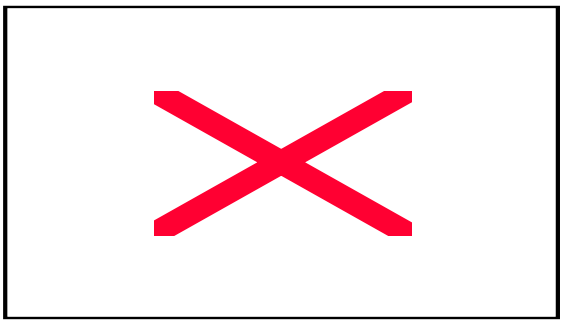
Ohio Quality and Productivity Forum

A QUALITY LEXICON



Five monographs were published by The Ohio Quality and Productivity Forum between 1988 and 1994. These were based on extensive discussions by the Ohio Quality and Productivity Forum (OQPF) Roundtable. Three were part of a planned series on the Fourteen Points for Management (Points 4 and 7 and 1). In the midst of the timeframe in which the Roundtable was discussing the 14 Points, Dr. Deming began to talk about his System of Profound Knowledge. After careful consideration, it was decided not to publish any of the remaining 11 points, and to devote our time and energy to understanding and applying the System of Profound Knowledge, from which the 14 points seemed to be derived. These monographs represent our thinking at one stage along the path we were taking in fulfilling our Roundtable mission and are now offered as a contribution to the existing body of knowledge rather than a definitive statement on the subject. Our experience has been that as our understanding increases, we would expect to add to or modify some of what is presented here. The writing and editing was done through the collaboration of Dr. Gipsie Ranney, now consulting with General Motors and Ben Carlson, now retired from Vernay Laboratories. Both have served as members of the Board of Directors of OQPF since 1988.

The OQPF Roundtable was a coalition of six company teams from southwestern Ohio which met bimonthly, from 1986 to 1990 and several times a year from 1990 to 1992. Under the guidance of Dr. Gipsie Ranney, these two-day work sessions had as their mission, the development and expansion of the knowledge needed by the company teams to implement and sustain the organizational changes required to continuously improve quality and competitive ability in their respective companies. The roster of the participating companies as well as the individual team members changed over the years, so it is impossible to identify who contributed to the thinking summarized in these monographs. The participating members acknowledge with appreciation, however, the contribution of Dr. Gipsie Ranney to our understanding of the Deming principles of management and to this publication.

The Ohio Quality and Productivity Forum (OQPF) was founded in early 1985 by volunteers and continues as a proactive organization dedicated to "Promote and further the concept of quality as the guiding principle in management, exemplified by the teachings of Dr. W. Edwards Deming." In addition to the Roundtable, OQPF has sponsored 14 Annual Deming Conferences. For the first twelve of its fifteen years of existence, OQPF also provided numerous quality seminars, monthly meetings for its membership to hear and discuss quality-related issues; actively promoted the quality message to business, education and government organizations and served as a clearing-house for information about quality management. An OQPF Healthcare Roundtable ran

successfully from 1995 to 1999. Financial limitations caused curtailment of all but the Annual Deming Conference.

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Abilene Paradox - Based on a story of a group of people that ended up agreeing to go to Abilene, when in reality none of them wanted to go. A book by the same name [1974] describes the phenomenon in teams or task groups that causes people to say and do things in order to gain or keep approval of others in the group. This, and the tendency to focus on differences rather than points of agreement may cause a group to fail to recognize they are each after the same goals. The need to be accepted as part of the group may result in a "collective self-deception that leads to self-destructive decisions within organizations", says the author Jerry Harvey.

accountability - Holding an individual or group subject to blame or penalty for the results of specified tasks, functions or results. The risk can be that the individual or group, while having responsibility to make a *contribution* to the task or result, cannot control all of the factors affecting the outcome and may be blamed (or credited) undeservedly for effects of other factors.

Accuracy - The degree of agreement of the results of a measurement process with an established standard (see "Precision"). Assumes the measurement process is in statistical control.

affinity diagram - When a group or team takes a number of ideas or items and groups them into categories according to some rationale, the result is called an Affinity Diagram. Construction of an Affinity Diagram can help the group reduce many pieces of information to an essential few in order to take the next step, or in some cases, may allow the group to see information in a new light.

algorithm - A procedure for carrying out a task.

attributes data - Data arising by classifying the individual outcomes of a process into two or more categories -or by counting the number of occurrences per unit of time, area or volume.

Baldrige Award - A national award established in 1988 [named for Malcolm Baldrige, former Secretary of Commerce] for the purpose of recognizing and promoting outstanding corporate [for-profit companies] efforts to improve quality and productivity. The Baldrige Award Guidelines are sometimes used as a checklist or framework for developing and implementing a plan for Total Quality or, for assessing organizational progress toward Total Quality. Some concerns and criticisms of the award include: a) it creates winners and losers by being limited to one company in each category, b) apparent emphasis on results over methods, c) insistence on "benchmarking" without accompanying instruction and cautionary information on the inherent risks in that practice.

Benchmarking - Identifying an organization that appears to do something well and copying or adapting its methods. Studying how well competitors are meeting customer needs or what other organizations appear to do well can be beneficial, providing management is aware that transferring a method from one set of circumstances to another will not necessarily produce the same results. It is important to have a theory as to why a method or system works and the conditions needed for its success.

Brainstorming - A method for getting ideas from a group of people in which ideas are offered and recorded without any judgment of the quality of the idea in order to stimulate one idea with another. After the group has run out of ideas, then some method such as "multi-voting" or "nominal group technique" is used to organize and prioritize the ideas collected.

by what method? - Goals set for any organization or system without an explicit method for achieving them are evidence of failure to understand the System of Profound Knowledge. "If you have a stable system, then there is no use to specify a goal. You will get whatever the system will deliver. A goal beyond the capability of the system cannot be reached. If you have not a stable system, then there is again no point in setting a goal. There is no way to know what the system will produce: it has no [predictable] capability." (Deming: Chapter 2, Out of the Crisis) It is management's job to change and improve the system. Others would say that if the system is not capable of achieving the goal, the goal might be met temporarily, but only with unexpected damage in other dimensions of organizational performance, either in the short term or the long term.

Cartesian Management - Seeing events or causal factors as separate and independent and managing accordingly. System management, on the other hand, acknowledges the complex interrelationships among the various factors and the dynamics of cause and effect over time. This latter view is part of what Deming refers to when he speaks of Appreciation for a System.

CEDAC - Cause and Effect Diagram with the Addition of Cards. Developed by Ryuji Fukuda, author of Managerial Engineering, this variation of the "fishbone" diagram is modified as needed simply by moving the cards (or "Post-its") containing the information.

closure - To bring to a completion, as in a meeting, when a topic or task is finished and the group is ready to move on or to end the meeting.

collaborative - An agreement or a relationship in which two or more parties work together (co-labor) on a task of mutual interest.

Common cause - A source of variation that is acting on or common to all outcomes of a process. It is constantly present but its influence may vary over time.

compensation - an organization's formal system of wages or salary and other benefits such as insurance, holidays, retirement, vacation, etc. [see also Reward System].

consensus - Often used to describe a decision-making process in which formal rules or voting are not used. It usually means that everyone who wishes to, has spoken and has been heard, and while the "consensus decision" may not be everyone's first choice, they can agree to it and can support it.

control - Three commonly-used versions of this word: (supervision)- to influence or manipulate an employee's behavior through the threat of consequences or the promise of reward, whether these are explicit or implied; (engineering)- to influence or manipulate a process through feedback or feedforward; (statistical)- a description of *behavior* of the variation in the output of a process.

corporate culture - Popularized in the early 1980's by a book of the same title, this term means the values, the assumptions, the organization's "legends" and heroes, the rituals and folklore that exist in most organizations and get passed along from one person to the next by example or word of mouth.

cost of quality - Often cited as "the cost of conformance (achieving quality) plus the cost of non-conformance (waste)." This measure of organizational "effectiveness" fails to take into account the unknown and unknowable costs [e.g., the cost of a dissatisfied customer, or the loss to the individual and to society of poor education] and narrowly defines quality as conformance to specifications.

CQI - Continuous Quality Improvement. A term now used by some organizations, (e.g., hospitals) in place of TQM [see also TQ, TQI, TQM, TQE].

Crawford Slip Method - Developed by E.C.Crawford of USC, this is a form of brainstorming which attempts to draw from a group of people their ideas on a particular subject. Participants write down each idea on a separate piece of paper, writing as many as they can in a limited period of time. All the different ideas are then compiled into one greater list.

critical mass - Dr.Deming uses this term to refer to that stage when an organization has "recruited" enough of its personnel to a new idea or philosophy that the transformation or change process will now be self-sustaining. Enough people will be behind the idea and will help convert others that the new idea will "take hold".

customer - This term is now used to described those persons who receive and use products and/or services, whether they be customers outside the organization (external customers) or co-workers within the same organization...usually referred to as "internal customers". See also Supplier.

Dead Messenger Society - A movie title parody that prompts recognition that organizations still tend to blame the messenger who happens to bring bad news (or call attention to the organization's problems, errors or flaws).

delayed effects - An acknowledgment of the fact that the effects of actions or decisions will likely not be fully observed in the immediate time frame. Managers need to take this into account when determining or evaluating strategies, or drawing conclusions about the effectiveness of managerial methods or actions. One of the lessons in this is that in organizations in which managers are frequently moved, it is common to incorrectly attribute the carry-over effects of the previous manager or managers to the manager currently in place, leading to erroneous conclusions about both the current and the previous manager's performance and ability.

detection - The process of inspection or looking for defects <u>after</u> the output has been produced. Often compared to "prevention" in which the process is improved to *avoid* making the defect.

Devil's Advocate - Reference to the role assumed by a person who takes the opposing side in a discussion in order to provide a good "test" of the prevailing argument (even though that person may not be personally opposed).

DFM - Design for Manufacturability. Design of product that considers the capability of the manufacturing process and the robustness of the product design to "forgive" (tolerate without affecting quality) process variation.

empirical method - Relying upon or derived from observation or experiment (from Latin and Greek words meaning "experience")

Empowerment - In the strict sense: authorization or permission. In a broader sense: taking action or creating conditions in which another person's full potential may be better realized, e.g., by providing proper tools, good training, clear direction, effective processes and systems and an environment in which the employee can take pride and find joy in his/her work. This broader definition is also referred to as "enablement" or enabling an employee.

enable - see Empowerment

entropy - In common usage: the tendency of systems to *deteriorate* toward a disordered state.

exogenous factors - A term borrowed from biology: derived or developed from external causes. In this case referring to external factors influencing the process or system.

expert system - A term used to identify systems or software that are developed with "expertise" built in. Presented to users as "ready for use". Users should seek information by which to judge the underlying assumptions on which the system is designed, the quality of the data used, and whether all relevant factors were included in the design.

extrinsic motivation - Action taken because of external factors, such as pay, bonus, threatened consequences, coercion, etc.

facilitate - A) In a group meeting, to serve as a supporter of the meeting *process*, helping the group move through its agenda to its desired outcome, but not getting personally involved in the meeting *content*. B) To "facilitate" efforts means to be help make things happen more readily or effectively.

fishbone diagram - Also known as a Cause and Effect Diagram or an Ishikawa Diagram, this is a tool for study of processes. It shows possible causes of an effect on the "bones" branching out from a line representing the process which produces the effect. Its primary limitation is that it has no means for adequately showing the possible *inter*-relationships of the various causes.

fishing expedition - Gathering data without any clear idea of what you are looking for, nor any plan for carefully investigating an issue.

fire-fighting - Spending one's time solving endless daily problems without improving the process or system that created them.

flow chart - Generally, a pictorial display of the sequence of actions taken in a process or in carrying out a task. There are several types of flow charts or flow diagrams: 1) *Top down* - detailed steps are listed under headings describing major actions. 2) *Logic flow* - a symbolic display of the logical sequence of actions and decisions in a process. 3) *Deployment flow* - actions, decisions, meetings, etc., are listed sequentially and in columns according to the individual, group or function responsible for, or participating in, the particular step. 4) *Organization viewed as a system* - a picture of an entire organization's components and its customers and suppliers as a system, beginning with customer research and ending with customers who use the output.

FMEA - Failure Modes Effects Analysis. A quality planning method that involves thinking about *what* might go wrong, what are the *chances* of it going wrong and what might be the *consequences* of it going wrong, leading to a *plan* for prevention and/or containment.

Force Field Analysis - A commonly used method of examining the conditions or forces which tend to drive a particular action or change as well as the forces which tend to prevent that action or change from occurring or succeeding. Once listed, strategies can then be devised to either increase one or more of the Driving Forces or decrease one or more of the Blocking Forces or some combination of both in order to move closer to the desired goal.

Funnel - A term referring to the experiment Deming describes to illustrate the futility and damage of adjusting a stable process *in reaction to each outcome* to try to affect subsequent results as desired. There are four rules of the funnel, three of which amount to tampering and produce more variation than if the process were left alone [see Chapter 11 in Deming's Out of the Crisis]. See "Tampering".

gap analysis - A formal study of the gaps between what exists and what needs, or ought, to exist.

group "memory" - A term used by meeting facilitators to describe any method for recording and displaying the pertinent points, questions, concerns, decisions, actions, plans, etc. of a group of people working together on a common task. This is often done with "flipcharts" which allows each page to be torn off and placed either in sequence or in some other logical order in the room. This gives the whole group quick and easy reference to their work, and provides visible evidence of the group's progress.

Hack -A label for someone who knows just enough to teach the wrong things very well...and enough to be dangerous.

Hoshin - From the Japanese term Hoshin Kanri, meaning Policy Deployment or Management by Policy. Used in this country to refer to a special focus of an organization. One organization refers to Hoshin as a "planning system for implementing Total Quality Management (TQM)"

hypothesis - An assertion subject to verification or proof.

IBNR - Sometimes used to make the point that some information or data may be "interesting, but not relevant". Management needs to know "What are we trying to learn from these data (what is the purpose of these data)?" "What do we know about how the data were obtained?" "What do the data tell us?" "What do the data *not* tell us that we need to know?" [see also *fishing expedition*]

Imagineering - A term used to describe creating a vision of a process or system as it would be in an ideal state.

inspection - A) *functional inspection*: testing products in real or simulated conditions to see whether they work as intended. B) *mass (100%) inspection*: looking at all products to screen out those that may be defective. C) *sampling inspection*: looking at a fraction (a sample) of all the output to determine disposition of that output.

intrinsic motivation - Actions taken because of internal desires or needs for such things as satisfaction with doing a job well, engaging in meaningful work, feeling challenged, achieving a personal goal, growing in skill or gaining knowledge.

JIT - A) "Just-in-Time"...maintaining minimal inventory by arranging with suppliers to deliver the needed items daily or even hourly. Has major inventory cost-saving benefits, but can be accomplished only if high levels of quality are consistently available from suppliers. B) "Just- in-Time Training" - providing training when it is needed and when there is both the opportunity and support for applying that training.

Kaizen - A Japanese term meaning continual improvement involving everyone. Said by some, to be one of the most important concepts in "Japanese Management", it is working *each and every day* to make improvements in the processes of the organization. Such incremental, but continuous improvement may reap great gains over time. It is contrasted with the Western world's pattern of relying on major "breakthrough" to gain needed improvement.

Learning Organization - From Peter Senge's book The Fifth Discipline: The Art and Practice of the Learning Organization. Senge argues, that to excel in an increasingly complex and dynamic world, organizations will have to provide for and encourage individuals and teams in *all* levels of the organization to learn. He envisions "learning organizations...where people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning how to learn together."

logic flow - Often used to refer to the logical sequence of steps in a process.

Management and Planning Tools - [see "New Tools"]

MBA - Management-by-Accident. It is not uncommon for managers to attempt to carry out their perceived responsibilities without any plan or explicit theory for doing so. Such management is often characterized more by reaction to events than by planning for improvement, and by past practice or "instinct" than by an explicit theory.

MBO - Management-by-Objective. A term used to describe a method for achieving organizational objectives. Top management would set broad goals, then each subsequent layer below would identify how it would support and implement those goals, providing greater and greater degrees of detail. Dr. Deming notes that the result of MBO as practiced, will likely be suboptimization of the organization. Because there is a strong tendency to focus on the result (*numbers*), rather than on the systems and processes that produce those numbers, and because the typical reward system emphasizes the importance of those numbers, employees find ways to give

management the *numbers*, often by taking actions that are not in the best interests of the organization.

measurement - A *process* for making an observation or evaluation. Like any process, measurement involves the interaction of people, methods, materials, and equipment in an environment to produce an output - in this case a number or evaluation. To extract meaning from measurements, the measurement process must be *stable* (in statistical control).

micro-management - Focused on details and minutia to the point of failing to see the larger picture.

Milky Way training - A term coined by Dr.Deming to describe worker training worker (and thereby passing errors, personal bias, inconsistencies, etc. from one worker to the next), leading further and further away from the desired target, thereby "going off to the Milky Way".

networking - Developing relationships with other individuals for the purpose of sharing ideas, providing support and unifying efforts.

new philosophy - May have several meanings, but is usually a reference to the relatively recent emphasis on Quality and the management principles that must accompany it. In some cases it is meant as a reference to Deming's theory for management.

New Tools - In addition to the Seven Tools [see Lexicon] there are "newer" TQM tools that are recommended for problem-solving or planning. Some of these are: Affinity Diagram, Force Field Analysis, Cross-Impact Matrix, Ripple-Effect Diagram or Wheel, Planning Tree Diagram, Five "Whys?", the data-collection Checksheet, and the process-conformance Checklist.

Nine Dots - A reference to the puzzle in which nine dots (three rows of three, equally spaced) are to be connected by four straight lines. Solutions require that one go "outside" the imagined box delineated by the perimeter of the dots...a difficult task for most people because they are conditioned by their training and experience. The message intended by this reference is that it is often important to get "outside" our paradigms or our typical way of viewing a situation or a problem.

nominal (value) - The stated "target" value for a characteristic of the outcome of a process...as distinguished from what the process is *delivering*.

nominal group technique - A weighted ranking technique used by teams or small groups to narrow down a list of items.

operational definition - "...puts communicable meaning into a concept." "An operational definition is one that reasonable men can agree on." (Dr. Deming) Example: customer and supplier agree to a defined method by which an item or group of items can be determined to meet requirements or not.

operationalize - To put into practice. In an organization, to become the normal way of doing things.

optimization - Achievement of the aim of a system; when all processes and sub-systems within an organization or system work together to create results that are congruent with the system's or organization's aim [see also sub-optimization].

Orchestra Director - Deming uses the example of an orchestra to make the point that the individual components of any System must work together to accomplish the aim of the system...they cannot each be just doing their individual best. In any organization, it is the top person's job to be the "orchestra director"...to see that all the components work together toward the aim.

paradigm - A model, or theory or conceptual system. In current use: a way of seeing or thinking which often serves to distort or limit our ability to receive or understand new information or learnings. Senge calls such models of thinking and perception "mental models" in his book The Fifth Discipline.

PDSA - Plan, Do, Study, Act, [see Shewhart Cycle] a method for learning and for improvement. Also described as Plan, Try, Observe, Act (on observations). Popularized in Japan as Plan, Do, Check**,** Act, or **PDCA**. Deming prefers Study rather than Check in order to emphasize the importance of *learning* in improvement.

performance - Systemic thinking recognizes that "performance" as observed or measured is the consequence of many factors and is rarely attributable just to the individual or group most closely associated with the process or event [see **x + (xy) = 8** at the end of this Lexicon].

population - A statistical term referring to the collection of measurements of a characteristic that could be made on the items in a frame or list.

Precision - The amount of "scatter" in a collection of measurements. A quantitative measure of precision requires the measurement system be in statistical control. Note that "precision" does not mean that the measurements are at or near a desired Target...only how tightly grouped they are.

prevention - Working to improve the process so it is likely that problems or defects will be avoided and will not have to be addressed by inspection (see detection) and rework.

problem solving - A process for responding to an unacceptable condition in order to make it acceptable. In many cases, this means returning conditions to their *prior* state. In such cases, problem solving can be distinguished from improvement because improvement's aim would be to change the conditions to a more *desirable* state, or to work on preventing or reducing the severity or frequency of the problem.

process - The interaction of materials, machines/tools, methods and people together in an environment to produce a product or result.

product - A result of a completed process. The product may be a physical item or the result of a group process such as a decision or a plan.

profound knowledge - [see System of Profound Knowledge]

protocol - An order or method for performing a particular task or function.

Pygmalion effect - Recognition that our expectations of an individual can significantly influence that individual's behavior and perceived performance. From George Bernard Shaw's play Pygmalion: "The difference between a lady and a flower-girl is not how she behaves, but how she's treated. I shall always be a flower girl to Professor Higgins because he treats me as a flower girl and always will; but I know I can be a lady to you because you always treat me as a lady and always will."

quality - Attempts to define this term are legion. Working definitions have progressed from "meeting customer specifications" to "satisfying the customer", to "meeting and *exceeding* customer expectations", but even this last definition puts an unnecessary boundary on quality, because it is limited to the *customer's* current information and perspective. Deming points out that many innovations have occurred because the *creator* of a product or service was able to develop a new idea that was not even imagined by the customer.

quality circles - Once thought by some to be the "method" by which quality could be achieved, programs like quality circles or employee involvement are now viewed, at best, as lacking a *systems approach* to quality and, at worst, as abdication by top management. Employee involvement is essential to quality and organizational success. However, such efforts must include participation by top management in order to have clear aim, redesign of products and process, innovation, and plans and actions that support the organization's strategies.

range - A statistic that reflects the amount of variation in a collection of results.

Red Bead Experiment - Carried out at each of Deming's 4-day seminars. Workers try to satisfy the customer by scooping out only white beads from a mixture of beads that is 80% white and 20% red . Each tries five times, all using the same tools and methods and under strict supervision (Deming!). Regardless of how hard people try to do well, results vary from one try to the next and "rankings" among the workers change. Lessons learned include: a) there is inherent (common cause) variation in every process; b) in such stable processes results we often view as individual "performance" are mostly due to the process or system, rather than the individual; c) there is not much the workers can do about the variation produced - the problems must be corrected by management; d) ranking of individuals based on such performance measures in not only meaningless, but destructive to the individuals in the system. These are important and powerful lessons for anyone responsible for supervising or evaluating another person's performance.

responsibility - A duty or obligation. In work, often those tasks, functions, processes or results which have been assigned to the individual which the individual is expected to do or to manage. In systems thinking, it is recognized that the "assignment of responsibility" does not mean that the "responsible" person or group of people actually has *control* over all the factors that affect the outcome. Too often, individuals or groups are blamed or credited undeservedly for the effects of the system [see also accountability].

reward system - In some cases this may refer only to such tangible elements as compensation and benefits, but typically this term also includes such intangible "rewards" as formal and informal recog-nition, praise or criticism, "perks", differential treatment by supervisors, being "included", access to information and many other considerations. Reward systems are powerful influences on

organiz-ational and employee behavior and need careful consideration and design to assure alignment with the aim and principles of the organization.

rework - Activity or effort required to convert an otherwise unacceptable outcome of a process into an acceptable outcome.

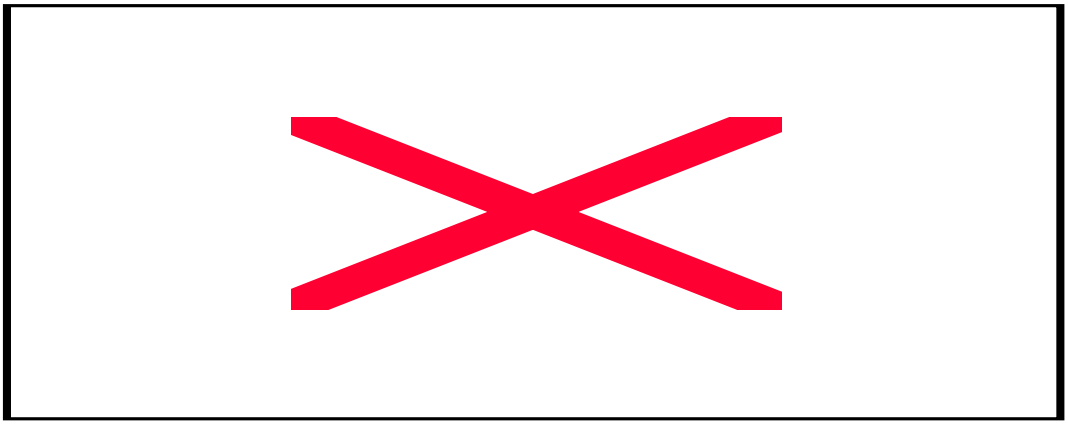
robust - A product or service designed in such a way that it can be readily produced in the presence of variation without defects or costly process treatment and with little variation or, to be designed to function properly in the presence of environmental variation.

Root Cause - To prevent continuing recurrence of an undesirable outcome, problem-solvers need to "peel back the layers" to find the underlying or "root" causes. One technique for doing this is to ask "Why did this happen?" and then to the reply to *that* question, ask "Why?" again. By the process of asking "Why?" several times in this fashion, one gets closer to the root cause. The early answers to the inquiries are more likely to be symptoms of more fundamental problems.

scientific method - "The totality of principles and processes regarded as characteristic or necessary for scientific investigation, generally taken to include rules for concept formation, conduct of observations and experiments, and validation of hypotheses by observation or experiments." (New American Heritage Dictionary) Similar to the Shewhart Cycle (PDSA).

Seven Tools - Sometimes referred to as the Seven *Statistical* Tools, or Seven *Traditional* Tools, these methods to organize or summarize data are an important part of any improvement methodology: Histogram [or Bar Chart], Pareto Chart, Run Chart [or Line Chart], Control Chart, Scatter Diagram, Flow Diagram and Cause & Effect Diagram. Some people list the PDSA Cycle rather than the Run Chart as the seventh tool.

Shewhart Cycle - A cycle for learning and for improvement. Also called PDSA (Plan,Do,Study,Act) or the Deming Cycle:



Sigma - The term used in statistics to refer to the standard deviation, a measure of the spread or variation, in data. Represented by the Greek letter σ.

Special Cause - A cause of variation which is localized, or acts at one period of time, or in one set of circumstances. A cause not common to all outcomes of a process.

stable - A synonym for variation that is in a State of Statistical Control (or In Statistical Control). Variation due only to common causes.

Standard Deviation - A statistic that reflects the degree of variation in a collection of results. Whereas the Range reflects only the difference between the high and low values in the sample data, the Standard Deviation uses *all* numbers and therefore reports more information about the data. In small sets of numbers, the Standard Deviation and the Range are similar as descriptions of variability.

standardization - Providing for uniformity of use of a method.

strategy - An approach to achieving a particular end, or plan as to how an end may be achieved.

stratification - a technique for organizing data to better understand the process producing the data and to identify potential improvement opportunities. Stratification groups individual numbers into meaningful categories or classifications according to some criterion such as time, location, type, source, reason, etc.

suboptimization - When individual components of an organization attempt to maximize the performance or results of that component without regard for whether that is in the best interest of the whole organization. For example, goals such as increasing sales, reducing inventory or cycle times are usually thought of as desirable things for a business to do, but myopic pursuit of those goals may not compatible with the organization's plan or supportive of its aim. "Optimization" is a process of orchestrating the components to move toward achievement of the organization's aim.

superstitious learning - Formation of beliefs about cause and effect based on observation without knowledge. Often happens when correlation is confused with cause and effect. Appears to be accompanied by a tendency to ignore Variation, to interpret each result as if it came from a single cause and to ignore delays between actions and effects.

synergy/synergism - A condition in which the combined results of a group of elements or people are greater or better than the individual elements could have produced separately. A list of ideas from an interactive group is likely to be more creative than adding together the lists produced by those same people working independently.

system - A collection of interdependent components that interact with one another. For example, an organization is a system; an automobile is a system; an office is a system, a family is a system. According to Deming, to be a System, all the components must have a *common aim*... "without an Aim, there *is* no system."

System of Profound Knowledge - The foundation for Deming's theory of management is composed of four interdependent parts:

1. Appreciation for a System
2. Knowledge about variation
3. Theory of knowledge
4. Psychology

One of Deming's contributions is the *synthesis* of these components into a theory for management.

Taguchi Loss Function - G. Taguchi pointed out that both the manufacturer's and society's expected loss (or cost) is reduced when the results of a process are centered on the intended target value with little variation. The loss (cost) is ever increasing as those same product characteristics depart from their targets. The expected loss also depends on where the distribution is, relative to the target. The Taguchi Loss Function is often shown as a parabolic curve, but in some situations the loss function is *asymmetric* with respect to the target, or desired value.

Tampering - Adjusting a stable process in an attempt to improve the next result by compensating for or taking into account the deviation from the target of the previous result. Tampering, or overadjust-ment of a stable process, actually increases the variation of the results.

tactic - A specific device or plan for carrying out a strategy.

theory - "a system of assumptions, accepted principles, and rules of procedure devised to analyze, predict or otherwise explain the nature or behavior of a specified set of phenomena." (American Heritage Dictionary] "Theory leads to prediction. Without prediction, experience and examples teach us nothing." "No number of examples establishes a theory, yet a single unexplained failure of a theory requires modification or even abandonment of the theory." [From Deming's discussion of Theory of Knowledge].

Total Quality - Used together, these words are usually meant to recognize that real quality requires *all* elements of the organization to work together toward achieving that end. It means to strive for excellence in everything an organization does. It refers to a *concept* whereas Total Quality Management refers to a collection of *practices*.

TQC - Total Quality Control... a term used to describe an approach in which an organization strives to achieve excellence in all aspects of its endeavors and activities. Frequent *use* of the term Total Quality Control probably started with the book What is Total Quality Control by Kaoru Ishikawa [1985] but the term originated with Armand Feigenbaum in his 1961 book by that name.

TQE - Total Quality Education (or Total Quality in Education). TQM methods and practices applied to education.

TQI - Total Quality Improvement, or CQI - Continuous Quality Improvement - a term now used by some organizations (e.g., hospitals) in place of TQM.

TQM - Total Quality Management. A collection of methods and practices an organization uses in an attempt to achieve Total Quality. Often used loosely as a general statement of purpose, TQM does not represent a specific method or set of methods, nor does it appear to represent a theory for transformation of organizations.

upstream - If the process by which something is accomplished or produced is thought of as a "flow" from one stage of the process to another, then "upstream" refers to the stages of the process that come before the stage that serves as the reference point. Improvements or innovations made upstream in a process (e.g., design of product or process) often can have high-leverage impact on results downstream.

User Group - a voluntary and often informal association of individuals or organizations that are "using" a particular method, or theory and wish to share information, discuss common issues

and/or pool resources to accomplish their respective goals. Aptly described as "a safe place to discuss ideas and problems". [origin: users of specific computer hardware and/or software].

value - "Worth in usefulness or importance to the possessor; utility or merit." (American Heritage Dictionary) "Price without a measure of Quality is meaningless" (Deming) Value is a combination of attributes, including quality. Some writers include price in the definition of value.

variables data - Data arising by obtaining a quantitative measure of a characteristic on an individual item or event.

vision - Picturing something as it *ought* to be or as you would *want* it to be in its ideal state.

voice of the customer - The needs and wants of the customer (or aggregate of customers) for a service or product that typically is expressed as a "target", but in the past was usually expressed as a set of tolerances (a "target" with acceptable deviations in either direction). This information provides the basis for designing and managing the process. A process sometimes used to translate the customer voice into product and process planning is Quality Function Deployment (QFD).

voice of the process - Whatever the process is producing (the outcomes). How this gets reported will depend on the sampling and measurement methods used. How the reported information gets translated will depend on the knowledge the interpreter has about that process, about variation and about systems.

waste - Anything that consumes the organization's resources without adding value to the final product or service. Uneconomic use of resources.

willing worker - An employee who would like to do a good job, but is prevented from doing so because of the presence of barriers that only management can remedy (a Deming term).

x + (xy) = 8 - Equation used in various forms by Dr. Deming to illustrate the point that the observed "performance" of an individual is actually a combination of the individual's effort and ability *and the effect of the system*. In the equation, **8** is an arbitrary number used to represent an observed result; **x** is the contribution of the individual to the result; **xy** is the effect of the system on the result. This equation with two unknowns cannot be solved uniquely for **x**. When performance of a collection of individuals is rank-ordered, the rank-ordering is *not* a ranking of the *individual* performances as is often thought, but rather is a ranking of the total outcomes of the individual's efforts and the interaction of the individual with the system. Values of **xy** are, almost certainly, different for each individual in that system. Thus, one cannot solve the equation, at one point in time, to evaluate individual effort and performance...leading to the conclusion that performance reviews and merit systems are seriously flawed when they are designed to rate or rank individual performance.

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