availability of

disconfirming data. And some scientists even have been known to falsify data to make things come out the way they want them to. Merely focusing on data, and analyzing them using scientific and statistical tools, is insufficient to ensure the validity of the conclusions reached—even in science itself.

That more than just science is needed is shown by Edmondson's (1995) findings about quality-improvement efforts at a large teaching hospital. Among the data collected in hospital patient-care units were instances of drug-related errors—occasions when patients received the wrong drug, the wrong dose, or the right drug at the wrong time. Although unfortunate for the patient, such events provided friendly data for use by unit members in analyzing what went wrong and developing strategies to keep it from happening again. Edmondson found, however, that the degree to which those data were used—or errors were even *recorded*—depended on the kind of leadership provided by the unit's nurse manager. Units whose manager had a hands-on, supportive style reported far more errors than did units with more distant and stringent managers. Close analysis of this disconcerting finding showed that it derived not from any laxity on the part of the hands-on managers but, instead, from the fact that staff in those managers' units were far more willing to treat error data as friendly, and therefore to record them, than were staff in units led by more evaluative nurse managers.

Even in TQM organizations, data and scientific tools can be rendered impotent if systems, or leaders, put winning or succeeding ahead of learning. For this reason, the movement we have seen toward increasing use of performance-contingent financial incentives in TQM organizations is worrisome. The more potent those incentives are (and, to be effective, they should be as potent as managers can make them), the more likely it is that organization members will abandon the appropriate use of data and scientific methods in order to obtain them. Also troubling is the fact that implementations of TQM increasingly are giving only lip service to the use of scientific and statistical tools. Together, these developments raise concerns about the future role of scientific methods—which unquestionably are among the most distinctive features of TQM philosophy—in actual TQM practice.

Learning about collective goals. To learn how to improve work processes is single-loop learning: The means by which organizational purposes are accomplished are open to analysis and improvement but the purposes themselves are not. To inquire about collective purposes, however, involves double-loop learning: The focus is on what is being done as well as how it is being done. Neither the philosophy nor the practice of total quality management draws significantly on members' ideas or experiences about collective purposes. TQM is a single-loop, top-down undertaking that seeks to provide those on the front line with the direction, the tools, and the coaching that they require to serve the enterprise well. It is noteworthy that the quotation given earlier from Juran (that one should ask not just about doing it better, but

also "why we do that at *all*") was directed specifically to managers, not to rank-and-file workers.

Some commentators suggest that TQM achieves an appropriate balance between managerial control and employee participation, between single- and double-loop learning. In contrast to devices such as quality circles, it is argued, TQM institutionalizes meaningful employee participation even as it retains top-down managerial control of the enterprise (Hill, 1991). Still, some organization members are likely to chafe at the uncompromising top-down orientation of TQM. In response, managers may find themselves tempted to engage in pseudo-participation: Members are invited to join in discussions about decisions that already have been made or that will be made by someone else. Pseudo-participation is ill-advised, because people almost always are able to tell when they are being manipulated. A far preferable stance, in our view, is for managers to be unapologetic about the fact that TQM neither espouses nor practices the engagement of all organization members in reflective learning about collective purposes.

Overall, TQM is about as learning-oriented as it is possible for a management program to be. Even so, there are many reports in the case literature on TQM of learning failures and of antilearning group norms developing. It may be that such reports come mainly from organizations in which TQM has been implemented incompletely or incompetently. It may be that the previous organizational experiences of members have left a residue of antilearning habits and attitudes so strong that it cannot be penetrated even by all of the pro-learning tools and supports that well-implemented TQM provides. Perhaps enduring systemic forces—such as an organization's top-down orientation, emphasis on control, or focus on success above all else—overwhelms learning-oriented TQM tools and practices. Or it may be that general cultural norms about learning (for example, that it is done in school but not at work) are sometimes too strong for TQM to counter.

All these possibilities, and others, merit consideration as explanations for those instances in which a learning orientation does not blossom even in TQM organizations. Yet we should not be too hard on TQM practitioners for not fully succeeding in realizing this part of the movement's philosophy. As Argyris (1993), Senge (1990), and others have noted, it is extremely difficult to create and sustain a thorough-going learning orientation in purposive enterprises. Clearly, there is both opportunity and need for research on how to create social systems in which learning and production go hand in hand (Sitkin, Sutcliffe, and Schroeder, 1994). Organizations in which TQM has been well and fully implemented provide a high platform for continuing the process of learning about learning in social systems.

Change

Under TQM, organization members are expected to improve work processes continuously so that their customers are served as well as possible. This can result in performance strategies uniquely well tailored to environmental constraints

and resources, especially those emanating from customers. It is one of the great strengths of the TQM approach. But what happens when the environment changes? Ideally, organizational units would be so closely in touch with the environment—including process innovations introduced by other organizations as well as changes in customers' needs—that they could adapt their performance strategies with little lag and, perhaps, even stay a step or two ahead of customers' wishes. This level of responsiveness, however, is unusual even in TQM organizations where continuous improvement is a core value and organizational policies and practices are specifically tailored to foster responsiveness to environmental changes.

The difficulties encountered by TQM units in responding to exogenous changes are of two types—one rooted in how people process information, the other in their tendency to develop emotional commitment to locally invented ways of operating.

Information processing. Once an individual, a group, or an organization develops a strategy for handling a certain kind of problem, that strategy is likely to become a standard routine, what we call, at the individual level, a habit (March and Simon, 1958; Gersick and Hackman, 1990; Louis and Sutton, 1991). Routines contribute enormously to the efficiency of daily life. Over time, however, they can become so integral to social systems that members continue to rely on them even when the situation changes markedly. In Langer's (1989) terms, individuals and groups tend to go about their work mindlessly, which can result in significant performance decrements when environmental opportunities and constraints change.

Moreover, when members do discover that things are not working as well as they did formerly, they commonly respond by executing their existing behavioral routines more vigorously than ever, rather than using the early signs of trouble as an occasion for reflection on the adequacy of those routines. The individual-level dynamics of this phenomenon are well known. A state of arousal increases the likelihood that one's dominant response (the one highest in the hierarchy of possible responses) will be exhibited with minimal cognitive mediation. Similar dynamics are observed at the group and organizational levels of analysis: Under arousing conditions (of which learning that standard routines are no longer generating hoped-for results is an instance), performers are as likely to exhibit those routines with even greater vigor as they are to inspect, reflect upon, and reconsider them (Staw, Sandelands, and Dutton, 1981; Ocasio, 1995).

Emotional commitment. The second impediment to responsiveness is rooted more in emotionality than in efficiency. When a work unit has invented its own performance strategy—which certainly is more characteristic of TQM organizations than of those with traditional management hierarchies—members can become quite reluctant to change it. The research literature is filled with cases in which a group or organization had ample data showing that strategic change was called for, but performers

either ignored those data, dismissed them as irrelevant, or engaged in manifestly irrational behaviors to avoid having to deal with them (Janis, 1982; Argyris, 1993). Only when the situation gets so bad that it threatens the unit's very survival (at which time it may be too late to recover) can one count on a social system taking seriously the need to make significant change (Miller and Friesen, 1980; Jensen, 1993).

Both processes sketched above contribute to the difficulties work units have in altering their performance strategies in response to environmental change. Moreover, the likelihood of responsive change may be lessened under precisely those circumstances in which change is needed most (Miller, 1993). There are exceptions, of course. Some groups and organizations do manage to stay even with, or even ahead of, changes in their environments. Some even welcome signs of trouble and use them as occasions for innovation rather than as a time to dig in their heels and do more of what has always been done. Still, the tendency to hold onto familiar, locally invented performance strategies appears to be nearly as pervasive as it is pernicious.

TQM organizations should be more likely than most to transcend the limitations of human information processing and emotionality in responding to environmental change. The learning orientation of TQM organizations, their commitment to management by fact, and their close links with customers should increase the likelihood that members will attend to unsettling data before they become too threatening to deal with. Moreover, TQM units are especially likely to encounter the conditions that Gersick and Hackman (1990) have identified as those that prompt inspection and reconsideration of habitual routines, such as having to deal with novelty, receiving an external intervention, or coming to terms with structural alterations of the performing unit. Even so, the challenge of altering performance strategies—especially those that have been locally invented—is a significant one for TQM organizations. Precisely because of their orientation to learning, data, and customers, such organizations should be a fruitful site for research that identifies and explores alternative ways of meeting that challenge.

PROSPECTS FOR TQM

Although dinner may seem assured to a snake who notices a rabbit strolling nearby, there is no guarantee of nourishment. If the rabbit is extraordinarily large, it may get stuck in the snake's throat; snakes have, on occasion, died when their eyes were too large for their throat. And if the rabbit is just a baby, consumption and digestion are easy, but there is little real nourishment. Eating a baby rabbit is hardly worth the trouble it takes to catch it.

Organizational change programs, including TQM, can go wrong for the same two reasons that snakes sometimes have trouble with their dinners. One, the changes may be so ambitious and involve such fundamental alterations of the social system that, for all their potential merit, the organization cannot accommodate to them. Espoused changes may appear to fail when in fact they never got

implemented. Two, the changes may be more window-dressing than real, as in a program that exhorts people to alter their behavior but that requires managers to do little other than issue the exhortation. In this case, implementation is easy, but the old organizational structures and systems remain untouched and continue to generate the same behavioral dynamics as before.

When implemented fully and well, TQM can thread its way between these two extremes (Reger et al., 1994). TQM changes are real rather than ephemeral, and they are generally consistent with research evidence about the factors that promote performance effectiveness. When TQM does tilt toward one or the other extreme, it invariably is toward interventions that are too modest. The reason is that TQM, by philosophy and design, skirts four features of work systems that are fundamental to organizational behavior and performance: (1) how front-line work is structured, (2) how gains are allocated, (3) how opportunities for learning are apportioned, and (4) how authority is distributed. For TQM, the aspiration is to implement changes that are substantial enough to make a real difference without altering the core premises of the enterprise—in effect, to achieve fundamental change without changing the fundamentals.[5] This aspiration presents practitioners with a series of troublesome dilemmas, the resolution of which often results in changes that are less risky, but also far less impactful, than would have been the case had the fundamentals been addressed frontally.

Design of work. Cross-functional quality teams and task forces are among the most common features of TQM organizations, and the work of such teams is usually quite well designed motivationally. By contrast, much less attention is given to the design of the work of front-line producers. Aside from the opportunity some employees have to work on quality teams or to perform support activities of the type formerly done by organization staff, the motivational structure of front-line jobs is unaltered in many, perhaps most, TQM implementations:

Dilemma 1: Motivating front-line organization members toward continuous improvement and the highest quality of output—but doing so without fundamentally changing the motivational structure of their work.

Allocation of gains. TQM philosophy is explicit that extrinsic rewards, including pay, should not be contingent on measured individual or team performance. This stance leaves some powerful motivational cards on the table. It is, moreover, unstable over the longer term. When workers perceive that they are contributing more to the organization than they did previously, their initial response may be pride and pleasure. That may suffice for a while. Eventually, however, members of profit-making firms will realize that *somebody* is making more money as a result of their greater contributions, and it is not them. At that point, they may begin to withdraw their commitment to the enterprise, and signs of a motivational backlash may even be seen:

Dilemma 2: Creating the kind of alignment with, and commitment to, organizational purposes that can come from sharing in collective

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Grant, Shani, and Krishnan (1994) provide an alternative view: that TQM is a revolutionary philosophy that does require fundamental changes in the very premises of an organization.

gains—but doing so without actually altering how organizational rewards are apportioned.

Opportunities for learning. The TQM aspiration of continuous improvement in meeting customer requirements is supported by a thorough-going learning orientation, including substantial investments in training and the widespread use of statistical and interpersonal techniques designed to promote individual and team learning. This orientation extends even beyond the organization's boundaries, as is seen in programs to teach quality practices to suppliers and in benchmarking visits to capture the best of other organizations' ideas and innovations.

Although front-line employees are encouraged to find ever-better ways to accomplish their assigned tasks, they are not invited to reflect on the purposes their work serves. Moreover, once something has been discovered that improves work practices—whether from the deliberations of a quality team, from benchmarking, or from a front-line work unit—then that improvement is likely to be identified as a best practice that everyone is expected to follow. Learning is indeed a core value in TQM organizations, but there are nontrivial constraints on what is to be learned about, who is to do the learning, and when learning should be set aside in favor of performing:

Dilemma 3: Achieving continuous learning by front-line organization members—while also requiring them to adhere closely to standardized best practices that have been developed by quality teams or imported from other organizations.

Distribution of authority. Consistent with Deming's position that it is *management's* job to create the systems within which employees do their work, the distribution of authority in organizations typically does not change much when TQM is implemented. Senior managers make the initial decision to adopt TQM and then manage its diffusion throughout the organization. They legitimize in advance the creation of all cross-functional quality teams and task forces. And they decide which of the ideas generated by those teams will actually be adopted. Keeping authority centralized reduces the risk that chaos will develop as various teams and task forces simultaneously come up with potentially incompatible work processes. And a clear, top-down chain of command surely makes it easier to secure the cooperation of middle managers when TQM itself is implemented, since they need not worry about their own authority being eroded.

The TQM founders also note, however, that those who will have to implement solutions to problems should be actively involved in analyzing and solving those problems. This principle is most evident in the widespread use of cross-functional teams to generate improved work methods, but sometimes it also is seen in widespread consultations with front-line workers about other organizational practices. As shown by Graham (1993), there is in many TQM organizations a chasm between front-line workers' involvement and accountability, on the one hand, and their actual decision-making authority, on the other:

Dilemma 4: Empowering organization members to be full participants in achieving collective purposes—but doing so without threatening top-down managerial control of the enterprise.

If radical changes in the design of work, the allocation of rewards, the structure of learning opportunities, and the distribution of authority were included as part of the basic TQM implementation package, then the chances of successful installation certainly would diminish. There are powerful people in virtually every organization who have strong personal or political stakes in keeping those four fundamentals intact. Moreover, radical changes can challenge employees' beliefs about organizational premises to such an extent that they may be unable to comprehend and accommodate to them (Reger et al., 1994). Prospects for the long-term success of those programs that *did* get implemented, however, might well be higher.

We suspect that the TQM authorities to whom we have been referring throughout this commentary would disagree that more radical changes would bring greater success. The strength of TQM, they might counter, is precisely that its prescriptions, as demanding and substantial as they are, are not too radical to be installed in everyday organizations. And when they are installed, the chances are excellent that significant improvements will develop in the organization's viability as a work system, in its contributions to the broader community, and in the learning and well-being of individual members.

These are significant outcomes, and we concur that they are well worth the expenditure of time and energy to achieve. It is with regret, therefore, that we conclude our commentary with a relatively gloomy projection about the future of total quality management. TQM, in our view, is far more likely gradually to lose the prominence and popularity it now enjoys than it is to revolutionize organizational practice. We see three worrisome trends, none of which, ironically, have anything to do with the quality of the ideas that were set forth by the TQM founders.

Trend one: Rhetoric is winning out over substance. The rhetoric of TQM is engaging, attractive, and consistent with both the managerial *Zeitgeist* in the United States and this country's preference for organizational solutions that smack of rationality. These features surely have aided TQM implementations and helped fuel its rapid contagion across organizations (March, 1981: 565). The problem is that what many organizations are actually implementing is a pale or highly distorted version of what Deming, Ishikawa, and Juran laid out. This problem is so serious that it shaped the organization of this commentary: Had we attempted to organize our thoughts exclusively around contemporary TQM practice rather than use the philosophy and prescriptions of the TQM founders as our point of departure, it would have been impossible to write. In too many TQM programs, moreover, it is the difficult-to-implement portions of the program that are being finessed or ignored and the rhetoric that is being retained. Science is fading, the slogans are staying, and the implications are worrisome.

Trend two: An astonishing number of other interventions, some related to TQM and some not, are increasingly being herded under the TQM banner. In one or another book or article, virtually every intervention ever tried by an

organization development consultant has been specified as something that is supposed to be done as part of TQM. The most frequently chosen add-on interventions (such as group-level performance-contingent rewards, work redesign, and empowerment programs) may reflect, in part, practitioners' struggles to deal with the four dilemmas discussed above. That the sharp and defining edges of a management program become blurred as more and more initiatives are launched in its name is, if not inevitable, at least a sign of that program's popularity and acceptance. But by destroying the distinctiveness of orthodox TQM, the entire approach is put at risk. For TQM, this is occurring at the hands of the very people who view themselves as the movement's best friends and most committed advocates.

Trend three: Research is not providing the corrective function for TQM that it could and should. There is plenty of room for additional learning, driven by research, on how TQM theory and practice could be improved. As we pointed out earlier, the conduct of such research is entirely consistent with the continuous-improvement idea prominent in TQM philosophy. But we researchers have not been carrying our share of the load: Too much of the TQM literature consists of anecdotal case reports or simplistic before-and-after evaluation studies that may be of more use politically in promoting TQM (or, for skeptics, in debunking it) than they are in building knowledge about TQM processes and practices.

Total quality management as articulated by Deming, Ishikawa, and Juran is a set of powerful interventions wrapped in a highly attractive package. When implemented well, TQM can help an organization improve itself and, in the process, better serve its community and its own members. If TQM is to prosper, however, rhetorical excesses will have to be kept in better check than they are at present, and researchers will have to do a better job of illuminating the mechanisms through which TQM practices realize their effects. For only if the continuous improvement idea comes to apply to TQM itself will this provocative philosophy have a chance of sustaining itself over time.

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