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The Quality Movement Meets Performance Technology

by Martin Wikoff

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The Quality Movement

A major movement has strongly influenced business and industry in recent years. Various names have been coined to label this movement including total quality management (TOM) and world class manufacturing, although the movement applies to more than the manufacturing sector. This *quality movement* was stimulated in large part from the trauma experienced by Western industries to increased competition from the Far East in the late 1970s and the '80s.

The quality movement influenced many facets of the business enterprise from manufacturing processes to marketing. Perhaps the way organizations utilize and manage people is the most heralded influence of the movement. The seeds of the people management approaches that characterize the quality movement seem to be in the early quality of work life (QWL) and job enrichment approaches of the 1970s. What has emerged at this juncture appears to be an amalgam of QWL, quality circles, employee involvement, and reward systems characterized by some form of profit-sharing.

There also seems to be considerable convergence between the human resource strategies of the quality movement and fields known variously as applied behavioral analysis, performance engineering, performance management, organizational behavior management, and performance technology. The purpose of this article is to provide some insight on the utilization of human resources from the perspective of performance technology to promote the adoption of an integrated and comprehensive approach to human performance.

Roots of Performance Technology

Performance technology has its roots in a branch of psychology primarily concerned with learning and performance. The approach emphasizes the systematic analysis of the factors that influence behavior and performance. What has emerged from this scientific branch of psychology is a performance technology that has been widely used in a multitude of settings, especially business and industry, to measurably improve human performance and job satisfaction.

Performance technology and the quality movement share many common procedures and strategies. Yet, there seems to be no link or amalgamation between the two movements. In fact, it appears the quality movement has yet to discover performance technology. This situation has impeded progress, resulted in duplication of effort, and in some cases has produced dysfunctional results for organizations. It has also delayed the formation of an integrated, consistent, and scientific framework to address issues of human performance. This is in contrast to the systematic and scientific approaches to other issues like workflow analysis and process design than characterizes the quality movement.

Performance technology is not new. Proponents have included one of history's most influential psycholo-

gists, B.F. Skinner. Other individuals,—like Bob Mager, Geary Rummler, Dale and Karen Brethower, and Tom Gilbert—have been promoting the approach and successfully applying the techniques for over 20 years. Several journals and magazines are dedicated to documenting applications of the technology in business and industry, some for nearly 25 years (*Performance and Instruction, Journal of Organizational Behavior Management, Journal of Applied Behavior Analysis, Performance Management Magazine*).

The ABC Model of Behavior and Performance

One of the most common ways to describe the model of performance that is the basis of performance technology is with the ABC model shown in figure 1. According to this framework, behavior is a function of events that precede and follow it; the antecedents (A) and consequences (C).

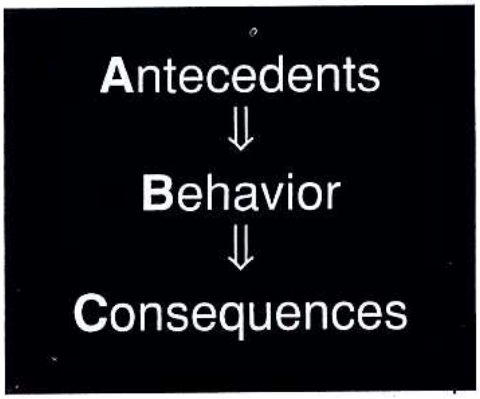

Figure 1. The ABC Model of Performance

Antecedents serve as cues of activators which set the stage for performance. Antecedents include such things as goals and objectives, role models, instructions, job aids, and performance data. Consequences refer to the reinforcers and punishers that encourage or discourage performance. The interrelationships among antecedents, performance, and consequences are called behavioral contingencies.

This model may seem simple, and indeed has been superficially treated by a variety of authors like *One Minute Manager* author, Ken Blanchard (Blanchard, 1981). However, although this model seems simple on the surface, as Skinner noted nearly 40 years ago, the interrelationships between antecedents, performance, and consequences are anything but simple. Fortunately, much has been learned about how contingencies should be arranged to have the greatest positive impact on learning and performance. It is this body of knowledge that is the basis for performance technology.

The Basic Methodology of Performance Technology

The basic methodology for the systematic application of the technology generally consists of seven procedures. Many of those procedures are similar or identical to techniques that characterize or are advocated by the quality movement.

Pinpointing. The first step to the performance technology is to specify the performance or behavior change that is desired. This step is called *pinpointing* and involves identifying performance targets that are most relevant to achieving desired organizational outcomes, goals, and/or missions. A typical way to depict the relationship between human performance and organizational success has been with a pyramid model such as the one presented by Luthans (1975).

Figure 2. The Performance Pyramid

That model of performance in organizations was further elaborated by Crowell (1981) and Wikoff (1984) as shown in figure 2. The top of the pyramid represents global measures of organizational performance, typically represented by measures like market share, profitability, and return-on-investment (ROI). The middle of the pyramid represents the accomplishments by various subgroups like plants, divisions, or departments that are needed in order to achieve desired organizational goals. These typically have included accomplishments in areas of quality, customer service, cost, and efficiency. At the base of the pyramid is individual performance. It is the contribution and efforts of individuals that, collectively, product accomplishments and ultimately organizational results.

Interestingly, similar triangle conceptualizations have been presented by Juran (1988) and Cross and Lynch (1989) as models for the specification of quality targets and performance measures for manufacturing and service industries.

Another concept that has been proven useful to the process of pinpointing is the notion of the performance system. Over 20 years ago, Brethower (1972) recommended a systems approach to looking at micro- and macro-work processes, performance measurement, and feedback systems in his seminal work on performance technology. This view has been further elaborated by a number of other performance technologists (c.f. Morasky, 1982; Rummler & Brache, 1990).

Performance system conceptualizations are another point of convergence and commonality between the quality movement and performance technology. The quality movement has widely adopted the systems model as a tool to design and improve work processes and depict supplier inputs and outputs to internal and external customers (see figure 3).

Performance Measurement. A key step in performance technology is a measurement of performance. Indeed, all subsequent steps are impossible or ineffective in the absence of measurement. The four measurement categories recommended by Gilbert (1978) and other performance technologists are quality, quantity, timeliness, and cost (c.f. Brinkerhoff and Dressler, 1990).

Measurement is another point of commonality between performance technology and the quality movement. Measures often referred to in the quality movement are some variation of quality, delivery, cost, and process time (c.f. Cross and Lynch, 1990; Maskell, 1991). These measures obviously overlap with those recommended by Gilbert (1978) and other performance technologists.

In addition, performance technology and the quality technology and the quality movement are characterized by an emphasis upon non-financial measures of performance. That is, measures that provide information about performance or processes that are primarily under the performer's control are recommended rather than relying on global financial ratios or indices as a basis for tracking performance. Like Deming, who has made the point that people should not be held responsible for problems attributable to processes out of their control, we have made the point that there are factors outside the control of performers that will influence whether effort will lead to desired accomplishments. These uncontrollable factors not only include the work process, but also include competition, the economy, other performers, and a multitude of other influences.

Feedback. One of the fundamental elements of performance technology is the widespread application of performance feedback, typically in the form of graphs and charts. Indeed, applied research dating back to the Hawthorne Studies (Rothlesberg and Dickson, 1932) has repeatedly established that simply providing individuals with feedback about their performance has a facilitating and positive effect on performance.

The use of graphs is a technique that is encouraged by the quality movement. However, graphing often only centers around statistical process control (SPC) data. Fortunately, the use of graphs to provide feedback about other aspects of performance such as delivery, waste, and process time is expanding (c.f. Cross and Lynch, Shoenberger, 1990).

Goal-Setting. Goal-setting is another key performance technology procedure. Indeed, goal-setting is one of the most well documented performance change strategies. Some theorists have attempted to use goal-setting to explain motivation (c.f. Locke and Latham, 1984).

Goal-setting is widely advocated in the quality movement. Customer-focused goals are encouraged at the organizational level, often in the form of a mission; at the group level as team goals and objectives; and at the individual level for such things as self-development. In general, goal-setting is the basis for the concept of continuous improvement. Ishikawa (1985), a Japanese quality expert notes that goals and standards are the basis for team activity and delegation.

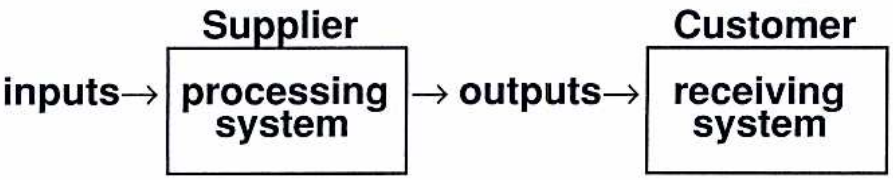

Figure 3. The Systems View of Performance

One point of confusion that arises occasionally is the point by Deming that quotas and certain other types of goals or standards can be dysfunctional. Accordingly, Deming is critical of management by objectives and similar systems. Indeed, certain goals can be dysfunctional precisely because they are so effective at motivating performance. For instance, if goals are set for quantity only, quality may suffer and vice versa. If goals are set for performance that is out of the control of the performer, frustration and dysfunctional behavior can occur.

Properly designed measures and properly conducted goal-setting are effective techniques for achieving high levels of performance and promoting continuous improvement. Goal-setting is a major point of convergence between the quality movement and performance technology.

Reinforcement. The introduction of positive reinforcement procedures and systems is one of the key steps in the application of performance technology. Technically, positive reinforcement refers to any consequence that strengthens the performance it follows. Behavioral research has revealed some very important aspects of reinforcement that deserve discussion.

Reinforcement works best when it is immediate. It is important, therefore, to ensure that reinforcement occurs as soon as possible following desired performance. If there are inherent delays because of the nature of the performance, such as a long sales cycle or completion of a long project, reinforcement for progress toward the terminal goal (sale or completed project) should be arranged.

While most performance technologists would agree with the concept of linking pay to desired performance, certain pay-for-performance schemes that characterize the quality movement are less than effective because there is a long delay between perfor-

mance and pay. Most gain-sharing and profit-sharing programs have long delays. Although these programs may be equitable by sharing organizational gains, and may enhance the retention of valued employees, it is not unexpected that empirical support for the effectiveness of these plans is scant (Campbell and Campbell, 1988).

Supervisors, team leaders, and peers are in the best position to provide immediate reinforcement. Indeed, there are numerous demonstrations of the positive effect of social reinforcement upon performance. Also, the job itself, if properly designed, can be intrinsically (and immediately) reinforcing.

Another important aspect of reinforcement is the schedule that it is delivered. Reinforcement can be delivered after every performance or intermittently according to a schedule based upon frequency or time. Much has been studied about reinforcement schedules; in 1957, B.F. Skinner and C.B. Ferster wrote a 700+ page book about the topic. While a review of reinforcement schedules is beyond the scope of this article, it will be noted that intermittent, unpredictable reinforcement is more effective than continuous reinforcement for encouraging and maintaining high levels of performance.

Knowledge of reinforcement schedule effects has direct implications for the design of optimal recognition programs, incentive systems, benefit plans, and pay in organizations. Yet, it appears that the body of knowledge relating to reinforcement and reward systems is often overshadowed by much armchair theorizing.

Certainly, the quality movement addresses the need for recognition and reward. However, the movement would benefit from a more systematic analysis of various recognition schemes, particularly in light of the considerable research base available to guide the design. Research and experience have also revealed that social reinforcement does not come naturally and often must by developed. Like training in SPC or problem-solving, training in giving positive reinforcement in a sincere and meaningful manner must be provided throughout the organization.

Evaluation. A common emphasis in both the quality movement and performance technology is evaluation. Performance improvement interventions are characterized by an experimental approach that involves ongoing measurement of results. If intended results do not occur, then the intervention procedures are reevaluated and modifications are made. In this way, performance technology shares the goal of process and continuous improvement with the quality movement.

Some Other Issues

Two other issues that have been the focus of much behavioral science research deserve mention—teams and self-direction.

Teamwork. The assumption behind teams is that people working together will be more productive and make better decisions (two heads are better than one). However, we also recognize that social influence is not always positive (too many cooks spoil the broth). Negative group effects are not new phenomena. In one of the earliest studies of human performance in early 1930s, the Hawthorne studies, the negative influence of peer pressure was documented. Individuals that performed beyond the group-established norms were subject to group rebuke, called "binging" (Rothlesberger & Dickson, 1939).

The potentially negative impact of groups continues to be documented in recent reviews (c.f. Druckman & Bjork, 1991). In many cases, the sum of team performance is less than would be expected by the combined contribution of the individual members. Some studies have shown that as the number of members of the team increases, individual contribution decreases. This suboptimization effect has been observed across a variety of tasks and work environments. This common effect has been called "social loafing."

Moreover, the potentially negative influences of teams or groups upon problem-solving and decision-making has been documented for many years. For instance, a phenomena called *risky shift* in which groups make more risky decisions than individuals was documented nearly 20 years ago (Janus, 1972). Group dynamics can also result in suboptimal problem-solving (c.f. Druckman & Bjork, 1991).

Thus, while a team seems to offer greater potential than individuals, teams are also fraught with interpersonal dynamics that can strongly influence performance in both positive and negative ways. However, the conventional wisdom that pervades the quality movement is that teams are good. Yet, empirical support for the relationship between teams and performance improvement is qualified. The data suggest that teams may result in improved performance, but the effects will be influenced by factors including task characteristics, an organization's culture, leadership, training, personnel selection, and reward systems (Lawler, 1986).

Empowerment and Self-Direction. The topics of self-management, self-control, and self-direction have been central to performance technology for over two decades. The findings from self-management research has formed the basis for numerous clinical applications of the technology for problems ranging from weight control to phobias. Specific techniques and methodologies for self-management have been detailed (c.f. Watson and Tharp, 1989). These methodologies

have also been recommended as strategies for business and industry as early as 1972 by Brethower.

Notions of self-direction and empowerment of individuals and work groups is also promoted in the quality movement. Greater progress in designing and implementing self-direction strategies will occur if the considerable body of knowledge and research that already exists regarding these strategies is not overlooked.

Summary

The quality movement is multi-faceted. It consists of more than a set of human resource management practices. The movement also has been influenced by many disciplines such as industrial engineering, accounting, marketing, as well as the behavioral sciences. In spite of the potential problems posed by integrating such diverse orientations, great progress is being made in improving organizational effectiveness and viability.

Performance technology has been around for many years. Although many of the techniques of the quality movement resemble performance technology procedures, there still needs to be a greater integration and association between the movements. Performance technology provides a body of empirical knowledge that will facilitate the implementation of effective human resource practices. An awareness and utilization of this database can only enhance the quality movement.

References

Blanchard, K. & Johnson, S. (1982). *The one-minute manager.* New York: William Morrow and Company.

Brethower, D.N. (1972). *Behavior analysis in business and industry: A total performance system.* Kalamazoo, MI: Behaviordelia.

Brinkerhoff, R.O. & Dressler, D.E. (1990). *Productivity measurement: A guide for managers and evaluators.* Newbury Park, CA: Sage.

Campbell, J.P. & Campbell, R.J. and Associates. (1988). *Productivity in organizations.* San Francisco: Jossey-Bass.

Cross, K.F. & Lynch, R.L. (1989). Accounting for competitive performance. *Journal of Cost Management, 3,* 20-28.

Crowell, C.R. & Anderson, D.C. (1983). Systematic behavior management: General program considerations. *Journal of Organizational Behavior Management, 4,* 129-163.

Druckman, D. & Bjork, R.A. (eds.) (1991). *In the mind's eye: Enhancing human performance.* Washington, D.C.: National Academy Press.

Gilbert, T. (1978). *Human competence.* New York: McGraw-Hill.

Ishikawa, K. (1985). *What is total quality control: The Japanese way.* Englewood Cliffs, NJ: Prentice-Hall.

Janus, I.L. (1972). *Victims of groupthink.* Boston: Houghton Mifflin.

Juran, J.M. (1988). *Juran on planning for quality.* New York: The Free Press.

Lawler, E.E. (1986). *High involvement management.* San Francisco: Jossey-Bass.

Locke, E.A. & Latham, G.P. (1984). *Goal setting: A motivational technique that works.* Englewood Cliffs, NJ: Prentice-Hall.

Maskell, B.H. (1991). *Performance measurement for world class manufacturing.* Cambridge, MA: Productivity Press.

Merwin, G.A., Thomason, J.A., & Sanford, E.E. (1989). A methodology and content review of organizational behavior management in the private sector: 1978-1986. *Journal of Organizational Behavior Management, 10,* 39-57.

Morasky, R.L. (1982). *Behavioral systems.* New York: Praeger.

Roethlisberger, F.J. & Dickson, W.J. (1939). *Management and the worker.* Cambridge: Harvard.

Rummler, G.A. & Brache, A.P. (1990). *Improving performance: How to manage the white space on the organizational chart.* San Francisco: Jossey-Bass.

Schonberger, R.J. (1990). *Building a chain of customers.* New York: The Free Press.

Skinner, B.F. (1969). *Contingencies of reinforcement: A theoretical analysis.* Englewood Cliffs, NJ: Prentice-Hall.

Skinner, B.F. & Ferster, C.B. (1957). *Schedules of reinforcement.* New York: Appleton-Century-Crofts.

Watson, D.L. & Tharp, R.G. (1989) *Self-directed behavior: Self-modification for personal adjustment.* Belmont, CA: Brooks/Cole.

Wikoff, M.B. (1984). *Managing performance.* Sausalito, CA: Persona.