

THE DEMING PARADIGM FOR REDUCING VARIATION

Unknown by Most, Misunderstood by Many, Relevant to All

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Introduction

Dr. W. Edwards Deming's contributions to quality and continual improvement have been recognized throughout the world as providing a better way of leading and managing organizations. Dr. Deming described the *ideal* or *optimal* effects of these better methods as leading to a chain reaction. He reinforced the point that improving quality lowers costs, improves productivity, and increases market share through better quality and lower price, which results in increasing employment with more and better jobs (1).

This positive chain reaction is contrary to many practices where changes through corporate and government policies identify an aim for a system that leads to less employment and more underemployment. The effects include an overall situation that is perceived as benefitting the few (the wealthy) at the expense of the many.

In his book *Out of the Crisis*, which was originally published in 1982 and updated in 1986, Dr. Deming concluded that western style management was not capable in meeting the challenges of this economic age. In many respects, the crisis is worse today than in 1986, reinforcing the statement that if you always do what you always did, on average, you will usually get what you always got. Dr. Deming wrote:

“With the storehouse of skills and knowledge contained in its millions of unemployed, and with the even more appalling underuse, misuse, and abuse of skills and knowledge in the army of employed people in all ranks in all industries, the United States may be today the most underdeveloped nation in the world.” (2)

Background

The Deming timeline on the W. Edwards Deming Institute website (3) highlights Dr. Deming's lifetime achievements in a diversity of areas that include academia, government service, and private sector consulting. He authored articles, papers, and books. His published books include *Quality, Productivity, and Competitive Position* (4), *Out of the Crisis* (5), and *The New Economics for Industry, Government, Education* (6).

Dr. Deming received numerous prestigious awards and recognition. He was awarded the Second Order Medal of the Sacred Treasure by the Emperor of Japan, Michinomiya Hirohito, in 1960 for his contributions in supporting their economic recovery. He received the National Medal of Technology, which was presented by President Ronald Reagan, and received the Distinguished Career in Science award from the National Academy of Sciences. He also received the Shewhart Medal from the American Society for Quality (ASQ) and was nominated for a Nobel Prize.

His contributions influenced the development of programs that promote quality in nations and organizations. Those programs include the Deming Prize in Japan and the Malcolm Baldrige National Quality Award (MBNQA) in the United States. The MBNQA is being used by 100 international programs (7).

Dr. Deming's contributions in broadening the application of the quality improvement philosophy and methods were also recognized by the editors of *FORTUNE* magazine as *among the greatest contributions in business history* (8).

It All Has to Do with Reducing Variation

I summarized Dr. Deming's insights, career accomplishments, recognitions and impacts to highlight the fact that when he stated "*If I had to reduce my message for management to just a few words, I'd say it all has to do with reducing variation*" (9) he literally meant what he said. This awareness and understanding is critical in supporting Dr. Deming's vision for transformation.

Among his many roles, Dr. Deming was a teacher who believed that the best teachers challenge and inspire their students for further research and study (10). Dr. Deming's statement about reducing variation certainly inspired and challenged me to better understand it. I spent a few years studying, researching, and applying variation reduction concepts. I learned that this simple statement has a powerful impact.

Dr. Deming's statement provides the foundation for a new context and broader frame of reference for how individuals, groups, and societies can better resolve problems, manage conflict, and make more effective decisions. To understand this foundation, you need to understand what is truly meant by the terms "problem," "transformation," and "variation."

The Word "Problem" Redefined

Given that everyone and everything varies, a problem is more accurately defined as an unacceptable degree of variation and a solved problem represents an acceptable degree of variation. A problem is never solved because variation cannot be eliminated. People affected by the situation determine if the variation got better or worse. My short article "The 5 Minute Talk on Reducing Variation" (11) introduces the overall concept. I wrote it in response to a challenge to identify ideas that could revolutionize government. The longer supporting article is "Revolutionizing Government in Five Minutes or Less" (12).

Transformation Defined

In his book *The New Economics for Industry, Government, Education*, Dr. Deming offered the definition of "transformation" as meaning a "change of form, shape or appearance." He thought the term "metanoia" may be more suitable and defined it as "penitence, repentance, reorientation of ones way of life, spiritual conversion." He described the effects of individual transformation as including the following:

“The individual, transformed, will perceive new meaning to his life, to events, to numbers, to interactions between people. Once the individual understands the system of profound knowledge, he will apply its principles in every kind of relationship with other people. He will have a basis for judgment of his own decisions and for transformation of the organizations that he belongs to.” (13)

Dr. Deming’s description of transformation and its effects on individuals is synonymous with the term “paradigm shift”:

“Transformation of American style of management is not a job or reconstruction, nor is it revision. It requires a whole new structure, from foundation upward. Mutation might be the word, except that mutation implies unordered spontaneity.” (14)

Paradigms provide a complimentary way of describing the profoundness of change and may help to explain why something as simple as *“it all has to do with reducing variation”* may be difficult to comprehend.

A paradigm is a mental model or framework, or a shared set of assumptions that helps us to recognize and solve problems and make better decisions. Paradigms can also limit and filter incoming experiences that shape our beliefs – this is referred to as the paradigm effect. For example, an early paradigm was the belief that the earth was flat. Spanish ship captains who accepted this paradigm sailed east to trade as opposed to traveling west and discovering new worlds and opportunities.

If you have paradigm flexibility, you can see new possibilities and opportunities. Paradigm paralysis represents the disease of certainty – you maintain your current beliefs despite evidence to the contrary that your paradigm is not capable of helping you achieve the needed results.

Variation Defined

Variation is a law of nature that states that ever person, place, or thing is one of a kind or unique. No two things exactly alike. “Life is variation – variation there will always be,” according to Deming (15).

Human survival has always been dependent on individuals and groups successfully managing variation. Laws, rules, policies, habits, tasks, systems, processes, standing operating procedures, habits, norms, mores, ideologies, and religious denominations represent just a few of the constructs that people develop to help manage variation.

In 1924, Dr. Walter Shewhart developed an innovative approach for managing variation in a manufacturing process. His approach includes the following principles (16):

Principle	Example
Everything varies	People live to different ages
Individual things are unpredictable	No one knows how long he or she will live
Groups of things from a constant system of causes tend to be predictable	Insurance companies can tell with great accuracy what percentage of people will live to be 60, 65, 70, etc.

Dr. Shewhart developed the control chart (i.e., behavior-over-time chart) for organizing numerical information in 1924. Control charts can be used to control and predict the variation in a product or service. This has led to the term *variation* often being considered in the more limited technical or statistical frame of reference. For instance, Dr. Deming remarked that only “3% of the problems have figures, 97% of the problems do not” (17).

However, the concept is much broader than technical. Dr. Shewhart translated the common references to variation into a method that adds the needed clarity for determining when to act and when to leave things alone.

The following tables illustrate how Dr. Shewhart assimilated common terms and concepts into a better framework for understanding, managing, and reducing variation.

Transition from Unconscious to Conscious Awareness and Understanding of Variation for Data and Numbers	
Commonly Used Terms & Examples (Unconscious awareness and understanding of variation)	Shewhart Terms (Conscious awareness and understanding of variation)
Numbers derived from counting things (e.g., big data, data analytics)	Attribute data
Numbers derived from measuring things (e.g., big data, data analytics)	Variable data
Usual, expected, normal, noise, recurring	Common (chance)
Unusual, unexpected, abnormal, temporary, non-recurring, signal	Special (assignable)

Transition from Unconscious to Conscious Awareness and Understanding of Variation for Systems and Processes	
Commonly Used Terms & Examples (Unconscious awareness and understanding of variation)	Shewhart Terms (Conscious awareness and understanding of variation)
Habits, patterns, routines, certainty, predictability (e.g., predictive analytics, algorithms)	Stable system – contains all common cause variation
If you always do what you always did, on average, you will usually get what you always got (e.g., prediction markets)	Stable system – contains all common cause variation
Unpredictable, unknown, uncertain, unexpected (chaos)	Unstable system – contains common and special cause variation

Transition from Unconscious to Conscious Awareness and Understanding of Variation for Decision Support (When to Act and When to Leave Things Alone)	
Commonly Used Terms & Examples (Unconscious awareness and understanding of variation)	Shewhart Terms (Conscious awareness and understanding of variation)
Taking action that does not result in a fundamental improvement to the process (e.g., nagging, fad diets)	Mistake 1
Not recognizing changes that are resulting in adverse impacts (e.g., 2008 financial crisis)	Mistake 2

The control chart is more than a statistical or analytic tool. It is a concept that represents a way of thinking that lies at the core of decision making and personal transformation. It helps to mitigate the two types of mistakes when making a change:

Mistake 1: Taking action on a stable process when nothing out of the ordinary has occurred and there is no desire or commitment to change.

Mistake 2: Not taking action when something out of the ordinary has or may have occurred.

You can find an example of a control chart and test your knowledge of variation in the short article “Quick Assessment of Your Knowledge of Variation” (18).

Dr. Deming estimated that, without a basic awareness and understanding of variation, 95% of changes result in no improvement (19). In other words, the majority of laws, policies, regulations, New Year resolutions, new diet programs, and get-rich-quick schemes may not result in the expected outcome.

Dr. Deming also concluded that avoiding mistake 1 or mistake 2 is impossible. The aim is to regulate the frequency of these two mistakes in order to minimize their adverse effects, including economic loss.

A new paradigm – the Deming Paradigm for Reducing Variation – will help increase individual effectiveness in making the changes that result in higher percentage of success and better understanding as to why something may have worked or did not work. Application of this paradigm by individuals throughout the world will result in a higher number of solutions that benefit all of us or at least does not leave us any worse off.

Dr. Deming developed what he referred to as the System of Profound Knowledge (SoPK) to help people transition to the better approach and to help leaders be more effective (20). Successful leaders have always applied the concept of SoPK using different terms. “Wisdom” is a term synonymous with the term “profound knowledge.” Wisdom, like the SoPK, is gained through theory, experience, reflection, and continual learning. Dr. Deming identified and provided a better method for acquiring wisdom that is and can be applied by children as well as by corporate and world leaders. The article “Continuous Improvement on the Free-Throw Line” (21) demonstrates and reinforces this concept.

The SoPK includes the theory of knowledge, understanding variation, appreciation of a system and understanding psychology (human behavior). Dr. Deming believed that individuals transformed by the SoPK must lead and/or support the changes that will result in needed improvements within organizations and nations.

Dr. Deming was among the first individuals to recognize that Dr. Shewhart’s concept and methods were applicable on a much broader scale than manufacturing processes. In June 1986, Deming updated the Foreword section that he wrote for Dr. Shewhart’s book *Statistical Method from the Viewpoint of Quality Control*. In the Foreword section, he noted:

“Another half-century may pass before the full spectrum of Dr. Shewhart’s contributions has been revealed in liberal education, science, and industry.” (22)

Broader Definition of Variation

Dr. Deming implied a broader description of variation than what he stated in his books. As the following statements reveal, Dr. Deming considered an ideal or optimal solution as one that benefits everyone (e.g., everyone wins or win/win):

“The aim proposed here for any organization is for everybody to gain – stockholders, employees, suppliers, customers, community, the environment – over the long term.” (23)

“Optimization is a process of orchestrating the efforts of all components towards achievement of the stated aim. Everybody wins with optimization.” (24)

People affected by the results of the system determine if they “won” (optimal) or “lost” (suboptimal). The criteria that people use for determining whether they won or lost may change over time through continual learning.

I realize that the terms win/win, win/lose, and lose/lose may seem trite, and I can imagine people’s eyes rolling back in their heads when they hear or see these phrases. But people do like feedback and they do like to see the score. They also generally have no problem letting you know if they benefit (win) or are harmed (lose) regarding a change that impacts them.

Dr. Deming liked to say that an orchestra is an example of a well-optimized system. The "optimal" (ideal) is music played as intended or envisioned by the composer or artist. There is variation every time the music is played. The audience determines if it was acceptable - a win (loved it) or a loss (hated it).

A broader definition of variation that supports Dr. Deming’s conclusion that “*it all has to do with reducing variation*” is provided below. This description is included in my book *Success Through Quality: Support Guide for the Journey to Continuous Improvement* (25). I started the book in 1991 and it was published in 1999 by the American Society for Quality. The expanded description of variation was posted to the ASQ website in 2005 (26). At the time, I was working on my master’s degree in Strategic Studies at the U.S. Army War College and working to raise awareness that understanding variation was a missing strategic leader core competency. An example of a strategic leader applying an SoPK-based framework during WWII is provided in the paper “Strategic Military Leadership” (27).

Broader Definition of Variation

Variation represents the difference between an ideal and an actual situation.

An ideal represents a standard of perfection – the highest standard of excellence – that is uniquely defined by stakeholders, including direct customers, internal customers, suppliers, society and shareholders.

Excellence is synonymous with quality, and excellent quality results from doing the right things, in the right way.

The fact that we can strive for an ideal but never achieve it means that stakeholders always experience some variation from the perfect situations they envision. This, however, also makes improvement and progress possible. Reducing the variation stakeholders experience is the key to quality and continuous improvement.

Big V and Little v

Dr. Joseph Juran was a colleague of Dr. Deming. Dr. Juran is also recognized as a world-renowned expert and pioneer in quality management. He coined the terms “Big Q” and “Little q” to distinguish the scope and level of effort that is needed for improving quality:

“Big Q takes the goals of more traditional, earlier modes of quality control management (“Little q”) and builds on them to broaden the quality “umbrella” in order to make quality management practices and philosophies more effective.” (28)

A similar approach to the word *variation* may help achieve a similar intent. The “Little v” represents the technical or statistical frame of reference represented in a control chart and all associated statistical tools and techniques. The “Big V” is the broader definition that supports Dr. Deming’s conclusion that “*it all has to do with reducing variation.*”

Reducing Variation in Order to Reach the Ideal

What is the ideal? People have *needs* and *wants* and take *action* to fulfill these requirements. Wants are represented by products and services (i.e., an *output*). An *ideal* identifies the *outcome* from the activity that produces a product or service that *people* expect will meet their needs. *Actions* are accomplished through a process that transforms inputs into outputs. A system includes one or more processes that share a common aim.

Dr. Abraham Maslow identified a hierarchy of needs that are required for physical and psychological health (29). They include:

- *Physiological needs*. Food, air, water, procreation, and shelter are needed for basic health and survival.
- *Safety needs*. Safety needs include physical security and freedom from war, crime, physical abuse, and accidents. They also include the need for freedom from fear, anxiety, chaos, and stress and the need for structure, law, and order.
- *Social needs*. Social needs represent the requirements to belong and be loved.
- *Self-esteem needs*. These needs include the need for esteem from others as well as self-esteem. Self-esteem leads to self-confidence and a sense of value as a contributing member of society.
- *Cognitive needs*. Everyone is born with the desire to learn, develop, know, comprehend, understand, and explain. The plan-do-study-act cycle of continuous improvement provides a road map that can be used to develop knowledge and understanding.
- *Aesthetic needs*. The need for beauty – which is represented by art, music, architectural and interior design, style of clothes, etc. – inspires the human spirit. Ugliness, on the other hand, provokes a sense of deprivation and even physiological or psychological sickness.
- *Self-actualization needs*. Self-actualization is exercising your personal power to pursue your unique purpose in life. Maslow believed that only a small percentage of the population ever reaches the self-actualization level.

To identify a need, you should start with a product or service and ask “Why?” a few times. Why do you need a car? To get to work (mobility/transportation). Why do you need to get to work? To earn money for food and shelter (survival), have fun (entertainment), and make a difference (self-actualization).

The next step is to identify the expectations along with the feedback people will use to assess quality (i.e., determine if they won or lost). Dr. Deming identified his expected *outcomes* for transformation in the preface to his books *Out of the Crisis* and *The New Economics for Industry, Government, Education*:

- *Out of the Crisis*: “The aim of this book is transformation of the style of American management” (30). This transformation will halt the decline of American industry and give it a chance to lead the world again.
- *The New Economics for Industry, Government, Education*: “The aim of this book is to start the reader on the road to knowledge, and to create a yearning for more knowledge. My 14 Points for Management follow naturally as application of the system of profound knowledge, for transformation from the present style of management to one of optimization.” (31)

The Deming philosophy and methods can be applied to any issue, including those that are controversial. My FedSmith.com article “Working with Idiots and Getting Better Results” (32) provides a needed context to support working with others who disagree with you but are needed to bring about change.

In his 1961 inaugural address, President John F. Kennedy challenged the people of the world to confront the common enemies of mankind, which included tyranny, poverty, disease, and war. He concluded that:

“All this will not be finished in the first 100 days. Nor will it be finished in the first 1,000 days, nor in the life of this Administration, nor even perhaps in our lifetime on this planet. But let us begin.” (33)

Anytime I hear an inspiring speech or a lofty goal, I am reminded of Dr. Deming’s example on the importance of asking a follow up question: “By what method?”

The Deming Paradigm for Reducing Variation includes a “method” (*let us begin*) that can be immediately applied to confront and resolve the tough issues. The first step is to identify a shared vision of the ideal or optimal situation. Here are a few examples:

Abortion. Termination of pregnancies by medical procedures or through the use of pharmaceuticals will always be available somewhere in the world through either legal or illegal means. An ideal would be that termination options are available but never needed.

I am personally pro-life and tolerate the Federal Law (Roe v. Wade). Applying the new paradigm to this issue will result in continually reducing the causes that lead to the need to terminate pregnancies.

Climate change: Scientists estimate that Earth is 4.54 billion years old and that climate change is a constant and runs in cycles. Although we may never have absolute scientific proof accepted by everyone that human actions (e.g., producing carbon emissions) are directly contributing to systemic climate changes, we may be able to agree that managing the effects of change can be continuously improved and that human survival and quality of life is dependent on safe (e.g., free of pollutants), available, and affordable air, land, and water.

War. Military theorist Carl von Clausewitz stated that, “War is the continuation of politics by other means” (34). In other words, war is the result of the failure of political systems. If you improve the political systems, it increases the odds of preventing war. If prevention fails, the improvements can help resolve the war quickly and decisively, with minimum use of resources and fewer deaths and injuries. Sun Tzu, a Chinese general, a military strategist, and the author of *The Art of War*, concluded that to subdue the enemy without fighting is the acme of skill (35). Sun Tzu possessed a level of wisdom that Dr. Deming would have likely concluded was profound.

War in Iraq. By law, American citizens own the system of government and are responsible for ensuring that their “employees” (e.g., elected officials, government employees) do the right things. American citizens are what Dr. Deming would refer to as “top management.”

Wider and more common knowledge of the SoPK would have most certainly shaped a different debate in the lead up to the Iraq war, which would have very likely identified more effective courses of action.

The fear and uncertainty associated with the attack on the World Trade Center (along with media acquiescence) shaped an environment in which the perceived need for a war with Iraq overtook the need for rational and deliberate debate. Opposition to the war was often associated with being unpatriotic. The perceived need for immediate action provided the justification for ignoring established, proven policies and doctrine for conducting theater-level war, which had global, long-term repercussions.

Hindsight is 20/20, but it has become clear that no one should have been too surprised by the problems and costs encountered as a result of the Iraq war. This clarity has become more evident through documentaries, U.S. Senate investigations, and articles and books written by people involved in the decision to go to war and those who had to execute the plan.

In the future, the use of prediction markets (36) within and among all key stakeholder groups may help support a more appropriate level of transparency supporting the decisions to go to war.

Out of the Crisis 2.0

The core tenant of the Deming paradigm is expressed in Dr. Deming's conclusion that "*it all has to do with reducing variation.*" Out of the Crisis 2.0 is described by a colleague and fellow Deming advocate as all about overcoming our past failure to change perspectives, beliefs, and assumptions. This requires that we help people understand, accept, and apply the new paradigm so that it is recognized as being among the great axioms.

An axiom is a maxim (i.e., a *well-known phrase* that expresses a general truth about life or a rule about behavior) *widely accepted* on its intrinsic merit (37). One of the most famous is axioms is found in the Declaration of Independence:

"We hold these truths to be self-evident, that all men are created equal, that they are endowed by their Creator with certain unalienable Rights, that among these are Life, Liberty and the pursuit of Happiness." (38)

Another axiom is provided in the preamble to the Constitution:

"*We the People* of the United States, in Order to form a more perfect Union, establish Justice, insure domestic Tranquility, provide for the common defence, promote the general Welfare, and secure the Blessings of Liberty to ourselves and our Posterity, do ordain and establish this Constitution for the United States of America." (39)

Barriers for Acceptance: The Term's Negative Connotation

If "reducing variation" was an individual or group, the results from the abuse attributed to them and upon them through misunderstanding would require treatment that might range from requiring therapy and institutionalization at one end of the spectrum to hospitalization or hospice care on the other.

The terms "reduce" and "reducing" are often perceived in a negative connotation. Synonyms for them include "take away," "eliminate," "decrease," and "make less." In a work setting, reducing can be linked to layoffs and downsizing. In general, taking something away may be perceived as not being a good thing.

The term "variation" can also be perceived negatively. Similar terms include "diversity" and "differences." For example, if a policy is being implemented to increase the "diversity" in an organization, neighborhood, or local school, the first impressions might not be positive because a change is being made to the prevailing comfort zone. Similarly, "differences" can be perceived negatively when it's unknown how those differences will affect the status quo - and the unknown can be threatening.

The idea of reducing variation among people can also be misinterpreted to mean bringing the top down to the middle instead of bringing up the bottom and middle to the top. It can also be misinterpreted that you want everyone to be the same.

Feedback from Readers and Deming Advocates

Correspondence resulting from articles I have written or posts I have made to various sites (including the *W. Edwards Deming Institute +Official Group+* on LinkedIn) identify a significant barrier in understanding Dr. Deming's intent regarding his conclusion that "*it all has to do with reducing variation.*" This misunderstanding may be the single most contributing factor that has marginalized Dr. Deming's contributions and slowed progress toward needed transformation.

The term "reducing variation" is commonly misunderstood and misinterpreted. Recently, someone provided me with an alternative interpretation for "reducing variation," complete with supporting examples. However, they were excellent examples of actions that actually increased variation, also known as tampering.

Reducing variation by eliminating the gaps or "differences" between the ideal and the actual makes things better, not worse. Put yet another way, if you are striving for the ideal/near perfection (the right thing) by doing things right, you are reducing variation.

To avoid misinterpretation and misunderstanding, some people believe that the term "reducing variation" should be avoided and replaced with "understanding variation" or "managing variation." Both of these terms are correct. In fact, Deming expressed the point that understanding variation is the key to success in quality and in business.

However, the more optimal solution is not to avoid the term because it can be misunderstood but rather to educate people on its meaning. Another alternative is to use the phrase "reduce variation in order to reach the ideal." The ideals for an organization should be identified in the vision statement so making progress in achieving the vision should be considered to be good thing.

Another comment that I received concluded that although variation one is of the principles in the SoPK, it was considered to be no more or less important than any of the other elements – that they all are equal. That's not the case.

The Paradigm Effect

All animals are equal, but some animals are more equal than others

– George Orwell, *Animal Farm* (40)

The paradigm effect occurs when the prevailing paradigm prevents you from recognizing a new one. To paraphrase George Orwell, all elements of the SoPK are equal, but the need to continually reduce variation makes the variation element more equal than others.

The feedback I received also included the belief that without knowing the context for Dr. Deming's statement, that it may never be known what he really meant and that Dr. Deming also stated that no theory could ever be proved.

If you believe that you were given your unique capabilities and talents for a purpose that includes taking action to make life a little better for others, and believe you have a moral responsibility to use these gifts, then you too may accept the axiom that “*it all has to do with reducing variation.*”

A Matter of Faith?

I concede that proving the theory that “*it all has to do with reducing variation*” may ultimately be a matter of faith. In the *Washington Post* article “A conversation with Bill O’Reilly,” Sally Quinn interviewed Bill O’Reilly, a best-selling author and cable news commentator, about his Christian faith (41). O’Reilly reinforced the belief that we are expected by a higher power to make a positive difference. O’Reilly also reinforced that people have the choice to take action (or inaction) that helps or harms.

In his book *When Jesus Came to Harvard, Making Moral Choices Today*, Harvey Cox arrived at similar observations regarding moral choices:

“...there has been an emerging convergence of the two ways of thinking that includes the consequences of action and inaction. ... We can now do great evil without intending to. What we need today is more awareness, a wider recognition of how vast systems we are caught up in can do terrible things and how we can contribute to evil without even being conscious of it.” (42)

The State of Transformation How Is That Paradigm Working Out for You?

Dr. Deming introduced a new paradigm that you often don’t discover until you recognize that you hit the proverbial wall with the old paradigm.

Dr. Deming’s book *The New Economics for Industry, Government, Education* was published in 1993. Since then, how much progress has been made in transformation of the American style of management that has resulted in American industries being recognized as leaders in the world through application of the Deming-based philosophy and methods?

One source of information for assessing progress in meeting Deming’s vision for transformation is communicated by Deming Institute through its use of social media, which includes a website, a blog, Facebook, LinkedIn, and attendance at conferences. Evidence of positive change has identified successes at an individual and organizational level.

Success at an industry, national, or global level is not apparent. Dr. Deming identified the most serious barriers that management faces to improving effectiveness and continual improvement. Those barriers are known as the seven deadly diseases of management. According to Dr. Deming, (43), those barriers are:

1. Lack of constancy of purpose to plan product and service that will have a market and keep the company in business, and provide jobs.

2. Emphasis on short-term profits: short-term thinking (just the opposite from constancy of purpose to stay in business), fed by fear of unfriendly takeover, and by push from bankers and owners for dividends.
3. Evaluation of performance, merit rating, or annual review.
4. Mobility of management; job hopping.
5. Management by use only of visible figures, with little or no consideration of figures that are unknown or unknowable.
6. Excessive medical costs.
7. Excessive costs of liability, swelled by lawyers that work on contingency fees.

Based on a review of the topics and postings at the Deming Group on LinkedIn and through my own research and observations, I would conclude that there is little national-level awareness of the seven deadly diseases of management nor an awareness or understanding as to how these diseases could be eradicated. For example, respective to disease 3 (evaluation of performance, merit rating, or annual review), how many school systems in the United States have eliminated grades in school because they understand the difference between common and special cause variation?

The general media is another source of information for assessing the status of the transformation. How often have you seen any media headlines that refer to numerical information that indicated they used a trend interpretation standard or even indicated that they knew that one or more standards existed? This would indicate knowledge of common and special cause variation.

In the area of government services, given that the American citizen meets Dr. Deming's criteria for "top management," does every citizen know how to apply a SoPK-based framework to ensure government services are provided as effectively and efficiently as possible?

I'll never forget successfully making the case to a Defense Agency senior executive that the organization's performance trends represented common cause variation and did not indicate improvement. He agreed but stated that there was no way he could present this conclusion (new paradigm) to the executive board! Bonuses for executives and employees in the federal government as well as in the private sector are dependent on the ignorance of common and special cause variation. This ignorance increases variation.

The effects of the prevailing style of management, including the seven deadly diseases, continue to have devastating consequences on the capability of American citizens to work together to bring about the "more perfect union" our Founders envisioned.

If you have concluded that we are falling short of meeting Dr. Deming's expectation for the pace of transformation, then a change to the new paradigm is needed.

Improving Quality It's All About Reducing Variation in Order to Reach the Ideal

Quality is one of those terms that is defined in many different ways. In 2001, *Quality Digest* magazine asked their readers how they defined quality, presenting the results in the article

“Definition of Quality: How do you define it?” (44). The article reinforced that any good definition of quality would need to reinforce the importance of relationships. As Dr. Deming said, “Everyone is a customer for somebody, or a supplier to somebody” (45).

In 2013, ASQ repeated the quest to find the common definitions of quality. The ASQ Global State of Quality Research survey asked respondents to define quality from their organization’s perspective. The survey responses led Paul Borawski, ASQ’s CEO at the time, to conclude:

“There still is no official definition of quality that serves all purposes. The statistics remain unchanged. Fifty percent say there is no single definition of quality. Fifty percent say there needs to be one.” (46)

The top 10 definitions in the survey results (47) are:

1. Efficiently providing products and services that meet or exceed customer expectations
2. Adding customer value
3. Continuously measuring the improvement of processes and services for customers
4. Acting as promised and reporting failures
5. Doing the right thing at the right time in the right way with the right people
6. Ensuring customers come back and products do not
7. Providing the best value to customers by improving everyday activities and processes
8. Beyond delivering what the customer wants, anticipating what the customer will want when he or she knows the possibilities
9. Delivering customer value across the organization through best-in-class products, services, and support
10. Meeting and exceeding the expectations of clients, employees, and relevant constituencies in the community

In the article “Finding Harmony” (48), Bob Kennedy discussed the importance of creating a universal definition of quality to make this the century of quality. He summarized the key points as follows:

- An obstacle to achieving quality globally is that there isn’t a universal definition of the word.
- A proposed definition is that quality is achieved when the right things are done right through the practice of excellence.
- Understanding the roles of creators, consumers, and complementors provides context for defining quality.

Dr. Deming reinforced that a system – such as a system of improvement – must have an aim. Any universal or common definition of quality must identify the interrelationships of quality, variation, and excellence (i.e., “Big Q and Little q” meets “Big V and Little v”).

Reducing Variation and Improving Quality

Too often, terms like “perfection,” “excellence,” “ideals,” and “quality” are referenced as standalone terms and rarely if ever in a context that recognizes their interdependencies. Given the previous discussion on quality and variation, if you accept that a “system of improvement” needs an aim and among the first steps needed to identify the aim is a common definition of variation and quality, then “reducing variation” is the aim for a system of improvement.

Dr. Deming’s conclusion that “*it all has to do with reducing variation*” provides the focus and a unifying concept that links the terms associated with variation, quality, and excellence. These keywords and their interrelationships are highlighted in **bold**:

Broader Definition of Variation

Variation represents the difference between an **ideal** and an actual situation.

An **ideal** represents a standard of **perfection** – the highest standard of **excellence** – that is **uniquely defined** by stakeholders, including direct customers, internal customers, suppliers, society and shareholders.

Excellence is synonymous with **quality**, and **excellent quality** results from doing the **right things**, in the **right way**.

The **fact** that we can strive for an ideal but never achieve it means that **stakeholders always experience some variation from the perfect situations they envision**. This, however, also makes improvement and progress possible. Reducing the variation stakeholders experience is the key to quality and continuous improvement.

Let’s look at the key points (caution – this may hurt):

- Variation links to ideals, and ideals link to perfection.
- Perfection links to excellence, and excellence links to people who provide feedback on the quality of the result. Did something get better (a win) or worse (a loss)?
- Excellence also links to quality, and quality links to “doing the right thing” (effectiveness) and “doing things right” (efficiency).
- Effectiveness links to outcomes, and outcomes link to needs.
- Efficiency links to outputs, and outputs link to wants.
- Wants link to product and services.
- “Doing” includes taking action through a *process* that transforms inputs into *outputs* (wants) that will meet or exceed the *outcome* expected by one or more individuals to fulfill a need or want. A *system* includes a collection of processes that share a common aim.

Within organizations, ideals should be expressed in a vision statement that, when achieved, will meet the expected *outcomes* of people. A mission statement identifies the purpose for the activity that results in the *output* that is needed to help achieve the vision. Most if not all employees are

involved in project management (tasks with a beginning and an end), process management (recurring activity), and quality management (working to do the right things right).

Vision and mission statements along with strategic planning should align all activity with a focus on reducing variation in order to reach the ideal. Too often, organizations' vision and mission statements are often nothing more than slogans, with little understanding of their interrelationship to quality and variation. Understanding this relationship is needed to make progress toward developing solutions in which everyone wins or at least is not any worse off.

It could be concluded that Dr. Deming's "simple" remark that "*it all has to do with reducing variation*" is an understatement.

Continual and Continuous Improvement

Dr. Deming, who was very particular on his use of words and statements, distinguished a difference between the terms "continual" and "continuous." "Continual" means intermittent (there are starts and stops), whereas "continuous" means never ending. On an individual level, process improvement is continual. At the system level, which can include thousands if not millions of people, improvement is continuous.

Reducing variation in order to reach the ideal is achieved through continual and continuous improvement. Variation either gets better or it gets worse as determined by one or more people.

Given that people are unique and imperfect, the systems they design and sustain will be imperfect. Consequently, people's needs will never be "perfectly met." There will always be variation, and at least one person will very likely conclude that the degree of variation is unacceptable.

Costs due to imperfect systems include the costs associated with people needing products and services that have not yet been developed as well as costs associated with problems in existing products and services. For example, a child born with the potential to cure cancer or create a new source of endless energy who, by chance, is born into a community that has a high degree of poverty and lack of access to a quality education may never realize his or her potential (self-actualization), which would be a loss for everyone. Defects in automobiles that cause deaths impact family and friends with costs that are unknown and unknowable. Given these types of risks, along with the unknown and unknowable, continuous improvement becomes a moral imperative.

Examples of Continual and Continuous Improvement

Let's look at some examples of continual and continuous improvement. Many people use automobiles to commute to work. My commuting process via an automobile is stable (good enough). Improvement is continual (e.g., car maintenance) but my process is part of a local, regional, and national travel transportation system that I expect to be continuously improved.

At a local level, when I commute to work, other people are going to work to support my needs. Police are ensuring traffic laws are being followed. Emergency medical technicians and other

health care professionals are standing by in case of accidents. Road crews are making needed repairs, and government workers are ensuring traffic signals are working properly. Organizations that offer flextime allow employees to arrive and depart work within a two-hour window, which can contribute to helping reduce congestion, making the roads a little safer for all.

When you consider the life-cycle utilization and costs of a product such as a car as it relates to commuting, it can involve literally millions of people and trillions of dollars in infrastructure-related costs and investments. Some of the variables that are an integral part of the system include the mining of raw materials, manufacturing, taxes (local, state, federal), insurance, maintenance (e.g., car, road, traffic signs and lights), medical care, energy (e.g., oil, gas), law enforcement, lawyers, courts, environmental impacts, and disposal (e.g., landfills, junkyards, recycling).

The daily commute impacts many areas and affects many people either directly or indirectly in the near, mid, and long term. I always expect a safe, economical, environmentally friendly, convenient, and reliable system and mode of transportation. I want perfection and I want it cheap! Imperfection that increases costs, inconvenience, and risk of death and injury is never acceptable, especially if it could be prevented through continual and continuous improvement by one or more people in the system.

Now imagine you want to make a change within one or more of the systems or subsystems. The goal is to reduce variation in one area without negatively impacting another in the near, mid, and long-term – a change that results in a solution in which everyone wins. Might it help if all the stakeholders (people) in one or more of the affected areas shared a common SoPK-based problem-solving and decision-making process to help ensure the change results in the expected improvement?

One of the better Deming-based approaches I have found useful is the Total Quality Transformation approach (49) developed by Productivity Quality (PQ) Systems in the early 1990s. It represents a SoPK-based framework using more common terms and can be translated, customized, and tailored to support improvement at any level.

The Subaru plant in Lafayette, Indiana, is among the best examples on the application of the SoPK (using different terms) within an organization. The plant meets zero landfill goals (50) and provides a proven model for environmental sustainability that can be applied within any industry.

Working In and On the System

As a civilian federal employee working as an auditor for the Department of the Navy, I had the opportunity to attend a four-day seminar conducted by Dr. Deming in 1988. Dr. Deming asked a lot of questions, but the one that changed the course of my life was, “What percent of your performance is due to the system?” The correct answer could fall between 85% and 100%. He later reinforced that “top management” is responsible for the performance of the system and transformation is everyone’s job. By law, the American people own the system of government – and are “top management.”

As both a federal employee and “top management,” my responsibilities were to help ensure the organization’s missions were accomplished through the effective and efficient utilization of all assigned resources. As an employee, I worked “in the system” to improve it. My articles at FedSmith.com provide many application examples and suggestions to help improve the quality of government services. Now as a retiree, I can focus on working “on the system,” which includes supporting the transformation or shift to the better methods.

All citizens (top management) have a responsibility to support their employees (elected representatives) by providing the leadership and support needed to continually and continuously reduce variation in order to reach the ideals upon which America was founded. The Deming Paradigm for Reducing Variation provides a new and broader frame of reference for how individuals, groups, and societies can better resolve problems, manage conflict, and make more effective decisions.

Conclusion

Dr. Shewhart developed a new paradigm that translates common terms for variation (“Little v”) into a framework for helping to determine when to act and when to leave things alone. Dr. Deming broadened the paradigm to a level Dr. Shewhart would likely never have imagined.

Given the variation principle, a problem is never solved because variation is never eliminated. A problem represents an unacceptable degree of variation and a solved problem represents an acceptable degree of variation. Variation either gets better or it gets worse.

Dr. Deming developed the SoPK to support efforts in optimization. Results of the application of the SoPK are commonly referred to as wisdom, but unlike wisdom, the SoPK offers a framework that can be applied by children and well as corporate and world leaders to resolve problems and make more effective decisions.

Dr. Deming’s conclusion that “*it all has to do with reducing variation*” results in the needed integration of “Big Q and Little q” with “Big V and Little v.” This interrelationship identifies a new and unrecognized axiom.

We’ll know that another paradigm shift has occurred when people around the world recognize that understanding, managing, and reducing variation is the key to excellent quality. Only then will Dr. Deming’s statement that “*it all has to do with reducing variation*” be recognized as one of the great axioms.

Footnotes

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